Initial Study and Mitigated Negative Declaration

for the

Dutra Property Subdivision Project

July 8, 2022

Prepared for:

City of Manteca – City Hall
1001 West Center Street
Manteca, CA 95337
(209) 456-8000

Prepared by:

De Novo Planning Group
1020 Suncast Lane, Suite 106
El Dorado Hills, CA 95762
(916) 580-9818

De Novo Planning Group

A Land Use Planning, Design, and Environmental Firm

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Proposed Dutra Property Subdivision Project

Lead Agency:
City of Manteca
1001 West Center Street
Manteca, CA 95337

Project Title: Dutra Property Subdivision Project

Project Location: The Project site includes approximately 39.49 acres located in the southern portion of the City of Manteca, south of State Route (SR) 120, in San Joaquin, California. The Project site is identified as Assessor's Parcel Number (APN) 226-170-08 (Portion), 226-170-12, -13, -14, -15, -16, -17, -18 by the San Joaquin County Assessor's Office. The Project site is located within the southwest quarter of Section 7 of Township 2 South, Range 7 East Mount Diablo Base and Meridian (MDBM), mapped on the USGS 7.5' Manteca, California, 7.5-minute series quadrangle map.

The Project site includes several distinct planning boundaries defined below. The following terms are used throughout this Initial Study to describe the planning area boundaries within the Project site:

- Project Site (or Annexation Area) – includes the whole of the project, including the proposed 34.6-acre Development Area, 3.11-acre Non-development Area and 1.8 acres of existing right-of-way. There are nine existing residential homes within the Project site.

- Development Area - includes 34.6 acres on three lots, with three residential homes, and an open agricultural area. The existing residential homes include outbuildings, livestock pens, ornamental landscaping, and overhead power lines located on the eastern side of the Project site along Oleander Avenue. The area west of the existing homes is undeveloped agricultural land. There is an existing 60' SSJID easement located on the southern side of the agricultural land. There are a variety of irrigation facilities in the agricultural area including standpipes and ditches, which will be abandoned or removed in accordance with the SSJID requirements. The parcels included in the Development Area are: 226-170-08 (Portion), 226-170-12, and -13. Each parcel is currently designated as Low Density Residential under the City of Manteca General Plan. Pre-zoning would be R-1. Development would result in 197 residential units, construction of a 2.92-acre Park/Basin (Lot A), installation of frontage/entry landscaping (Lots B/C/D), expansion of an existing storm drainage basin (Wackerly Basin), and retention of two lots (Lots E/F) that have existing residential homes along Oleander Avenue.

- Non-development Area - includes five lots, with six existing residential homes located on the southern and eastern side of the Project site along Oleander Avenue and Peach Road. The parcels included in this area are: 226-170-14, -15, -16, -17, and -18. These parcels are included as part of an inhabited annexation to create a logical boundary to the City limit line. The total acreage for the non-development area is 3.11 acres. Each parcel is currently designated as Low Density Residential under the City of Manteca General Plan. Pre-zoning would be R-1. These parcels would remain under their current uses and no new development would occur. Because of the fact that this area will lack any development, there is limited to no physical change or environmental impact.

- Right-of-Way Annexation Area - includes 60 feet of right-of-way along the Project site frontage on Oleander Avenue and Peach Road. This area is currently under the jurisdiction of San Joaquin County, and intended to be annexed into the City of Manteca for roadway improvements to the City standards.

Project Description: The proposed Project includes the annexation of 39.49 acres of land into the City of Manteca. This includes Development Area, Non-development Area, and Right-of-Way, all of which are discussed in more detail below.

Within the Development Area, the proposed Project would result in the subdivision and development of 197 residential units, construction of a 2.92-acre Park/Basin (Lot A), installation of frontage/entry landscaping (Lots B/C/D), expansion of an existing storm drainage basin (Wackerly Basin), and retention of two lots (Lots E/F) that have existing residential homes along Oleander Avenue. The residential density would be approximately 5.7 units/acre, with typical lot sizes of 50 feet by 80 feet or 4,000 square feet. Each lot would contain a two-car garage and two driveway parking spaces. The existing residential structures within the Development area would be retained on Lot E and F, along with the ancillary structures associated with the residences. All other facilities and structures would be removed, including septic tanks, leach fields, wells, irrigation facilities, and electric lines, per City of Manteca and SSJID standards and specifications. Residences would front on Oleander Avenue, consistent with the existing residential orientation along the street. Access to the subdivision will occur from the east along

Oleander Avenue, and from the south along Peach Road. The internal circulation design includes roadway stubs to access the property to the south and to the west in accordance with the City's requirements.

Within the Non-Development Area, the proposed Project would have no new development. The existing six residential homes on five lots would remain intact. This area has an existing density that ranges from .21 acre lots to 1.35 acre lots. These parcels are designated Low Density Residential under the City of Manteca General Plan, and would receive a pre-zoning of R-1.

Within the Right-of-Way annexation Area, approximately 60 feet of roadway would be annexed and developed to a City of Manteca standard. Within the roadway, it is anticipated there will be underground utility improvements to serve the proposed Project. This may include connections for the Non-development Area for city services.

The annexation will include detachment from the Lathrop Manteca Fire District.

Findings:
In accordance with the California Environmental Quality Act, the City of Manteca has prepared an Initial Study to determine whether the proposed project may have a significant adverse effect on the environment. The Initial Study and Proposed Mitigated Negative Declaration reflect the independent judgment of City of Manteca staff. On the basis of the Initial Study, the City of Manteca hereby finds:

> *Although the proposed project could have a significant adverse effect on the environment, there will not be a significant adverse effect in this case because the project has incorporated specific provisions to reduce impacts to a less than significant level and/or the mitigation measures described herein have been added to the project. A Mitigated Negative Declaration has thus been prepared.*

The Initial Study, which provides the basis and reasons for this determination, is attached and/or referenced herein and is hereby made a part of this document.

____ ____________________

Signature Date

Proposed Mitigation Measures:

The following Mitigation Measures are extracted from the Initial Study. These measures are designed to avoid or minimize potentially significant impacts, and thereby reduce them to an insignificant level. A Mitigation Monitoring and Reporting Program (MMRP) is an integral part of project implementation to ensure that mitigation is properly implemented by the City and the implementing agencies. The MMRP will describe actions required to implement the appropriate mitigation for each CEQA category including identifying the responsible agency, program timing, and program monitoring requirements. Based on the analysis and conclusions of the Initial Study, the impacts of proposed project would be mitigated to less-than-significant levels with the implementation of the mitigation measures presented below.

AGRICULTURE AND FORESTRY RESOURCES

Mitigation Measure AG-1*:* Prior to the conversion of important farmland on the Project site, the Project applicant shall participate in the City's agricultural mitigation fee program and the SJMSCP by paying the established fees on a per-acre basis for the loss of important farmland. Fees paid toward the City's program shall be used to fund conservation easements on comparable or better agricultural lands to provide compensatory mitigation.

BIOLOGICAL RESOURCES

Mitigation Measure BIO-1*:* Prior to commencement of any grading activities, the Project proponent shall seek coverage under the SJMSCP to mitigate for habitat impacts to covered special status species. Coverage involves compensation for habitat impacts on covered species through implementation of incidental take and minimization Measures (ITMMs) and payment of fees for conversion of lands that may provide habitat for covered special status species. These fees are used to preserve and/or create habitat in preserves to be managed in perpetuity. Obtaining coverage for a Project includes incidental take authorization (permits) under the Endangered Species Act Section 10(a), California Fish and Game Code Section 2081, and the MBTA. Coverage under the SJMSCP would fully mitigate all habitat impacts on covered special-status species.

Mitigation Measure BIO-2: Prior to the approval of improvement plans, the Project applicant shall provide a landscape plan that includes tree planting specifications established by the Manteca Municipal Code (17.19.060) for the replacement of any trees, excluding orchard and non-native trees, to be removed at a ratio of 1:1. Replacement trees shall be planted on-site at a location that is agreeable to the City.

CULTURAL RESOURCES

Mitigation Measure CUL-1: The Project applicant shall ensure that a training session for all workers is conducted in advance of the initiation of construction activities at the site. The training session will provide information on recognition of artifacts, human remains, and cultural deposits to help in the recognition of potential issues.

Mitigation Measure CUL-2: The Project applicant shall retain a qualified archaeologist to observe initial ground disturbance activities, during initial grading. If artifacts, exotic rock, shell or bone are uncovered during the construction, the archaeologist will be able to document the finding, and determine if additional work is necessary to excavate or remove the artifacts or feature.

Mitigation Measure CUL-3: If cultural resources (i.e., prehistoric sites, historic sites, isolated artifacts/features, and paleontological sites) are discovered during construction, work shall be halted immediately within 50 meters (165 feet) of the discovery, the City of Manteca shall be notified, and a qualified archaeologist that meets the Secretary of the Interior's Professional Qualifications Standards in prehistoric or historical archaeology (or a qualified paleontologist in the event paleontological resources are found) shall be retained to determine the significance of the discovery. The City of Manteca shall consider recommendations presented by the professional for any unanticipated discoveries and shall carry out the measures deemed feasible and appropriate. Such measures may include avoidance, preservation in place, excavation, documentation, curation, data recovery, or other appropriate measures. Specific measures are developed based on the significance of the find.

Mitigation Measure CUL-4: If any human remains are found during grading and construction activities, all work shall be halted immediately within 50 meters (165 feet) of the discovery and the County Coroner must be notified, according to Section 5097.98 of the State Public Resources Code and Section 7050.5 of California's Health and Safety Code. If the remains are determined to be Native American, the coroner shall notify the Native American Heritage Commission, and the procedures outlined in CEQA Section 15064.5(d) and (e) shall be followed. Additionally, if the Native American resources are identified, a Native American monitor, following the Guidelines for Monitors/Consultants of Native American Cultural, Religious, and Burial Sites established by the Native American Heritage Commission, may also be required and, if required, shall be retained at the applicant's expense.

Geology and Soils

Mitigation Measure GEO-1: Prior to issuance of any building permits, the Project applicant shall be required to submit building plans to the City of Manteca for review and approval. The building plans shall also comply with all applicable requirements of the most recent California Building Standards Code. All on-site soil engineering activities shall be conducted under the supervision of a licensed geotechnical engineer or certified engineering geologist.

Mitigation Measure GEO-2: The Project applicant shall submit a Notice of Intent (NOI) and Storm Water Pollution Prevention Plan (SWPPP) to the RWQCB in accordance with the NPDES General Construction Permit requirements. The SWPPP shall be designed to control pollutant discharges utilizing Best Management Practices (BMPs) and technology to reduce erosion and sediments. BMPs may consist of a wide variety of measures taken to reduce pollutants in stormwater runoff from the Project site. Measures shall include temporary erosion control measures (such as silt fences, staked straw bales/wattles, silt/sediment basins and traps, check dams, geofabric, sandbag dikes, and temporary revegetation or other ground cover) that will be employed to control erosion from disturbed areas. Final selection of BMPs will be subject to approval by the City of Manteca and the RWQCB. The SWPPP will be kept on site during construction activity and will be made available upon request to representatives of the RWQCB.

Hazards and Hazardous Materials

Mitigation Measure HAZ-1: The Project applicant shall hire a qualified consultant to perform soil and site testing to check whether hazardous conditions are present, prior to any grading activities. The soil sampling shall address the presence/absence of hazardous substances in the soils, including agrichemicals and/or petroleum products. A soil sampling and analysis workplan shall be shall be prepared and meet the requirements of the Department of Toxic Substances Control Interim Guidance for Sampling Agricultural Properties (2008). The soils in the area where farming equipment and/or tanks have been stored should be included in the soil sampling and analysis workplan.

If the sampling results indicate the presence of agrichemicals that exceed commercial screening levels, a removal action workplan shall be prepared in coordination with San Joaquin County Environmental Health Department. The removal action workplan shall include a detailed engineering plan for conducting the removal action, a description of the on-site contamination, the goals to be achieved by the removal action, and any alternative removal options that were considered and rejected and the basis for that rejection. A no further action letter shall be issued by San Joaquin County Environmental Health Department upon completion of the removal action. The removal action shall be deemed complete when the confirmation samples exhibit concentrations below the commercial screening levels, which will be established by the agencies.

If asbestos-containing materials and/or lead are found in the buildings, a California Occupational Safety and Health Administration (Cal/OSHA) certified asbestos containing building materials (ACBM) and lead based paint contractor shall be retained to remove the asbestos-containing materials and lead in accordance with EPA and Cal/OSHA standards. In addition, all activities (construction or demolition) in the vicinity of these materials shall comply with Cal/OSHA asbestos and lead worker construction standards. The ACBM and lead shall be disposed of properly at an appropriate offsite disposal facility.

Mitigation Measure HAZ-2 Prior to initiation of any ground disturbance activities within 50 feet of a well, the Project applicant shall hire a licensed well contractor to obtain a well abandonment permit from San Joaquin County Environmental Health Department, and properly abandon the on-site wells, pursuant to review and approval of the City Engineer and the San Joaquin County Environmental Health Department.

Noise

Mitigation Measure NOISE-1: To reduce traffic noise increases, Oleander Avenue from “Street D” to Woodward Avenue shall be paved with quiet pavement. If an updated noise analysis, prepared to the satisfaction of the Community Development Director based on the project's circulation system approved by the City, demonstrates alternative means of mitigating the project’s noise increases to Oleander Avenue from “Street D” to Woodward Avenue to be less than 5 dBA, project applicant may choose to proceed with an alternative mitigation method with the express approval of the Community Development Director. If the updated noise analysis demonstrates that the anticipated noise increases to Oleander Avenue from “Street D” to Woodward Avenue no longer exceed 5 dBA based on the mitigating effects of revised circulation patterns or another design characteristics, the paving requirement would no longer apply.

Mitigation Measure NOISE-2a: Construction activities shall adhere to the requirements of the City of Manteca Municipal Code with respect to hours of operation. This requirement shall be noted in the improvements plans prior to approval by the City’s Public Works Department.

Mitigation Measure NOISE-2b: All equipment shall be fitted with factory equipped mufflers, and in good working order. This requirement shall be noted in the improvements plans prior to approval by the City’s Public Works Department.

Mitigation Measure NOISE-3: Any compaction required less than 26 feet from the adjacent residential structures shall be accomplished by using static drum rollers which use weight instead of vibrations to achieve soil compaction. As an alternative to this requirement, pre-construction crack documentation and construction vibration monitoring could be conducted to ensure that construction vibrations do not cause damage to any adjacent structures.

PUBLIC SERVICES

Mitigation Measure PUBLIC-1: The Project applicant shall pay applicable park in-lieu fees or dedicate parkland in accordance with the City of Manteca Municipal Code standards outlined in Chapter 3.20. Proof of payment of the in-lieu fees shall be submitted to the City Engineer.

UTILITIES

Mitigation Measure UTIL-1: Prior to the issuance of a building or grading permit, the Project applicant shall submit a drainage plan to the City of Manteca for review and approval. The plan shall include an engineered storm drainage plan that demonstrates attainment of pre-Project runoff requirements prior to release at the outlet canal and describes the volume reduction measures and treatment controls used to reach attainment consistent with the Manteca Storm Drain Master Plan.

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INITIAL STUDY CHECKLIST

PROJECT TITLE

Dutra Property Subdivision Project

LEAD AGENCY NAME AND ADDRESS

City of Manteca – City Hall
1001 West Center Street
Manteca, CA 95337
(209) 456-8000

CONTACT PERSON AND PHONE NUMBER

Doug Ledebour
KDH Group, LLC
3200 Danville Blvd, Ste 200
Alamo, CA 94507
(925) 648-8888

PROJECT LOCATION AND SETTING

The Project site includes approximately 39.49 acres located in the southern portion of the City of Manteca, south of State Route (SR) 120, in San Joaquin, California. The Project site is identified as Assessor's Parcel Number (APN) 226-170-08 (Portion), 226-170-12, -13, -14, -15, -16, -17, -18 by the San Joaquin County Assessor's Office. The Project site is located within the southwest quarter of Section 7 of Township 2 South, Range 7 East Mount Diablo Base and Meridian (MDBM), mapped on the USGS 7.5' Manteca, California, 7.5-minute series quadrangle map.

The Project site includes several distinct planning boundaries defined below. The following terms are used throughout this Initial Study to describe the planning area boundaries within the Project site:

- Project Site (or Annexation Area) – includes the whole of the project, including the proposed 34.6-acre Development Area, 3.11-acre Non-development Area and 1.8 acres of existing right-of-way. There are nine existing residential homes within the Project site.

- Development Area - includes 34.6 acres on three lots, with three residential homes, and an open agricultural area. The existing residential homes include outbuildings, livestock pens, ornamental landscaping, and overhead power lines located on the eastern side of the Project site along Oleander Avenue. The area west of the existing homes is undeveloped agricultural land. There is an existing 60' SSJID easement located on the southern side of the agricultural land. There are a variety of irrigation facilities in the agricultural area including standpipes and ditches, which will be abandoned or removed in accordance with the SSJID requirements. The parcels included in the Development Area are: 226-170-08 (Portion), 226-170-12, and -13. Each parcel is currently designated as Low Density Residential under the City of Manteca General Plan. Pre-zoning would be R-1. Development would result in 197 residential units, construction of a 2.92-acre Park/Basin (Lot A), installation of frontage/entry landscaping (Lots B/C/D), expansion of an existing storm drainage basin (Wackerly Basin), and retention of two lots (Lots E/F) that have existing residential homes along Oleander Avenue.

- Non-development Area - includes five lots, with six existing residential homes located on the southern and eastern side of the Project site along Oleander Avenue and Peach Road. The parcels included in this area are: 226-170-14, -15, -16, -17, and -18. These parcels are included as part of an inhabited annexation to create a logical boundary to the City limit line. The total acreage for the non-development area is 3.11 acres. Each parcel is currently designated as Low Density Residential under the City of Manteca General Plan. Pre-zoning would be R-1. These parcels would remain under their current uses and no new development would occur. Because of the fact that this area will lack any development, there is limited to no physical change or environmental impact.

- Right-of-Way Annexation Area - includes 60 feet of right-of-way along the Project site frontage on Oleander Avenue and Peach Road. This area is currently under the jurisdiction of San Joaquin County, and intended to be annexed into the City of Manteca for roadway improvements to the City standards.

See Figures 1 and 2 for the regional location and the project vicinity.

PROJECT DESCRIPTION

The proposed Project includes the annexation of 39.49 acres of land into the City of Manteca. This includes Development Area, Non-development Area, and Right-of-Way, all of which are discussed in more detail below.

Within the Development Area, the proposed Project would result in the subdivision and development of 197 residential units, construction of a 2.92-acre Park/Basin (Lot A), installation of frontage/entry landscaping (Lots B/C/D), expansion of an existing storm drainage basin (Wackerly Basin), and retention of two lots (Lots E/F) that have existing residential homes along Oleander Avenue. The residential density would be approximately 5.7 units/acre, with typical lot sizes of 50 feet by 80 feet or 4,000 square feet. Each lot would contain a two-car garage and two driveway parking spaces. The existing residential structures within the Development area would be retained on Lot E and F, along with the ancillary structures associated with the residences. All other facilities and structures would be removed, including septic tanks, leach fields, wells, irrigation facilities, and electric lines, per City of Manteca and SSJID standards and specifications. Residences would front on Oleander Avenue, consistent with the existing residential orientation along the street. Access to the subdivision will occur from the east along Oleander Avenue, and from the south along Peach Road. The internal circulation design includes roadway stubs to access the property to the south and to the west in accordance with the City's requirements.

Within the Non-Development Area, the proposed Project would have no new development. The existing six residential homes on five lots would remain intact. This area has an existing density that ranges from .21 acre lots to 1.35 acre lots. These parcels are designated Low Density Residential under the City of Manteca General Plan, and would receive a pre-zoning of R-1.

Within the Right-of-Way annexation Area, approximately 60 feet of roadway would be annexed and developed to a City of Manteca standard. Within the roadway, it is anticipated there will be underground utility improvements to serve the proposed Project. This may include connections for the Non-development Area for city services.

The annexation will include detachment from the Lathrop Manteca Fire District.

Figure 3a contains the tentative subdivision map for the Development Area.

There is an Alternative Site Plan (Tentative Map) for the Development Area, that is largely the same as the proposed Tentative Map. See Figure 3b. This Alternative Site Plan would result in the same number of units (197 residential units), but would not include a proposed roadway extending from the western side of the Project site through to Airport Way. As a result, the park/basin would be enlarged to 3.55 acres. Internal circulation and lot layout would otherwise be largely the same as under the proposed Project.

GENERAL PLAN AND ZONING DESIGNATIONS

The Project site, including the Development Area and Non-development Area, is designated LDR (Low Density Residential) by the Manteca General Plan land use map. The City's LDR land use establishes a mix of dwelling unit types and character determined by the individual site and market conditions. The density range allows substantial flexibility in selecting dwelling unit types and parcel configurations to suit particular site conditions and housing needs. The type of dwelling units anticipated in this density range include small lots and clustered lots as well as conventional large lot detached residences. The allowed density within the City's LDR designation is 2.1 to 8 dwelling units per acre. With 197 units on approximately 34.6 acres in the Development Area, the proposed density would be 5.7 dwelling units per acre, which is within the allowed density range. It is noted that the existing residential density within the Non-development Area is 1.92 dwelling units to the acre, which is slightly below the minimum density for this land use. There is no new development proposed, and the annexation of this land, even being under the density minimum, would continue under its current conditions. Figure 4 illustrates the General Plan land uses.

The San Joaquin County Local Agency Formation Commission (LAFCo) will require the Project site to be pre-zoned by the City of Manteca in conjunction with the proposed annexation. The City's pre-zoning for the Project site, including the Development Area and Non-development Area, will be R-1 (One Family Dwelling), which is consistent with the LDR (Low Density Residential) land use designation of the Manteca General Plan. This zoning district allows for substantial flexibility in selecting dwelling unit types and parcel configurations to suit site conditions and housing needs. Figure 5 illustrates the Prezone Map.

A General Plan Amendment would not be required for the project. The proposed Project would require a prezoning of the land, which would go into effect upon annexation of the land.

REQUESTED ENTITLEMENTS AND OTHER APPROVALS

The City of Manteca is the Lead Agency for the proposed project, pursuant to the State Guidelines for Implementation of CEQA, Section 15050.

This document will be used by the City of Manteca to take the following actions:

- Adoption of the Mitigated Negative Declaration (MND);
- Adoption of the Mitigation Monitoring and Reporting Program;
- Approval of City of Manteca pre-zoning;
- Approval of Tentative Maps;
- Approval of Annexation of the Development Area and Authorization to submit Annexation request to San Joaquin LAFCo;

- Approval of future Final Maps;
- Approval of future Improvement Plans;
- Approval of future Grading Plans;
- Approval of future Site Plan and Design Review;
- City review, approval, of construction and utility plans; and
- Approval of future Building Permits.

The following agencies may be required to issue permits or approve certain aspects of the proposed project:

- Central Valley Regional Water Quality Control Board (CVRWQCB) - Storm Water Pollution Prevention Plan (SWPPP) approval prior to construction activities pursuant to the Clean Water Act;
- San Joaquin Valley Air Pollution Control District (SJVAPCD) - Approval of construction-related air quality permits;
- SJVAPCD - Authority to Construct, Permit to Operate for stationary sources of air pollution; and
- San Joaquin Council of Governments - SJCOG, Inc. (SJCOG) - Issuance of incidental take permit under the San Joaquin Multi-Species Habitat Conservation and Open Space Plan (SJMSCP);
- San Joaquin Local Agency Formation Commission (LAFCo) – Annexation and Detachment from Lathrop Manteca Fire District.

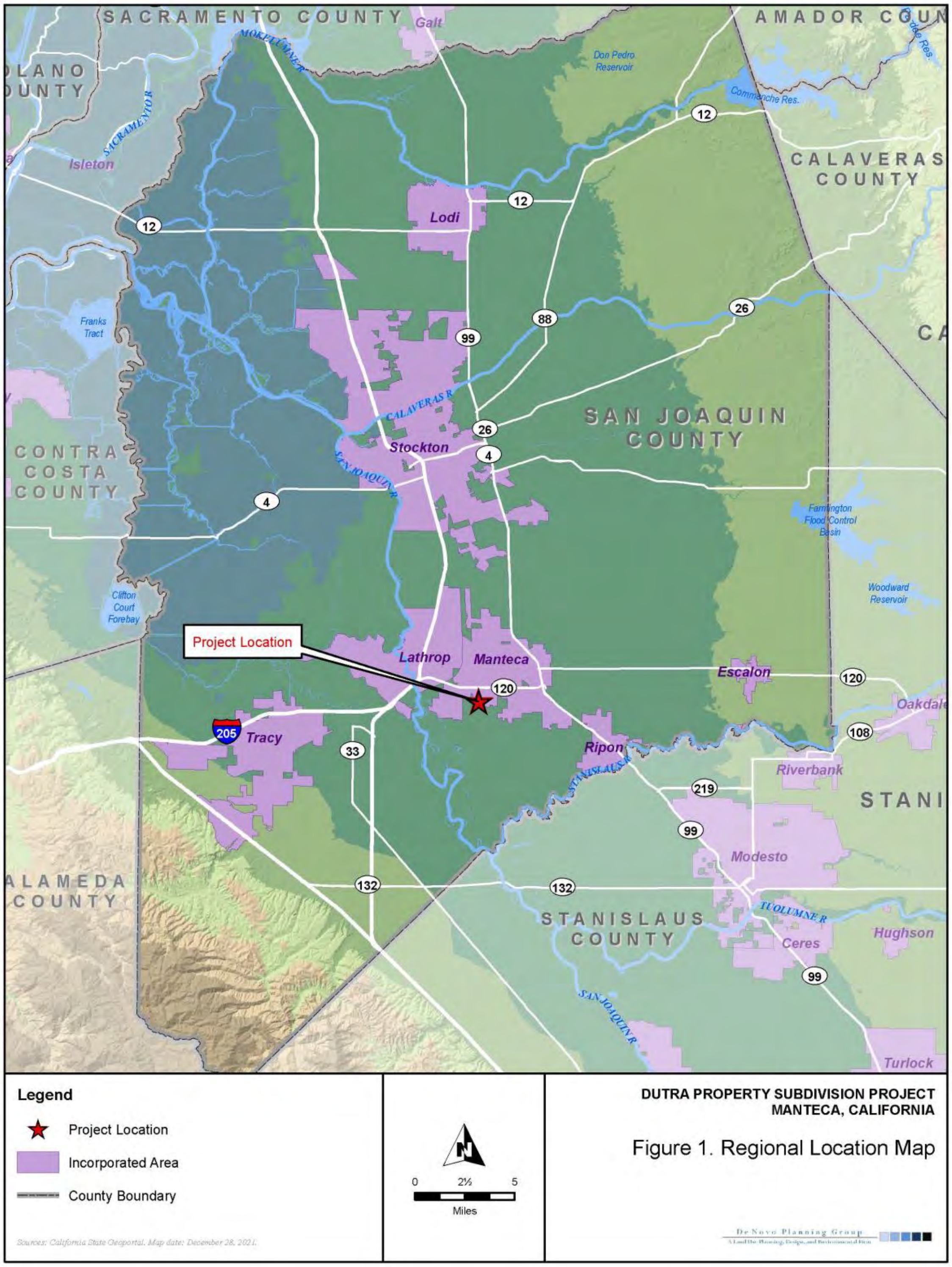

Figure 1. Regional Location Map

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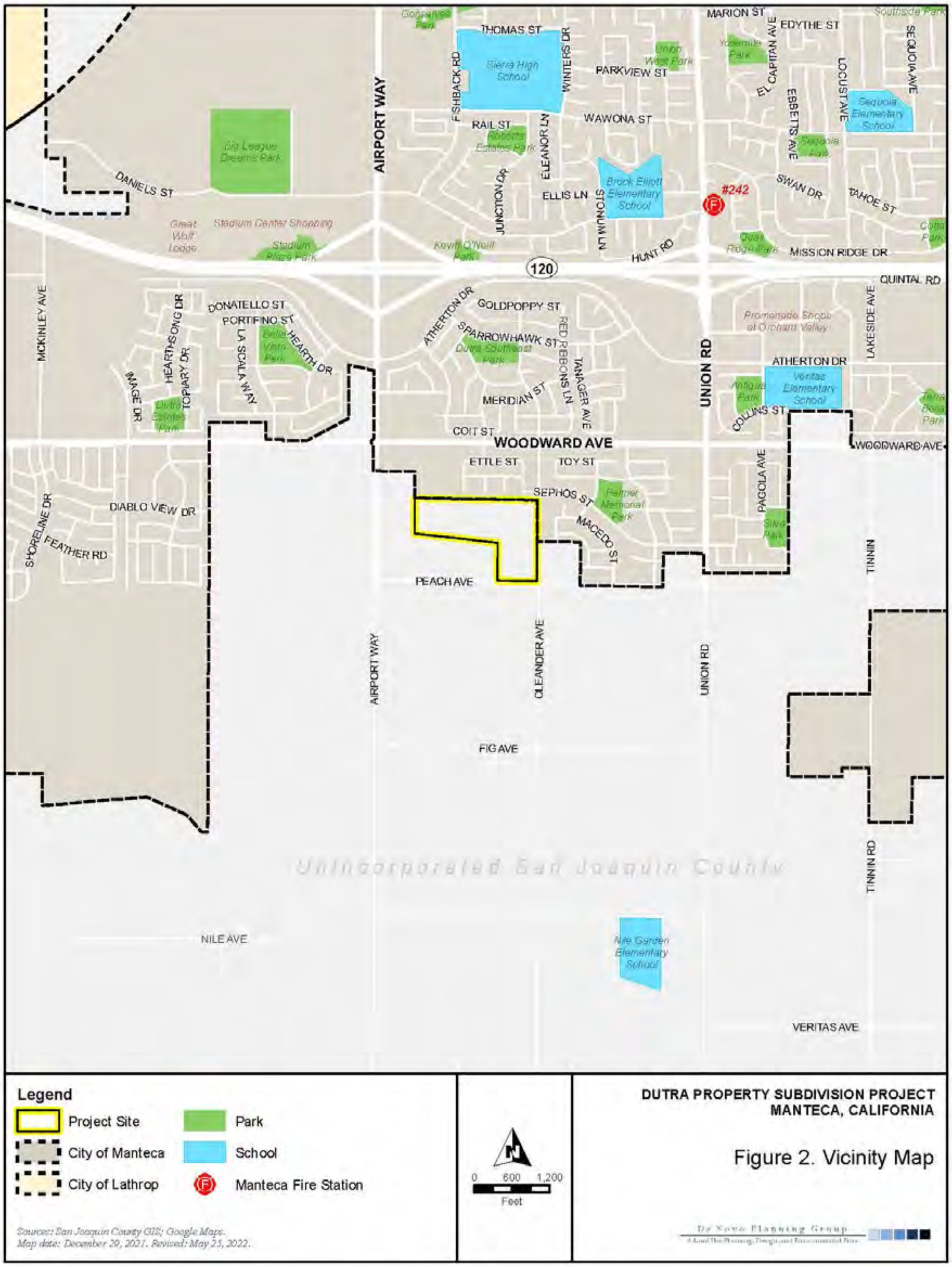

Figure 2. Vicinity Map

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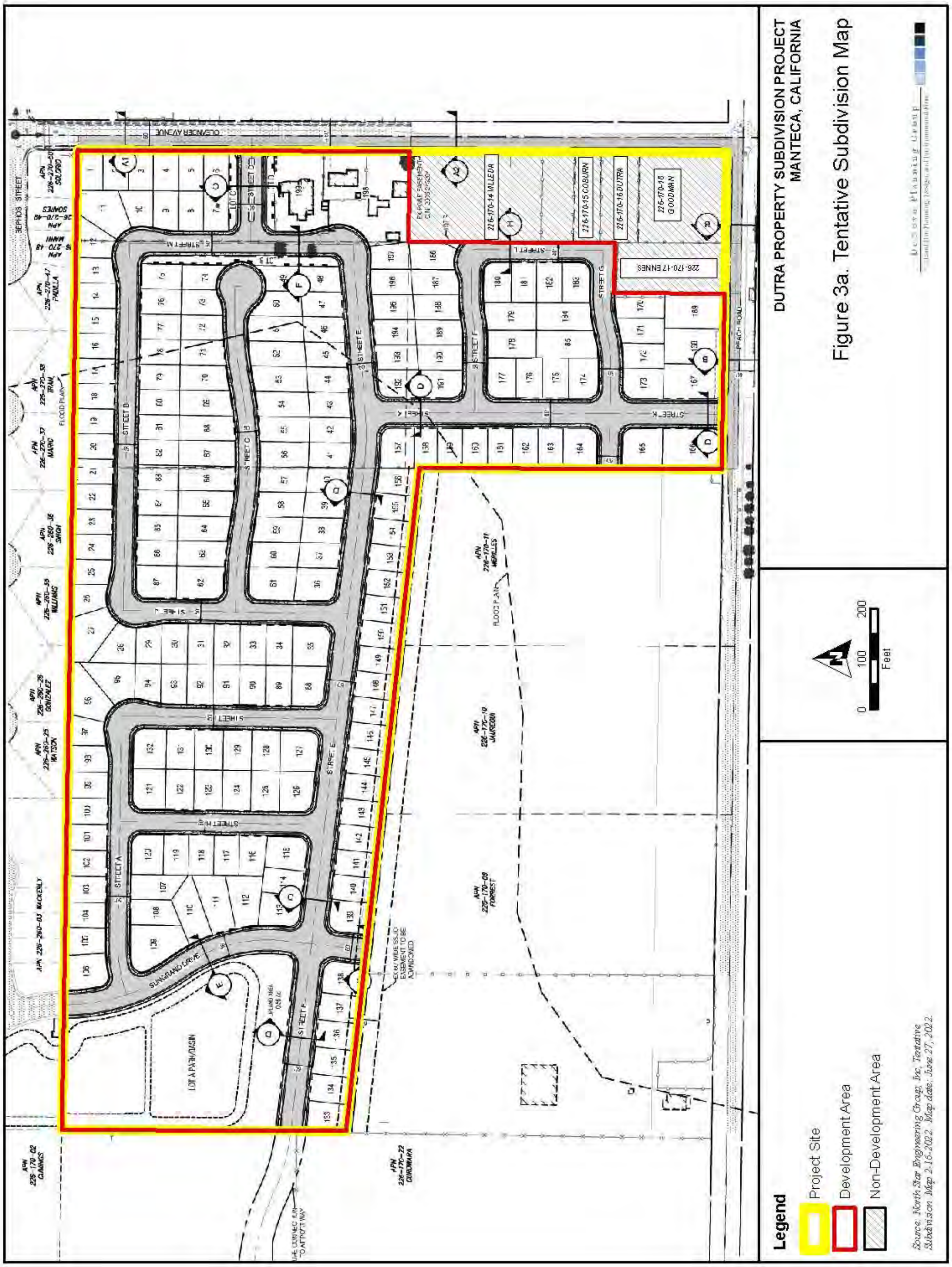

Figure 3a. Tentative Subdivision Map

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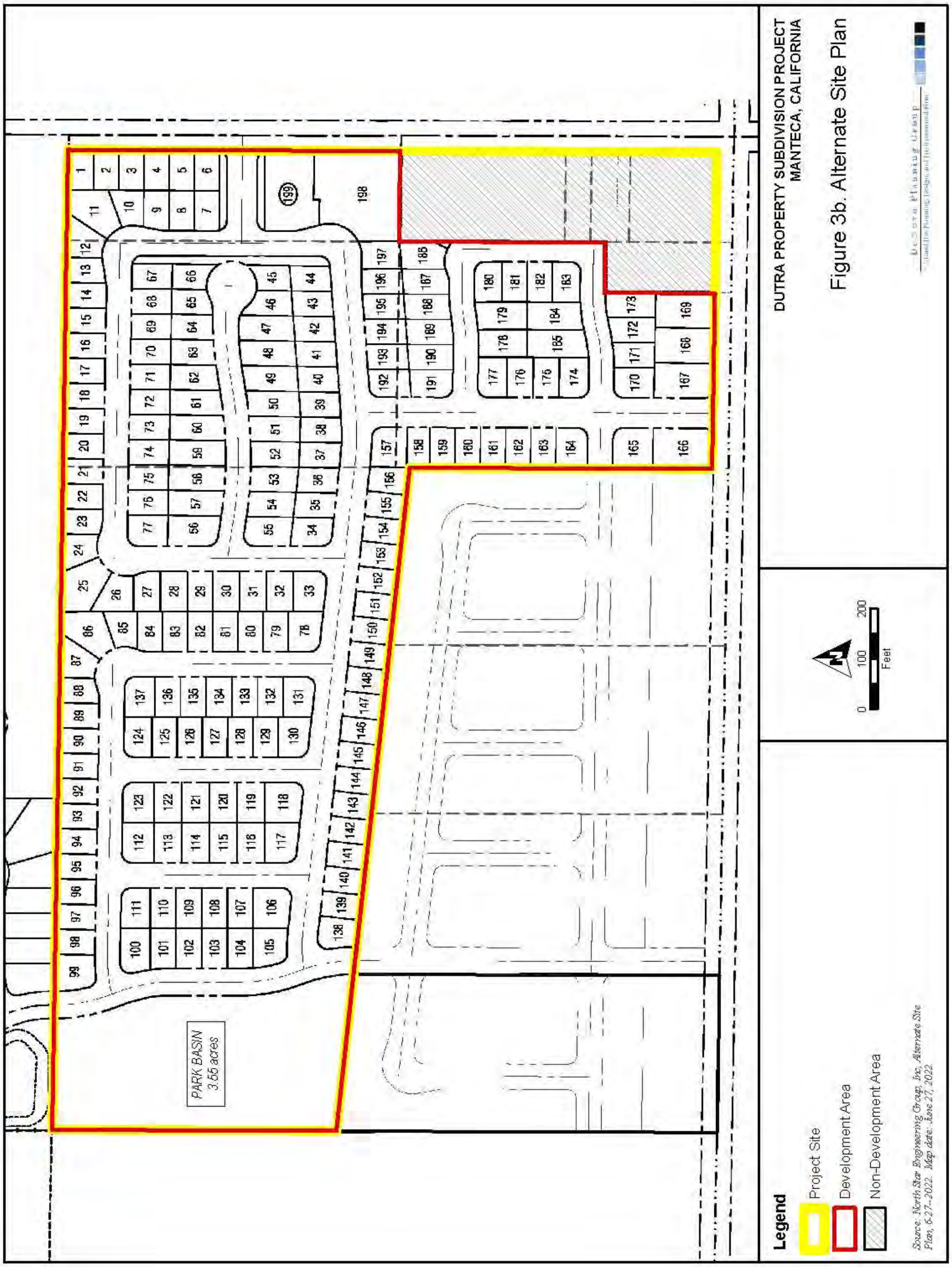

Figure 3b. Alternate Site Plan

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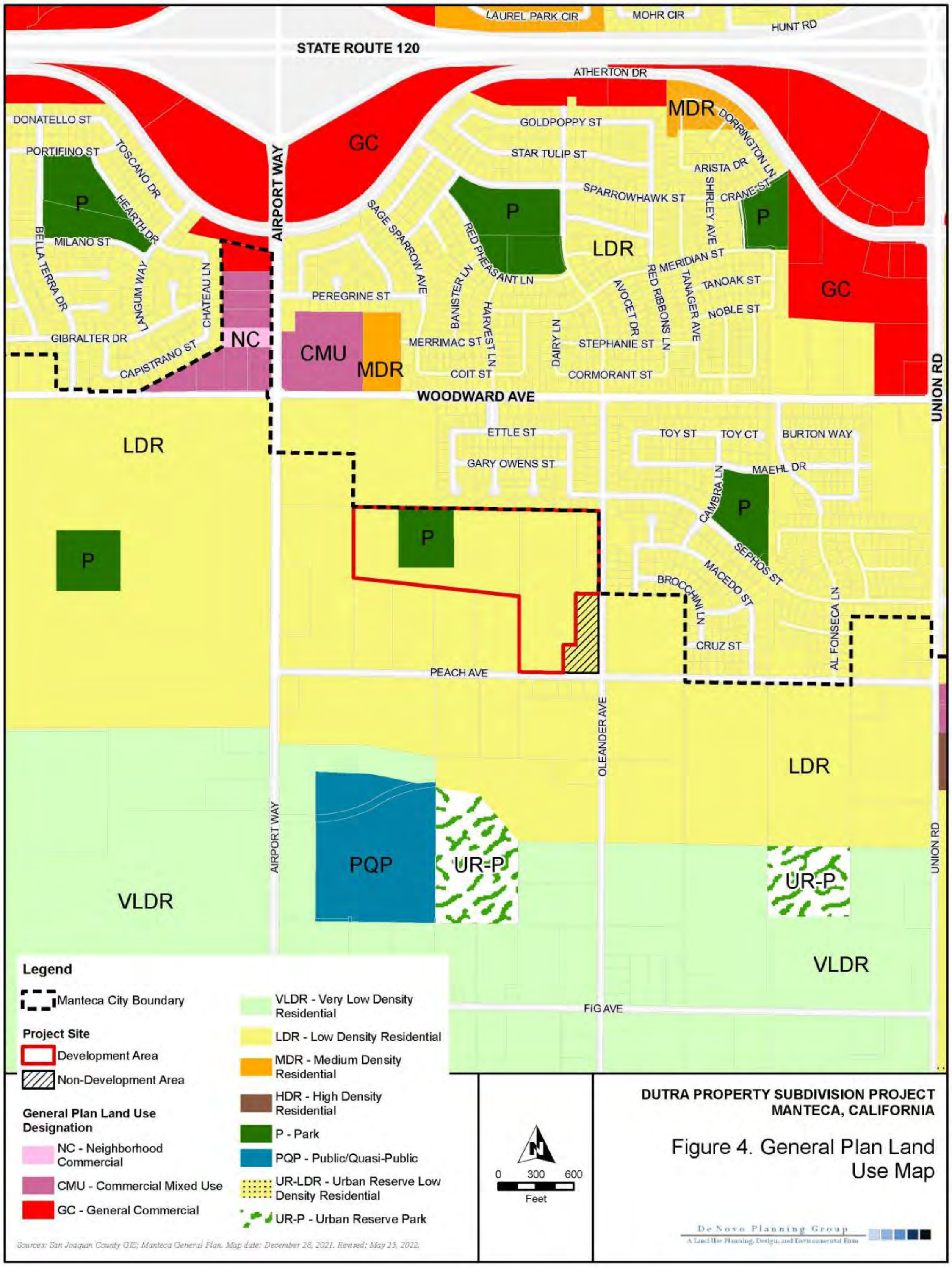

Figure 4. General Plan Land Use Map

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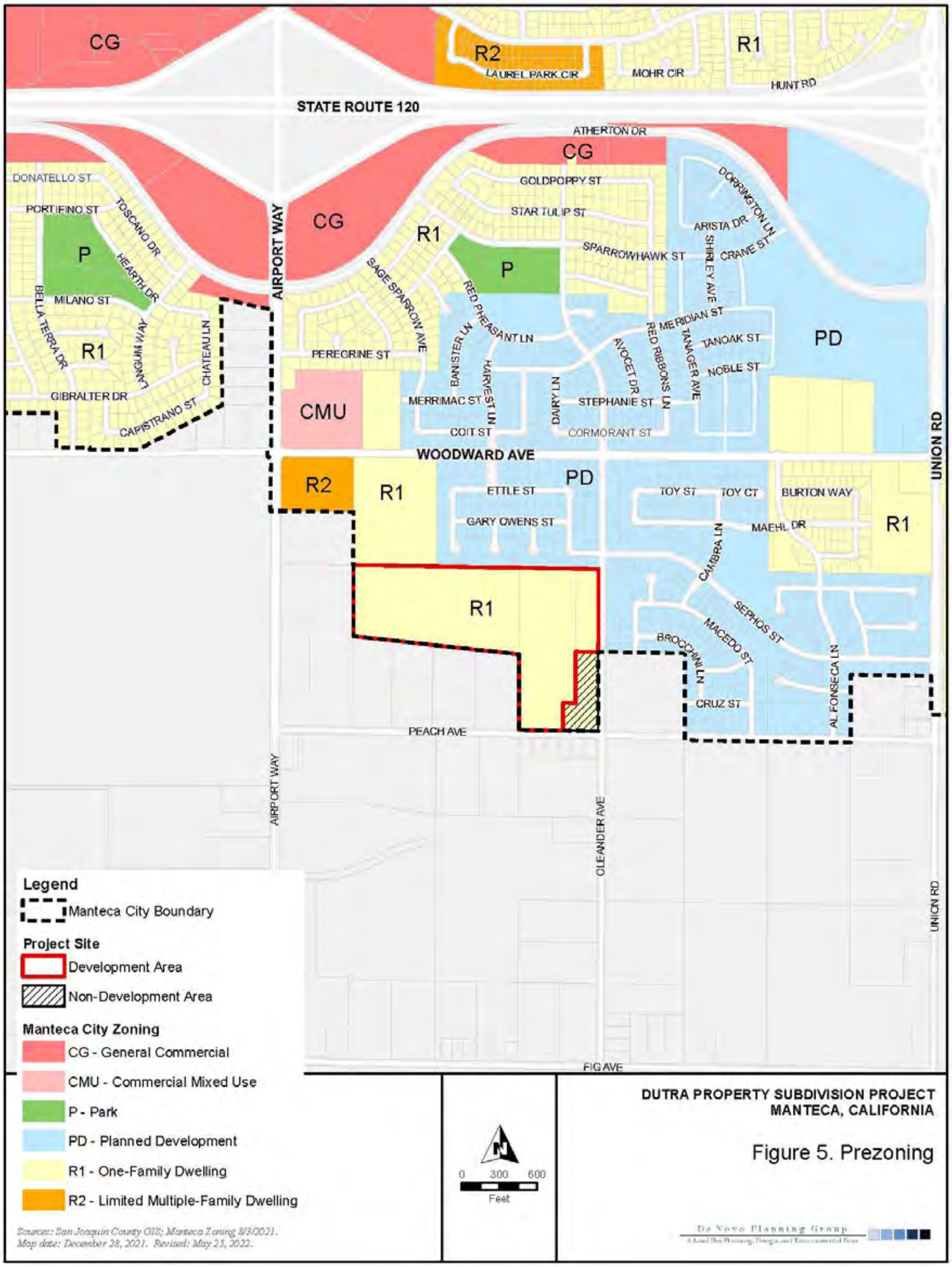

Figure 5. Prezoning

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ENVIRONMENTAL FACTORS POTENTIALLY AFFECTED

None of the environmental factors listed below would have potentially significant impacts as a result of development of this project, as described on the following pages.

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

DETERMINATION

On the basis of this initial evaluation:

	I find that the proposed project COULD NOT have a significant effect on the environment, and a NEGATIVE DECLARATION will be prepared.
X	I find that although the proposed project could have a significant effect on the environment, there will not be a significant effect in this case because revisions in the project have been made by or agreed to by the project proponent. A MITIGATED NEGATIVE DECLARATION will be prepared.
	I find that the proposed project MAY have a significant effect on the environment, and an ENVIRONMENTAL IMPACT REPORT is required.
	I find that the proposed project MAY have a "potentially significant impact" or "potentially significant unless mitigated" impact on the environment, but at least one effect 1) has been adequately analyzed in an earlier document pursuant to applicable legal standards, and 2) has been addressed by mitigation measures based on the earlier analysis as described on attached sheets. An ENVIRONMENTAL IMPACT REPORT is required, but it must analyze only the effects that remain to be addressed.
	I find that although the proposed project could have a significant effect on the environment, because all potentially significant effects (a) have been analyzed adequately in an earlier EIR or NEGATIVE DECLARATION pursuant to applicable standards, and (b) have been avoided or mitigated pursuant to that earlier EIR or NEGATIVE DECLARATION, including revisions or mitigation measures that are imposed upon the proposed project, nothing further is required.

Signature

Date

EVALUATION INSTRUCTIONS

1) A brief explanation is required for all answers except "No Impact" answers that are adequately supported by the information sources a lead agency cites in the parentheses following each question. A "No Impact" answer is adequately supported if the referenced information sources show that the impact simply does not apply to projects like the one involved (e.g., the project falls outside a fault rupture zone). A "No Impact" answer should be explained where it is based on project-specific factors as well as general standards (e.g., the project will not expose sensitive receptors to pollutants, based on a project-specific screening analysis).
2) All answers must take account of the whole action involved, including off-site as well as on-site, cumulative as well as project-level, indirect as well as direct, and construction as well as operational impacts.
3) Once the lead agency has determined that a particular physical impact may occur, then the checklist answers must indicate whether the impact is potentially significant, less than significant with mitigation, or less than significant. "Potentially Significant Impact" is appropriate if there is substantial evidence that an effect may be significant. If there are one or more "Potentially Significant Impact" entries when the determination is made, an EIR is required.
4) "Negative Declaration: Less Than Significant With Mitigation Incorporated" applies where the incorporation of mitigation measures has reduced an effect from "Potentially Significant Impact" to a "Less Than Significant Impact." The lead agency must describe the mitigation measures, and briefly explain how they reduce the effect to a less than significant level (mitigation measures from Section XVII, "Earlier Analyses," may be cross-referenced).
5) Earlier analyses may be used where, pursuant to the tiering, program EIR, or other CEQA process, an effect has been adequately analyzed in an earlier EIR or negative declaration. Section 15063(c)(3)(D). In this case, a brief discussion should identify the following:
    a) Earlier Analysis Used. Identify and state where they are available for review.
    b) Impacts Adequately Addressed. Identify which effects from the above checklist were within the scope of and adequately analyzed in an earlier document pursuant to applicable legal standards, and state whether such effects were addressed by mitigation measures based on the earlier analysis.
    c) Mitigation Measures. For effects that are "Less than Significant with Mitigation Measures Incorporated," describe the mitigation measures which were incorporated or refined from the earlier document and the extent to which they address site-specific conditions for the project.
6) Lead agencies are encouraged to incorporate into the checklist references to information sources for potential impacts (e.g., general plans, zoning ordinances). Reference to a previously prepared or outside document should, where appropriate, include a reference to the page or pages where the statement is substantiated.
7) Supporting Information Sources: A source list should be attached, and other sources used or individuals contacted should be cited in the discussion.
8) This is only a suggested form, and lead agencies are free to use different formats; however, lead agencies should normally address the questions from this checklist that are relevant to a project's environmental effects in whatever format is selected.
9) The explanation of each issue should identify:
    a) The significance criteria or threshold, if any, used to evaluate each question; and
    b) The mitigation measure identified, if any, to reduce the impact to less than significant.

EVALUATION OF ENVIRONMENTAL IMPACTS

In each area of potential impact listed in this section, there are one or more questions which assess the degree of potential environmental effect. A response is provided to each question using one of the four impact evaluation criteria described below. A discussion of the response is also included.

- Potentially Significant Impact. This response is appropriate when there is substantial evidence that an effect is significant. If there are one or more "Potentially Significant Impact" entries, upon completion of the Initial Study, an EIR is required.
- Less than Significant With Mitigation Incorporated. This response applies when the incorporation of mitigation measures has reduced an effect from "Potentially Significant Impact" to a "Less Than Significant Impact". The Lead Agency must describe the mitigation measures and briefly explain how they reduce the effect to a less than significant level.
- Less than Significant Impact. A less than significant impact is one which is deemed to have little or no adverse effect on the environment. Mitigation measures are, therefore, not necessary, although they may be recommended to further reduce a minor impact.
- No Impact. These issues were either identified as having no impact on the environment, or they are not relevant to the project.

ENVIRONMENTAL CHECKLIST

This section of the Initial Study incorporates the most current Appendix "G" Environmental Checklist Form contained in the CEQA Guidelines. Impact questions and responses are included in both tabular and narrative formats for each of the 21 environmental topic areas.

I. AESTHETICS

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

Responses to Checklist Questions

Responses a), c): There are no scenic viewsheds within the City of Manteca, and the City of Manteca General Plan does not specifically designate any scenic viewsheds within the city. The existing Manteca General Plan does, however, note Manteca's scenic environmental resources including the San Joaquin River environment, and scenic vistas of the Coast Range and the Sierra.

For analysis purposes, a scenic vista can be discussed in terms of a foreground, middle ground, and background viewshed. The middle ground and background viewshed is often referred to as the broad viewshed. Examples of scenic vistas can include mountain ranges, valleys, ridgelines, or water bodies from a focal point of the forefront of the broad viewshed, such as visually important trees, rocks, or historic buildings. An impact would generally occur if a project would change the view to the middle ground or background elements of the broad viewshed, or remove the visually important trees, rocks, or historic buildings in the foreground. There are no scenic middleground or background views from the Project site that would be significantly affected by the proposed project.

The proposed Project would not significantly disrupt middle ground or background views from public viewpoints. The proposed Project would result in changes to the foreground views from the public viewpoint by adding residential buildings to a site that is currently vacant (except for the existing residences located with the Project site along Oleander Avenue).

Upon build-out, the Project site would be of similar visual character to nearby and adjacent developments (such as the residential community located to the north of the Project site). For motorists travelling along nearby roadways, such as Oleander Avenue, the Project site would appear to be a continuation of adjacent residential land uses and would not present unexpected or otherwise unpleasant aesthetic values within the general vicinity.

The greatest visual change would apply to neighbors that are located to the west, south, and east of the Project site with a direct view of the area. Views of the Project site are generally visible from immediately adjacent residences. However, the proposed Project would change the view from an open agricultural area to a residential neighborhood.

The change in character of the Project site, once developed, is anticipated by the General Plan and would be visually compatible with surrounding existing land uses. Moreover, although the City considers the visual impact from the loss of agricultural lands, not all agricultural lands are the same. The Project site does not have characteristics that would normally be considered a significant scenic amenity or visual resource. Furthermore, proposed setbacks and landscaping around the perimeter and at the entrance of the Project site will buffer the foreground viewshed from residents in the immediate vicinity. Therefore, implementation of the proposed Project would have a ***less than significant*** impact relative to this topic.

Response b): The Project site is not located within view of a state scenic highway. Only one highway section in San Joaquin County is listed as a Designated Scenic Highway by the Caltrans Scenic Highway Mapping System; the segment of Interstate 580 from Interstate 5 to State Route 205. The City of Manteca is not visible from this roadway segment. Therefore, the proposed Project would not substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway. Implementation of the proposed Project would have ***no impact*** relative to this topic.

Response d): The Project site currently consists of vacant land with some existing residences. The Project site contains minimal existing lighting. There is a potential for the proposed Project to create new sources of light and glare. Examples of lighting would include construction lighting, street lighting, security lighting along sidewalks, exterior building lighting, interior building lighting, and automobile lighting. Examples of glare would include reflective building materials and automobiles.

There is a potential for the implementation of the proposed Project to introduce new sources of light and glare into the project area. Contributors to light and glare impacts would include construction lighting and street lighting that would create ongoing light impacts to the area. Nighttime construction activities are not anticipated to be required as part of on-site roadway construction. Operational light sources from street lighting may be required to provide for safe travel. However, to minimize light and glare impacts, the City has adopted ordinances that establish lighting standards for all new and existing development. These ordinances are existing standards. All street lighting would have to comply with the City of Manteca lighting standards. Section 17.50.060 of the Manteca Municipal Code identifies general lighting standards for light shielding, illumination levels, and nuisance prevention.

LED is the best illumination source for reducing urban glare. All streetlights within the Project site would comply with the Crime Prevention Through Environmental Design (CPTED) streetlight illumination standards. LED lights are 40 to 60% more energy efficient than traditional lighting technologies. By using LED luminaries, it is possible to provide better quality lighting with no glare, lower energy consumption, and reduce CO_2 emissions.

Lastly, it is noted that sky glow is an effect of light pollution, which has historically not been an environmental concern in the City of Manteca given their enforcement of their lighting ordinance which imposes design conditions on lighting within the City's jurisdiction. It is also noted that sky glow can also be a function of lighting density, which is a function of building density. For instance, nighttime light pollution and sky glow is much more common in densely populated urban environments, but is not common within the small suburban communities of the Central Valley.

Therefore, implementation of the proposed Project would have a ***less than significant*** impact relative to this topic.

II. AGRICULTURE AND FORESTRY RESOURCES

Would the project:	*Potentially Significant Impact*	*Less Than Significant with Mitigation Incorporation*	*Less Than Significant Impact*	*No Impact*
a) Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?		X		
b) Conflict with existing zoning for agricultural use, or a Williamson Act contract?				X
c) Conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code section 1222(g)) or timberland (as defined in Public Resources Code section 4526)?				X
d) Result in the loss of forest land or conversion of forest land to non-forest use?				X
e) Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland, to non-agricultural use or conversion of forest land to non-forest use?			X	

Responses to Checklist Questions

Response a): The Project site is a mix of Prime Farmland, Farmland of Statewide Importance, and Farmland of Local Importance, as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency (California Department of Conservation, 2018).

The proposed conversion is consistent with the City's overall planning vision, as identified in the 2023 General Plan, which assumes the site would be developed with residential and park uses. The 2023 General Plan and General Plan EIR anticipated development of the Project site as part of the overall evaluation of buildout of the City. Additionally, the proposed General Plan Update designates this land for Low Density Residential uses consistent with the proposed Project and is anticipated in the overall buildout of the City as part of the General Plan Update EIR, currently out for public review. The 2023 General Plan EIR also addressed the conversion and loss of agricultural land that would result from buildout of the 2023 General Plan, providing a discussion of the General Plan policies intended to reduce impacts. The City certified the General Plan EIR, adopted Statement of Overriding Considerations and Findings of Fact, and adopted the General Plan. The proposed Project is consistent with the General Plan policies related to this topic, and the proposed Project does not cause an impact greater then what has already been considered in the City's certified EIR.

The proposed Project is subject to the City's agricultural mitigation fee program and the SJMSCP. Payment of these fees is standard for the conversion of farmland in the City of Manteca. Different types of land require different levels of mitigation. The entirety of San Joaquin County is mapped according to each land use category so that landowners, project proponents and project reviewers are aware of the applicable SJMSCP fees for the proposed development. The appropriate fees are collected by the City and remitted to SJCOG for administration. SJCOG uses the funds to preserve open space land of comparable types throughout the County, often coordinating with other private or public land trusts to purchase conservation easements or buy land outright for preservation. Fees are automatically adjusted on an annual basis.

The project proponent will be required to pay the established fees on a per-acre basis for the loss of Prime Farmland, Farmland of Statewide Importance, and Farmland of Local Importance. Fees paid toward the City's program shall be used to fund conservation easements on comparable or better agricultural lands to provide compensatory mitigation. Implementation of the following mitigation would ensure there is a ***less than significant*** impact relative to this issue.

Mitigation Measure(s)

Mitigation Measure AG-1*: Prior to the conversion of important farmland on the Project site, the Project applicant shall participate in the City's agricultural mitigation fee program and the SJMSCP by paying the established fees on a per-acre basis for the loss of important farmland. Fees paid toward the City's program shall be used to fund conservation easements on comparable or better agricultural lands to provide compensatory mitigation.*

Response b): The Project site is not zoned for agricultural use by the City of Manteca nor is it under a Williamson Act contract (California Department of Conservation, 2016). The proposed Project would not conflict with existing zoning for agricultural use, or a Williamson Act contract. Implementation of the proposed Project would have ***no impact*** relative to this issue.

Response c): The Project site is not forest land (as defined in Public Resources Code section 1222(g)) or timberland (as defined in Public Resources Code section 4526). The proposed Project would not conflict with existing zoning for, or cause rezoning of, forest land or timberland. Implementation of the proposed Project would have ***no impact*** relative to this issue.

Response d): The Project site is not forest land. The proposed Project would not result in the loss of forest land or conversion of forest land to non-forest use. Implementation of the proposed Project would have ***no impact*** relative to this issue.

Response e): The Project site does not contain forest land, and there is no forest land in the vicinity of the Project site. The Project site is designated LDR and will result in a conversion of the land to non-farmland. This is consistent with the General Plan. The proposed Project does not involve any other changes in the existing environment not disclosed under the previous responses which, due to their location or nature, could result in conversion of farmland, to non-agricultural use, or conversion of forest land to non-forest use. Implementation of the proposed Project would have a ***less than significant*** impact relative to this issue.

III. AIR QUALITY

Would the project:	***Potentially Significant Impact***	***Less Than Significant with Mitigation Incorporation***	***Less Than Significant Impact***	***No Impact***
a) Conflict with or obstruct implementation of the applicable air quality plan?			X	
b) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard?			X	
c) Expose sensitive receptors to substantial pollutant concentrations?			X	
d) Result in other emissions (such as those leading to odors) adversely affecting a substantial number of people?			X	

Existing Setting

The Project site is located within the San Joaquin Valley Air Pollution Control District (SJVAPCD). This agency is responsible for monitoring air pollution levels and ensuring compliance with federal and state air quality regulations within the San Joaquin Valley Air Basin (SJVAB) and has jurisdiction over most air quality matters within its borders.

Responses to Checklist Questions

Responses a), b): Air quality emissions would be generated during construction and during operation of the proposed project. Operational emissions would come primarily from vehicle emissions from vehicle trips generated by the proposed Project and from the use of energy (i.e., electricity and natural gas) within the proposed Project residences.

SJVAPCD Small Project Analysis Level (SPAL)

The SJVAPCD has established CEQA Small Project Analysis Level (SPAL) screening thresholds, which are based on District New Source Review (NSR) offset requirements for stationary sources (SJVAPCD, 2017). Projects that fit the descriptions and are less than the project sizes provided are deemed to have a less than significant impact on air quality due to criteria pollutant emissions and as such are excluded from quantifying criteria pollutant emissions for CEQA purposes. The Single-Family land use category was chosen for the purposes of the SPAL screening thresholds. According to the SPAL screening thresholds, Single Family projects that are less than 390 units and Condominiums/Townhouse projects that are less than 256 units in project size would have a less than significant impact on air quality due to criteria pollutant emissions. The proposed Project would develop up to 197 residential units, which is smaller than the 390-unit SPAL screening threshold for Single Family Projects.

Construction-Related Emissions

The SJVAPCD's approach to analysis of construction impacts is to require implementation of effective and comprehensive control measures, rather than to require detailed quantification of emission concentrations for modeling of direct impacts. PM_{10} emitted during construction can vary greatly depending on the level of activity, the specific operations taking place, the equipment being operated, local soils, weather conditions, and other factors, making quantification difficult.

Despite this variability in emissions, experience has shown that there are a number of feasible control measures that can be reasonably implemented to significantly reduce PM_{10} emissions from construction activities. The SJVAPCD has determined that, on its own, compliance with Regulation VIII for all sites and implementation of all other control measures indicated in Tables 6-2 and 6-3 of the SJVAPCD's Guide for Assessing and Mitigating Air Quality Impacts (as appropriate) would constitute sufficient mitigation to reduce construction PM_{10} impacts to a level considered less than significant.

Construction would result in numerous activities that would generate dust. The fine, silty soils in the project area and often strong afternoon winds exacerbate the potential for dust, particularly in the summer months. Impacts would be localized and variable. Construction impacts would last for a period of several months to several years. The initial phase of project construction would involve grading and site preparation activities, followed by building construction. Construction activities that could generate dust and vehicle emissions are primarily related to grading, soil excavation, and other ground-preparation activities, as well as building construction.

Control measures are required and enforced by the SJVAPCD under Regulation VIII. The SJVAPCD considers construction-related emissions from all projects in this region to be mitigated to a less than significant level if SJVAPCD-recommended PM_{10} fugitive dust rules and equipment exhaust emissions controls are implemented. The proposed Project would be required to comply with all applicable measures from SJVAPCD Rule VIII. The proposed Project would have a less than significant impact related to construction activities on these potential impacts.

In addition, Table AIR-1 (below) provides the results of the construction-related emissions modeling results from CalEEMod in comparison to the SJVAPCD thresholds for criteria air pollutants.

Table AIR-1: Project Mitigated Construction Criteria Pollutant Emissions (tons/year)

Emissions Type	*Proposed Project Emissions*	*SJVAPCD Threshold*	*Above Threshold in Proposed Project?*
ROG	2.48	10	N
NO_x	2.58	10	N
CO	3.19	100	N
PM_{10}	0.40	15	N
$PM_{2.5}$	0.18	15	N
SO_x	7.02	27	N

Source: CalEEMod, v. 2020.4.0

Operational Emissions

For the purposes of this operational air quality analysis, actions that violate Federal standards for criteria pollutants (i.e., primary standards designed to safeguard the health of people considered to be sensitive receptors while outdoors and secondary standards designed to safeguard human welfare) are considered significant impacts. Additionally, actions that violate State standards developed by the CARB or criteria developed by the SJVAPCD, including thresholds for criteria pollutants, are considered significant impacts.

SJVAPCD Rule 9510 Indirect Source Review

District Rule 9510 requires developers of large residential, commercial and industrial projects to reduce smog-forming (NOx) and particulate (PM_{10} and $PM_{2.5}$) emissions generated by their projects. The Rule applies to many project types, including to projects which, upon full build-out, will include 50 residential units or more. Project developers are required to reduce:

- 20 percent of construction-exhaust nitrogen oxides;
- 45 percent of construction-exhaust PM_{10};
- 33 percent of operational nitrogen oxides over 10 years; and
- 50 percent of operational PM_{10} over 10 years.

Developers are encouraged to meet these reduction requirements through the implementation of on-site mitigation; however, if the on-site mitigation does not achieve the required baseline emission reductions, the Project applicant will mitigate the difference by paying an off-site fee to the District. Fees reduce emissions by helping to fund clean-air projects in the District. The proposed Project would be required to consult with the SJVAPCD regarding the applicability of Rule 9510 Indirect Source Review including the fees.

Criteria Pollutant Emissions and Thresholds

Project operational emissions are provided in Table AIR-2 (below) (further detail is provided in Appendix A), in comparison to the SJVAPCD criteria pollutant thresholds.

Table AIR-2: Project Mitigated Operational Criteria Pollutant Emissions (tons/year)

Emissions Type	*Proposed Project Emissions*	*SJVAPCD Threshold*	*Above Threshold in Proposed Project?*
ROG	2.54	10	N
NO_x	1.37	10	N
CO	8.07	100	N
PM_{10}	1.55	15	N
$PM_{2.5}$	0.45	15	N
SO_x	0.02	27	N

Source: CalEEMod, v.2020.4.0

As shown above, the proposed Project would not exceed the applicable SJVAPCD thresholds associated with operational emissions. Therefore, the proposed Project would have a ***less than significant*** impact with regard to operational emissions.

Conclusion

As described above, the proposed Project would have ***a less than significant*** impact related to the potential to conflict with or obstruct implementation of the applicable air quality plan, or to result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard.

Response c): Sensitive receptors are those parts of the population that can be severely impacted by air pollution. Sensitive receptors include children, the elderly, and the infirm. Although there are existing residences located to the north, south, and east of the Project site, there are no schools located adjacent to the Project site. The nearest school (Veritas School) is located approximately 0.8 miles to the northeast of the Project site, at its closest point.

Implementation of the proposed Project would not expose these sensitive receptors to substantial pollutant concentrations. Air emissions would be generated during the construction and operational phases of the project. The construction phase of the project would be temporary and short-term, and the implementation of all State, Federal, and SJVAPCD requirements would greatly reduce pollution concentrations generated during construction activities. Additionally, operational emissions would be minimal and would have a negligible effect on nearby sensitive receptors.

Operation of the proposed Project would result in emissions from vehicle trips and from building energy use. However, as described under Response a) – b) above, the proposed Project would not generate significant concentrations of air emissions. Therefore, impacts to sensitive receptors would be negligible and this is a ***less than significant*** impact.

Response d): The proposed Project would not generate objectionable odors. People in the immediate vicinity of construction activities may be subject to temporary odors typically associated with construction activities (diesel exhaust, hot asphalt, etc.). However, any odors generated by construction activities would be minor and would be short and temporary in duration.

Examples of facilities that are known producers of operational odors include: Wastewater Treatment Facilities, Chemical Manufacturing, Sanitary Landfill, Fiberglass Manufacturing, Transfer Station, Painting/Coating Operations (e.g., auto body shops), Composting Facility, Food Processing Facility, Petroleum Refinery, Feed Lot/Dairy, Asphalt Batch Plant, and Rendering Plant. If a project would locate receptors and known odor sources in proximity to each other further analysis may be warranted; however, if a project would not locate receptors and known odor sources in proximity to each other, then further analysis is not warranted.

The project does not include any of the aforementioned uses. Additionally, construction activities would be temporary and minor. Lastly, other emissions are evaluated in responses a-c), as provided above. As such, implementation of the proposed Project would have a ***less than significant*** impact relative to this topic.

IV. BIOLOGICAL RESOURCES

Would the project:	*Potentially Significant Impact*	*Less Than Significant with Mitigation Incorporation*	*Less Than Significant Impact*	*No Impact*
a) Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?		X		
b) Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations or by the California Department of Fish and Game or US Fish and Wildlife Service?			X	
c) Have a substantial adverse effect on state or federally protected wetlands (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?			X	
d) Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?			X	
e) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?			X	
f) Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?		X		

Regional Setting

The City of Manteca is located in the western portion of the Great Valley Geomorphic Province of California. The Great Valley Province is a broad structural trough bounded by the tilted block of the Sierra Nevada on the east and the complexly folded and faulted Coast Ranges on the west. The San Joaquin River is located just south and west of the City. This major river drains the Great Valley Province into the San Joaquin Delta to the north, ultimately discharging into the San Francisco Bay to the northwest.

The City of Manteca is located within the San Joaquin Valley Bioregion, which is comprised of Kings County, most of Fresno, Kern, Merced, and Stanislaus counties, and portions of Madera, San Luis Obispo, and Tulare counties. The San Joaquin Valley Bioregion is the third most populous out of ten bioregions in the state, with an estimated 2 million people. The largest cities are Fresno, Bakersfield, Modesto, and Stockton. Interstate 5 and State Route 99 are the major north-south roads that run the entire length of the bioregion. Habitat in the bioregion includes vernal pools, valley sink scrub and saltbush, freshwater marsh, grasslands, arid plains, orchards, and oak savannah. Historically, millions of acres of wetlands flourished in the bioregion, but stream diversions for irrigation dried all but about five percent. Remnants of the wetland habitats are protected in this bioregion in publicly owned parks, reserves, and wildlife areas. The bioregion is considered the state's top agricultural producing region with the abundance of fertile soil.

The region has a Mediterranean climate that is subject to cool, wet winters (often blanketed with fog) and hot, dry summers. The average annual precipitation is approximately 13.81 inches. Precipitation occurs as rain most of which falls between the months of November through April, peaking in January at 2.85 inches. The average temperatures range from December lows of 37.5 F to July highs of 94.3 F.

The Project site is relatively flat, and is composed of level agricultural fields, farm roads/driveways, irrigation ditches/catch basins, residences, outbuildings, and debris piles. Elevation ranges from approximately 23 to 26 feet above mean sea level, with the slight slope from southeast to northwest. There are no rivers, streams, or other natural aquatic habitats on the Project site.

Vegetation on the Project site consists of barren, agricultural, ruderal, and landscaping. Common plant species observed along the fringe of the farm fields and in association with the residences along Oleander Avenue include: wild oat (*Avena barbata*), softchess (*Bromus hordeaceus*) alfalfa (*Medicago sativa*), Russian thistle (Salsola tragus), Italian thistle (*Carduus pycnocephalus*), rough pigweed (*Amaranthus retroflexus*), sunflower (*Helianthus annuus*), tarragon (*Artemisia dracunculus*), prickly lettuce (*Lactuca serriola*), milk thistle (*Silybum marianum*), sow thistle (*Sonchus asper*), barley (*Hordeum* sp.), mustard (*Brassica niger*), and heliotrope (*Heliotropium curassavicum*).

Agricultural and ruderal vegetation found on the Project site provides habitat for both common and a few special-status wildlife populations. For example, some commonly observed wildlife species in the region include: California ground squirrel (*Spermophilus beecheyi*), California vole (*Microtus californicus*), coyote (*Canis latrans*), raccoon (*Procyon lotor*), opossum (*Didelphis virginiana*), striped skunk (*Mephitis mephitis*), red-tailed hawk (*Buteo jamaicensis*), northern harrier (*Circus cyaneus),* American kestrel (*Falco sparverius*), white-tailed kite (*Elanus leucurus*), American killdeer (*Charadrius vociferus*), gopher snake (*Pituophis melanoleucus*), garter snake (*Thamnophis species*), and western fence lizard (*Sceloporus occidentalis*), as well as many native insect species. There are also several bat species in the region. Bats often feed on insects as they fly over agricultural and natural areas.

Locally common and abundant wildlife species are important components of the ecosystem. Due to habitat loss, many of these species must continually adapt to using agricultural, ruderal, and ornamental vegetation for cover, foraging, dispersal, and nesting.

Responses to Checklist Questions

Response a): The following discussion is based on a background search of special-status species that are documented in the California Natural Diversity Database (CNDDB), the California Native Plant Society's (CNPS) Inventory of Rare and Endangered Plants, and the U.S. Fish and Wildlife Service's (USFWS) records of listed endangered and threatened species from the IPAC database. The background search was regional in scope and focused on the documented occurrences within 10 miles of the Project site. Table BIO-1 provides a list of special-status plants and Table BIO-2 provides a list of special-status animals. Figure 6 and 7 provide a map of occurrences within the regional vicinity.

TABLE BIO-1: SPECIAL-STATUS PLANT SPECIES WHICH MAY OCCUR IN PROJECT AREA

SPECIES	*STATUS (FED./CA/ CNPS/SJMSCP)*	*GEOGRAPHIC DISTRIBUTION*	*HABITAT AND BLOOMING PERIOD*
Big tarplant *Blepharizonia plumosa*	--/--/1B.1/No	San Francisco Bay area with occurrences in Alameda, Contra Costa, San Joaquin, Stanislaus, and Solano Counties	Valley and foothill grassland; 30-505 m. July-Oct.
Slough thistle *Cirsium crassicaule*	--/--/1B.1/Yes	San Joaquin Valley: Kings, Kern, and San Joaquin Counties	Freshwater sloughs and marshes; 3-100 m. May-August.
Recurved larkspur *Delphinium recurvatum*	--/--/1B.2/Yes	Central Valley from Colusa to Kern Counties	Alkaline soils in saltbush scrub, cismontane woodland, valley and foothill grassland; 3-750 m. March-May.
Round-leaved filaree *Erodium macrophyllum*	--/--/2.1/No	Scattered occurrences in the Great Valley, southern north Coast Ranges, San Francisco Bay area, south Coast Ranges, Channel Islands, Transverse Ranges, and Peninsular Ranges	Cismontane woodland, valley and foothill grassland on clay soils; 15-1,200 m. March-May.
Delta button-celery *Eryngium racemosum*	--/E/1B.1/Yes	San Joaquin River delta floodplains and adjacent Sierra Nevada foothills: Calaveras, Merced, San Joaquin, and Stanislaus Counties	Riparian scrub, seasonally inundated depressions along floodplains on clay soils; below 75 m. June-August.
Wright's trichocoronis *Trichocoronis wrightii* var. *wrightii*	--/--/2.1/Yes	Scattered locations in the Central Valley; southern coast of Texas	Floodplains, moist places, on alkaline soils; below 450 m. May-September.
Caper-fruited tropidocarpum *Tropidocarpum capparideum*	--/--/1B.1/Yes	Historically known from the northwest San Joaquin Valley and adjacent Coast Range foothills; currently known from Fresno, Monterey, and San Luis Obispo Counties	Alkaline hills in valley and foothill grassland; below 455 m. March-April.

NOTES: CNPS = CALIFORNIA NATIVE PLANT SOCIETY
SJMSCP = SAN JOAQUIN MULTI-SPECIES HABITAT CONSERVATION AND OPEN SPACE PLAN
FEDERAL
E = ENDANGERED UNDER THE FEDERAL ENDANGERED SPECIES ACT.
T = THREATENED UNDER THE FEDERAL ENDANGERED SPECIES ACT.
STATE
E = ENDANGERED UNDER THE CALIFORNIA ENDANGERED SPECIES ACT.
T = THREATENED UNDER THE FEDERAL CALIFORNIA ENDANGERED SPECIES ACT.
R = RARE UNDER THE CALIFORNIA ENDANGERED SPECIES ACT
CALIFORNIA NATIVE PLANT SOCIETY
1B = RARE, THREATENED, OR ENDANGERED IN CALIFORNIA AND ELSEWHERE.
2 = RARE, THREATENED, OR ENDANGERED IN CALIFORNIA, BUT MORE COMMON ELSEWHERE.
3 = A REVIEW LIST – PLANTS ABOUT WHICH MORE INFORMATION IS NEEDED.
4 = PLANTS OF LIMITED DISTRIBUTION – A WATCH LIST
.1 = SERIOUSLY ENDANGERED IN CALIFORNIA (OVER 80% OF OCCURRENCES THREATENED-HIGH DEGREE AND IMMEDIACY OF THREAT).
.2 = FAIRLY ENDANGERED IN CALIFORNIA (20-80% OCCURRENCES THREATENED).
.3 = NOT VERY ENDANGERED IN CALIFORNIA (<20% OF OCCURRENCES THREATENED).

Special Status Plant Species

There are seven special status plants identified as having the potential to occur on the Project site based on known occurrences in the region. These include: Big tarplant (*Blepharizonia plumose*), Slough thistle (*Cirsium crassicaule*), Recurved larkspur (*Delphinium recurvatum*), Round-leaved filaree (*Erodium macrophyllum*), Delta button-celery (*Eryngium racemosum*), Wright's trichocoronis (*Trichocoronis wrightii var. wrightii*), and Caper-fruited tropidocarpum (*Tropidocarpum capparideum*).

Of the seven species, there are no federal listed species, one state listed species (endangered), five CNPS 1B listed species (including the state listed species), and two CNPS 2 listed species. The state listed species and CNPS 1B listed species are covered species under the SJMCP. The CNPS 2 listed species are not covered under the SJMCP.

TABLE BIO-2: SPECIAL-STATUS WILDLIFE AND FISH SPECIES WHICH MAY OCCUR IN PROJECT AREA

SPECIES	*STATUS (FED/CA/ SJMSCP)*	*GEOGRAPHIC DISTRIBUTION*	*HABITAT REQUIREMENTS*
INVERTEBRATES			
Vernal pool fairy shrimp *Branchinecta lynchi*	T/--/Yes	Central Valley, central and south Coast Ranges from Tehama County to Santa Barbara County. Isolated populations also in Riverside County	Common in vernal pools; they are also found in sandstone rock outcrop pools.
Vernal pool tadpole shrimp *Lepidurus packardi*	E/--/Yes	Shasta County south to Merced County	Vernal pools and ephemeral stock ponds.
Molestan blister beetle *Lytta molesta*	--/--/Yes	Distribution of this species is poorly known.	Annual grasslands, foothill woodlands or saltbush scrub.
Sacramento anthicid beetle *Anthicus sacramento*	--/--/No	Found in several locations along the Sacramento and San Joaquin rivers, from Shasta to San Joaquin counties, and at one site along the Feather River.	Sand dune area, sand slipfaces among bamboo and willow, but may not depend on these plants.
Valley elderberry longhorn beetle *Desmocerus californicus dimorphus*	T/--/Yes	Stream side habitats below 3,000 feet throughout the Central Valley	Riparian and oak savanna habitats with elderberry shrubs; elderberries are the host plant.
AMPHIBIANS			
California tiger salamander *Ambystoma californiense (A. tigrinum c.)*	T/SSC/Yes	Central Valley, including Sierra Nevada foothills, up to approximately 1,000 feet, and coastal region from Butte County south to northeastern San Luis Obispo County.	Small ponds, lakes, or vernal pools in grass-lands and oak woodlands for larvae; rodent burrows, rock crevices, or fallen logs for cover for adults and for summer dormancy.
California red-legged frog *Rana aurora draytoni*	T/SSC/Yes	Found along the coast and coastal mountain ranges of California from Marin County to San Diego County and in the Sierra Nevada from Tehama County to Fresno County	Permanent and semi-permanent aquatic habitats, such as creeks and cold-water ponds, with emergent and submergent vegetation. May estivate in rodent burrows or cracks during dry periods.
BIRDS			
Aleutian goose *Branta canadensis leucopareia*	D/--/Yes	The entire population winters in Butte Sink, then moves to Los Banos, Modesto, the Delta, and East Bay reservoirs; stages near Crescent City during spring before migrating to breeding grounds.	Roosts in large marshes, flooded fields, stock ponds, and reservoirs; forages in pastures, meadows, and harvested grainfields; corn is especially preferred
American Peregrine Falcon *Falco peregrinus anatum*	D (BCC)/D/No	Patchy breeding distribution and occur across the continental U.S., with bigger concentrations taking place in the western states and Alaska. They winter in the northern limits of their range, including portions of Canada, and are very widespread during migration.	Near wetlands, lakes, rivers, or other water; on cliffs, banks, dunes, mounds; also, human-made structures. Nest consists of a scrape or a depression or ledge in an open site.
Bald eagle *Haliaeetus leucocephalus*	D (BCC)/E/No	Nests in Siskiyou, Modoc, Trinity, Shasta, Lassen, Plumas, Butte, Tehama, Lake, and Mendocino Counties and in the Lake Tahoe Basin. Reintroduced into central coast. Winter range includes the rest of California, except the southeastern deserts, very high altitudes in the Sierra Nevada, and east of the Sierra Nevada south of Mono County	In western North America, nests and roosts in coniferous forests within 1 mile of a lake, reservoir, stream, or the ocean
Burrowing owl *Athene cunicularia*	BCC/SSC/Yes	Lowlands throughout California, including the Central Valley, northeastern plateau, southeastern deserts, and coastal areas. Rare along south coast	Level, open, dry, heavily grazed or low stature grassland or desert vegetation with available burrows

SPECIES	STATUS (FED/CA/ SJMSCP)	GEOGRAPHIC DISTRIBUTION	HABITAT REQUIREMENTS
California black rail *Laterallus jamaicensis coturniculus*	BCC/T/Yes	Permanent resident in the San Francisco Bay and east-ward through the Delta into Sacramento and San Joaquin Counties; small populations in Marin, Santa Cruz, San Luis Obispo, Orange, Riverside, and Imperial Counties	Tidal salt marshes associated with heavy growth of pickleweed; also occurs in brackish marshes or freshwater marshes at low elevations
Fox sparrow *Branta canadensis leucopareia*	BCC/--/No	Found throughout North American, with several subspecies wintering in chaparral in California.	Breed in thickets and chaparral across northern North America and south along the western mountains. During migration, Fox Sparrows forage in the leaf litter of open hardwood forests as well as swampy thickets. Winter in chaparral.
Least Bittern *Ixobrychus exilis*	BCC/SSC/No	Nest in large marshes with dense vegetation from southern Canada to northern Argentina. These birds migrate from the northern parts of their range in winter for the southernmost coasts of the United States and areas further south, travelling at night.	Colonial nester in marshlands and borders of ponds and reservoirs which provide ample cover. Nests usually placed low in tules, over water. Marsh & swamp wetland.
lesser yellowlegs *Branta canadensis leucopareia*	BCC/--/No	Wintering occurs along the coasts of California, Baja California, southeastern U.S., and along the Gulf of Mexico, in addition to southeastern Texas and throughout Central America.	Wintering habitat use varies with rainfall; tidal flats may be frequented during the dry season, while adjacent shallow lagoons and marshes are used during the rainy season.
lewis's woodpecker *Branta canadensis leucopareia*	BCC/--/No	Breed from southern British Columbia down to Arizona and New Mexico; this range also covers California east to Colorado. They winter from southern British Columbia throughout the southwestern U.S. Within the northern portion of its breeding range, it remains present throughout the year in many portions of its breeding range.	Open ponderosa pine forest, open riparian woodland dominated by cottonwood, and logged or burned pine forest. Their breeding distribution is widely associated with ponderosa pine distribution in western North America. Lewis's Woodpeckers commonly reuse existing nest holes or natural cavities in trees, as they do not use newly excavated ones.
Loggerhead shrike *Lanius ludovicianus*	BCC/SSC/Yes	Resident and winter visitor in lowlands and foothills throughout California. Rare on coastal slope north of Mendocino County, occurring only in winter	Prefers open habitats with scattered shrubs, trees, posts, fences, utility lines, or other perches
Long-billed curlew *Numenius americanus*	BCC/--/Yes	Nests in northeastern California in Modoc, Siskiyou, and Lassen Counties. Winters along the coast and in interior valleys west of Sierra Nevada	Nests in high-elevation grasslands adjacent to lakes or marshes. During migration and in winter; frequents coastal beaches and mudflats and interior grasslands and agricultural fields
Marbeled godwit *Branta canadensis leucopareia*	BCC/--/No	Breeds in Montana as well as North and South Dakota, with this range extending through Alberta, Saskatchewan and Manitoba in Canada. Marbled Godwits winter along both coasts and the Gulf of Mexico and are transient elsewhere.	Breeds in marshes and flooded plains, in migration and winter also on mudflats and beaches.
Mountain plover *Charadrius montanus*	BCC/SSC/Yes	Does not breed in California; in winter, found in the Central Valley south of Yuba County, along the coast in parts of San Luis Obispo, Santa Barbara, Ventura, and San Diego Counties; parts of Imperial, Riverside, Kern, and Los Angeles Counties	Occupies open plains or rolling hills with short grasses or very sparse vegetation; nearby bodies of water are not needed; may use newly plowed or sprouting grainfields
Nuttalls woodpecker *Branta canadensis leucopareia*	BCC/--/No	Year-round distribution occurs from northern California and southward to northwestern Baja California.	Found primarily in oak woodlands, but also found in riparian woodlands. Tree nest cavity excavated by males with little assistance from females; male may roost in cavity as it nears completion.
Oak titmouse *Baeolophus inornatus*	BCC/S/No	Nonmigratory species that breeds from Oregon, through California and to northwest Baja California, Mexico.	Live in warm, open, dry oak or oak-pine woodlands. Many will use scrub oaks or other brush as long as woodlands are nearby. Nests are built in tree cavities. Occasionally, Oak Titmice nest in stumps, fenceposts, pipes, eaves, or holes in riverbanks. They will also use nest boxes.

SPECIES	*STATUS (FED/CA/ SJMSCP)*	*GEOGRAPHIC DISTRIBUTION*	*HABITAT REQUIREMENTS*
Short-eared owl *Asio flammeus*	BCC/SSC/Yes	Permanent resident along the coast from Del Norte County to Monterey County although very rare in summer north of San Francisco Bay, in the Sierra Nevada north of Nevada County, in the plains east of the Cascades, and in Mono County; small, isolated populations	Freshwater and salt marshes, lowland meadows, and irrigated alfalfa fields; needs dense tules or tall grass for nesting and daytime roosts.
Song sparrow (Modesto Population) *Melospiza melodia*	BCC/SSC/Yes	Restricted to California, where it is locally numerous in the Sacramento Valley, Sacramento–San Joaquin River Delta, and northern San Joaquin Valley. Exact boundaries of range uncertain.	Found in emergent freshwater marshes dominated by tules (*Scirpus* spp.) and cattails (*Typha* spp.) as well as riparian willow (*Salix* spp.) thickets. They also nest in riparian forests of Valley Oak (*Quercus lobata*) with a sufficient understory of blackberry (*Rubus* spp.), along vegetated irrigation canals and levees, and in recently planted Valley Oak restoration sites.
Swainson's hawk *Buteo swainsoni*	BCC/T/Yes	Lower Sacramento and San Joaquin Valleys, the Klamath Basin, and Butte Valley. Highest nesting densities occur near Davis and Woodland, Yolo County	Nests in oaks or cottonwoods in or near riparian habitats. Forages in grasslands, irrigated pastures, and grain fields
Merlin *Falco columbarius*	--/--/Yes	Does not nest in California. Rare but widespread winter visitor to the Central Valley and coastal areas	Forages along coastline in open grasslands, savannas, and woodlands. Often forages near lakes and other wetlands
Tricolored blackbird *Agelaius tricolor*	BCC/C (SSC)/Yes	Permanent resident in the Central Valley from Butte County to Kern County. Breeds at scattered coastal locations from Marin County south to San Diego County; and at scattered locations in Lake, Sonoma, and Solano Counties. Rare nester in Siskiyou, Modoc, and Lassen Counties	Nests in dense colonies in emergent marsh vegetation, such as tules and cattails, or upland sites with blackberries, nettles, thistles, and grainfields. Habitat must be large enough to support 50 pairs. Probably requires water at or near the nesting colony
Western grebe *Branta canadensis leucopareia*	BCC/--/No	Breeds mainly from western Canada, east to southwestern Manitoba, and south through U.S. from California and Utah through the northern Rocky Mountain and upper Great Plains states. Winters mainly along Pacific Coast from southeastern Alaska to northwestern Mexico.	Breed on freshwater lakes and marshes with extensive open water bordered by emergent vegetation. During winter they move to saltwater or brackish bays, estuaries, or sheltered sea coasts and are less frequently found on freshwater lakes or rivers.
Western yellow-billed cuckoo *Coccyzus americanus occidentalis*	T (BCC)/E/Yes	Nests along the upper Sacramento, lower Feather, south fork of the Kern, Amargosa, Santa Ana, and Colorado Rivers	Wide, dense riparian forests with a thick understory of willows for nesting; sites with a dominant cottonwood overstory are preferred for foraging; may avoid valley oak riparian habitats where scrub jays are abundant
Williamson's sapsucker *Branta canadensis leucopareia*	BCC/--/No	Breeding: Southern British Columbia, through central Washington to California; extending to Idaho, Montana, Utah, Wyoming, Colorado, New Mexico and Arizona. Winter: Arizona, New Mexico, through the Sierra Madres and into central Mexico.	Inhabits open coniferous and mixed coniferous-deciduous forests.
Yellow-billed magpie *Pica nuttalli*	BCC/--/No	The year-round range of Yellow-billed Magpies is entirely in California.	Resides in oak savanna, open areas with large trees, and along streams. This species also forages in grassland, pasture, fields, and orchards.
Yellow-headed blackbird *Xanthocephalus*	--/SSC/Yes	Nests in freshwater emergent wetlands with dense vegetation and deep water. Often along borders of lakes or ponds.	Nests only where large insects such as odonatan are abundant, nesting timed with maximum emergence of aquatic insects.
FISH			
Delta smelt *Hypomesus transpacificus*	T/T/Yes	Primarily in the Sacramento–San Joaquin Estuary but has been found as far upstream as the mouth of the American River on the Sacramento River and Mossdale on the San Joaquin River; range extends downstream to San Pablo Bay.	Occurs in estuary habitat in the Delta where fresh and brackish water mix in the salinity range of 2–7 parts per thousand.

SPECIES	STATUS (FED/CA/ SJMSCP)	GEOGRAPHIC DISTRIBUTION	HABITAT REQUIREMENTS
Hardhead *Mylopharodon conocephalus*	--/SSC/No	Tributary streams in the San Joaquin drainage; large tributary streams in the Sacramento River and the main stem	Resides in low to mid-elevation streams and prefer clear, deep pools and runs with slow velocities. They also occur in reservoirs.
Central Valley steelhead *Oncorhynchus mykiss*	T/--/No	Sacramento River and tributary Central Valley rivers.	Occurs in well-oxygenated, cool, riverine habitat with water temperatures from 7.8°C to 18°C. Habitat types are riffles, runs, and pools.
Central Valley fall- /late fall-run Chinook salmon *Oncorhynchus tshawytscha*	--/SSC/No	Sacramento and San Joaquin Rivers and tributary Central Valley rivers.	Have the same general habitat requirements as winter and spring-run Chinook salmon.
Longfin smelt *Spirinchus thaleichthys*	--/SSC/Yes	Occurs in estuaries along the California coast. Adults concentrated in Suisun, San Pablo, and North San Francisco Bays.	Prior to spawning, these fish aggregate in deepwater habitats available in the northern Delta, including, primarily, the channel habitats of Suisun Bay and the Sacramento River. Spawning occurs in fresh water on the San Joaquin River below Medford Island and on the Sacramento River below Rio Vista.
MAMMALS			
Riparian (San Joaquin Valley) woodrat *Neotoma fuscipes riparia*	E/SSC, FP/Yes	Historical distribution along the San Joaquin, Stanislaus, and Tuolumne Rivers, and Caswell State Park in San Joaquin, Stanislaus, and Merced Counties; presently limited to San Joaquin County at Caswell State Park and a possible second population near Vernalis	Riparian habitats with dense shrub cover, willow thickets, and an oak overstory
Riparian brush rabbit *Sylvilagus bachmani riparius*	E/E/Yes	Limited to San Joaquin County at Caswell State Park near the confluence of the Stanislaus and San Joaquin Rivers and Paradise Cut area on Union Pacific right-of-way lands	Native valley riparian habitats with large clumps of dense shrubs, low-growing vines, and some tall shrubs and trees
American badger *Taxidea taxus*	--/SSC/Yes	In California, badgers occur throughout the state except in humid coastal forests of northwestern California in Del Norte and Humboldt Counties	Badgers occur in a wide variety of open, arid habitats but are most commonly associated with grasslands, savannas, mountain meadows, and open areas of desert scrub; the principal habitat requirements for the species appear to be sufficient food (burrowing rodents), friable soils, and relatively open, uncultivated ground
San Joaquin kit fox *Vulpes macrotis mutica*	E/T/Yes	Principally occurs in the San Joaquin Valley and adjacent open foothills to the west; recent records from 17 counties extending from Kern County north to Contra Costa County	Saltbush scrub, grassland, oak, savanna, and freshwater scrub
REPTILES			
Giant garter snake *Thamnophis couchi gigas*	T/T/Yes	Central Valley from the vicinity of Burrel in Fresno County north to near Chico in Butte County; has been extirpated from areas south of Fresno	Sloughs, canals, low gradient streams and freshwater marsh habitats where there is a prey base of small fish and amphibians; they are also found in irrigation ditches and rice fields; requires grassy banks and emergent vegetation for basking and areas of high ground protected from flooding during winter.

STATUS EXPLANATIONS:

FEDERAL

E = ENDANGERED UNDER THE FEDERAL ENDANGERED SPECIES ACT.

T = THREATENED UNDER THE FEDERAL ENDANGERED SPECIES ACT.

PE = PROPOSED FOR ENDANGERED UNDER THE FEDERAL ENDANGERED SPECIES ACT.

PT = PROPOSED FOR THREATENED UNDER THE FEDERAL ENDANGERED SPECIES ACT.

C = CANDIDATE SPECIES FOR LISTING UNDER THE FEDERAL ENDANGERED SPECIES ACT.

D = DELISTED FROM FEDERAL LISTING STATUS.

BCC = BIRD OF CONSERVATION CONCERN

STATE
E = ENDANGERED UNDER THE CALIFORNIA ENDANGERED SPECIES ACT.
T = THREATENED UNDER THE CALIFORNIA ENDANGERED SPECIES ACT.
C = CANDIDATE SPECIES FOR LISTING UNDER THE STATE ENDANGERED SPECIES ACT.
FP = FULLY PROTECTED UNDER THE CALIFORNIA FISH AND GAME CODE.
SSC = SPECIES OF SPECIAL CONCERN IN CALIFORNIA.

Special Status Wildlife Species

Invertebrates: There are three special-status invertebrates that are documented within a 10-mile radius of the Project site according to the CNDDB including: Molestan blister beetle (*Lytta molesta*), Sacramento anthicid beetle (*Anthicus sacramento*), and valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*). In addition, the Vernal pool fairy shrimp (*Branchinecta lynchi*) and Vernal pool tadpole shrimp (*Lepidurus packardi*) are documented in the USFWS IPAC database as potentially occurring within the region.

Vernal pool fairy shrimp (VPFS) is a federal threatened invertebrate found in the Central Valley, central and south Coast Ranges from Tehama County to Santa Barbara County. They are commonly found in vernal pools and in sandstone rock outcrop pools. VPFS is not anticipated to be directly affected by any individual phase or component of the proposed Project because there in not appropriate vernal pool habitat on the Project site.

Vernal pool tadpole shrimp (VPTS) is a federal endangered invertebrate found in vernal pools and stock ponds from Shasta County south to Merced County. VPTS is not anticipated to be directly affected by any individual phase or component of the proposed Project because there in not appropriate vernal pool habitat on the Project site.

Valley elderberry longhorn beetle (VELB) is a federal threatened insect, proposed for delisting. Elderberry (*Sambucus* sp.), which is a primary host species for valley elderberry longhorn beetle (VELB). VELB is not anticipated to be directly affected by the proposed project.

Essential habitat for Molestan blister beetle and Sacramento anthicid beetle is not present on the Project site.

No special-status invertebrates are expected to be affected by the proposed project. Nevertheless, Mitigation Measure BIO-1 requires the Project proponent to seek coverage under the SJMSCP to mitigate for habitat impacts to covered special status species. Coverage involves compensation for habitat impacts on covered species through implementation of incidental take and minimization measures (ITMMs) and payment of fees for conversion of lands that may provide habitat for covered special status species. These fees are used to preserve and/or create habitat in preserves to be managed in perpetuity. Obtaining coverage for a Project includes incidental take authorization (permits) under the Endangered Species Act Section 10(a), California Fish and Game Code Section 2081, and the MBTA. Coverage under the SJMSCP would fully mitigate all habitat impacts on covered special-status species.

Reptile and amphibian species: There is one special-status amphibian that is documented within a 10-mile radius of the Project site according to the CNDDB including: California tiger salamander (*Ambystoma californiense*). In addition, the California red-legged frog (*Rana aurora draytoni*) and Giant garter snake (*Thamnophis couchi gigas*) are documented in the USFWS IPAC database as potentially occurring within the region. There is no essential habitat for any of these three species within the Project.

No special-status reptiles or amphibians are expected to be affected by the proposed project. Nevertheless, Mitigation Measure BIO-1 requires the Project proponent to seek coverage under the SJMSCP to mitigate for habitat impacts to covered special status species. Coverage involves compensation for habitat impacts on covered species through implementation of incidental take and minimization measures (ITMMs) and payment of fees for conversion of lands that may provide habitat for covered special status species. These fees are used to preserve and/or create habitat in preserves to be managed in perpetuity. Obtaining coverage for a Project includes incidental take authorization (permits) under the Endangered Species Act Section 10(a), California Fish and Game Code Section 2081, and the MBTA. Coverage under the SJMSCP would fully mitigate all habitat impacts on covered special-status species.

Birds: Special-status birds that are documented in the CNDDB within a ten-mile radius of the Project site include: Aleutian goose (*Branta canadensis leucopareia*), Yellow-headed blackbird (*Xanthocephalus xanthocephalus*), Swainson's hawk (*Buteo swainsoni*), song sparrow (Modesto population) (*Melospiza melodia*), Merlin (*Falco columbarius*), western yellow-billed cuckoo (*Coccyzus americanus occidentalis*), burrowing owl (*Athene cunicularia*), Tricolored blackbird (*Agelaius tricolor*). In addition, the bald eagle (*Haliaeetus leucocephalus*), black rail (*Laterallus jamaicensis*), fox sparrow (*Passerella iliaca*), least bittern (*Ixobrychus exilis*), lesser yellowlegs (*Tringa flavipes*), Lewis's woodpecker (*Melanerpes lewis*), loggerhead shrike (*Lanius ludovicianus*), long-billed curlew (*Numenius americanus*), marbeled godwit (*Limosa fedoa*), mountain plover (*Charadrius montanus*), Nuttalls woodpecker (*Picoides nuttallii*), oak titmouse (*Baeolophus inornatus*), peregrine falcon (*Falco peregrinus*), short-eared owl (*Asio flammeus*), western grebe (A*echmophorus occidentalis*), Williamson's sapsucker (*Sphyrapicus thyroideus*), and yellow-billed magpie (*Pica nuttalli*) are documented in the USFWS IPAC database as potentially occurring within the region. The Project site may provide suitable foraging habitat for a variety of potentially occurring special-status birds, including those listed above. Potential nesting habitat is present in a variety of trees located within the Project site and in the vicinity, although no active or residual nests were observed. There is also the potential for other special-status birds that do not nest in this region and represent migrants or winter visitants to forage on the Project site.

Year-round birds: Special-status birds that can be present in the region throughout the year include: bald eagle (*Haliaeetus leucocephalus*), black rail (*Laterallus jamaicensis*), burrowing owl (*Athene cunicularia*), loggerhead shrike *(Lanius ludovicianus*), Nuttalls woodpecker (*Picoides nuttallii*), oak titmouse (*Baeolophus inornatus*), song sparrow (Modesto population) (*Melospiza melodia*), tricolored blackbird *(Agelaius tricolor*), Williamson's sapsucker (*Sphyrapicus thyroideus*), yellow-billed magpie (*Pica nuttalli*), among others. Some of these species are migratory, but also reside year-round in California.

Summering Birds: Special-status birds that are only present in the region in the spring and summer months include: Aleutian goose (*Branta canadensis leucopareia*), least bittern (*Ixobrychus exilis*), Swainson's hawk (*Buteo swainsoni*), western yellow-billed cuckoo (*Coccyzus americanus occidentalis*), and yellow-billed magpie (*Pica nuttalli*).

Overwintering Birds: Special-status birds that are only present in the region in the fall and winter months include: fox sparrow (*Passerella iliaca*), lesser yellowlegs (*Tringa flavipes*), Lewis's woodpecker (*Melanerpes lewis*), long-billed curlew (*Numenius americanus*), marbeled godwit (*Limosa fedoa*), merlin *(Falco columbarius*), mountain plover (*Charadrius montanus*), peregrine falcon (*Falco peregrinus*), short-eared owl (*Asio flammeus*), and western grebe (A*echmophorus occidentalis*).

Nesting Raptors (Birds of Prey): All raptors (owls, hawks, eagles, falcons), including species and their nests, are protected from take pursuant to the Fish and Game Code of California Section 3503.5, and the federal Migratory Bird Treaty Act, among other federal and State regulations. Special-status raptors that are known to occur in the region include: bald eagle (*Haliaeetus leucocephalus*), burrowing owl (*Athene cunicularia*), Cooper's hawk *(Accipiter cooperii*), ferruginous hawk *(Buteo rega*), golden eagle *(Aquila chrysaetos*), great horned owl *(Bubo virginianus),* prairie falcon *(Falco mexicanus*), red-tailed hawk *(Buteo jamaicensis),* short-eared owl (*Asio flammeus*), Swainson's hawk *(Buteo swainsoni*), and white-tailed kite *(Elanus leucurus*), among others.

Analysis: While the Project site contains very limited nesting habitat, there are powerlines and trees located along Oleander Avenue, as well as throughout the region. These represent potentially suitable nesting habitat for a variety of special-status birds. Additionally, the agricultural land represents potentially suitable nesting habitat for the ground-nesting birds where disturbance is less frequent. In general, most nesting occurs from late February and early March through late July and early August, depending on various environmental conditions. The CNDDB currently contains nesting records for Swainson's hawk and burrowing owl in the vicinity of the Project site. In addition to the species described above, common raptors may nest in or adjacent to the Project site.

New sources of noise and light during the construction and operational phases of the project could adversely affect nesters if they located adjacent to the Project site in any given year. Additionally, the proposed Project would eliminate the agricultural areas on the Project site, which serve as potential foraging habitat for birds throughout the year. Mitigation Measure BIO-1 requires participation in the SJMSCP. As part of the SJMSCP, SJCOG requires preconstruction surveys for projects that occur during the avian breeding season (March 1 – August 31). When active nests are identified, the biologists develop buffer zones around the active nests as deemed appropriate until the young have fledged. SJCOG also uses the fees to purchase habitat as compensation for the loss of foraging habitat. Implementation of the proposed project, with the Mitigation Measure BIO-1, would ensure that potential impacts to special status birds are reduced.

Mammal: Special-status mammals that are documented within a 10-mile radius of the Project site include: Riparian (San Joaquin Valley) woodrat (*Neotoma fuscipes riparia*), Riparian brush rabbit (*Sylvilagus bachmani riparius*), American badger (*Taxidea taxus*), and San Joaquin kit fox (*Vulpes macrotis mutica*).

Riparian (San Joaquin Valley) woodrat and riparian brush rabbit: The Project site does not contain appropriate habitat for riparian (San Joaquin Valley) woodrat and riparian brush rabbit.

American badger, San Joaquin kit fox, or San Joaquin pocket mouse: The Project site does not contain high quality habitat for the American badger. All but one of the documented occurrences of the San Joaquin kit fox occur on the southwest side of Tracy near the foothills with one documented occurrence located near Mountain House. The closest documented occurrence of San Joaquin pocket mouse is approximately five miles west of the Project site. It is unlikely that the Project site is used by American badger, San Joaquin kit fox, or San Joaquin pocket mouse and these species have not been observed during recent or previous field surveys.

Special-status bats: The Project site provides potential habitat for several special-status bats, including: Greater western mastiff bat (*Eumops perotis californicus*), western red bat (*Lasiurus blossevillii*), small-footed myotis/bat (*Myotis ciliolabrum*), long-eared myotis/bat (*Myotis evotis*), fringed myotis/bat (*Myotis thysanodes*), long-legged myotis/bat (*Myotis volans*), and Yuma myotis/bat (*Myotis yumanensis*). These species are not federal, or state listed; however, they are tracked by the CNDDB. Development of the Project site would eliminate foraging habitat for special status bats by removing the agricultural areas. Additionally, special status bats can establish roosts within the structures and/or trees located on the Project site. Bats can establish roosts even when absent in prior years. These special status bat species are covered by the SJMSCP.

Conclusion: No special-status species are expected to be affected by the proposed project. Nevertheless, Mitigation Measure BIO-1 requires the Project proponent to seek coverage under the SJMSCP to mitigate for habitat impacts to covered special status species. Coverage involves compensation for habitat impacts on covered species through implementation of incidental take and minimization Measures (ITMMs) and payment of fees for conversion of lands that may provide habitat for covered special status species. These fees are used to preserve and/or create habitat in preserves to be managed in perpetuity. Obtaining coverage for a Project includes incidental take authorization (permits) under the Endangered Species Act Section 10(a), California Fish and Game Code Section 2081, and the MBTA. Coverage under the SJMSCP would fully mitigate all habitat impacts on covered special-status species.

More specifically, the SJMSCP is administered by a Joint Powers Authority consisting of members of the SJCOG, the CDFW, and the USFWS. According to the SJMSCP, adoption and implementation by local planning jurisdictions provides full compensation and mitigation for impacts to plants, fish and wildlife. Adoption and implementation of the SJMSCP also secures compliance pursuant to the state and federal laws such as CEQA, the National Environmental Policy Act (NEPA), the Planning and Zoning Law, the State Subdivision Map Act, the Porter-Cologne Act and the Cortese-Knox Act in regard to species covered under the SJMSCP. Applicants pay mitigation fees on a per-acre basis. The entire County is mapped according to these categories so that landowners, project proponents and project reviewers are easily aware of the applicable SJMSCP fees for the proposed development. The appropriate fees are collected by the City and remitted to SJCOG for administration. SJCOG uses the funds to preserve open space land of comparable types throughout the County, often coordinating with other private or public land trusts to purchase conservation easements or buy land outright for preservation. The fees are automatically adjusted on an annual basis. The fees have been designed to sufficiently mitigate the impacts of projects on candidate, sensitive, and special status species. Therefore, with implementation of Mitigation Measure BIO-1, the proposed Project would have a ***less than significant*** impact relative to this topic.

Mitigation Measure(s)

***Mitigation Measure BIO-1**: Prior to commencement of any grading activities, the Project proponent shall seek coverage under the SJMSCP to mitigate for habitat impacts to covered special status species. Coverage involves compensation for habitat impacts on covered species through implementation of incidental take and minimization Measures (ITMMs) and payment of fees for conversion of lands that may provide habitat for covered special status species. These fees are used to preserve and/or create habitat in preserves to be managed in perpetuity. Obtaining coverage for a Project includes incidental take authorization (permits) under the Endangered Species Act Section 10(a), California Fish and Game Code Section 2081, and the MBTA. Coverage under the SJMSCP would fully mitigate all habitat impacts on covered special-status species.*

Responses b): There is no riparian habitat on the Project site. The CNDDB record search revealed documented occurrences of four sensitive habitats within 10 miles of the Project site including:

Elderberry Savanna, Great Valley Cottonwood Riparian Forest, Great Valley Mixed Riparian Forest, and Great Valley Oak Riparian. None of these sensitive natural communities occur within the portion of the Project site. Implementation of the proposed Project would have a ***less than significant*** impact on riparian habitats or natural communities.

Response c): The Project site does not contain protected wetlands or other jurisdictional areas and there is no need for permitting associated with the federal or state Clean Water Acts. The irrigation ditches are man-made isolated facilities with the sole purpose of agricultural irrigation. These ditches are exempt from permitting. Absent any wetlands or jurisdictional waters, implementation of the proposed Project would have ***less than significant*** impact relative to this topic.

Response d): The CNDDB record search did not reveal any documented wildlife corridors or wildlife nursery sites on or adjacent to the Project site. Special status fish species documented within the region include: Delta smelt (*Hypomesus transpacificus*), Hardhead (*Mylopharodon conocephalus*), Central Valley steelhead (*Oncorhynchus mykiss*), Central Valley fall- /late fall-run Chinook salmon (*Oncorhynchus tshawytscha*), and Longfin smelt (*Spirinchus thaleichthys*). The closest major natural movement corridor for native fish that are documented in the region is the San Joaquin River, located to the west of the Project site. The land uses within the Project site would not have any direct disturbance to the San Joaquin River or its tributaries, and therefore, would not have any direct disturbance to the movement corridor or habitat.

The ongoing operational phase of the proposed Project requires discharge of stormwater into the City storm drainage system, which ultimately discharges into the Delta. The discharge of stormwater could result in indirect impacts to special status fish and wildlife if stormwater was not appropriately treated through BMPs prior to its discharge to the Delta. The Manteca Municipal Code Title 13 (Public Services) Chapter 13.28 (Stormwater Management and Discharges) establish minimum storm water management requirements and controls. Storm water drainage is managed through the implementation of best management practices to the extent they are technologically achievable to prevent and reduce pollutants. The City requires reasonable protection from accidental discharge of prohibited materials or other wastes into the municipal storm drain system or watercourses. The management of water quality through BMPs is intended to ensure that water quality does not degrade to levels that would interfere or impede fish or wildlife. Implementation of these required measures would ensure that this potential impact is reduced to a ***less than significant*** level.

Responses e): The proposed Project is subject to the San Joaquin County Multi-Species Habitat Conservation and Open Space Plan (SJMSCP). The proposed Project does not conflict with the SJMSCP. Therefore, the proposed Project would have a ***less than significant*** impact relative to this topic. The mitigation measure presented in this Initial Study requires participation in the SJMSCP.

Responses f): The Resource Conservation Element of the General Plan establishes numerous policies and implementation measures related to biological resources as listed below:

Conservation Element Policies

RC-P-31. Minimize impact of new development on native vegetation and wildlife.

- ***Consistent****: This Initial Study includes an in-depth analysis of impacts for sensitive plants and wildlife, as well as habitat. Where impacts are identified, mitigation measures are presented to minimize, avoid, or compensate to the extent practicable.*

RC-P-33. Discourage the premature removal of orchard trees in advance of development, and discourage the removal of other existing healthy mature trees, both native and introduced.

- ***Consistent**: The proposed Project will not require the removal of orchard trees.*

RC-P-34. Protect special status species and other species that are sensitive to human activities.

- ***Consistent**: This Initial Study includes an in-depth analysis of impacts for sensitive plants and wildlife, as well as habitat. Where impacts are identified, mitigation measures are presented to minimize, avoid, or compensate to the extent practicable.*

RC-P-35. Allow contiguous habitat areas.

- ***Consistent**: Habitat areas in the vicinity of the Project site include agricultural plant communities which provide habitat for a variety of biological resources in the region. Agricultural areas occur throughout the region and are generally flat and well drained, and as a result are well suited for many crops. Alfalfa fields, hay, row crops, orchards, dominate the agricultural areas in the vicinity. The proposed Project does not require contiguous habitat areas to change or convert to another use.*

RC-P-36. Consider the development of new drainage channels planted with native vegetation, which would provide habitat as well as drainage.

- ***Consistent**: The proposed Project does not include new drainage channels, in part because drainage channels in populated areas present health and safety considerations given the presence of water and the potential for drowning.*

Municipal Code

The Manteca Municipal Code calls for the avoidance of heritage trees as defined under section 17.61.030. Heritage trees are any natural woody plant rooted in the ground and having a diameter of 30 inches or more when measured two feet above the ground.

Section 17.19.060 calls for the protection of all existing trees having a diameter of six inches or more when measured 4½ feet above the ground. The City planning department must be notified of planned construction or grade changes within the proximity of existing mature trees. Existing trees must be protected from construction equipment, machinery, grade changes, and excavation for utilities, paving, and footers. Replacement of existing trees is subject to approval from the planning director and must be with a minimum 24-inch box tree of compatible species for the development site and be consistent with Section 17.19.030.

Section 12.08.070 of the municipal code prohibits cutting, pruning, removing, injuring, or interference with any tree, shrub, or plant upon or in any street tree area or other public place in the City without prior approval from the superintendent. The City is authorized to grant such permission at their discretion and where necessary. Except for utility companies, as provided in Section 12.08.080, no such permission shall be valid for a longer period than 30 days after its issuance.

There are no heritage trees located on the Project site that are planned to be removed. The Project site contains several ornamental trees, all of which are in the vicinity of the existing residence in the eastern portion of the project area. These trees are anticipated to remain intact on Lots E and F and do not require removal.

Nevertheless, the following mitigation measures would require compliance with the Manteca Municipal Code for removal and replacement of trees in the event that tree removal is necessary. With the implementation of the following mitigation measures, the proposed Project would have a ***less than significant*** impact relative to this topic.

Mitigation Measure

Mitigation Measure BIO-2*: Prior to the approval of improvement plans, the Project applicant shall provide a landscape plan that includes tree planting specifications established by the Manteca Municipal Code (17.19.060) for the replacement of any trees, excluding orchard and non-native trees, to be removed at a ratio of 1:1. Replacement trees shall be planted on-site at a location that is agreeable to the City.*

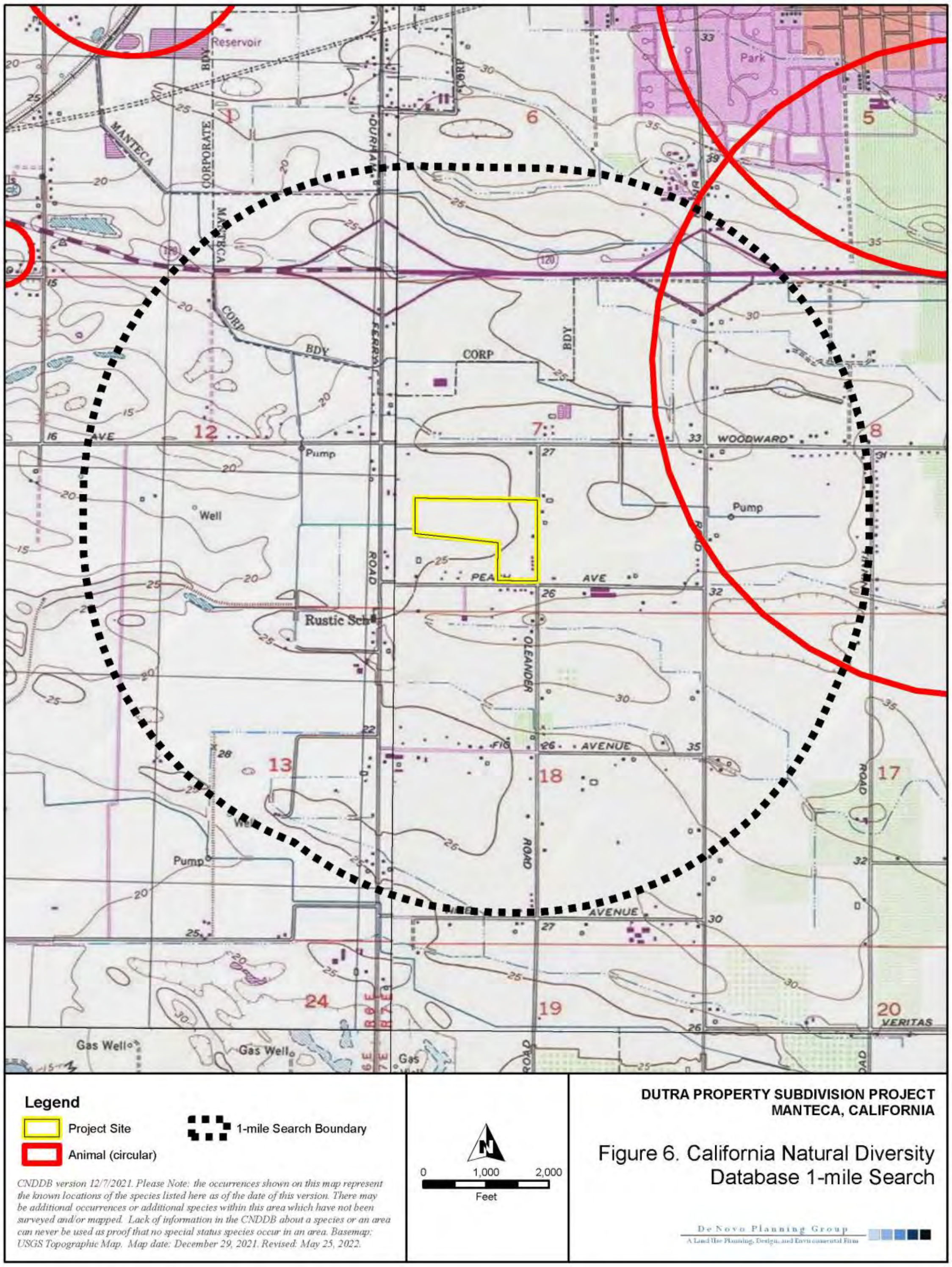

Figure 6. California Natural Diversity Database 1-mile Search

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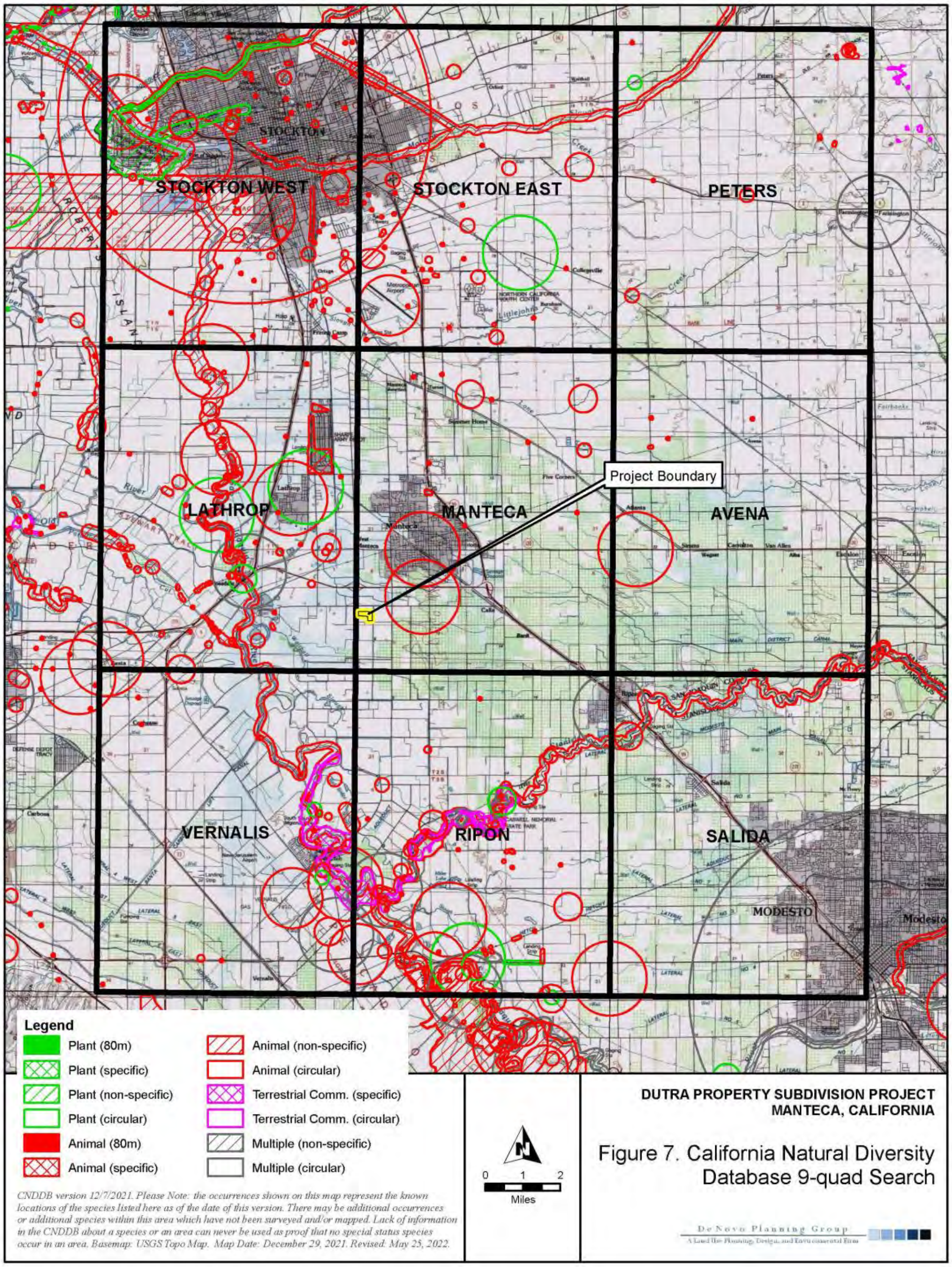

Figure 7. California Natural Diversity Database 9-quad Search

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V. CULTURAL RESOURCES

Would the project:	*Potentially Significant Impact*	*Less Than Significant with Mitigation Incorporation*	*Less Than Significant Impact*	*No Impact*
a) Cause a substantial adverse change in the significance of a historical resource pursuant to Section15064.5?		X		
b) Cause a substantial adverse change in the significance of an archaeological resource pursuant to Section 15064.5?		X		
c) Disturb any human remains, including those interred outside of formal cemeteries?		X		

Responses to Checklist Questions

Responses a), b): A Cultural Resources Assessment was prepared by Peak & Associates on December 21, 2021. The Cultural Resources Assessment included an Information Center records search and a complete field survey of the Project site. Melinda A. Peak, senior historian/archeologist with Peak & Associates, Inc. served as principal investigator for the study, with archeologist Michael Lawson completing the field survey.

The Cultural Resources Assessment included a record search that was conducted for the current APE and a 0.25-mile radius at the Central California Information Center of the California Historical Resources Information System on October 8, 2021. There are no resources recorded on the Project site.

In the ¼-mile radius search area, the Tesla-Salado-Manteca 115 kV Transmission Line has been recorded as P-39-005337. The Project site is shown as included as part of report done for the Windmiller and Napoli in 2002 (SJ-04786). This is an overview, with limited survey, and most private property would not have been surveyed in 2002. No previous survey had been conducted of the Project site.

Several other linear studies have been conducted in the record search radius (complete citations in the Report List in Appendix 2).

The Project site was surveyed on November 11, 2021 by Michael Lawson of Peak & Associates. He investigated the property by walking linear transects spaced no more than ten meters apart across the entire property. Transects were narrowed in portions of the property such as near the buildings and other features.

The project area is mostly flat, likely graded for irrigation for farming. Hay grass is currently growing in most of the parcel. Modern irrigation equipment is placed at the edges of fields. The east side of the survey area has several houses and outbuildings, as well as horses.

Soil throughout the farm field portion of survey area is uniformly light tan sandy loam, with light inclusion of water-rounded pebbles formed of granitic elements such as quartz and feldspar. Metavolcanic pebbles are less abundant. Areas that are disturbed by vehicular roads, animal trails and animal burrowing exhibit the same soil. No variation in soils color was observed. Soil in the animal pens at the east side of the parcel is medium brown loam, heavy in organic material, with little or no visible pebbles or gravel.

Aside from hay grass, mostly nonnative grasses and small bushes were observed near the perimeter of the survey area. There are a few native oaks and nonnative trees within the yards of the homes on the eastern side.

For the open acreage parallel transects no wider than ten meters were used, but closer transects and overlapping paths were required within animal pens and near houses.

Two homes are currently present on Oleander Avenue, at the eastern side of the parcel. Both date to about 1990. A third building lies to the south of the two modern residences, appearing to be an outbuilding.

No prehistoric period or historical period resources were observed during the survey.

Although unlikely, there is always a slight possibility that a site may exist in the Project site and be obscured by vegetation, siltation or historic activities, leaving no surface evidence. In order to assist in the recognition of cultural resources, a training session for all workers should be conducted in advance of the initiation of construction activities at the site. The training session will provide information on recognition of artifacts, human remains, and cultural deposits to help in the recognition of potential issues.

Implementation of the following mitigation measure would require investigations and avoidance methods in the event that a previously undiscovered cultural resource is encountered during construction activities. With implementation of the following mitigation measure, development of the proposed Project would have a ***less than significant*** impact on historical and archaeological resources.

Mitigation Measure(s)

Mitigation Measure CUL-1: *The Project applicant shall ensure that a training session for all workers is conducted in advance of the initiation of construction activities at the site. The training session will provide information on recognition of artifacts, human remains, and cultural deposits to help in the recognition of potential issues.*

Mitigation Measure CUL-2: *The Project applicant shall retain a qualified archaeologist to observe initial ground disturbance activities, during initial grading. If artifacts, exotic rock, shell or bone are uncovered during the construction, the archaeologist will be able to document the finding, and determine if additional work is necessary to excavate or remove the artifacts or feature.*

Mitigation Measure CUL-3: *If cultural resources (i.e., prehistoric sites, historic sites, isolated artifacts/features, and paleontological sites) are discovered during construction, work shall be halted immediately within 50 meters (165 feet) of the discovery, the City of Manteca shall be notified, and a qualified archaeologist that meets the Secretary of the Interior's Professional Qualifications Standards in prehistoric or historical archaeology (or a qualified paleontologist in the event paleontological resources are found) shall be retained to determine the significance of the discovery. The City of Manteca shall consider recommendations presented by the professional for any unanticipated discoveries and shall carry out the measures deemed feasible and appropriate. Such measures may include avoidance, preservation in place, excavation, documentation, curation, data recovery, or other appropriate measures. Specific measures are developed based on the significance of the find.*

Response c): Indications are that humans have occupied the Central Valley for at least 10,000 years and it is not always possible to predict where human remains may occur outside of formal burials. Therefore, excavation and construction activities, regardless of depth, may yield human remains that may not be interred in marked, formal burials. Under CEQA, human remains are protected under the definition of archaeological materials as being "any evidence of human activity." Additionally, Public Resources Code Section 5097 has specific stop-work and notification procedures to follow in the event that human remains are inadvertently discovered during construction. Implementation of the following mitigation measure would reduce this potential impact to a ***less than significant*** level.

Mitigation Measure(s)

Mitigation Measure CUL-4: *If any human remains are found during grading and construction activities, all work shall be halted immediately within 50 meters (165 feet) of the discovery and the County Coroner must be notified, according to Section 5097.98 of the State Public Resources Code and Section 7050.5 of California's Health and Safety Code. If the remains are determined to be Native American, the coroner shall notify the Native American Heritage Commission, and the procedures outlined in CEQA Section 15064.5(d) and (e) shall be followed. Additionally, if the Native American resources are identified, a Native American monitor, following the Guidelines for Monitors/Consultants of Native American Cultural, Religious, and Burial Sites established by the Native American Heritage Commission, may also be required and, if required, shall be retained at the applicant's expense.*

VI. ENERGY

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

Responses to Checklist Questions

Response a-b): Appendix F of the State CEQA Guidelines requires consideration of the potentially significant energy implications of a project. CEQA requires mitigation measures to reduce "wasteful, inefficient and unnecessary" energy usage (Public Resources Code Section 21100, subdivision [b][3]). According to Appendix F of the CEQA Guidelines, the means to achieve the goal of conserving energy include decreasing overall energy consumption, decreasing reliance on natural gas and oil, and increasing reliance on renewable energy sources. In particular, the proposed Project would be considered "wasteful, inefficient, and unnecessary" if it were to violate state and federal energy standards and/or result in significant adverse impacts related to project energy requirements, energy inefficiencies, energy intensiveness of materials, cause significant impacts on local and regional energy supplies or generate requirements for additional capacity, fail to comply with existing energy standards, otherwise result in significant adverse impacts on energy resources, or conflict or create an inconsistency with applicable plan, policy, or regulation.

The proposed Project includes the construction of 197 residential units. The amount of energy used at the Project site would directly correlate to the size of the proposed units, the energy consumption of associated unit appliances, and outdoor lighting. Other major sources of proposed Project energy consumption include fuel used by vehicle trips generated during project construction and operation, and fuel used by off-road construction vehicles during construction.

The following discussion provides calculated levels of energy use expected for the proposed project, based on commonly used modelling software (i.e., CalEEMod v.2020.4.0 and the California Air Resource Board's EMFAC2021). It should be noted that many of the assumptions provided by CalEEMod are conservative relative to the proposed project. Therefore, this discussion provides a conservative estimate of proposed Project emissions.

It should be noted that the existing energy usage of the Project site is not modeled, since existing baseline energy consumption would be greater than zero (i.e., the existing Project site does not produce more energy than it requires to operate). That is, the analysis focused on gross emissions, as opposed to net emissions. Therefore, the analysis provided herein for energy represents a conservative overestimate of the net increase in emissions and energy usage generated by the proposed project.

Electricity and Natural Gas

Electricity and natural gas used by the proposed Project would be used primarily to power on-site buildings. Total annual unmitigated and mitigated electricity (kWh) and natural gas (kBTU) usage associated with the operation of the proposed Project are shown in Table ENERGY-1, below (as provided by CalEEMod). The proposed Project incorporates feasible mitigation to reduce the proposed project's operational electricity and natural gas consumption.

According to Calico's *Appendix A: Calculation Details for CalEEMod*, CalEEMod uses the California Commercial End Use Survey (CEUS) database to develop energy intensity value for non-residential buildings. The energy use from residential land uses is calculated based on the Residential Appliance Saturation Survey (RASS). Similar to CEUS, this is a comprehensive energy use assessment that includes the end use for various climate zones in California.

Table ENERGY-1: Project Operational Natural Gas and Electricity Usage

Emissions[a]	***Natural Gas (kBTU/year)***	***Electricity (kWh/year)***
Single Family Housing	4,660,790	1,557,760
Total	**4,660,790**	**1,557,760**

NOTE: [A] NUMBERS PROVIDED HERE MAY NOT ADD UP EXACTLY TO TOTAL DUE TO ROUNDING.
SOURCE: CALEEMOD (V.2020.4.0).

As shown in Table ENERGY-1, project operational energy usage would be reduced with implementation of project components considered mitigation by CalEEMod (note: given the limited mitigation options available in the current version of CalEEMod, the reduction attributable to mitigation represents a conservative analysis). These project components include installation of Energy Star appliances (consistent with the requirements under the current version of California's Building Energy Efficiency Standards), and compliance with the Model Water Efficient Landscape Ordinance (as contained in the California Code of Regulations and as prescribed in Chapter 17.48 of the Manteca Municipal Code). These reductions in overall proposed Project energy usage also reflect a reduction in the project's energy intensity.

On-Road Vehicles (Operation)

The proposed Project would generate vehicle trips during its operational phase. According to the Transportation Impact Analysis Report prepared for the proposed Project (Kittelson & Associates, 2022), the proposed Project would generate approximately 1,883 daily vehicles trips. In order to calculate operational on-road vehicle energy usage and emissions, default trip lengths generated by CalEEMod were used, which are based on the project location and urbanization level parameters selected within CalEEMod (i.e., "San Joaquin Valley Air Pollution Control District" project location and "Urban" setting, respectively). These values are provided by the individual districts or use a default average for the state, depending on the location of the proposed project. Using fleet mix data provide by CalEEMod (v2020.4.0), and Year 2022 gasoline and diesel MPG (miles per gallon) factors for individual vehicle classes as provided by EMFAC2021, De Novo derived weighted MPG factors for operational on-road vehicles of approximately 24.2 MPG for gasoline vehicles. With this information, De Novo calculated as a conservative estimate that the unmitigated proposed Project would generate vehicle trips that would use a total of approximately 74 gallons of gasoline fuel per day, on average, or 26,995 gallons of fuel per year.

On-Road Vehicles (Construction)

The proposed Project would also generate on-road vehicle trips during project construction (from construction workers, vendors, and haulers). The Project site is essentially flat, and it is anticipated that the Project site can be balanced on site, meaning that there would be limited to no cut and fill (i.e., import/export).). Estimates of vehicle fuel consumed were derived based on the assumed construction schedule, vehicle trip lengths and number of workers per construction phase as provided by CalEEMod, and Year 2022 gasoline MPG factors provided by EMFAC2021. For the purposes of simplicity, it was assumed that all vehicles used gasoline as a fuel source (as opposed to diesel fuel or alternative sources).

Table ENERGY-2, below, describes gasoline and diesel fuel used by on-road mobile sources during each phase of the construction schedule. As shown, the vast majority of on-road mobile vehicle fuel used during the construction of the proposed Project would occur during the building construction phase.

Table ENERGY-2: On-Road Mobile Fuel Generated by Project Construction Activities – By Phase

Construction Phase	# of Days	Total Daily Worker Trips[(a)]	Total Daily Vendor Trips[(a)]	Total Hauling Trips[(a)]	Gallons of Gasoline Fuel[(b)]	Gallons of Diesel Fuel[(b)]
Site Preparation	30	18	-	-	355	-
Grading	75	20	-	-	987	-
Building Construction	740	124	42	-	60,369	30,455
Paving	55	15	-	-	543	-
Architectural Coating	55	25	-	-	905	-
Total	**N/A**	**N/A**	**N/A**	**N/A**	**63,159**	**30,455**

NOTE: [(A)] PROVIDED BY CALEEMOD. [(B)]SEE APPENDIX A FOR FURTHER DETAIL

SOURCE: CALEEMOD (V.2020.4.0); EMFAC2021.

Off-Road Vehicles (Construction)

Off-road construction vehicles would use diesel fuel during the construction phase of the proposed project. A non-exhaustive list of off-road constructive vehicles expected to be used during the construction phase of the proposed Project includes: cranes, forklifts, generator sets, tractors, excavators, and dozers. Based on the total amount of CO_2 emissions expected to be generated by the proposed Project (as provided by the CalEEMod output), and a CO_2 to diesel fuel conversion factor (provided by the U.S. Energy Information Administration), the proposed Project would use up to a total of approximately 20,415 gallons of diesel fuel for off-road construction vehicles (during the site preparation and grading phases of the proposed project). Detailed calculations are provided in Appendix A.

Other

The proposed Project landscape maintenance activities would generally require the use fossil fuel (i.e., gasoline) energy. For example, lawn mowers require the use of fuel for power. As an approximation, it is estimated that landscape care maintenance could require approximately four individuals one full day per week, or 1,644 hours per year. Assuming an average of approximately 0.5 gallons of gasoline used per person-hour, the proposed Project would require the use of approximately 832 gallons of gasoline per year to power landscape maintenance equipment. The energy used to power landscape maintenance equipment would not differ substantially from the energy required for landscape maintenance for similar project.

The proposed Project could also use other sources of energy not identified here. Examples of other energy sources include alternative and/or renewable energy (such as solar PV) and/or on-site stationary sources (such as on-site diesel generators) for electricity generation. However, the proposed Project does not propose to use other sources of energy at this time.

Conclusion

The proposed Project would use energy resources for the operation of project buildings (electricity and natural gas), for on-road vehicle trips (e.g., gasoline and diesel fuel) generated by the proposed project, and from off-road construction activities associated with the proposed Project (e.g., diesel fuel). Each of these activities would require the use of energy resources. The proposed Project would be responsible for conserving energy, to the extent feasible, and relies heavily on reducing per capita energy consumption to achieve this goal, including through Statewide and local measures.

The proposed Project would be in compliance with all applicable federal, state, and local regulations regulating energy usage. For example, PG&E is responsible for the mix of energy resources used to provide electricity for its customers, and it is in the process of implementing the Statewide Renewable Portfolio Standard (RPS) to increase the proportion of renewable energy (e.g., solar and wind) within its energy portfolio. PG&E is expected to achieve at least a 33% mix of renewable energy resources by 2020, and 50% by 2030. Additionally, energy-saving regulations, including the latest State Title 24 building energy efficiency standards ("part 6"), would be applicable to the proposed project. Other statewide measures, including those intended to improve the energy efficiency of the statewide passenger and heavy-duty truck vehicle fleet (e.g., the Pavley Bill and the Low Carbon Fuel Standard) are improving vehicle fuel economies, thereby conserving gasoline and diesel fuel. These energy savings would continue to accrue over time.

As a result, the proposed Project would not result in any significant adverse impacts related to project energy requirements, energy use inefficiencies, and/or the energy intensiveness of materials by amount and fuel type for each stage of the proposed Project including construction, operations, maintenance, and/or removal. PG&E, the electricity and natural gas provider to the Project site, maintains sufficient capacity to serve the proposed project. The proposed Project would comply with all existing energy standards, including those established by the City of Manteca, and would not result in significant adverse impacts on energy resources. Therefore, the proposed Project would not be expected cause an inefficient, wasteful, or unnecessary use of energy resources nor cause a significant impact on any of the threshold as described by Appendix F of the CEQA Guidelines. This is a **less than significant** impact.

VII. GEOLOGY AND SOILS

Would the project:	***Potentially Significant Impact***	***Less Than Significant with Mitigation***	***Less Than Significant Impact***	***No Impact***
a) Directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving:			X	
i) Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42.			X	
ii) Strong seismic ground shaking?			X	
iii) Seismic-related ground failure, including liquefaction?		X		
iv) Landslides?			X	
b) Result in substantial soil erosion or the loss of topsoil?		X		
c) Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse?		X		
d) Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial direct or indirect risks to life or property?		X		
e) Have soils incapable of adequately supporting the use of septic tanks or alternative waste water disposal systems where sewers are not available for the disposal of waste water?				X
f) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?			X	

Responses to Checklist Questions

Responses a.i), a.ii), a.iv): The Project site is not located within a currently designated Alquist-Priolo Earthquake Fault Zone, and known surface expression of active faults does not exist within the Project site. However, the Project site is located within a seismically active region. The U.S. Geological Survey identifies potential seismic sources within approximately 20 miles of the Project site. Two of the closest known faults classified as active by the U.S. Geological Survey are an unnamed fault east of the City of Tracy, located approximately 8 miles to the west, and the San Joaquin fault, located approximately 16 miles to the southwest. The Midway fault is located approximately 20 miles to the west. Other faults that could potentially affect the proposed Project include the Corral Hollow-Carnegie fault, the Greenville fault, the Antioch fault, and the Los Positas fault.

Geologic Hazards

Potential seismic hazards resulting from a nearby moderate to major earthquake could generally be classified as primary and secondary. The primary seismic hazard is ground rupture, also called surface faulting. The common secondary seismic hazards include ground shaking and ground lurching.

Ground Rupture

Because the property does not have known active faults crossing the Project site, and the Project site is not located within an Earthquake Fault Special Study Zone, ground rupture is unlikely at the subject property.

Ground Shaking

According to the California Geological Survey's Probabilistic Seismic Hazard Assessment Program, Manteca is considered to be within an area that is predicted to have a 10 percent probability that a seismic event would produce horizontal ground shaking of 10 to 20 percent within a 50-year period. This level of ground shaking correlates to a Modified Mercalli intensity of V to VII, light to strong. As a result of these factors the California Geological Survey has defined the entire county as a seismic hazard zone. There will always be a potential for groundshaking caused by seismic activity anywhere in California, including the Project site.

In order to minimize potential damage to the buildings and site improvements, all construction in California is required to be designed in accordance with the latest seismic design standards of the California Building Code. The California Building Code, Title 24, Part 2, Chapter 16 addresses structural design and Chapter 18 addresses soils and foundations. Collectively, these state requirements, which have been adopted by the City of Manteca, include design standards and requirements that are intended to minimize impacts to structures in seismically active areas of California. Section 1613 specifically provides structural design standards for earthquake loads. Section 1803.5.11 and 1803.5.12 provide requirements for geotechnical investigations for structures assigned varying Seismic Design Categories in accordance with Section 1613. Design in accordance with these standards and policies would reduce any potential impact to a less than significant level.

Landslides

The Project site is not susceptible to landslides because the area is essentially flat. This is a less than significant impact.

Conclusion

In order to minimize potential damage to the buildings and site improvements, all construction in California is required to be designed in accordance with the latest seismic design standards of the California Building Code. The California Building Code, Title 24, Part 2, Chapter 16 addresses structural design and Chapter 18 addresses soils and foundations. Collectively, these state requirements, which have been adopted by the City of Manteca, include design standards and requirements that are intended to minimize impacts to structures in seismically active areas of California. Section 1613 specifically provides structural design standards for earthquake loads.

Section 1803.5.11 and 1803.5.12 provide requirements for geotechnical investigations for structures assigned varying Seismic Design Categories in accordance with Section 1613. Additionally, the City of Manteca has adopted Design and Construction Standards and incorporated numerous policies relative to seismicity to ensure the health and safety of all people. Design in accordance with these standards and policies would reduce any potential impact to a less than significant level. Because all development in the Project site must be designed in conformance with these state and local standards and policies, any potential impact would be considered ***less than significant***.

Responses a.iii), c), d): Liquefaction normally occurs when sites underlain by saturated, loose to medium dense, granular soils are subjected to relatively high ground shaking. During an earthquake, ground shaking may cause certain types of soil deposits to lose shear strength, resulting in ground settlement, oscillation, loss of bearing capacity, landsliding, and the buoyant rise of buried structures. The majority of liquefaction hazards are associated with sandy soils, silty soils of low plasticity, and some gravelly soils. Cohesive soils are generally not considered to be susceptible to liquefaction. In general, liquefaction hazards are most severe within the upper 50 feet of the surface, except where slope faces, or deep foundations are present.

Expansive soils are those that undergo volume changes as moisture content fluctuates; swelling substantially when wet or shrinking when dry. Soil expansion can damage structures by cracking foundations, causing settlement and distorting structural elements. Expansion is a typical characteristic of clay-type soils. Expansive soils shrink and swell in volume during changes in moisture content, such as a result of seasonal rain events, and can cause damage to foundations, concrete slabs, roadway improvements, and pavement sections.

Soil expansion is dependent on many factors. The more clayey, critically expansive surface soil and fill materials will be subjected to volume changes during seasonal fluctuations in moisture content. are no expansive (i.e., shrink-swell) soils within the Project site. The soils encountered at the Project site consist mostly of Tinnin loamy coarse sand (0-2% slopes) along the western and northern portion of the Project site, while Veritas fine sandy loam (0-2% slopes) occurs on the southern leg of the Project site.

Future development of the proposed Project could expose people or structures to adverse effects associated with liquefaction and/or soil expansion. Construction of the proposed Project would be required to comply with the City's General Plan policies related to geologic and seismic hazards. These policies obligate the City to require that new development mitigate the potential impacts of geologic hazards through building plan review (Policy S-P-2) and mitigate the potential impacts of seismic-induced settlement of uncompacted fill and liquefaction due to the presence of a high-water table (Policy S-P-2). To that end, General Plan Policy S-P-1 requires that all proposed development prepare geological reports and/or geological engineering reports for projects located in areas of potentially significant geological hazards, including potential subsidence (collapsible surface soils) due to groundwater extraction.

With implementation of the following mitigation measure, this potential impact would be ***less than significant***.

Mitigation Measure(s)

Mitigation Measure GEO-1*: Prior to issuance of any building permits, the Project applicant shall be required to submit building plans to the City of Manteca for review and approval. The building plans shall also comply with all applicable requirements of the most recent California Building*

Standards Code. All on-site soil engineering activities shall be conducted under the supervision of a licensed geotechnical engineer or certified engineering geologist.

Response b): The Project site is currently vacant land except for the single-family residences along Oleander Avenue. According to the Project site plans prepared for the proposed project, development of the proposed Project would result in the creation of new impervious surface areas throughout the Project site. The development of the Project site would also cause ground disturbance of topsoil. The ground disturbance would be limited to the areas proposed for grading and excavation, including the proposed driveway areas, residential building pads, and drainage, sewer, and water infrastructure improvements. After grading and excavation, and prior to overlaying the disturbed ground surfaces with impervious surfaces and structures, the potential exists for wind and water erosion to occur, which could adversely affect downstream storm drainage facilities.

Without implementation of appropriate Best Management Practices (BMPs) related to prevention of soil erosion during construction, development of the proposed Project would result in a potentially significant impact with respect to soil erosion. Implementation of the following mitigation measures would ensure the impact is ***less than significant***.

Mitigation Measure(s)

Mitigation Measure GEO-2*: The Project applicant shall submit a Notice of Intent (NOI) and Storm Water Pollution Prevention Plan (SWPPP) to the RWQCB in accordance with the NPDES General Construction Permit requirements. The SWPPP shall be designed to control pollutant discharges utilizing Best Management Practices (BMPs) and technology to reduce erosion and sediments. BMPs may consist of a wide variety of measures taken to reduce pollutants in stormwater runoff from the Project site. Measures shall include temporary erosion control measures (such as silt fences, staked straw bales/wattles, silt/sediment basins and traps, check dams, geofabric, sandbag dikes, and temporary revegetation or other ground cover) that will be employed to control erosion from disturbed areas. Final selection of BMPs will be subject to approval by the City of Manteca and the RWQCB. The SWPPP will be kept on site during construction activity and will be made available upon request to representatives of the RWQCB.*

Response e): The proposed Project has been designed to connect to the existing City sewer system and septic systems will not be used. Therefore, ***no impact*** would occur related to soils incapable of adequately supporting the use of septic tanks.

Response f): Known paleontological resources or sites are not located on the Project site. Additionally, unique geologic features are not located on the Project site. As discussed in Section V, Cultural Resources, should artifacts or unusual amounts of stone, bone, or shell be uncovered during construction activities, an archeologist should be consulted for an evaluation. Implementation of Mitigation Measure CLT-1 would require investigations and avoidance methods in the event that a previously undiscovered cultural resource is encountered during construction activities. With implementation of Mitigation Measure CLT-1, impacts to paleontological resources or unique geologic features are not expected. This is a ***less than significant*** impact.

VIII. GREENHOUSE GAS EMISSIONS

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

Existing Setting

Various gases in the Earth's atmosphere, classified as atmospheric greenhouse gases (GHGs), play a critical role in determining the Earth's surface temperature. Solar radiation enters Earth's atmosphere from space, and a portion of the radiation is absorbed by the Earth's surface. The Earth emits this radiation back toward space, but the properties of the radiation change from high-frequency solar radiation to lower-frequency infrared radiation.

Naturally occurring GHGs include water vapor (H_2O), carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), and ozone (O_3). Several classes of halogenated substances that contain fluorine, chlorine, or bromine are also GHGs, but they are, for the most part, solely a product of industrial activities. Although the direct GHGs, including CO_2, CH_4, and N_2O, occur naturally in the atmosphere, human activities have changed their atmospheric concentrations. From the pre-industrial era (i.e., ending about 1750) to 2011, concentrations of these three GHGs have increased globally by 40, 150, and 20 percent, respectively (IPCC, 2013).

Greenhouse gases, which are transparent to solar radiation, are effective in absorbing infrared radiation. As a result, this radiation that otherwise would have escaped back into space is now retained, resulting in a warming of the atmosphere. This phenomenon is known as the greenhouse effect. Among the prominent GHGs contributing to the greenhouse effect are carbon dioxide (CO_2), methane (CH_4), ozone (O_3), water vapor, nitrous oxide (N_2O), and chlorofluorocarbons (CFCs).

Emissions of GHGs contributing to global climate change are attributable in large part to human activities associated with the industrial/manufacturing, utility, transportation, residential, and agricultural sectors. In California, the transportation sector is the largest emitter of GHGs, followed by the industrial sector (California Energy Commission, 2016).

As the name implies, global climate change is a global problem. GHGs are global pollutants, unlike criteria air pollutants and toxic air contaminants, which are pollutants of regional and local concern, respectively. California produced 441 million gross metric tons of carbon dioxide equivalents ($MMTCO_2e$) in 2014 (California Energy Commission, 2016). By 2020, estimated business-as-usual greenhouse gas emissions in California are projected to be 509 $MMTCO_2e$ per year (California Air Resources Board, 2015). Given that the U.S. EPA estimates that worldwide emissions from human activities totaled nearly 46 billion gross metric tons of carbon dioxide equivalents ($BMTCO_2e$) in 2010, California's incremental contribution to global GHGs is approximately 2% (U.S. EPA, 2014).

Carbon dioxide equivalents are a measurement used to account for the fact that different GHGs have different potential to retain infrared radiation in the atmosphere and contribute to the greenhouse effect. This potential, known as the global warming potential of a GHG, is also dependent on the lifetime, or persistence, of the gas molecule in the atmosphere. Expressing GHG emissions in carbon dioxide equivalents takes the contribution of all GHG emissions to the greenhouse effect and converts them to a single unit equivalent to the effect that would occur if only CO_2 were being emitted.

Consumption of fossil fuels in the transportation sector was the single largest source of California's GHG emissions in 2014, accounting for 37% of total GHG emissions in the state. This category was followed by the industrial sector (24%), the electricity generation sector (including both in-state and out of-state sources) (20%) and the agriculture sector (8%) (California Energy Commission, 2016).

Responses to Checklist Questions

Responses a), b): The SJVAPCD has evaluated different approaches for estimating impacts, and summarizing potential GHG emission reduction measures. The SJVAPCD staff has concluded that "*existing science is inadequate to support quantification of impacts that project specific GHG emissions have on global climatic change*." This is readily understood when one considers that global climatic change is the result of the sum total of GHG emissions, both man-made and natural that occurred in the past; that is occurring now; and will occur in the future. The effects of project specific GHG emissions are cumulative, and unless reduced or mitigated, their incremental contribution to global climatic change could be considered significant.

The *Guidance for Assessing and Mitigating Air Quality Impacts* (SJVAPCD, 2015) provides an approach to assessing a project's impacts on greenhouse gas emissions by evaluating the proposed Project's emissions to the "reduction targets" established in ARB's AB 32 Scoping Plan. For instance, the SJVACD's guidance recommends that projects should demonstrate that "*project specific GHG emissions would be reduced or mitigated by at least 29%, compared to Business as Usual (BAU), including GHG emission reductions achieved since the 2002-2004 baseline period, consistent with GHG emission reduction targets established in ARB's AB 32 Scoping Plan. Projects achieving at least a 29% GHG emission reduction compared to BAU would be determined to have a less than significant individual and cumulative impact for GHG*."

Subsequent to the SJVAPCD's approval of the *Final Draft Guidance for Assessing and Mitigating Air Quality Impacts* (SJVAPCD 2015), the California Supreme Court issued an opinion that affects the conclusions that should/should not be drawn from a GHG emissions analysis that is based on consistency with the AB 32 Scoping Plan. More specifically, in *Center for Biological Diversity v. California Department of Fish and Wildlife*, the Court ruled that showing a "project-level reduction" that meets or exceeds the Scoping Plan's overall statewide GHG reduction goal is not necessarily sufficient to show that the proposed Project's GHG impacts will be adequately mitigated: "*the Scoping Plan nowhere related that statewide level of reduction effort to the percentage of reduction that would or should be required from individual projects*..." According to the Court, the lead agency cannot simply assume that the overall level of effort required to achieve the statewide goal for emissions reductions will suffice for a specific project.

Given this Court decision, reliance on a 29 percent GHG emissions reduction from projected BAU levels compared to the proposed Project's estimated 2020 levels as recommended in the SJVAPCD's guidance documents is not an appropriate basis for an impact conclusion in the MND. Given that the SJVAPCD staff has concluded that "*existing science is inadequate to support quantification of impacts that project specific GHG emissions have on global climatic change,*" this MND instead relies on a qualitative approach for this analysis. The approach still relies on the Appendix G of the CEQA Guidelines thresholds which indicate that climate change-related impacts are considered significant if implementation of the proposed Project would do any of the following:

1. Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment.
2. Conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of greenhouse gases.

These two CEQA Appendix G threshold questions are provided within the Initial Study checklist and are the thresholds used for the subsequent analysis. The focus of the analysis is on the proposed Project's consistency with the relevant efficiency (i.e. per service population) threshold.

The proposed Project would generate GHGs during the construction and operational phases of the proposed project. The primary source of construction-related GHGs from the proposed Project would result from emissions of CO_2 associated with the construction of the proposed project, and worker vehicle trips. The proposed Project would require limited grading, and would also include site preparation, building construction, and architectural coating phases. The operational phase of the proposed Project would generate GHGs primarily from the proposed project's operational vehicle trips and building energy (electricity and natural gas) usage. Other sources of GHG emissions would be minimal. Proposed Project construction-related GHGs are provided in Table GHG-1, below. Proposed project operational-related GHGs are provided in Table GHG-2.

Table GHG-1: Construction GHG Emissions (Mitigated Metric Tons/Yr)

Year	***Bio-CO_2***	***NBio-CO_2***	***Total CO_2***	***CH_4***	***N_2O***	***CO_2e***
2022	0.0000	214.0031	214.0031	0.0667	2.3000e-004	215.7385
2023	0.0000	626.1291	626.1291	0.1044	0.0174	633.9125
2024	0.0000	566.6762	566.6762	0.0761	0.0182	574.0100
2025	0.0000	493.4224	493.4224	0.0674	0.0158	499.8114
Maximum	0.0000	626.1291	626.1291	0.1044	0.0182	633.9125

SOURCE: CALEEMOD (V.2020.4.0).

Table GHG-2: Operational GHG Emissions 2021 (Mitigated Metric Tons/Yr)

Category	***Bio-CO_2***	***NBio-CO_2***	***Total CO_2***	***CH_4***	***N_2O***	***CO_2e***
Area	0.0000	87.7313	87.7313	3.9200e-003	1.5600e-003	88.2956
Energy	0.0000	392.8467	392.8467	0.0281	7.3900e-003	395.7499
Mobile	0.0000	1,372.4225	1,372.4225	0.0803	0.0739	1,396.4453
Waste	45.7237	0.0000	45.7237	2.7022	0.0000	113.2786
Water	3.2577	8.6593	11.9169	0.3360	8.0700e-003	22.7217
Total	48.9814	1,861.6598	1,910.6412	3.1505	0.0909	2,016.4911

SOURCE: CALEEMOD (V.2020.4.0).

A common threshold for GHGs is 4.6 MT CO2e/SP/year (residents+employees).[1] According to the 2020 U.S. Census, the population in Manteca is 83,498 people, and the average persons per household is 3.15. Therefore, the proposed Project would result in the construction of residential housing that would generate up to an estimated 617 people. Therefore, assuming a 30-year amortization of construction emissions, the combined project construction and operational GHG emissions would generate approximately 3.4 MT CO2e/SP/year, below the threshold of 4.6 MT CO2e/SP/year.

The proposed Project would not generate GHG emissions that would have a significant impact on the environment or conflict with any applicable plans, policies, or regulations. Since the proposed Project would be consistent with the City CAP, and would not exceed any relevant GHG threshold, impacts related to greenhouse gases are ***less than significant***.

[1] For example, the Bay Area Air Quality Management District (BAAQMD) has promulgated a threshold of 4.6 MT CO2e/SP/year (residents+employees). See Bay Area Air Quality Management District CEQA Guidelines, May 2017.

IX. HAZARDS AND HAZARDOUS MATERIALS

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

Responses to Checklist Questions

Responses a), b): The proposed Project would create new residential uses on a site that is surrounded by existing residential, and agricultural uses. The proposed residential land uses do not routinely transport, use, or dispose of hazardous materials, or present a reasonably foreseeable release of hazardous materials, with the exception of common hazardous materials such as household cleaners, paint, engine oil, and similar household substances. The operational phase of the proposed Project does not pose a significant hazard to the public or the environment.

The Project site has historically been used for agricultural purposes. Like most agricultural operations in the Central Valley, agricultural practices in the area have used agricultural chemicals as a standard practice. Although no contaminated soils have been identified in the Project site or in the immediate vicinity above applicable levels, residual concentrations of pesticides may be present in soil as a result of historic agricultural and ranching activities. Additionally, although groundwater wells have not been identified on the Project site, there is a possibility that groundwater wells exist on-site. Should groundwater wells be present on-site, the proper well abandonment permit would need to be obtained.

The residences, outbuildings, barns and equipment storage areas located along the eastern side of the Project site are anticipated to remain intact on Lots E and F. However, if the structures are demolished, they will require evaluation for asbestos and lead containing materials. If such are demolished at some future time, special demolition and disposal practices are required in accordance with state regulations to ensure their safe handling. For instance, if asbestos or lead is present, there is a special demolition process, as well as special landfills that are permitted to accept such demolition debris. It should be noted that CEQA does not require that these hazardous materials must be tested and analyzed at the current time – only that adequate performance measures would be taken to reduce the potential for a significant hazard to the public or environment is generated during project activities (including demolition). However, if the asbestos or lead is not present, then the demolition process would not require any special handling. Additionally, existing areas containing storage of farm equipment would require soil sampling to assess the soils in these areas.

There are no known underground storage tanks or pipelines located on the Project site that contain hazardous materials. Therefore, the disturbance of such items during construction activities is unlikely. Construction equipment and materials would likely require the use of petroleum-based products (oil, gasoline, diesel fuel), and a variety of common chemicals including paints, cleaners, and solvents. Transportation, storage, use, and disposal of hazardous materials during construction activities would be required to comply with applicable federal, state, and local statutes and regulations. Compliance would ensure that human health and the environment are not exposed to hazardous materials. Therefore, with implementation of the following mitigation measures (Mitigation Measures HAZ-1 through HAZ-2), the proposed Project would have a ***less than significant*** impact relative to this issue.

Mitigation Measure HAZ-1: *The Project applicant shall hire a qualified consultant to perform soil and site testing to check whether hazardous conditions are present, prior to any grading activities. The soil sampling shall address the presence/absence of hazardous substances in the soils, including agrichemicals and/or petroleum products. A soil sampling and analysis workplan shall be shall be prepared and meet the requirements of the Department of Toxic Substances Control Interim Guidance for Sampling Agricultural Properties (2008). The soils in the area where farming equipment and/or tanks have been stored should be included in the soil sampling and analysis workplan.*

If the sampling results indicate the presence of agrichemicals that exceed commercial screening levels, a removal action workplan shall be prepared in coordination with San Joaquin County Environmental Health Department. The removal action workplan shall include a detailed engineering plan for conducting the removal action, a description of the on-site contamination, the goals to be achieved by the removal action, and any alternative removal options that were considered and rejected and the basis for that rejection. A no further action letter shall be issued by San Joaquin County Environmental Health Department upon completion of the removal action. The removal action shall be deemed complete when the confirmation samples exhibit concentrations below the commercial screening levels, which will be established by the agencies.

If asbestos-containing materials and/or lead are found in the buildings, a California Occupational Safety and Health Administration (Cal/OSHA) certified asbestos containing building materials (ACBM) and lead based paint contractor shall be retained to remove the asbestos-containing materials and lead in accordance with EPA and Cal/OSHA standards. In addition, all activities (construction or demolition) in the vicinity of these materials shall comply with Cal/OSHA asbestos and lead worker construction standards. The ACBM and lead shall be disposed of properly at an appropriate offsite disposal facility.

Mitigation Measure HAZ-2 *Prior to initiation of any ground disturbance activities within 50 feet of a well, the Project applicant shall hire a licensed well contractor to obtain a well abandonment permit from San Joaquin County Environmental Health Department, and properly abandon the on-site wells, pursuant to review and approval of the City Engineer and the San Joaquin County Environmental Health Department.*

Response c): The Project site is located over ¼ mile from an existing school. The nearest schools include Brock Elliot Elementary (0.92 miles north) and Walter E. Woodward Elementary School (1.82 miles east). Because the Project site is beyond the ¼-mile radius of a school, Implementation of the proposed Project would result in ***no impact*** relative to this topic.

Response d): According the California Department of Toxic Substances Control (DTSC) there are no Federal Superfund Sites, State Response Sites, or Voluntary Cleanup Sites on, or in the near vicinity of the Project site. The Project site is not included on a list of hazardous materials sites compiled pursuant to Government Code § 65962.5. Implementation of the proposed Project would result in a ***less than significant*** impact relative to this environmental topic.

Response e): The Federal Aviation Administration (FAA) establishes distances of ground clearance for take-off and landing safety based on such items as the type of aircraft using the airport. The Project site is not located within the vicinity of a private airstrip or public airport. The closest airport or airstrip is the Stockton Metropolitan Airport, located approximately 5.5 miles north of the Project site. Implementation of the proposed Project would have a ***less than significant*** impact with regards to this environmental issue.

Response f): The Office of Emergency Services (OES) maintains an Emergency Operations Plan (EOP) that serves as the official Emergency Plan for San Joaquin County. It includes planned operational functions and overall responsibilities of County Departments during an emergency situation. The Emergency Plan also contains a threat summary for San Joaquin County, which addresses the potential for natural, technological and human-caused disasters (County Code, Title 4-3007).

The County OES also prepared a Hazardous Materials Area Plan (§2720 H&S, 2008) that describes the hazardous materials response system developed to protect public health, prevent environmental damage and ensure proper use and disposal of hazardous materials. The plan establishes effective response capabilities to contain and control releases, establishes oversight of long-term cleanup and mitigation of residual releases, and integrates multi-jurisdiction and agency coordination. This plan is now implemented by the San Joaquin County Environmental Health Department.

The San Joaquin County Environmental Health Department maintains a Hazardous Materials Management Plan/ Hazardous Materials Business Plan (HMMP/HMBP). The HMMP/HMBP describes agency roles, strategies and processes for responding to emergencies involving hazardous materials. The Environmental Health Department maintains a Hazardous Materials Database and Risk and Flood Maps available to the public on its website.

In San Joaquin County, all major roads are available for evacuation, depending on the location and type of emergency that arises. The proposed Project does not include any actions that would impair or physically interfere with any of San Joaquin County's emergency plans or evacuation routes. Future uses on the Project site will have access to the County resources that establish protocols for safe use, handling and transport of hazardous materials. Construction activities are not expected to result in any unknown significant road closures, traffic detours, or congestion that could hinder the emergency vehicle access or evacuation in the event of an emergency. Implementation of the proposed Project would have a ***less than significant*** impact with regards to this environmental issue.

Response g): The risk of wildfire is related to a variety of parameters, including fuel loading (vegetation), fire weather (winds, temperatures, humidity levels and fuel moisture contents), and topography (degree of slope). Steep slopes contribute to fire hazard by intensifying the effects of wind and making fire suppression difficult. Fuels such as grass are highly flammable because they have a high surface area to mass ratio and require less heat to reach the ignition point, while fuels such as trees have a lower surface area to mass ratio and require more heat to reach the ignition point.

The City has areas with an abundance of flashy fuels (i.e., grassland) in the outlying residential parcels and open lands that, when combined with warm and dry summers with temperatures often exceeding 100 degrees Fahrenheit, create a situation that results in higher risk of wildland fires. Most wildland fires are human caused, so areas with easy human access to land with the appropriate fire parameters generally result in an increased risk of fire.

The City of Manteca contains areas with “moderate” and “non-wildland fuel” ranks. The areas warranting “moderate” fuel ranks possess combustible material in sufficient quantities combined with topographic characteristics that pose a wildfire risk. CalFire data for the areas immediately surrounding the Project site also include “moderate” and “non-wildland fuel” ranks. Areas west of Interstate 5, approximately 15 miles or further southwest of the Planning Area, are designated as “moderate” and “high” fuel ranks.

The Project site is located in an area with a “Local Responsibility Zone (LRA) Unzoned” rank. The Project site is also not located on a steep slope, and the Project site is essentially flat. The Project site is also located in an urban area, with existing or future urban development located on all sides. Therefore, this is a ***less than significant*** impact and no mitigation is required.

X. HYDROLOGY AND WATER QUALITY

Would the project:	*Potentially Significant Impact*	*Less Than Significant with Mitigation Incorporation*	*Less Than Significant Impact*	*No Impact*
a) Violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or ground water quality?			X	
b) Substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin?			X	
c) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner which would:				
(i) Result in substantial erosion or siltation on- or off-site;			X	
(ii) Substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or offsite;			X	
(iii) Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff; or			X	
(iv) Impede or redirect flood flows?			X	
d) In flood hazard, tsunami, or seiche zones, risk release of pollutants due to project inundation?			X	
e) Conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan?			X	

Responses to Checklist Questions

Response a): Implementation of proposed Project would not violate any water quality or waste discharge requirements. Construction activities including grading could temporarily increase soil erosion rates during and shortly after project construction. Construction-related erosion could result in the loss of soil and could adversely affect water quality in nearby surface waters. The RWQCB requires a project-specific SWPPP to be prepared for each project that disturbs an area one acre or larger. The SWPPP is required to include project specific best management measures that are designed to control drainage and erosion. Mitigation Measure GEO-2 would require the preparation of a SWPPP to ensure that the proposed Project prepares and implements a SWPPP throughout the construction phase of the proposed Project. The SWPPP (Mitigation Measure GEO-2) and the project specific drainage plan would reduce the potential for the proposed Project to violate water quality standards during construction. Implementation of the proposed Project would result in a ***less than significant*** impact relative to this topic.

Response b): The proposed Project would connect to the City of Manteca water system. The City's municipal water supply includes deliveries from the South San Joaquin Irrigation District's (SSJID) South County Water Supply Program (SCWSP), and local groundwater pumped from the City's wells.

The proposed Project would not substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted). The City's 2023 General Plan designates the Project site as LDR, which allows for residential densities of up to 8 dwelling units per acre. Therefore, the City's 2023 General Plan anticipated up to 276 units and an associated population of approximately 860 persons within the Project site.

Project construction would add additional impervious surfaces to the Project site; however, various areas of the Project site would remain largely pervious, which would allow infiltration to underlying groundwater. For example, the proposed Project proposes to include a park/drainage basin within the western-northern portion of the Project site (see Figure 3). Additionally, the proposed Project includes landscaping areas that would remain pervious. These areas would continue to contribute to groundwater recharge following construction of the proposed Project. Furthermore, the proposed Project is not anticipated to significantly affect groundwater quality because sufficient stormwater infrastructure would be constructed as part of project to detain and filter stormwater runoff and prevent long-term water quality degradation. Therefore, project construction and operation would not substantially deplete or interfere with groundwater supply or quality. This impact would be ***less than significant***.

Responses c.i), c.ii), c.iii), e): When land is in a natural or undeveloped condition, soils, mulch, vegetation, and plant roots absorb rainwater. This absorption process is called infiltration or percolation. Much of the rainwater that falls on natural or undeveloped land slowly infiltrates the soil and is stored either temporarily or permanently in underground layers of soil. When the soil becomes completely soaked or saturated with water or the rate of rainfall exceeds the infiltration capacity of the soil, the rainwater begins to flow on the surface of land to low lying areas, ditches, channels, streams, and rivers. Rainwater that flows off a site is defined as storm water runoff. When a site is in a natural condition or is undeveloped, a larger percentage of rainwater infiltrates into the soil and a smaller percentage flow off the Project site as storm water runoff.

The infiltration and runoff process is altered when a site is developed. Buildings, sidewalks, roads, and parking lots introduce asphalt, concrete, and roofing materials to the landscape. These materials are relatively impervious, which means that they absorb less rainwater. As impervious surfaces are added to the ground conditions, the natural infiltration process is reduced. As a result, the volume and rate of storm water runoff increases. The increased volumes and rates of storm water runoff can result in flooding if adequate storm drainage facilities are not provided.

There are no rivers, streams, or water courses located on or immediately adjacent to the Project site. As such, there is no potential for the proposed Project to alter a water course, which could lead to on or offsite flooding. Drainage improvements associated with the Project site would be located on the Project site, and the proposed Project would not alter or adversely impact offsite drainage facilities.

The proposed Project would increase impervious surfaces throughout the Project site. The proposed Project would require the installation of storm drainage infrastructure to ensure that storm waters properly drain from the Project site. The proposed storm drainage plan includes an engineered network of storm drain lines, manholes, inlets, and a water quality basin. The storm drainage plan was designed and engineered to ensure proper construction of storm drainage infrastructure to control runoff and prevent flooding, erosion, and sedimentation. The City Engineer reviews all storm drainage plans as part of the improvement plan submittal to ensure that all facilities are designed to the City's standards and specifications. The City Engineer also reviews all storm drainage plans to ensure that post-project runoff does not exceed pre-project runoff. The City Engineer's review of pre- and post-project runoff is intended to ensure that the capacity of the existing storm drainage system is not exceeded. This determination is ultimately made by the City Engineer during the improvement plan review and approval.

Additionally, the proposed Project is subject to the requirements of Chapter 13.28 of the Manteca Municipal Code – Stormwater Management and Discharge Control. The purpose of these requirements is to "establish minimum storm water management requirements and controls to protect and safeguard the general health, safety and welfare of the public residing in watersheds within the city of Manteca". These requirements are intended to assist in the protection and enhancement of the water quality of watercourses, water bodies, and wetlands in a manner pursuant to and consistent with the Federal Water Pollution Control Act (Clean Water Act, 33 USC Section 1251 et seq.), Porter- Cologne Water Quality Control Act (California Water Code Section 13000 et seq.) and National Pollutant Discharge Elimination System ("NPDES") Permit No. CAS000004, as such permit is amended and/or renewed.

The proposed Project storm drainage plan will require the construction of new storm water drainage facilities on the Project site; however, the construction of these facilities would not substantially alter the existing drainage pattern of the area, or alter the course of a stream or river, in a manner that would result in substantial erosion or siltation, substantially increase the rate or amount of surface runoff in a manner that would result in flooding, or create or contribute runoff water which would exceed the capacity or existing or planned drainage systems or provide substantial additional sources of polluted runoff. The proposed Project would also not conflict with any water control quality plan or sustainable groundwater management plan. With implementation of the following mitigation measures, the proposed Project would have a ***less than significant*** impact relative to this environmental topic.

Response d): Approximately eastern portion of the Project site is located within the 500-year flood zone. The 500-year flood zone by definition indicates an area protected by levees from the 1% annual chance flood. The proposed Project is not located within a 100-year or 200-year flood zone.

The risks of flooding hazards on the Project site and immediate surroundings are primarily related to large, infrequent storm events. These risks of flooding are greatest during the rainy season between November and March. Flooding events can result in damage to structures, injury or loss of human and animal life, exposure to waterborne diseases, and damage to infrastructure. In addition, standing floodwater can destroy agricultural crops, undermine infrastructure and structural foundations, and contaminate groundwater.

Further, in 2007, the State of California passed a series of laws referred to as Senate Bill (SB) 5 directing the Department of Water Resources (DWR) to prepare flood maps for the Central Valley flood system and the State Plan of Flood Control, which includes a system of levees and flood control facilities located in the Central Valley. This legislation also set specific locations within the area affected by the 200-year flood event as the urban level of flood protection (ULOP) for the Central Valley.

SB5 “requires all cities and counties within the Sacramento-San Joaquin Valley, as defined in California Government Code Sections 65007(h) and (j), to make findings related to an ULOP or national Federal Emergency Management Agency (FEMA) standard of flood protection before: (1) entering into a development agreement for any property that is located within a flood hazard zone; (2) approving a discretionary permit or other discretionary entitlement, or ministerial permit that would result in the construction of a new residence, for a project that is located within a flood hazard zone; or (3) approving a tentative map, or a parcel map for which a tentative map was not required, for any subdivision that is located within a flood hazard zone.” In 2016, the City of Manteca approved a Memorandum of Understanding to pursue 200-year urban level of flood protection to satisfy SB 5.

The Project site is located within a dam inundation area for the New Melones Dam, Tulloch Dam, and the San Luis Dam. Dam failure is generally a result of structural instability caused by improper design or construction, instability resulting from seismic shaking, or overtopping and erosion of the dam. Larger dams that are higher than 25 feet or with storage capacities over 50 acre-feet of water are regulated by the California Dam Safety Act, which is implemented by the California Department of Water Resources, Division of Safety of Dams (DSD). The DSD is responsible for inspecting and monitoring these dams. The Act also requires that dam owners submit to the California Office of Emergency Services inundation maps for dams that would cause significant loss of life or personal injury as a result of dam failure. The County Office of Emergency Services is responsible for developing and implementing a Dam Failure Plan that designates evacuation plans, the direction of floodwaters, and provides emergency information.

Regular inspection by DSD and maintenance by the dam owners ensure that the dams are kept in safe operating condition. As such, failure of these dams is considered to have an extremely low probability of occurring and is not considered to be a reasonably foreseeable event.

The proposed Project would not expose people or structures to a significant risk of loss, injury or death involving flooding as a result of the failure of a levee or dam.

The Project site is not anticipated to be inundated by a tsunami because it is located at an elevation of approximately 23 to 26 feet above sea level and is approximately 60 miles away from the Pacific Ocean which is the closest ocean waterbody.

The Project site is not anticipated to be inundated by a seiche because it is not located in close proximity to a water body capable of creating a seiche.

Implementation of the proposed Project would have a ***less than significant*** impact relative to the risk of release of pollutants due to project inundation by flood hazards, seiches, and tsunamis, or the potential to alter the course of a stream or river in a manner that would impede or redirect flood flows.

XI. LAND USE AND PLANNING

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

Responses to Checklist Questions

Response a): The Project site is located immediately adjacent to the Manteca city limits. The proposed Project is consistent with the surrounding uses and would not physically divide an established community. Implementation of the proposed Project would have a ***less than significant*** impact relative to this topic.

Response b): The key planning documents that are directly related to, or that establish a framework within which the proposed Project must be consistent, include:

- City of Manteca General Plan; and
- City of Manteca Zoning Ordinance.

The Project site is designated LDR (Low Density Residential) by the Manteca General Plan land use map. The City's LDR land use establishes a mix of dwelling unit types and character determined by the individual site and market conditions. The density range allows for substantial flexibility in selecting dwelling unit types and parcel configurations to suit particular site conditions and housing needs. The type of dwelling units anticipated in this density range include small lots and clustered lots as well as conventional large lot detached residences. The allowed density within the City's LDR designation is 2.1 to 8 dwelling units per acre. With 197 units on approximately 34.6 acres, the proposed density would be 5.7 dwelling units per acre, which is within the allowed density range.

The San Joaquin County Local Agency Formation Commission (LAFCo) will require the Project site to be pre-zoned by the City of Manteca in conjunction with the proposed annexation. This includes the Development Area, and Non-development Area. The City's pre-zoning designation for the entire Project site will be R-1 (One Family Dwelling), which is consistent with the LDR (Low Density Residential) land use designation of the Manteca General Plan. This zoning district allows for substantial flexibility in selecting dwelling unit types and parcel configurations to suit site conditions and housing needs. The prezoning of the land will go into effect upon annexation of the land.

A General Plan Amendment would not be required for the project. The proposed Project would not cause a significant environmental impact due to a conflict with any land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect. Implementation of the proposed Project would have a ***less than significant*** relative to this topic.

XII. MINERAL RESOURCES

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

Existing Setting

The California Geological Survey identifies areas that contain or that could contain significant mineral resources so as to provide context for local agency land use decisions and to protect availability of known mineral resources. Classifications ranging from MRZ-1 to MRZ-4 are based on knowledge of a resource's presence and the quality of the resource. No mineral extraction operations are known to exist in or adjacent to the Project site. The Project site is not in a designated Mineral Resource Zone as delineated by the Mineral Resources and Mineral Hazards Mapping Program (MRMHMP) (California Department of Conservation, 2012).

Responses to Checklist Questions

Responses a), b): The Project site is not in a designated Mineral Resource Zone as delineated by the Mineral Resources and Mineral Hazards Mapping Program (MRMHMP). The proposed Project activities would not result in substantial subsurface excavation and would not preclude future exploration for, and extraction of, mineral resources since the proposed use would be decommissioned in the long-term. Therefore, the proposed Project would not result in the loss of an available known mineral resources nor result in the loss of availability of locally-important mineral resource recovery sites delineated in a local general plan, specific plan, or other land use plan. Additionally, there are no oil and gas extraction wells within or near the property. Therefore, the impact is ***less than significant*** to this environmental topic.

XIII. NOISE

	Potentially Significant Impact	*Less Than Significant with Mitigation Incorporated*	*Less Than Significant Impact*	*No Impact*
a) Generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?		X		
b) Generation of excessive groundborne vibration or groundborne noise levels?			X	
c) For a project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?				X

Existing Setting

Existing Ambient Noise Levels

To quantify the existing ambient noise environment in the Project Vicinity, continuous (24-hour) noise level measurements were conducted on the project site on November 11th – November 12th, 2021. The noise measurement locations are shown on Figure Noise-1. The noise level measurement survey results are provided in Table Noise-2. Appendix B of the Noise Study shows the complete results of the noise monitoring survey.

The sound level meters were programmed to collect hourly noise level intervals at each site during the survey. The maximum value (L_{max}) represents the highest noise level measured during an interval. The average value (L_{eq}) represents the energy average of all of the noise measured during an interval. The median value (L_{50}) represents the sound level exceeded 50 percent of the time during an interval.

TABLE NOISE-1: SUMMARY OF EXISTING BACKGROUND NOISE MEASUREMENT DATA

SITE	*LOCATION*	*DATE/TIME*	L_{DN}	*AVERAGE MEASURED HOURLY NOISE LEVELS, DB*					
				DAYTIME (7AM-10PM)			*NIGHTTIME (10PM-7AM)*		
				L_{EQ}	L_{50}	L_{MAX}	L_{EQ}	L_{50}	L_{MAX}
Continuous (24-hour) Noise Level Measurements1									
LT-1	West of Project Site, 30 ft. to Airport Way Median	11/11/2021-11/12/2021	71	70	56	88	63	46	85
LT-2	South side of project site, 90 ft. to Union Road Median	11/11/2021-11/12/2021	52	50	44	68	44	42	65

SOURCE: SAXELBY ACOUSTICS, 2022.

A Larson Davis Laboratories (LDL) Model 820 precision integrating sound level meter was used for the ambient noise level measurement survey. The meter was calibrated before and after use with an LDL Model CAL200 acoustical calibrator to ensure the accuracy of the measurements. The equipment used meets all pertinent specifications of the American National Standards Institute for Type 1 sound level meters (ANSI S1.4).

Existing and Future Traffic Noise Environment at Sensitive Receptors

Off-Site Traffic Noise Impact Assessment Methodology: To predict existing and cumulative noise levels due to traffic, the Federal Highway Administration (FHWA) Highway Traffic Noise Prediction Model (FHWA RD-77-108) was used. The model is based upon the Calveno reference noise emission factors for automobiles, medium trucks, and heavy trucks, with consideration given to vehicle volume, speed, roadway configuration, distance to the receiver, and the acoustical characteristics of the site. The FHWA model was developed to predict hourly L_{eq} values for free-flowing traffic conditions.

Traffic volumes for existing conditions were obtained from the traffic data prepared for the Project (Kittelson & Associates, 2022). Truck percentages and vehicle speeds on the local area roadways were estimated from field observations.

Traffic noise levels are predicted at the sensitive receptors located at the closest typical setback distance along each Project-area roadway segment. Where traffic noise barriers are predominately along a roadway segment, a -5 offset was added to the noise prediction model to account for various noise barrier heights. A -5 to dB offset was also applied where outdoor activity areas are shielded by intervening buildings. In some locations, sensitive receptors may be located at distances which vary from the assumed calculation distance and may experience shielding from intervening barriers or sound walls. However, the traffic noise analysis is believed to be representative of the majority of sensitive receptors located closest to the Project-area roadway segments analyzed in this report.

Table Noise-2 shows the existing traffic noise levels in terms of L_{dn} at closest sensitive receptors along each roadway segment. A complete listing of the FHWA Model input data is contained in Appendix C of the Noise Study.

TABLE NOISE-2: EXISTING TRAFFIC NOISE LEVELS

ROADWAY	*SEGMENT*	*EXTERIOR TRAFFIC NOISE LEVEL, DB L_{DN}*
Airport Way	North of Woodward Ave.	65.1
Woodward Ave.	Airport Way	57.4
Airport Way	South of Woodward Ave.	57.4
Union Rd.	North of Woodward Ave.	59.4
Woodward Ave.	East of Union Rd.	57.1
Woodward Ave.	West of Union Rd.	58.2
Union Rd.	South of Woodward Ave.	62.9
Peach Ave.	East of Oleander Ave.	N/A
Oleander Ave.	North of Street D	47.2
Oleander Ave.	South of Street D	47.2
E Peach Ave.	West of Street K	44.8

SOURCE: FHWA-RD-77-108 WITH INPUTS FROM KITTELSON & ASSOCIATES AND SAXELBY ACOUSTICS. 2022.

Predicted Exterior Traffic Noise Levels: Implementation of the proposed Project would result in an increase in ADT volumes on the local roadway network, and consequently, an increase in noise levels from traffic sources along affected segments. Tables Noise-3 and Noise-4 show the predicted traffic noise level increases on the local roadway network for Existing, Existing + Project, Cumulative No Project, and Cumulative + Project conditions. Appendix C of the Noise Study provides the complete inputs and results of the FHWA traffic noise modeling.

TABLE NOISE-3: EXISTING AND EXISTING PLUS PROJECT TRAFFIC NOISE LEVELS

ROADWAY	SEGMENT	NOISE LEVELS (L_{DN}, DB) AT NEAREST SENSITIVE RECEPTORS				
		EXISTING	EXISTING + PROJECT	CHANGE	EX. GP CRITERIA[1] / PROPOSED GP CRITERIA[2]	SIGNIFICANT UNDER EX. GP? / SIGNIFICANT UNDER GP UPDATE?
Airport Way	North of Woodward Ave.	66.7	67.3	0.6	+5-10 dBA	No
					+1.5 dBA	No
Woodward Ave.	West of Airport Way	62.8	63.8	1.0	+5-10 dBA	No
					+3 dBA	No
Airport Way	South of Woodward Ave.	67.2	67.6	0.4	+5-10 dBA	No
					+ 1.5 dBA	No
Union Rd.	North of Woodward Ave.	59.4	59.5	0.1	>60 dBA	No
					+5 dBA	No
Woodward Ave.	East of Union Rd.	57.5	57.8	0.3	>60 dBA	No
					+5 dBA	No
Woodward Ave.	West of Union Rd.	58.6	59.0	0.4	>60 dBA	No
					+5 dBA	No
Union Rd.	South of Woodward Ave.	62.9	63.1	0.2	+5-10 dBA	No
					+3 dBA	No
Peach Ave.	East of Oleander Ave.	46.0	49.7	3.7	>60 dBA	No
					+5 dBA	No
Oleander Ave.	North of Street D	**45.0**	**54.2**	**9.2**	>60 dBA	No
					+5 dBA	**Yes**
Oleander Ave.	South of Street D	45.0	45.5	0.5	>60 dBA	No
					+5 dBA	No
E Peach Ave.	West of Street K	42.6	47.0	4.4	>60 dBA	No
					+5 dBA	No

[1] *EXISTING GP CRITERIA - IN MAKING A DETERMINATION OF IMPACT UNDER THE CALIFORNIA ENVIRONMENTAL QUALITY ACT (CEQA), A SUBSTANTIAL INCREASE WILL OCCUR IF AMBIENT NOISE LEVELS ARE INCREASED BY 10 DB OR MORE. AN INCREASE FROM 5-10 DB MAY BE SUBSTANTIAL. FACTORS TO BE CONSIDERED IN DETERMINING THE SIGNIFICANCE OF INCREASES FROM 5-10 DB INCLUDE:*

- *THE RESULTING NOISE LEVELS*
- *THE DURATION AND FREQUENCY OF THE NOISE*
- *THE NUMBER OF PEOPLE AFFECTED*
- *THE LAND USE DESIGNATION OF THE AFFECTED RECEPTOR SITES*
- *PUBLIC REACTIONS/CONTROVERSY AS DEMONSTRATED AT WORKSHOPS/HEARINGS, OR BY CORRESPONDENCE*
- *PRIOR CEQA DETERMINATIONS BY OTHER AGENCIES SPECIFIC TO THE PROJECT*

[2] *PROPOSED GP CRITERIA - IN MAKING A DETERMINATION OF IMPACT UNDER THE CALIFORNIA ENVIRONMENTAL QUALITY ACT (CEQA), A SUBSTANTIAL INCREASE WILL OCCUR IF AMBIENT NOISE LEVELS HAVE A SUBSTANTIAL INCREASE. GENERALLY, A 3 DB INCREASE IN NOISE LEVELS IS BARELY PERCEPTIBLE, AND A 5 DB INCREASE IN NOISE LEVELS IS CLEARLY PERCEPTIBLE. THEREFORE, INCREASES IN NOISE LEVELS SHALL BE CONSIDERED TO BE SUBSTANTIAL WHEN THE FOLLOWING OCCURS:*

- *WHEN EXISTING NOISE LEVELS ARE LESS THAN 60 DB, A 5 DB INCREASE IN NOISE WILL BE CONSIDERED SUBSTANTIAL;*
- *WHEN EXISTING NOISE LEVELS ARE BETWEEN 60 DB AND 65 DB, A 3 DB INCREASE IN NOISE WILL BE CONSIDERED SUBSTANTIAL;*
- *WHEN EXISTING NOISE LEVELS EXCEED 65 DB, A 1.5 DB INCREASE IN NOISE WILL BE CONSIDERED SUBSTANTIAL.*

SOURCE: FHWA-RD-77-108 (WITH INPUTS FROM KITTELSON & ASSOCIATES AND SAXELBY ACOUSTICS). 2022.

TABLE NOISE-4: CUMULATIVE AND CUMULATIVE + PROJECT TRAFFIC NOISE LEVELS

ROADWAY	SEGMENT	NOISE LEVELS (L_{DN}, DB) AT NEAREST SENSITIVE RECEPTORS				
		CUMULATIVE	CUMULATIVE + PROJECT	CHANGE	EX. GP CRITERIA[1] / PROPOSED GP CRITERIA[2]	SIGNIFICANT UNDER EX. GP? / SIGNIFICANT UNDER GP UPDATE?
Airport Way	North of Woodward Ave.	71.8	72.0	0.2	+5-10 dBA	No
					+1.5 dBA	No
Woodward Ave.	West of Airport Way	64.5	65.2	0.7	+5-10 dBA	No
					+3 dBA	No
Airport Way	South of Woodward Ave.	74.8	74.9	0.1	+5-10 dBA	No
					+1.5 dBA	No
Union Rd.	North of Woodward Ave.	62.4	62.5	0.1	+5-10 dBA	No
					+3 dBA	No
Woodward Ave.	East of Union Rd.	60.8	60.9	0.1	+5-10 dBA	No
					+3 dBA	No
Woodward Ave.	West of Union Rd.	59.4	59.7	0.3	>60 dBA	No
					+5 dBA	No
Union Rd.	South of Woodward Ave.	65.4	65.5	0.1	+5-10 dBA	No
					+1.5 dBA	No
Peach Ave.	East of Oleander Ave.	46.0	49.7	3.7	>60 dBA	No
					+5 dBA	No
Oleander Ave.	North of Street D	**45.0**	**54.2**	**9.2**	>60 dBA	No
					+5 dBA	**Yes**
Oleander Ave.	South of Street D	45.0	45.5	0.5	>60 dBA	No
					+5 dBA	No
E Peach Ave.	West of Street K	42.6	47.0	4.4	>60 dBA	No
					+5 dBA	No

[1] *EXISTING GP CRITERIA - IN MAKING A DETERMINATION OF IMPACT UNDER THE CALIFORNIA ENVIRONMENTAL QUALITY ACT (CEQA), A SUBSTANTIAL INCREASE WILL OCCUR IF AMBIENT NOISE LEVELS ARE INCREASED BY 10 DB OR MORE. AN INCREASE FROM 5-10 DB MAY BE SUBSTANTIAL. FACTORS TO BE CONSIDERED IN DETERMINING THE SIGNIFICANCE OF INCREASES FROM 5-10 DB INCLUDE:*

- *THE RESULTING NOISE LEVELS*
- *THE DURATION AND FREQUENCY OF THE NOISE*
- *THE NUMBER OF PEOPLE AFFECTED*
- *THE LAND USE DESIGNATION OF THE AFFECTED RECEPTOR SITES*
- *PUBLIC REACTIONS/CONTROVERSY AS DEMONSTRATED AT WORKSHOPS/HEARINGS, OR BY CORRESPONDENCE*
- *PRIOR CEQA DETERMINATIONS BY OTHER AGENCIES SPECIFIC TO THE PROJECT*

[2] *PROPOSED GP CRITERIA - IN MAKING A DETERMINATION OF IMPACT UNDER THE CALIFORNIA ENVIRONMENTAL QUALITY ACT (CEQA), A SUBSTANTIAL INCREASE WILL OCCUR IF AMBIENT NOISE LEVELS HAVE A SUBSTANTIAL INCREASE. GENERALLY, A 3 DB INCREASE IN NOISE LEVELS IS BARELY PERCEPTIBLE, AND A 5 DB INCREASE IN NOISE LEVELS IS CLEARLY PERCEPTIBLE. THEREFORE, INCREASES IN NOISE LEVELS SHALL BE CONSIDERED TO BE SUBSTANTIAL WHEN THE FOLLOWING OCCURS:*

- *WHEN EXISTING NOISE LEVELS ARE LESS THAN 60 DB, A 5 DB INCREASE IN NOISE WILL BE CONSIDERED SUBSTANTIAL;*
- *WHEN EXISTING NOISE LEVELS ARE BETWEEN 60 DB AND 65 DB, A 3 DB INCREASE IN NOISE WILL BE CONSIDERED SUBSTANTIAL;*

- *WHEN EXISTING NOISE LEVELS EXCEED 65 DB, A 1.5 DB INCREASE IN NOISE WILL BE CONSIDERED SUBSTANTIAL.*

SOURCE: FHWA-RD-77-108 WITH INPUTS FROM KITTELSON & ASSOCIATES AND SAXELBY ACOUSTICS. 2022.

Based upon data in Tables Noise-3 and Noise-4, the proposed Project is predicted to result in a maximum traffic noise level increase of 9.2 dB.

Evaluation of Transportation Noise on Overall Project Site

Traffic Noise Levels

Airport Way: Cumulative plus project traffic noise levels are predicted to be 75 dB Ldn at a distance of 50 feet from the centerline of Airport Way, assuming no shielding from intervening buildings or sound walls. The proposed residential uses are located approximately 630 feet from the centerline Airport Way. Therefore, maximum exterior noise levels of 58 dB Ldn are predicted for these uses.

Peach Road: Cumulative plus Project traffic noise levels are predicted to be 52 dB Ldn at a distance of 50 feet from the centerline of Peach Road, assuming no shielding from intervening buildings or sound walls. The backyards of the proposed residential uses are located approximately 130 feet from the centerline this road. Therefore, maximum exterior noise levels of 46 dB Ldn are predicted for these uses.

Oleander Avenue: Cumulative plus Project traffic noise levels are predicted to be 55 dB Ldn at a distance of 50 feet from the centerline of Lovelace Road, assuming no shielding from intervening buildings or sound walls. The backyards of the proposed residential uses are located approximately 90 feet from the centerline this road. Therefore, maximum exterior noise levels of 51 dB L_{dn} are predicted for these uses.

Construction Noise Environment

During the construction of the proposed Project, including roads, water, and sewer lines and related infrastructure, noise from construction activities would add to the noise environment in the Project vicinity. As indicated in Table Noise-5, activities involved in construction would generate maximum noise levels ranging from 76 to 90 dB at a distance of 50 feet.

TABLE NOISE-5: CONSTRUCTION EQUIPMENT NOISE

TYPE OF EQUIPMENT	*MAXIMUM LEVEL, DB*	
	25 FEET	*50 FEET*
Backhoe	84	78
Compactor	89	83
Compressor (air)	84	78
Concrete Saw	96	90
Dozer	88	82
Dump Truck	82	76
Excavator	87	81
Generator	87	81
Jackhammer	94	89
Pneumatic Tools	91	85

SOURCE: ROADWAY CONSTRUCTION NOISE MODEL USER'S GUIDE. FEDERAL HIGHWAY ADMINISTRATION. FHWA-HEP-05-054. JANUARY 2006.

Construction Vibration Environment

The primary vibration-generating activities associated with the proposed Project would happen during construction when activities such as grading, utilities placement, and road construction occur. Table Noise-6 shows the typical vibration levels produced by construction placement.

TABLE NOISE-6: VIBRATION LEVELS FOR VARIOUS CONSTRUCTION EQUIPMENT

TYPE OF EQUIPMENT	PEAK PARTICLE VELOCITY @ 25 FEET (INCHES/SECOND)	PEAK PARTICLE VELOCITY @ 100 FEET (INCHES/SECOND)
Large Bulldozer	0.089	0.011
Loaded Trucks	0.076	0.010
Small Bulldozer	0.003	0.000
Auger/drill Rigs	0.089	0.011
Jackhammer	0.035	0.004
Vibratory Hammer	0.070	0.009
Vibratory Compactor/roller	0.210	0.026

SOURCE: FEDERAL TRANSIT ADMINISTRATION, TRANSIT NOISE AND VIBRATION IMPACT ASSESSMENT GUIDELINES, MAY 2006

Impacts and Mitigation Measures

Response a):

Traffic Noise Increases under Existing (2003) General Plan Standards

As shown in Tables Noise-3 and Noise-4, some noise-sensitive receptors located along the Project-area roadways within and outside of the Project site are currently exposed to exterior traffic noise levels exceeding the City of Manteca 60 dB Ldn exterior noise level standard for residential uses. These receptors would continue to experience elevated exterior noise levels with implementation of the proposed Project. For example, sensitive receptors under Existing conditions located adjacent to Airport Way, north of Woodward Avenue, experience an exterior noise level of approximately 66.7 dB Ldn. Under Existing + Project conditions, exterior traffic noise levels are predicted to be approximately 67.3 dB Ldn. Exterior noise levels in both scenarios exceed the City's exterior noise level standard of 60 dB Ldn. Under the City's existing General Plan, the Project's contribution of 0.6 dB would not exceed the City's increase criteria of 5-10 dB.

On Oleandar Avenue north of Street D, the predicted noise increase is 9.2 dBA under plus project conditions. However, the noise levels under cumulative plus project conditions are predicted to be 54.2 dBA Ldn which meets the City's 60 dBA Ldn exterior noise standard. Under the existing General Plan standards, the increase of 9.2 dBA would not likely be considered significant considering that the resulting noise level is within the City's acceptable exterior noise standard limit of 60 dBA Ldn. Therefore, this would be a ***less-than-significant*** impact.

Traffic Noise Increases under Proposed General Plan Standards

The Proposed City of Manteca General Plan Noise Element specifies criteria to determine the significance of traffic noise impacts. An increase in the traffic noise level of 1.5 dB or more would be significant where the pre-Project noise levels are greater than 65 dB L_{dn}, 3.0 dB or more where existing noise levels are between 60-65 dB L_{dn}, and 5 dB or more where existing noise levels are less than 60 dBA L_{dn}.

According to Tables Noise-3 and Noise-4, the maximum noise level increase due to Project traffic is predicted to be 9.2 dBA L_{dn}. For this segment of Oleander Avenue, the existing traffic noise level at the nearest sensitive receptor is approximately 45.0 dBA. Therefore, an increase of 5 dB would be required to be considered a significant impact. The existing plus project increase of 9.2 dB would be significant under this scenario. All other roadway segments analyzed in the traffic study do not exceed the Proposed General Plan Standards for significant impacts.

In order to reduce this impact, the use of quiet pavement, or another alternative may be required. Construction of new six-foot-tall sound walls is not a feasible mitigation measure in this location as the impacted residential uses are fronted onto Oleander Drive.

Quiet pavements are typically assumed to provide a 3 to 5 dBA reduction. Assuming a minimum reduction of 3 dBA, quiet pavement placed along sensitive receptor areas on the previously listed roadway segment could reduce Project noise level increases, as outlined below:

- **Oleander Avenue from "Street D" to East Woodward Avenue** – noise levels are predicted to increase by 9.2 dB without mitigation. Use of quiet pavement would reduce this increase to approximately 4.2 to 6.2 dBA, depending on the performance of the quiet pavement. Resulting noise levels would be expected to be in the range of 49.2-51.2 dB Ldn. Approximately 1,200 feet (approximately 0.28 miles) of quiet pavement would be required. See Figure 3.10-2 from the Noise Study for approximate required pavement locations.

With the use of quiet pavement on Oleander Avenue traffic noise level increases are expected to be in the range of 4.2 to 6.2 dBA, with resulting noise levels of no more than 51.2 dBA Ldn. This is well within the City's 60 dBA Ldn exterior noise standard. It is noted that it may also be possible for circulation or design modifications that could demonstrate an alternative means of mitigating the project's noise increases to Oleander Avenue. If alternative means can be shown to reduce noise on Oleander to less than 5 dBA, the project applicant may choose to proceed with an alternative mitigation method. This reduction would require documentation in an updated noise analysis, and would make the quiet pavement requirement no longer applicable. Mitigation Measure Noise-1 includes provisions for mitigating traffic noise through either installation of quiet pavement, or an alternative means supported by an updated noise study. Implementation of this mitigation measure would ensure traffic noise impacts would be ***less-than-significant***.

Operational Noise Increases

The proposed Project would include typical residential noise sources which would be compatible with the adjacent existing residential uses (a.k.a. neighborhood traffic, yard equipment, truck deliveries, garbage collected, etc.). Typical maximum noise levels from a park playground or sports field is 55 dBA Leq at a distance of 50 feet from the center of the play area. The proposed Lot A park/basin is located approximately 550 feet from the nearest existing off-site receptors, as measured from the center of the park. At this distance park noise levels would be expected to be approximately 34 dBA Leq. This is well under the City's 50 dBA Leq daytime and 45 dBA Leq nighttime noise standards for stationary noise sources

Construction Noise

During the construction of the Project, including roads, water, sewer lines, and related infrastructure, noise from construction activities would add to the noise environment in the

Project vicinity. Existing receptors adjacent to the proposed construction activities are located south and east of the site.

As indicated in Table Noise-5, activities involved in construction would generate maximum noise levels ranging from 82 to 96 dB L_{max} at a distance of 50 feet. Noise would also be generated during the construction phase by increased truck traffic on area roadways. A significant Project-generated noise source would be truck traffic associated with transport of heavy materials and equipment to and from construction sites. This noise increase would be of short duration and would likely occur primarily during daytime hours.

Construction activities would be temporary in nature and are exempt from noise regulation during the hours of 7:00 AM to 7:00 PM, as outlined in the City's Municipal Code:

> **17.58.050 D. Exempt Activities**
>
> 8. Construction activities when conducted as part of an approved Building Permit, except as prohibited in Subsection 17.58.050(E)(1) (Prohibited Activities) below.
>
> **17.58.050 E. Prohibited Activities**
>
> 1. Construction Noise. Operating or causing the operation of tools or equipment on private property used in alteration, construction, demolition, drilling, or repair work daily between the hours of 7:00 p.m. and 7:00 a.m., so that the sound creates a noise disturbance across a residential property line, except for emergency work of public service utilities.

Therefore, with implementation of Mitigation Measure Noise-1, temporary construction noise impacts would be reduced to less than significant.

Exterior Traffic Noise at Proposed Uses

Table Noise-7 shows the predicted traffic noise levels at the proposed residential uses adjacent to the major Project-area arterial roadways and highways. Based upon Tables Noise-7, exterior noise levels would exceed the City's 60 dBA L_{dn} normally acceptable exterior noise standard. Therefore, no additional noise control measures would be required.

TABLE NOISE-7: CUMULATIVE + PROJECT TRANSPORTATION NOISE LEVELS AT PROPOSED RESIDENTIAL USES

SEGMENT	*APPROXIMATE RESIDENTIAL SETBACK, FEET[1]*	*PREDICTED NOISE LEVELS, DB L_{DN}*
Airport Way	630	58
Peach Road	130	46
Oleander Avenue	90	51

NOTES:

[1] SETBACK DISTANCES ARE MEASURED IN FEET FROM THE CENTERLINES OF THE ROADWAYS TO THE CENTER OF RESIDENTIAL BACKYARDS.

SOURCE: SAXELBY ACOUSTICS. 2022.

Interior Noise Impacts at Proposed Residential Uses

Modern construction typically provides a 25-dB exterior-to-interior noise level reduction with windows closed. Therefore, sensitive receptors exposed to exterior noise of 70 dB L_{dn}, or less, will typically comply with the City of Manteca 45 dB L_{dn} interior noise level standard. Additional noise reduction measures, such as acoustically-rated windows, are generally required for exterior noise levels exceeding 70 dB L_{dn}.

The proposed residential uses are predicted to be exposed to unmitigated first-floor exterior transportation noise levels up to 58 dBA L_{dn} at the proposed residential uses east of Airport Way. The second-floor locations may be exposed to noise levels 2-3 dB higher than ground floor receivers. Therefore, noise levels of 61 dB L_{dn} are expected at the second-floor facades along Airport Way.

Based upon a 25-dB exterior-to-interior noise level reduction, interior noise levels are predicted to be up to 36 at second floors and 33 dBA L_{dn} at first floors. Accordingly, predicted interior noise levels along the first row of residential uses along Airport Way are predicted to comply with the City's 45 dB L_{dn} interior noise level standard.

Therefore, this is a **less than significant** impact and no mitigation measures are required.

Mitigation Measure(s)

Mitigation Measure NOISE-1: *To reduce traffic noise increases, Oleander Avenue from "Street D" to Woodward Avenue shall be paved with quiet pavement. If an updated noise analysis, prepared to the satisfaction of the Community Development Director based on the project's circulation system approved by the City, demonstrates alternative means of mitigating the project's noise increases to Oleander Avenue from "Street D" to Woodward Avenue to be less than 5 dBA, project applicant may choose to proceed with an alternative mitigation method with the express approval of the Community Development Director. If the updated noise analysis demonstrates that the anticipated noise increases to Oleander Avenue from "Street D" to Woodward Avenue no longer exceed 5 dBA based on the mitigating effects of revised circulation patterns or another design characteristics, the paving requirement would no longer apply.*

Mitigation Measure NOISE-2a: *Construction activities shall adhere to the requirements of the City of Manteca Municipal Code with respect to hours of operation. This requirement shall be noted in the improvements plans prior to approval by the City's Public Works Department.*

Mitigation Measure NOISE-2b: *All equipment shall be fitted with factory equipped mufflers, and in good working order. This requirement shall be noted in the improvements plans prior to approval by the City's Public Works Department.*

Response b): Construction vibration impacts include human annoyance and building structural damage. Human annoyance occurs when construction vibration rises significantly above the threshold of perception. Building damage can take the form of cosmetic or structural damage.

With the exception of vibratory compactors, the Table 3.11-7 data indicate that construction vibration levels anticipated for the Project are less than the 0.2 in/sec threshold at a distance of 25 feet. Use of vibratory compactors within 26 feet of the adjacent buildings could cause vibrations in excess of 0.2 in/sec. Sensitive receptors which could be impacted by construction-related vibrations, especially vibratory compactors/rollers, are located approximately 10-15 feet, or further, from the Project site.

Implementation of the following mitigation measure will ensure that these potential impacts are reduced to a ***less than significant*** level.

Mitigation Measure(s)

Mitigation Measure NOISE-3: *Any compaction required less than 26 feet from the adjacent residential structures shall be accomplished by using static drum rollers which use weight instead of vibrations to achieve soil compaction. As an alternative to this requirement, pre-construction crack documentation and construction vibration monitoring could be conducted to ensure that construction vibrations do not cause damage to any adjacent structures.*

Response c): There are no airports within two miles of the Project vicinity. Therefore, this impact is not applicable to the proposed Project.

XIV. POPULATION AND HOUSING

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

Responses to Checklist Questions

Response a): According to the 2020 U.S. Census, the population in Manteca is 83,498 people, and the average persons per household is 3.13. The proposed Project would result in the construction of residential housing that would generate up to an estimated 617 people. This is an estimated 0.7 percent growth in Manteca. An estimated 0.7 percent growth in Manteca is not considered substantial growth in Manteca or the region and it is consistent with the assumed growth in the General Plan. The approximately 617 people may come from Manteca or surrounding communities. The proposed Project would not include upsizing of offsite infrastructure or roadways. The installation of new infrastructure would be limited to the internal Project site. The sizing of the infrastructure would be specific to the number of units proposed within the Project site. Implementation of the proposed Project would not induce substantial population growth in an area, either directly or indirectly. Implementation of the proposed Project would have a ***less than significant*** impact relative to this topic.

Response b): The Project site currently contains undeveloped agricultural land and a single unoccupied house. The proposed Project would not displace housing or people. Implementation of the proposed Project would have ***no impact*** relative to this topic.

XV. PUBLIC SERVICES

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

Responses to Checklist Questions

Response a):

Fire Protection

The proposed Project would add up to 197 residential units, which is anticipated to add approximately 617 people to the City of Manteca. The additional of up to 617 people in the City of Manteca would place additional demands for fire service on the Manteca Fire Department.

The Manteca Fire Department serves approximately 83,498 residents throughout approximately 17.2 square miles within the City limits. The Manteca Fire Department operates out of four (4) facilities that are strategically located in the City of Manteca. The nearest fire station to the Project site is located at 1465 W Lathrop Road with a travel distance of approximately 1.22 miles west on Lathrop Road then north on Airport Way to the Project site.

The Manteca Fire Department maintains a goal for the initial company of three (3) firefighters to arrive on scene for fire and emergency medical service (EMS) incidents within five (5) minutes 90% of the time (Response Effectiveness). In 2016, the Department averaged a response time for Code 3 emergencies such as fires, medical calls or auto accidents at 4:20 minutes City-wide. The Department is currently meeting the Response Effectiveness goal. The City's currently ISO PPC is rated Class 2 on a scale of 1 to 10, with Class 1 being the highest possible protection rating and Class 10 being the lowest, which is better than most of the jurisdictions in San Joaquin and Stanislaus County.

The City of Manteca receives funds for the provision of public services through development fees, property taxes, and connection and usage fees. As land is developed within the City and annexed into the City of Manteca, these fees apply. The City of Manteca reviews these fee structures on an annual basis to ensure that they provide adequate financing to cover the provision of city services. The City's Community Development, Public Works, and Finance Departments are responsible for continual oversight to ensure that the fee structures are adequate. The City reviews the referenced fees and user charges on an annual basis to determine the correct level of adjustment required to reverse any deficits and assure funding for needed infrastructure going forward. The City includes discussion of these fees and charges as part of the annual budget hearings.

The City of Manteca General Plan 2023 includes policies and implementation measures that would allow for the Department to continue providing adequate facilities and staffing levels. Below is a list of relevant policies:

- The City shall endeavor to maintain an overall fire insurance (ISO) rating of 4 or better (Policy PF-P-42).
- The City shall endeavor through adequate staffing and station locations to maintain the minimum feasible response time for fire and emergency calls (PF-P-43).
- The City shall provide fire services to serve the existing and projected population (PF-P-44).
- The City will establish the criteria for determining the circumstances under which fire service will be enhanced (PF-P-45).
- The Fire Department shall continuously monitor response times and report annually on the results of the monitoring (PF-I-24).
- The City shall encourage a pattern of development that promotes the efficient and timely development of public services and facilities (LU-P-3).

Impact fees from new development are collected based upon projected impacts from each development. The adequacy of impact fees is reviewed on an annual basis to ensure that the fee is commensurate with the service. Payment of the applicable impact fees by the Project applicant, and ongoing revenues that would come from property taxes, sales taxes, and other revenues generated by the proposed project, would fund capital and labor costs associated with fire protection services. Payment of such fees is adequate to ensure that the proposed Project would not result in any CEQA impacts related to this topic, including the potential for the proposed Project to cause substantial adverse physical impact associated with the provision of new or physically alternated governmental services, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts. Therefore, the impact of the proposed Project on the need for additional fire services facilities is ***less than significant***.

Police Protection

The proposed Project would add up to 197 residential units, which is anticipated to add approximately 617 people to the City of Manteca. The additional of up to 617 people in the City of Manteca would place additional demands for police service on the Manteca Police Department.

The Project site is currently under the jurisdiction of the Manteca Police Department. The Manteca Police Department operates out of its headquarters located at 1001 W. Center Street. The Project site is located approximately 1 mile southwest of the headquarters.

The Manteca Police Department is organized into two divisions: Operations and Services. Additionally, the Police Department operates a Public Affairs Unit. For budgeting purposes, the Police Department is organized into the following programs: administration, patrol, investigations, support services, dispatch, code enforcement, jail services, and animal services.

The City of Manteca receives funds for the provision of public services through development fees, property taxes, and connection and usage fees. As land is developed within the City and annexed into the City of Manteca, these fees apply. The City of Manteca reviews these fee structures on an annual basis to ensure that they provide adequate financing to cover the provision of city services. The City's Community Development, Public Works, and Finance Departments are responsible for continual oversight to ensure that the fee structures are adequate. The City reviews the referenced fees and user charges on an annual basis to determine the correct level of adjustment required to reverse any deficits and assure funding for needed infrastructure going forward. The City intends to include discussion of these fees and charges as part of the annual budget hearings.

The City's General Plan includes policies and implementation measures that would allow for the Manteca Police Department to continue providing adequate staffing levels. Below is a list of relevant policies:

- The City shall endeavor through adequate staffing and patrol arrangements to maintain the minimum feasible police response times for police calls. Currently the City has 76 sworn officers. With a population of 83,498, that equates to a staffing level of .91 officers per 1000 residents.

- The City shall provide police services to serve the existing and projected population. The Police Department will continuously monitor response times and report annually on the results of the monitoring.

Impact fees from new development are collected based upon projected impacts from each development. The adequacy of impact fees is reviewed on an annual basis to ensure that the fee is commensurate with the service. Payment of the applicable impact fees by the Project applicant, and ongoing revenues that would come from property taxes, sales taxes, and other revenues generated by the proposed project, would fund capital and labor costs associated with police services. Payment of such fees is adequate to ensure that the proposed Project would not result in any CEQA impacts related to this topic, including the potential for the proposed Project to cause substantial adverse physical impact associated with the provision of new or physically alternated governmental services, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts.

Based on the current adequacy of existing response times and the ability of the Manteca Police Department to serve the City, it is anticipated that the existing police department facilities are sufficient to serve the proposed project. Consequently, any impacts would be ***less than significant***.

Schools

The Manteca Unified School District (MUSD) provides school services for grades K through 12 within the communities of Manteca, Lathrop, Stockton, and French Camp. The District is approximately 113 square miles and serves more than 23,500 students. Within the City of Manteca, there are 14 schools serving elementary age and middle school students (grades K-8), one K-6 school, four high schools (grades 9-12), one community day school (grades 7-12), and one vocational high school (grades 11-12). Table Public-1 lists MUSD schools in Manteca and the most recent enrollment for each school.

A small portion of the southeast planning area is served by the Ripon Unified School District (RUSD). District-wide RUSD Schools has a total enrollment of 4,663 students for the 2019-2020 school year, with the majority of students served outside of the planning area.

TABLE PUBLIC-1: PUBLIC SCHOOLS SERVING MANTECA

SCHOOL	GRADES SERVED	ADDRESS	ENROLLMENT 2019-2020 SCHOOL YEAR
ELEMENTARY AND MIDDLE SCHOOLS			
George McParland Elementary School	K-8	1601 Northgate Dr	1,163
Stella Brockman Elementary School	K-8	763 Silverado Dr	813
Brock Elliott Elementary School	K-8	1110 Stonum Ln	838
French Camp Elementary	K-8	241 4th Street	584
Golden West Elementary School	K-8	1031 North Main St	536
Joshua Cowell Elementary School	K-8	740 Pestana Ave	651
Lincoln Elementary School	K-8	750 E Yosemite Ave	651
Manteca Community Day	K-6	737 W Yosemite Ave	15
Neil Hafley Elementary School	K-8	849 Northgate Dr	752
New Haven Elementary School	K-8	14600 Austin Rd	535
Nile Garden Elementary School	K-8	5700 E Nile Rd	726
Sequoia Elementary School	K-8	710 Martha St	815
Shasta Elementary School	K-8	751 E Edison St	772
Veritas Elementary School	K-8	1600 Pagola Ave	932
Walter Woodward Elementary School	K-8	575 Tannehill Dr	910
HIGH SCHOOLS			
Calla High School	9-12	130 S Austin Rd	162
East Union High School	9-12	1700 N Union Rd	1,614
Manteca Community Day School	7-12	737 W Yosemite Ave	50
Manteca High School	9-12	450 E Yosemite Ave	1,686
Sierra High School	9-12	1700 Thomas St	1,471
Manteca Unified Vocational Academy (be.tech)	11-12	2271 W. Louise Ave	127

SOURCE: CALIFORNIA DEPARTMENT OF EDUCATION EDUCATIONAL DEMOGRAPHICS UNIT ENROLLMENT FOR 2018-19

As shown in Table Public-1, the schools serving the City had a total enrollment of approximately 15,803 students, of which 10,693 were enrolled in elementary and middle school (grades K – 8) and 5,110 were enrolled in high school (grades 9 – 12).

District-wide MUSD Schools has a total enrollment of 23,834 students for the 2019-2020 school year. Table Public-2 provides a summary of the public school enrollment by grade within Manteca.

TABLE PUBLIC-4: ENROLLMENT BY GRADE MUSD (2019-2020)

MANTECA UNIFIED	GRADE LEVEL													
	K	1	2	3	4	5	6	7	8	9	10	11	12	TOTAL 2019-2020
Total	1,931	1,645	1,692	1,740	1,740	1,716	1,811	1,883	2,002	2,002	1,859	1,907	1,931	**23,834**

SOURCE: CALIFORNIA DEPARTMENT OF EDUCATION EDUCATIONAL DEMOGRAPHICS UNIT ENROLLMENT FOR 2019-2020

The proposed Project includes residential units that would directly increase the student population in the area. The proposed Project would include the development of up to 197 dwelling units, which would directly cause population growth and increase enrollment in the local school districts. Calculations based on the Manteca Unified School District, School Mitigation Fee Justification Study Final Draft Report, July 2020, which identifies grade K-6 student generation rate of 0.33 students per Single family unit, grade 7-8 student generation rate of 0.096 students per Single family unit and grade 9-12 student generation rate of 0.207 students per Single family unit., the proposed Project would be expected to generate up to roughly 125 new students, broken down by grades as follows:

- K–6: 65.0 students
- 7–8: 18.9 students
- 9–12: 40.8 students

The MUSD collects impact fees from new developments under the provisions of the Leroy F. Greene School Facilities Act of 1998, enacted by Senate Bill 50 (“SB 50”). SB 50 restricts the ability of local agencies to deny or condition land use approvals on the basis that school facilities are inadequate and precludes local agencies from requiring anything other than payment of the prevailing developer fee adopted by the local school district. SB 50 sets forth the “exclusive methods of considering and mitigating impacts on school facilities” resulting from any planning and/or development project, regardless of whether its character is legislative, adjudicative, or both. Govt. Code § 65996(a) (emphasis added).

Section 65995(h) provides that “[t]he payment or satisfaction of a fee, charge, or other requirement levied or imposed pursuant to Section 17620 of the Education Code in the amount specified in Section 65995 … is hereby deemed to be full and complete mitigation of the impacts of any legislative or adjudicative act, or both, involving but not limited to, the planning, use, or development of real property … on the provision of adequate school facilities.” (emphasis added).

The reference in Section 65995(h) to fees “imposed pursuant to Section 17620 of the Education Code in the amount specified in Section 65995” is to per-square-foot school fees that can be imposed by school districts on new residential and commercial and industrial construction. Pursuant to this authority, the District has adopted a Level 1 fee in the amount of $3.79 per square foot of assessable space of new residential construction. Payment of this Level 1 fee by the Project applicant constitutes full and complete mitigation of all impacts of the proposed Project on the District’s school facilities as a matter of law. (Gov't Code § 659959h).)

Under SB 50, the City of Manteca is legally precluded from concluding, under CEQA or otherwise, that payment of the prevailing Level 1 fee will not completely mitigate the impacts of the proposed Project. Government Code § 65995(a) provides that SB 50 constitutes sets forth the “exclusive methods of considering and mitigating impacts on school facilities” when evaluating a development project. Because the methods of both “considering and mitigating” impacts on school facilities set forth in Government Code section 65996(a) are exclusive, SB 50 obviates the need for CEQA documents even to contain a description and analysis of a development project’s impacts on school facilities. See Chawanakee Unified Sch. Dist. v. Cty. of Madera, 196 Cal. App. 4th 1016, 1027 (2011). Further, these statutes prohibit local agencies from concluding that payment of the authorized fees do not constitute full and complete mitigation of a project’s school facilities impacts. Local agencies have no power to supersede the legislature's express and unambiguous directives on this subject.

Nor does the City possess the authority to deny or condition the proposed Project unless the Project applicant agrees to pay fees or provide other mitigation beyond the duly adopted Level 1 fee. Under Government Code § 65995(a), a "local agency may not deny or refuse to approve a legislative or adjudicative act, or both, involving, but not limited to, the planning, use, or development of real property on the basis of a person's refusal to provide school facilities mitigation that exceeds the amounts authorized pursuant to [SB 50.]"

In short, payment of the Level 1 fee is "deemed to provide full and complete school facilities mitigation and, notwithstanding [Government Code] Section 65858, or [CEQA], or any other provision of state or local law, a state or local agency may not deny or refuse to approve [the] development of real property ... on the basis that school facilities are inadequate.".

Payment of the applicable impact fees by the Project applicant, and ongoing revenues that would come from taxes, would fund capital and labor costs associated with school services. The adequacy of fees is reviewed on an annual basis to ensure that the fee is commensurate with the service. Payment of the applicable impact fees by the Project applicant, and ongoing revenues that would come from property taxes and other revenues generated by the proposed project, would fund improvements associated with school services.

The provisions of State law are considered full and complete mitigation for the purposes of analysis under CEQA for school construction needed to serve new development. In fact, State law expressly precludes the City from reaching a conclusion under CEQA that payment of the Leroy F. Greene School Facilities Act school impact fees would not completely mitigate new development impacts on school facilities. Consequently, the City of Manteca is without the legal authority under CEQA to impose any fee, condition, or other exaction on the proposed Project for the funding of new school construction other than the fees allowed by the Leroy F. Greene School Facilities Act. Additionally, local agencies are prohibited from using the inadequacy of school facilities as a basis for denying or conditioning approvals. Although MUSD may collect higher fees than those imposed by the Leroy F. Greene School Facilities Act, no such fees are required to mitigate the impact under CEQA. Because the proposed Project would pay fees as required by The Leroy F. Greene School Facilities Act, this impact would be ***less than significant***.

Parks

CEQA requires that the proposed Project is analyzed to determine whether any substantial adverse impacts would be associated with any new or physically altered governmental facilities that may be required to serve the proposed Project (in this case, for park and recreation facilities). The proposed Project directly increases the number of persons in the area as a result of employment potential, and residential uses. The proposed Project includes up to 197 residential units, which is projected to increase the population by up to an estimated 617 people (based on 3.13 persons per household). For the purposes of extractive and collecting fees to mitigate for increase park demands (Quimby Act), the California Government Code Section 66477 states: *The amount of land dedicated or fees paid shall be based upon the residential density, which shall be determined on the basis of the approved or conditionally approved tentative map or parcel map and the average number of persons per household. There shall be a rebuttable presumption that the average number of persons per household by units in a structure is the same as that disclosed by the most recent available federal census or a census taken pursuant to Chapter 17 (commencing with Section 40200) of Part 2 of Division 3 of Title 4.*

The City's General Plan identifies a park standard based on a goal of five acres of developed parkland per 1,000 residents within the city limits. However, Manteca Municipal Code Chapter 3.20.080, Neighborhood parks, requires in all new subdivisions, the developer to build and dedicate a neighborhood park that meets the required three acres per 1,000 people per the adopted park acquisition and improvement fee. The additional two acres of parkland per 1,000 people is made of one acre of community park and one acre of special park, which are paid through in-lieu fees.

Based on an estimate of 617 residents, the Project would require approximately 3.085 acres of parkland (1.234 acres of community park, and 1.851 acres of neighborhood park). The proposed Project includes 2.92 acres of dedicated park, which includes some LID area that may not count toward the park dedication. The alternative Site Plan includes an estimated 3.55 acres of dedicated park, a portion of which is LID area and may not count toward the park dedication. The City Parks Department will evaluate the final park dedication from the site plan that is approved, compared to the park requirements based on the Quimby Act population calculation at the time park fees are due.

The Quimby Act allows a development to provide the parkland onsite, or to pay the in-lieu fees to the City for the future development of park elsewhere in the City. In accordance with the Municipal Code Chapter 3.20, Park Acquisition and Improvement Fees, fees are deposited in specific funds that shall be used solely for the acquisition, improvement and expansion of public parks and recreation facilities as outlined in the park acquisition and improvement fee update. The proposed Project may be subject to the City park dedication in-lieu fees, depending on the final park dedication. As such, with the implementation of Mitigation Measure PUBLIC-1, the proposed Project will result in a ***less-than-significant*** impact.

Mitigation Measure(s)

Mitigation Measure PUBLIC-1: *The Project applicant shall pay applicable park in-lieu fees or dedicate parkland in accordance with the City of Manteca Municipal Code standards outlined in Chapter 3.20. Proof of payment of the in-lieu fees shall be submitted to the City Engineer.*

Other Public Facilities

The proposed Project would not result in a need for other public facilities that are not addressed above, or in Section XVIII, Utilities and Service Systems. Implementation of the proposed Project would have ***no impact*** relative to this issue.

XVI. RECREATION

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

Responses to Checklist Questions

Responses a): The proposed Project would result in the construction of up to 197 single-family residential homes, which would result in up to an estimated 617 individuals. The City of Manteca General Plan Policy PF-P-49 calls for city park acquisition efforts to be based on the goal of 5 acres of developed neighborhood and community parkland per 1,000 residents within the City parks. The Manteca Municipal Code requires all new subdivisions to build and dedicate a neighborhood park that meets the required three acres per 1,000 people. The additional two acres of parkland per 1,000 people is made of one acre of community park and one acre of special park, which are paid through in-lieu fees.

Based on an estimate of 617 residents, the Project would require approximately 3.085 acres of parkland (1.234 acres of community park, and 1.851 acres of neighborhood park). The proposed Project includes 2.92 acres of dedicated park, which includes some LID area that may not count toward the park dedication. The alternative Site Plan includes an estimated 3.55 acres of dedicated park, a portion of which is LID area and may not count toward the park dedication. The City Parks Department will evaluate the final park dedication from the site plan that is approved, compared to the park requirements based on the Quimby Act population calculation at the time park fees are due.

The in-lieu fees would ultimately fund the construction of new park land to offset the increased demand for these facilities. With implementation of Mitigation Measure PUBLIC-1, this potential impact would be reduced to a ***less than significant*** level.

Responses b): Beyond the park facilities described above, the proposed Project does not include the construction of recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment. Implementation of the proposed Project would have a ***less than significant*** impact relative to this topic.

XVII. TRANSPORTATION

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

Existing Setting

This section summarizes applicable federal, state, regional, and local plans, laws, and regulations that are relevant to this analysis. This information provides a context for the discussion related to the proposed Project's consistency with applicable policies, plans, laws, and regulations.

Federal Regulations

This section summarizes federal agencies and laws pertinent to the proposed Project.

Federal Highway Administration

The Federal Highway Administration (FHWA) is the agency of the United States Department of Transportation (DOT) responsible for the federally funded roadway system, including the interstate highway network and portions of the primary state highway network, such as Interstate 5 (I-5).

State Regulations

This section summarizes State of California agencies, regulations, and policies that pertain to transportation in Manteca.

California Environmental Quality Act (CEQA)

The California Environmental Quality Act (CEQA) Guidelines, Appendix G Environmental Checklist Form describes four recommended categories of impacts related to transportation and traffic. These categories are recommended for formal environmental review of projects, but are referenced as appropriate for this TIA.

A project's impact is considered to be significant if it would:

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

b. Conflict or be inconsistent with CEQA Guideline section 15064.3, subdivision (b).

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

d. Result in inadequate emergency access.

Significance criteria “b” is related to the implementation of vehicle miles traveled (VMT) as the primary performance metric consistent with Senate Bill 743 as described below.

Senate Bill 743

Senate Bill 743 (SB 743) was signed into law in September 2013. Senate Bill 743 (Steinberg, 2013) required changes to the California Environmental Quality Act (CEQA) Guidelines regarding the analysis of transportation impacts. The purpose of SB 743 is to promote the reduction of greenhouse gas emissions, the development of multimodal transportation networks, and a diversity of land uses.

Prior to implementation of SB 743, CEQA transportation analyses of individual projects typically determined impacts on the circulation system in terms of roadway delay and/or capacity usage at specific locations, such as street intersections or freeway segments. The SB 743 changes include the elimination of auto delay, level of service (LOS), and other similar measures of vehicular capacity or traffic congestion as a basis for determining significant impacts.

Under SB 743, a project’s effect on automobile delay shall not constitute a significant environmental impact. Therefore, level of service (LOS) and other similar vehicle delay or capacity metrics can no longer serve as transportation impact metrics for CEQA analysis. The California Office of Planning and Research (OPR) updated the CEQA Guidelines and provided a final technical advisory in December 2018, which recommends vehicle miles traveled (VMT) as the most appropriate measure of transportation impacts under CEQA. The California Natural Resources Agency certified and adopted the CEQA Guidelines including the Guidelines section implementing SB 743. The changes have been approved by the Office of the Administrative Law and are now in effect.

Revisions to CEQA transportation analysis requirements do not preclude the application of local general plan policies, municipal and zoning codes, conditions of approval, or any other planning requirements through a city’s planning approval process. These requirements aim to ensure adequate operation of the transportation system in terms of transportation congestion measures related to vehicular delay and roadway capacity.

California Department of Transportation

The California Department of Transportation (Caltrans) is the primary State agency responsible for transportation issues. As owner/operator of the State Highway System, Caltrans may review projects and plans as a commenting agency or responsible agency under the California Environmental Quality Act (CEQA). IN relation to this role, Caltrans published the Vehicle Miles Traveled-Focused Transportation Impact Study Guide” in May, 2020. This replaced the “Guide for the Preparation of Traffic Impact Studies” (December 2002), which established Measures of Effectiveness based on level of service targets.

Caltrans recommends following the guidance on methods of VMT assessment found in OPR’s Technical Advisory. Caltrans comments on a CEQA document may note methodological deviations from those methods and may recommend that significance determinations and mitigation be aligned with state greenhouse gas reduction goals as articulated in OPR’s guidance, the California Air Resources Board’s Scoping Plan, and related documentation.

Caltrans facilities within the Manteca study area include State Route 120 and its on- and off-ramps.

For projects that may physically affect facilities under its administration, Caltrans requires encroachment permits before any construction work may be undertaken.

Regional Regulations

This section summarizes regional agencies, plans, and policies that pertain to transportation in Manteca.

San Joaquin Council of Governments Regional Congestion Management Program

The San Joaquin Council of Governments (SJCOG) is responsible for the Regional Congestion Management Program (RCMP). The purpose of the RCMP is to monitor congestion, identify congestion problems, and establish a programming mechanism aimed at reducing congestion. Designation of a regional transportation system supports RCMP monitoring activities and focuses the implementation of the RCMP on a core network of key transportation facilities that facilitate regional travel within San Joaquin County.

The RCMP network includes the following facilities in the project study area:

- Interstate 5 (I-5)
- State Route 99 (SR 99)
- Airport Way
- Louise Road
- Yosemite Avenue
- Union Road
- Roth Road

The RCMP also designates multimodal corridors where quality of transportation service is monitored for transit, bicycles and pedestrians as well as vehicles. The following multimodal corridors are designated in the project study area:

- Yosemite Avenue, Airport Way to Northwoods Ave-Commerce Ave
- Lathrop Road, from Airport Way to Crestwood Avenue
- Lathrop Road, from Harlan Road to 7th Street

Prior to 2021, the RCMP included LOS standards for the RCMP network that would affect the evaluation of local development traffic impacts. Consistent with the implementation of SB 743 CEQA streamlining legislation, the 2021 RCMP discontinues the use of LOS for the evaluation of RCMP congestion deficiencies.

The RCMP identifies deficient corridors based on combined speed-based congestion and reliability metrics. None of the deficient corridors identified in the 2021 RCMP are in the Manteca study area.

Local Regulations

This section summarizes City policies and regulations that pertain to transportation in Manteca.

Manteca General Plan

The 2021 update of the Manteca General Plan includes the following policies relevant to the transportation evaluation of the project (Table TT-1).

Table TT-1: Selected Manteca General Plan Policies

No.	Policy
C-1.1	Strive to balance levels of service (LOS) for all modes (vehicle, transit, bicycle, and pedestrian) to maintain a high level of access and mobility, while developing a safe, complete, and efficient circulation system. The impact of new development and land use proposals on VMT, LOS, and accessibility for all modes should be considered in the review process.
C-1.2	To the extent feasible, strive for a vehicular LOS of D or better during weekday AM and PM peak hours at all streets and intersections, except in the Downtown area or in accordance with Policy C-1.3.
C-1.3	At the discretion of the City Council or Planning Commission, certain locations may be allowed to fall below the City's LOS standard established by C-1.2 under the following circumstances: ■ a. Where constructing facilities with enough capacity to provide LOS D is found to be unreasonably expensive. ■ b. Where conditions are worse than LOS D and caused primarily by traffic from adjacent jurisdictions. ■ C. Where maintaining LOS D will be a disincentive to use transit and active transportation modes (i.e., walking and bicycling) or to the implementation of transportation or land use improvements that would reduce vehicle travel. Examples include roadway or intersection widening in areas with substantial pedestrian activity or near major transit centers.
C-2.2	Design roadway improvements to occur in a contiguous, orderly fashion and strive to build roadway improvements in advance of new development particularly when addressing existing deficiencies. However, major circulation improvements shall be constructed no later than when abutting lands develop or redevelop, with dedication of right-of-way and construction of improvements, or participation in construction of such improvements, required as a condition of approval.
C-2.3	Require new development to pay a fair share of the costs of street and other transportation improvements based on impacts in conformance with the goals and policies established in this Circulation Element and the Public Facilities Implementation Program (PFIP).
C-2.13	Require development projects to arrange streets in an interconnected block pattern, so that pedestrians, bicyclists, and drivers are not forced onto arterial streets for inter- or intra-neighborhood travel. This approach will also ensure safe and efficient movement of emergency responders and ensure that vehicle miles traveled are minimized within the community. The street pattern shall include measures to provide a high level of connectivity and decrease vehicle miles traveled.

No.	Policy
C-2.14	Residential subdivisions with lots fronting on an existing arterial street shall provide for separate roadway access to the maximum extent feasible, with access to residential lots provided from residential or collector streets. For those properties that currently front arterial streets, consideration should be given to providing separate roadway access as a condition of approval for any redevelopment or subdivision of the property.
C-2.15	Ensure that development and infrastructure projects are designed in a way that provides pedestrian and bicycle connectivity to adjacent neighborhoods and areas (such as ensuring that sound walls, berms, and similar physical barriers are considered and gaps or other measures are provided to ensure connectivity).
C-2.19	In the development of new projects, give special attention to maintaining/ensuring adequate corner-sight distances appropriate for the speed and type of facility, including intersections of city streets and private access drives and roadways.

SOURCE: MANTECA GENERAL PLAN, MARCH, 2021, PP, 4-2 TO 4-11

Existing Plus Project Traffic Operations

Intersection operations were assessed for Existing plus Project conditions and compared to existing conditions (See Appendix D Traffic Impact Analysis Report). The Project would cause the following changes in level of service:

- Airport Way & Woodward Avenue: From LOS D to E during the AM peak hour and from LOS C to LOS D during the PM peak hour
- Union Road & Woodward Ave: From LOS E to F during the PM peak hour

All study intersections would operate at LOS D or better with the Project in Existing Plus Project Conditions, consistent with General Plan policies, except for the following locations:

- Airport Way & Woodward Avenue (LOS E during the AM peak hour)
  - This all-way stop controlled intersection meets CAMUTCD peak hour signal warrant #3 with existing traffic and signalization is planned in the future based on the City's PFIP. Signalization of this intersection would result in acceptable LOS in existing plus project conditions. Existing plus project operational results with signalization is presented in Table 13 of the Traffic Impact Analysis (Appendix D), and the peak hour signal warrant evaluation is presented in the Signal Warrants section of this report.
- Union Road & Woodward Ave (LOS F during the AM and PM peak hours)
  - This all-way stop controlled intersection meets CAMUTCD peak hour signal warrant #3 with existing traffic and signalization is planned in the future based on the City's PFIP. Signalization of this intersection would result in acceptable LOS in existing and existing plus project conditions. Existing plus project operational results with signalization is presented in Table 13, and the peak hour signal warrant evaluation is presented in the Signal Warrants section of this report.

Cumulative Plus Project Traffic Operations

Intersection operations were assessed for Cumulative (2040 growth without the project) and Cumulative Plus Project conditions and the analysis results are shown in Table 12. The operations analysis assumes intersection improvements consistent with the information provided in the PFIP as listed above.

Cumulative conditions intersection geometries assumed in these analyses are summarized and provided in the Appendix and the assumed project driveway control/geometry are described in the project description section of this report. Cumulative plus Project peak hour traffic volumes are shown in Figure 9.

All study intersections operate at an acceptable LOS D or better during the Cumulative plus Project Conditions weekday AM and PM peak hours except for the following:

- Airport Way & SR 120 WB Ramps (LOS F during AM and PM peak hours)
- Airport Way & SR 120 EB Ramps (LOS F during AM and PM peak hours)

The travel model indicates large increases in traffic volumes along Airport Way and the intersecting roads for the 2040 forecast year. Therefore, the SR 120 ramp intersections with Airport Way are anticipated to experience demands that exceed the committed capacity, resulting in LOS F conditions at each ramp.

Based on the analysis results, the project is anticipated to cause incremental increases in delays at the intersections studied but is not anticipated to change the LOS at any study intersection in Cumulative Plus Project Conditions when comparing to Cumulative (No-Project) Conditions. The project would increase delays but would not change the LOS at any study intersection. Changes in average delay at the deficient SR 120 & Airport Way ramps due to the Project are anticipated to range between 2 percent and 9 percent.

Recommended Intersection Improvements

The following improvements are recommended to provide future intersection operations consistent with the General Plan Policy C-1.2 which specifies that the city shall strive for LOS D operations outside the Downtown area.

Airport Way & Woodward Avenue

Under Existing plus project conditions, Airport Way and Woodward Avenue operates at unacceptable LOS E in the AM peak hour, and operates at acceptable LOS Existing conditions (Appendix D Traffic Impact Analysis). The PFIP indicates that this intersection will ultimately be signalized. The Airport Way & Woodward Avenue intersection meets the CAMUTCD Peak Hour signal warrant (Warrant #3) under Existing conditions as presented in the Signal Warrants section of the Traffic Impact Analysis and is assumed to also meet Warrant #3 in Existing plus project, Cumulative, and Cumulative plus project conditions since the Plus Project and future traffic volumes are anticipate to be greater than existing conditions as development continues to occur within the City. Installation of a traffic signal at Airport Way & Woodward Avenue provides acceptable LOS operations.

- **Traffic COA #1**: *Prior to issuance of building permits, the project applicant(s) shall contribute fair share funding by paying PFIP fees to cover their proportionate cost of the* *improvements at the Airport Way/Woodward Avenue intersection. The improvements include:*

- *Signalize the Airport Way/Woodward Avenue intersection; and*
- *Retiming and optimizing the intersection.*

<u>Union Road & Woodward Avenue</u>

Under Existing plus project conditions, Union Road and Woodward Avenue operates at unacceptable LOS F in the AM and PM peak hours, and operates at unacceptable LOS F and E in the AM and PM peak hours, respectively (Appendix D Traffic Impact Analysis). The PFIP indicates that this intersection will ultimately be a signal. Union Road and Woodward Avenue meets Warrant #3 Peak Hour under Existing conditions as presented in the Signal Warrants section of the Traffic Impact Analysis and is assumed to also meet Warrant #3 in Existing plus project, Cumulative, and Cumulative plus project conditions since the Plus Project and future traffic volumes are anticipate to be greater than existing conditions as development continues to occur within the City. Installation of a traffic signal at Union Road & Woodward Avenue provides acceptable LOS operations.

- **Traffic COA #2**: *Prior to issuance of building permits, the project applicant(s) shall contribute fair share funding by paying PFIP fees to cover their proportionate cost of the improvements at the Union Road/Woodward Avenue intersection. The improvements include:*

  - *Signalize the Union Road/Woodward Avenue intersection; and*
  - *Retiming and optimizing the intersection.*

<u>Airport Way & SR 120 Ramps (westbound and eastbound)</u>

The Manteca General Plan Major Streets Circulation Plan indicates an ultimate width of six lanes for Airport Way south of Daniels Street to Atherton Drive. The PFIP also identifies the interchange as one that will be improved; however, the future configuration is not specified. The following configuration is expected to provide LOS D or better operations:

- **Traffic COA #3**: *Prior to issuance of building permits, the project applicant(s) shall contribute fair share funding by paying PFIP fees to cover their proportionate cost of the improvements at the Airport Way and SR 120 ramps. The improvements include:*

  - *Airport Way and SR 120 Westbound Ramps*
    - *Three northbound and southbound through lanes*
    - *One northbound left turn lane*
    - *One southbound right turn lane*
    - *Two westbound right turn lanes and one westbound left turn lane*
  - *Airport Way and SR 120 Eastbound Ramps*
    - *Three northbound and southbound through lanes*
    - *One northbound right turn lane*
    - *One southbound left turn lane*

Responses to Checklist Questions

Response a), b): Less than Significant. The project would be consistent with the City of Manteca General Plan and PFIP in terms of provisions for roadways, bicycle and pedestrian facilities. The project frontage improvements along Oleander Avenue and Peach Road would not conflict with city plans. The project will provide ADA compliant sidewalks along both sides of internal roadways and throughout the project site to enhance local pedestrian circulation, similar to the other residential developments that exist near the site. The project would not conflict with other road, transit bicycle or pedestrian plans documented by the city.

The proposed development was evaluated against the screening criteria in the Office of Planning and Research (OPR) Technical Advisory. The following criteria are applicable to residential developments.

- Small projects – projects consistent with a Sustainable Communities Strategy and local general plan that generate or attract fewer than 110 trips per day.
- Projects near major transit stops – certain projects (residential, retail, office, or a mix of these uses) proposed within ½ mile of an existing major transit stop or an existing stop along a high-quality transit corridor.
- Affordable residential development – a project consisting of a high percentage of affordable housing may be a basis to find a less-than-significant impact on VMT.
- Projects in low VMT areas – residential and office projects that incorporate similar features (i.e., density, mix of uses, transit accessibility) as existing development in areas with low VMT will tend to exhibit similarly low VMT.

The proposed Project would generate more than 110 trips per day, would not be near a major transit stop, would not have a high percentage of affordable housing units, and would not be in an area already designated as a low VMT area. The Project would not meet the screening criteria. Therefore, a VMT analysis is required.

VMT Impact Criteria

The methodology used in other Manteca studies is based upon a comparison of future VMT conditions with the Project to existing baseline VMT conditions. The calculated residential VMT for the "with Project" scenario is compared with baseline citywide VMT per single family residential household. If the development would generate vehicle travel exceeding 15 percent below the established baseline, there is a significant impact.

The travel model developed for the City of Manteca General Plan Update was used to develop baseline (2019) VMT per single family residential household. The established baseline VMT per single family household is 103.8. Therefore, single family residential projects that exceed 88.2 VMT per household (15 percent below base year levels) would be considered to have significant transportation impacts. Projects that generate less than 88.2 VMT per household would be considered to have a less than significant transportation impact.

Project VMT Analysis

Kittelson & Associates added the proposed Project to the travel model and calculated the total daily VMT (see Table TT-1). The project VMT per household would be 38.7 percent lower than the baseline VMT per household, which is a greater reduction than the threshold of 15 percent lower than baseline. Therefore, the proposed Project would not have a significant impact on VMT.

Table TT-1: Project VMT Evaluation

Scenario	*Residential Units*	*Daily VMT*	*VMT per Unit*
2019 Manteca Baseline	21,226	2,203,915	103.8
2040 Project	197	12,531	63.6
Comparison to Baseline			-38.7%

SOURCE: KITTELSON & ASSOCIATES, 2021

Therefore, impacts associated with the potential to conflict with a program plan, ordinance, or policy or conflict or be inconsistent with CEQA Guidelines Section 15064.3, subdivision (b) would be ***less than significant***.

Responses c), d): **Less than Significant.** The project proposes to provide access via two side-street stop-sign controlled connections – one along Oleander Avenue and one along Peach Road - as shown in the conceptual site plan and is not anticipated to introduce hazardous geometric design features if designed consistent with accepted design guidelines for safety. The relatively straight and level alignment of Oleander Avenue and Peach Road near the project site should not hinder adequate sight distance being provided.

Proposed roadway geometries/cross-sections and design features should be reviewed as part of the City's site plan review to confirm that proposed designs are consistent with the local code and design standards and to confirm that design features (such as trees, fountains, on-street parking, etc.) do not limit site distance.

Based on the conceptual site plan provided, the internal project streets would provide sidewalks along each side of internal roadways so that pedestrians would be separated from vehicle traffic, as well as along the project frontages of Oleander Avenue and Peach Road, consistent with other nearby residential neighborhoods.

The Project would have access to all parcels via two driveways (one along Oleander Avenue and another along Peach Road) and an interior street system. All streets are recommended to be designed to accommodate emergency vehicles.

As parcels adjacent to the project develop in the future, the project site plan allows for a future street connection to the west which would provide an additional emergency access route from/to Airport Way.

Therefore, impacts associated with design features and emergency access would be ***less than significant***.

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XVIII. TRIBAL CULTURAL RESOURCES

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
a) Would the project cause a substantial adverse change in the significance of a tribal cultural resource, defined in Public Resources Code Section 21074 as either a site, feature, place, cultural landscape that is geographically defined in terms of the size and scope of the landscape, sacred place, or object with cultural value to a California Native American tribe, and that is:				
i) Listed or eligible for listing in the California Register of Historical Resources, or in a local register of historical resources as defined in Public Resources Code Section 5020.1(k)?		X		
ii) A resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of Public Resources Code Section 5024.1? In applying the criteria set forth in subdivision (c) of Public Resources Code Section 5024.1, the lead agency shall consider the significance of the resources to a California Native American tribe.		X		

Responses to Checklist Questions

Responses a), b): A record search was conducted through the Central California Information Center (CCaIC) in October 8, 2021 to identify previously recorded sites and previous cultural resources studies in and near the Project site. The record search indicates that: the Project site does not contain any recorded prehistoric or historic archaeological resources or historic buildings. The Project site has a moderate potential for the discovery of prehistoric, ethnohistoric, or historic archaeological sites that may meet the definition of TCRs. Although no TCRs have been documented in the Project site, the Project site is located in a region where significant cultural resources have been recorded and there remains a potential that undocumented archaeological resources that may meet the TCR definition could be unearthed or otherwise discovered during ground-disturbing and construction activities. Examples of significant archaeological discoveries that may meet the TCR definition would include villages and cemeteries. Due to the possible presence of undocumented TCRs within the Project site, construction-related impacts on tribal cultural resources would be potentially significant. With implementation of the following mitigation measures (as provided under Section V. Cultural Resources), the proposed Project would have a ***less than significant*** impact related to tribal cultural resources.

Mitigation Measures

Implement Mitigation Measures CLT-1 through CLT-4.

XIX. UTILITIES AND SERVICE SYSTEMS

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

Responses to Checklist Questions

Responses a)-c):

Water

It is anticipated that water supply for the proposed Project would be local groundwater and treated surface water from SSJID's South County Water Supply Program (SCWSP). Water distribution will be by an underground distribution system to be installed as per the City of Manteca standards and specifications. The applicant for the proposed Project will provide their proportionate share of required funding to the City for the acquisition and delivery of treated potable water supplies to the proposed Project site through connection fees.

The City's General Plan designates the Project site as LDR, which allows for the uses proposed for the proposed Project. Therefore, the City's 2023 General Plan anticipated the proposed Project and the City's UWMP assumed that the site would be developed with LDR uses. There are no changes to the land use assumptions in the City's General Plan Update, and UWMP Update. The following analysis reflects the City's most current water demand and supply projections based on the General Plan Update.

A comparison of the City's projected potable and raw water supplies and demands is shown in Table UTIL-1 for Normal, Single Dry, and Multiple Dry Years. Demand within the City's service area is not expected to exceed the City's supplies in any Normal year between 2020 and 2040. No demand reductions are assumed during dry years. With this assumption, the City's water demands are not expected to exceed water supplies in Single Dry Years or Multiple Dry Years.

Table UTIL-1: Summary of Potable and Raw Water Demand Versus Supply During Hydrologic Normal, Single Dry, and Multiple Dry Years

Hydrologic Condition		Supply and Demand Comparison, AFY 2025	2030	2035	2040
Normal Year					
Available Potable and Raw Water Supply(a)		23,260	25,247	27,569	37,284
Total Water Demand(b)		18,480	21,012	23,891	27,164
Potential Surplus (Deficit)		4,780	4,235	3,678	10,120
Supply Shortfall, Percent of Demand		-	-	-	-
Single Dry Year					
Available Potable and Raw Water Supply(a)		23,260	25,247	27,569	37,284
Total Water Demand(b)		18,480	21,012	23,891	27,164
Potential Surplus (Deficit)		4,780	4,235	3,678	10,120
Supply Shortfall, Percent of Demand		-	-	-	-
Multiple Dry Year					
Multiple Dry Year 1	Available Potable and Raw Water Supply(a)	23,260	25,247	27,569	37,284
	Total Water Demand(b)	18,480	21,012	23,891	27,164
	Potential Surplus (Deficit)	4,780	4,235	3,678	10,120
	Supply Shortfall, Percent of Demand	-	-	-	-
Multiple Dry Year 2	Available Potable and Raw Water Supply(a)	23,260	25,247	27,569	37,284
	Total Water Demand(b)	18,480	21,012	23,891	27,164
	Potential Surplus (Deficit)	4,780	4,235	3,678	10,120
	Supply Shortfall, Percent of Demand	-	-	-	-
Multiple Dry Year 3	Available Potable and Raw Water Supply(a)	21,409	24,313	27,552	33,376
	Total Water Demand(b)	18,480	21,012	23,891	27,164
	Potential Surplus (Deficit)	2,929	3,301	3,661	6,212
	Supply Shortfall, Percent of Demand	-	-	-	-
Multiple Dry Year 4	Available Potable and Raw Water Supply(a)	21,409	24,313	27,552	33,376
	Total Water Demand(b)	18,480	21,012	23,891	27,164
	Potential Surplus (Deficit)	2,929	3,301	3,661	6,212
	Supply Shortfall, Percent of Demand	-	-	-	-
Multiple Dry Year 5	Available Potable and Raw Water Supply(a)	23,260	25,247	27,569	37,284
	Total Water Demand(b)	18,480	21,012	23,891	27,164
	Potential Surplus (Deficit)	4,780	4,235	3,678	10,120
	Supply Shortfall, Percent of Demand	-	-	-	-

(a) Surface Water Supply from Table 6-2 plus Assumed Groundwater Supply from Table 6-3.

(b) Equals the City's total projected potable and raw water demand (from Table 5-1 and Table 5-4).

The analysis included in the City's UWMP assumed that the Project site would be developed with LDR uses. The unit water use factor for LDR land uses is 2240 gallons per day per acre (gpd/ac), which equates to 77,504 gallons per day for the proposed project. The proposed Project is well below this total allowed units (276 units allowed) and would result in less water consumption compared to the maximum allowed. The proposed Project would not increase demand beyond the levels assumed for the Project site in the City's UWMP.

The technical analyses shows that the total projected water supplies determined to be available for the Proposed Project during Normal, Single Dry, and Multiple Dry years during a 20-year projection will meet the projected water demand associated with the Proposed Project, in addition to existing and planned future uses. The proposed Project would not result in insufficient water supplies available to serve the Project from existing entitlements and resources. Therefore, the proposed Project would result in a **less than significant** impact to water supplies.

Wastewater

The City of Manteca owns and operates a wastewater collection, treatment, and disposal system, and provides sanitary sewerage service to the City of Manteca and a portion of the City of Lathrop. On February 18, 2021, the RWQCB adopted Waste Discharge Requirements Order No. R5-2021-0003 NPDES NO. CA0081558, prescribing waste discharge requirements for the City of Manteca WQCF and allowing expansion of the plant up to 17.5 mgd.

The Manteca WQCF is an activated sludge plant with denitrification. The WQCF consists of an influent pump station, aerated grit tanks, primary sedimentation basins, fine-bubble activated sludge aeration basins, secondary clarifiers, secondary effluent equalization pond, tertiary filters, UV disinfection and effluent pumping station. Secondary effluent is land applied during the spring and summer. Tertiary filtered and UV disinfected water is discharged to the San Joaquin River during the winter.

The 2006 Wastewater Master Plan Update projected a capacity requirement of 27 mgd ADWF at buildout for the WQCF at buildout. Expansion of the WQCF to buildout would occur in multiple phases, which would increase the ADWF capacity to 17.5 mgd, then to 27 mgd. The Wastewater Master Plan projected a potential reclaimed water use of 3.28 mgd. The 2005 Urban Water Management Plan projected a reclaimed water usage of 2 mgd by 2030. All of these flows may be adjusted based on historical reductions in water usage as part of a new Wastewater Master Plan which will start in 2021 and finish in 2023.

According to the City's 2012 Wastewater Collection System Master Plan Update, LDR uses are estimated to generated 1,073 gallons per acre per day. The Project site includes 39.49 acres of LDR, which would generate approximately 37,125 gallons per day (gpd) of wastewater. The proposed Project would increase the amount of wastewater requiring treatment. The wastewater would be treated at the WQCF. Occupancy of the proposed Project would be prohibited without sewer allocation.

The City's available capacity would ensure that there would not be a determination by the wastewater treatment and/or collection provider that there is inadequate capacity to serve the proposed Project's projected demand in addition to the provider's existing commitments. Additionally, any planned expansion to the WQCF (such as a planned expansion to a total capacity of 27 mgd) with a subsequent allocation of capacity to the proposed Project would ensure that there would not be a determination by the wastewater treatment and/or collection provider that there is inadequate capacity to serve the proposed Project's projected demand in addition to the provider's existing commitments.

As noted above, the City's 2023 General Plan designates the Project site as LDR, which allows for residential densities of up to 8 dwelling units per acre. Therefore, the City's 2023 General Plan anticipated up to 276 units and an associated population of 860 persons within the Project site.

Because the Project applicant would pay City Public Facilities Implementation Plan (PFIP) fees to develop the Project site (paid at the issuance of a building permit for development), and adequate long-term wastewater treatment capacity is available to serve full build-out of the proposed Project, a ***less than significant*** impact would occur related to requiring or resulting in the construction of new wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects.

Storm Drainage

Flooding events can result in damage to structures, injury or loss of human and animal life, exposure of waterborne diseases, and damage to infrastructure. In addition, standing floodwater can destroy agricultural crops, undermine infrastructure and structural foundations, and contaminate groundwater. The RD-17 levee system is designed to a 100-year flood protection standard. The Project site is currently located in Zone X (shaded), which by definition indicates an area protected by levees from the 1% annual chance flood.

Onsite storm drainage would be installed to serve the proposed Project. Development of the proposed Project would include construction of a new storm drainage system, including a drainage collection system, storm drain pump stations, and detention basins. The stormwater drainage detention basins will be constructed to meet the City of Manteca Standards. Discharge from the basins will be conveyed through controlled flow pumping facilities to existing City of Manteca and SSJID dual use main storm drain laterals. It is noted that the locations of the proposed detention basins are conceptual and will be finalized during the design of Improvement Plans.

Installation of the Project's storm drainage system will be subject to current City of Manteca Design Specifications and Standards. The proposed storm drainage collection and detention system will be subject to the SWRCB and City of Manteca regulations, including: Manteca Storm Drain Master Plan, 2013; Phase II, NPDES Permit Requirements; NPDES-MS4 Permit Requirements; and LID Guidelines. The City requires detention basins to help attenuate peak flows before drainage discharge is pumped into SSJID's facilities. Delaying the release of water over longer periods of time further reduces the potential of downstream flooding. Most of the proposed detention basins are joint-use facilities providing recreation and other uses when not being used for stormwater detention.

Conveyance of the detained storm drainage runoff from the proposed on-site dual use detention basins may be via either gravity flow drainage lines or pumped to existing realigned and upgraded City and SSJID dual use Laterals. Stormwater quality standards imposed and monitored by the Environmental Protection Agency (EPA) and the SWRCB through the City's NPDES permit require treatment of stormwater runoff prior to its release into natural drainage features or dual use South SSJID and City Laterals. Stormwater quality is an integral part of the City's stormwater management system. Most existing stormwater is pumped into the dual use SSJID and City laterals and drains.

Implementation of BMP's and LID features may result in reduced rates and volumes of stormwater runoff to the detention facilities and off-site points of connection. Stormwater infrastructure needs within the Project area may be reduced. Size and quantity of stormwater collection, detention, and water quality features may be reduced as a result of the following:

1. Reduced pipe sizes due to the retention of the first half inch of rainfall.
2. Reduced collection system structures and pipe sizes due to implementation of LID features.

3. Reduced pump station facilities due to retention of the first half inch of rainfall.
4. Reduced power usage due to implementation of LID features and reduction in stormwater discharge volumes.

Because the Project site could increase runoff significantly, and create downstream drainage problems; Project impacts to stormwater are considered potentially significant. The following mitigation measure requires the Project applicant to submit a drainage plan to the City of Manteca for review and approval. The plan will include an engineered storm drainage plan that demonstrates attainment of pre-Project runoff requirements prior to release at the storm drainage outlet and describes the volume reduction measures and treatment controls used to reach attainment consistent with the Manteca Storm Drain Master Plan. With the implementation of the following mitigation measure, drainage impacts would be reduced to **less than significant**.

MITIGATION MEASURE(S)

Mitigation Measure UTIL-1*: Prior to the issuance of a building or grading permit, the Project applicant shall submit a drainage plan to the City of Manteca for review and approval. The plan shall include an engineered storm drainage plan that demonstrates attainment of pre-Project runoff requirements prior to release at the outlet canal and describes the volume reduction measures and treatment controls used to reach attainment consistent with the Manteca Storm Drain Master Plan.*

Responses d), e): The City of Manteca Solid Waste Division (SWD) provides solid waste hauling service for the City of Manteca and would serve the proposed project. Solid waste from Manteca is primarily landfilled at the Forward Sanitary Landfill, located northeast of Manteca. Other landfills used include Foothill Sanitary and North County.

The residential uses of the proposed Project are estimated to generate roughly 10 pounds per day per household. It is estimated that the proposed 193 residential units would generate 1,930 pounds per day (0.965 tons per day) of solid waste.

Forward Sanitary Landfill has a remaining capacity of 23,700,000 cubic yards, and has a current maximum permitted throughput of 8,668 tons per day. This landfill originally had a cease operation date in the year 2020. A 17.3-acre expansion was approved in January of 2020 inside the landfill's existing boundaries along Austin Road east of Stockton Metropolitan Airport. The lifespan of the landfill will extend from 2030 to 2036 and an additional 8.2 million cubic yards of waste will be processed on two sites, an 8.7-acre parcel in the northeast corner and an 8.6-acre parcel on the south end of the property. The City will need to secure a new location or expand existing facilities when the Forward Landfill is ultimately closed. There are several options that the City will have to consider for solid waste disposal at that time which is estimated to be 2036, including the construction of new facilities or expansion of existing facilities.

At the closure of the Forward Landfill, the City can potentially utilize the Foothill Landfill and the North County Landfill as locations for solid waste disposal. The permitted maximum disposal at the Foothill Landfill is 1,500 tons per day and the North County Landfill is 825 tons per day. The remaining capacity of these landfills include 125 million cubic yards of solid waste at the Foothill Landfill, with an estimated cease operation date of 2054, and 35.4 million cubic yards of solid waste at the North County Landfill, which has an estimated cease operation date of 2035. The addition of solid waste associated with the proposed Project to the Foothill Landfill and North County Landfill would not exceed the combined landfills' remaining capacity of 160.4 cubic yards.

The addition of solid waste associated with the proposed Project, approximately 0.965 tons per day at total buildout, to the Forward Landfill would not exceed the landfill's remaining capacity. The City will need to secure a new location of disposal of all solid waste generated in the City when the Forward landfill is ultimately closed. There are several options that the City will have to consider for solid waste disposal at that time. Because the proposed Project would increase the local waste stream, the proposed Project would subject to the City's waste connection fee.

Development of the site for residential uses was assumed in the City's General Plan EIR. The proposed Project would not interfere with regulations related to solid waste (i.e. the State-mandated waste target of not less than 75 percent of solid waste generated be source reduced, recycled, or composted), or generate waste in excess of the capacity of local infrastructure. Implementation of the proposed Project would have a ***less than significant*** impact relative to this topic.

XX. WILDFIRE

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

Existing Setting

There are no State Responsibility Areas (SRAs) within the vicinity of the Manteca Planning Area. The City of Manteca is not categorized as a "Very High" Fire Hazard Severity Zone (FHSZ) by CalFire. No cities or communities within San Joaquin County are categorized as a "Very High" FHSZ by CalFire. Although this CEQA topic only applies to areas within a SRA or Very High FHSZ, out of an abundance of caution, these checklist questions are analyzed below.

Responses to Checklist Questions

Response a): The Project site will connect to an existing network of City streets. The proposed circulation improvements would allow for greater emergency access relative to existing conditions. The proposed Project would not impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan. Therefore, impacts from project implementation would be considered ***less than significant*** relative to this topic.

Response b): The risk of wildfire is related to a variety of parameters, including fuel loading (vegetation), fire weather (winds, temperatures, humidity levels and fuel moisture contents) and topography (degree of slope). Steep slopes contribute to fire hazard by intensifying the effects of wind and making fire suppression difficult. Fuels such as grass are highly flammable because they have a high surface area to mass ratio and require less heat to reach the ignition point. The County has areas with an abundance of flashy fuels (i.e. grassland) in the foothill areas of the eastern and western portion of the County. The Project site is located in an area that is predominately agricultural and urban, which is not considered at a significant risk of wildlife. Therefore, impacts from project implementation would be considered ***less than significant*** relative to this topic.

Response c): The proposed Project includes development of infrastructure (water, sewer, and storm drainage). The proposed infrastructure improvements would allow for decreased fire risk relative to existing conditions. The proposed Project would not impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan. Therefore, impacts from project implementation would be considered ***less than significant*** relative to this topic.

Response d): The Project site will be connecting to an existing network of City streets. The proposed circulation improvements would allow for greater emergency access relative to existing conditions. The proposed Project would not impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan.

Landslides include rockfalls, deep slope failure, and shallow slope failure. Factors such as the geological conditions, drainage, slope, vegetation, and others directly affect the potential for landslides. One of the most common causes of landslides is construction activity that is associated with road building (i.e. cut and fill). The Project site is relatively flat; therefore, the potential for a landslide in the Project site is essentially non-existent.

Therefore, impacts from proposed Project implementation would be considered ***less than significant*** relative to this topic.

XXI. MANDATORY FINDINGS OF SIGNIFICANCE

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

Responses to Checklist Questions

Response a): This Initial Study includes an analysis of the impacts associated with aesthetics, agricultural and forest resources, air quality, biological resources, cultural resources, geology and soils, greenhouse gas emissions, hazards and hazardous materials, hydrology and water quality, land use and planning, mineral resources, noise, population and housing, public services, recreation, transportation and traffic, and utilities and service systems. The analysis covers a broad spectrum of topics relative to the potential for the proposed Project to have environmental impacts. This includes the potential for the proposed Project to substantially degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory. It was found that the proposed Project would have either no impact, a less than significant impact, or a less than significant impact with the implementation of mitigation measures. For the reasons presented throughout this Initial Study, the proposed Project would not substantially degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory. With the implementation of mitigation measures presented in this Initial Study, the proposed Project would have a ***less than significant*** impact relative to this topic.

Response b): This Initial Study includes an analysis of the impacts associated with aesthetics, agricultural and forest resources, air quality, biological resources, cultural resources, geology and soils, greenhouse gas emissions, hazards and hazardous materials, hydrology and water quality, land use and planning, mineral resources, noise, population and housing, public services, recreation, transportation/traffic, and utilities and service systems. The analysis covers a broad spectrum of topics relative to the potential for the proposed Project to have environmental impacts. It was found that the proposed Project would have either no impact, a less than significant impact, or a less than significant impact with the implementation of mitigation measures. These mitigation measures would also function to reduce the proposed Project's contribution to cumulative impacts.

The proposed Project would increase the population and use of public services and systems; however, it was found that there is adequate capacity to accommodate the proposed Project.

There are no significant cumulative or cumulatively considerable effects that are identified associated with the proposed Project after the implementation of all mitigation measures presented in this Initial Study. With the implementation of all mitigation measures presented in this Initial Study, the proposed Project would have a ***less than significant*** impact relative to this topic.

Responses c): The construction phase could affect surrounding neighbors through increased air emissions, noise, and traffic; however, the construction effects are temporary and are not substantial. The operational phase could also affect surrounding neighbors through increased air emissions, noise, and traffic; however, mitigation measures have been incorporated into the proposed Project that would reduce the impacts to a less than significant level. The proposed Project would not cause substantial adverse effects on human beings. Implementation of the proposed Project would have a ***less than significant*** impact relative to this topic.

REFERENCES

Army Corps of Engineers. 1987. Army Corps of Engineers Wetland Delineation Manual.

Barbour and Major 1988. Terrestrial Vegetation of California.

Bay Area Air Quality Management. 2017. Bay Area Air Quality Management District CEQA Guidelines. May 2017. Available: https://www.baaqmd.gov/~/media/files/planning-and-research/ceqa/ceqa_guidelines_may2017-pdf.pdf?la=en&rev=4cfd0d5df7094cd4bc4099b087797799

C Donald Ahrens. 2006. Meteorology Today: An Introduction to Weather, Climate, & the Environment.

California Air Resources Board. Risk Reduction Plan to Reduce Particulate Matter Emissions from Diesel-Fueled Engines and Vehicles. October 2000. Available at: <https://www.arb.ca.gov/diesel/documents/rrpFinal.pdf>.

California Air Resources Board. 2016. ARB Databases: Aerometric Data Analysis and Management System (ADAM). Available at: <http://www.arb.ca.gov/html/databases.htm>.

California Air Resources Board. 2021. EMFAC 2021 Emissions Inventory. Available: https://arb.ca.gov/emfac/emissions-inventory/c5a21aa85c0d98bad4d0f52e9a8ab3dbc1155c88

California Department of Conservation, Division of Land Resource Protection Conservation Program Support. 2016. San Joaquin County Williamson Act FY 2015/2016. The Williamson Act. Available at: https://www.conservation.ca.gov/dlrp/wa/Pages/stats_reports.aspx

California Department of Conservation, Division of Land Resources Protection. 2018. Farmland Mapping and Monitoring Program. San Joaquin County Important Farmland 2016. Available: https://www.conservation.ca.gov/dlrp/fmmp/Pages/SanJoaquin.aspx

California Department of Conversation. 2012. Author: Smith, J.D. and Clinkenbeard J.P. Special Report 199. Update of Mineral Land Classification for Portland Cement Concrete-Grade Aggregate in the Stockton-Lodi Production-Consumption Region, San Joaquin and Stanislaus Counties, California. Available: https://maps.conservation.ca.gov/cgs/informationwarehouse/mlc/

California Department of Forestry and Fire Protection (CAL FIRE). 2007. Fire Hazard Severity Zones in State Responsibility Area (SRA). Adopted by CAL FIRE on October 2, 2007. Available at: http://frap.fire.ca.gov/webdata/maps/san_joaquin/fhszs_map.39.pdf

California Department of Forestry and Fire Protection (CAL FIRE). 2007. Draft Fire Hazard Severity Zones in LRA. Adopted by CAL FIRE on November 7, 2007. Available: http://frap.fire.ca.gov/webdata/maps/san_joaquin/fhszl06_1_map.39.pdf

California Department of Toxic Substances Control (DTSC). 2017. EnviroStor database. Accessed on October 15, 2021. Available at: https://www.envirostor.dtsc.ca.gov/public/

California Energy Commission. 2005. Global Climate Change: In Support of the 2005 Integrated Energy Policy Report. (CEC-600-2005-007.) Available at:

http://www.energy.ca.gov/2005publications/CEC-100-2005-007/CEC-100-2005-007-CMF.PDF.

California Energy Commission. 2006. Inventory of California Greenhouse Gas Emissions and Sinks 1990 to 2004. (CEC-600-2006-013-SF.) Available at: http://www.energy.ca.gov/2006publications/CEC-600-2006-013/CEC-600-2006-013-SF.PDF.

California Energy Commission. 2016. California Greenhouse Gas Emission Inventory – 2016 Edition. Available at: https://www.arb.ca.gov/cc/inventory/data/data.htm

California Natural Diversity Database (CNDDB). 2021. Version 10/2021. Accessed on February 20, 2019.

City of Manteca. Adopted December 17, 1991. City of Manteca Comprehensive General Plan.

City of Manteca, 2003. Manteca General Plan 2023 Draft Environmental Impact Report. Certified October 6, 2003.

City of Manteca. 2011. City of Manteca General Plan 2023. Policy Document. Adopted October 6, 2003. Housing Element Amended June 15, 2010. Circulation Element Amended April 5, 2011. Available: https://www.ci.manteca.ca.us/CommunityDevelopment/Documents/City%20of%20Manteca%20General%20Plan.pdf

City of Manteca. 2013. City of Manteca Climate Action Plan. Adopted October 15, 2013. http://www.ci.manteca.ca.us/communitydevelopment/Documents/Final%20Climate%20Action%20Plan.pdf .

City of Manteca, 2013. 2012 Wastewater Collection System Master Plan Update. January 2013. Available: https://www.ci.manteca.ca.us/pwt/Documents/Wastewater%20Collection%20System%20Master%20Plan%20-%20Complete.pdf

City of Manteca. 2018. Municipal Service Review and Sphere Of Influence Plan.

City of Manteca. 2021. Manteca Municipal Code. Current through Ordinance O2021-12 and the September 2021 code supplement.

Hickman, James C. 1993. Jepson Manual: Higher Plants of California.

Intergovernmental Panel on Climate Change. 2013. "Climate Change 2013: The Physical Science Basis, Summary for Policymakers." Available at: http://www.climatechange2013.org/images/report/WG1AR5_SPM_FINAL.pdf

Kittleson & Associates. Dutra Property Transportation Impact Analysis. February 21, 2022.

Sawyer, John and Todd Keeler-Wolf. 1995. A Manual of California Vegetation.

Saxelby, Luke. 2022. Environmental Noise Assessment – Dutra-Lopez Property. March 2022.

Skinner, Mark W. and Bruce M. Pavlik, Eds. 2001. California Native Plant Society's Inventory of Rare and Endangered Vascular Plants of California.

San Joaquin Air Pollution Control District (SJVAPCD). 2017. Small Project Analysis Level (SPAL). March 1, 2017. Available: http://www.valleyair.org/transportation/CEQA%20Rules/GAMAQI-SPAL.PDF

West Yost Associates, 2018. Technical Memorandum: Infrastructure Analysis for the City of Manteca General Plan Update. June 29, 2018.

U.S. Environmental Protection Agency. 2014. Climate Change Indicators in the United States: Global Greenhouse Gas Emissions. Updated May 2014. Available at: www.epa.gov/climatechange/indicators

APPENDIX A: AIR QUALITY/GREENHOUSE GAS/ENERGY MODELING OUTPUTS

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

DUTRA PROPERTY SUBDIVISION PROJECT

San Joaquin County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Single Family Housing	197.00	Dwelling Unit	31.68	354,600.00	612
City Park	2.92	Acre	2.92	127,195.20	0

1.2 Other Project Characteristics

Urbanization	Rural	**Wind Speed (m/s)**	2.7	**Precipitation Freq (Days)**	51
Climate Zone	2			**Operational Year**	2025
Utility Company	Pacific Gas and Electric Company				
CO2 Intensity (lb/MWhr)	203.98	**CH4 Intensity (lb/MWhr)**	0.033	**N2O Intensity (lb/MWhr)**	0.004

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - Actual acreage

Construction Phase - No demolition/vacant land. Site is flat.

Grading - Actual acreage, site will not require import/export, balanced on site.

Architectural Coating - Per rule 4601.

Vehicle Trips - Trip rates per ITE 210 (Kittelson report 2022)

Area Coating - 100 b/L for interior coating limitations provided per rule 4601.

Land Use Change - Assume 90% cropland and 10% grassland existing vegetation land use

Sequestration -

Construction Off-road Equipment Mitigation - Per SJVACPD requirements/rules for dust prohibition.

Mobile Land Use Mitigation -

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Area Mitigation - Per SJVAPCD rules.

Water Mitigation -

Operational Off-Road Equipment -

Stationary Sources - Emergency Generators and Fire Pumps -

Off-road Equipment -

Off-road Equipment -

Off-road Equipment -

Table Name	Column Name	Default Value	New Value
tblArchitecturalCoating	EF_Nonresidential_Exterior	150.00	100.00
tblArchitecturalCoating	EF_Nonresidential_Interior	150.00	100.00
tblArchitecturalCoating	EF_Residential_Exterior	150.00	100.00
tblArchitecturalCoating	EF_Residential_Interior	150.00	100.00
tblAreaCoating	Area_EF_Nonresidential_Exterior	150	100
tblAreaCoating	Area_EF_Nonresidential_Interior	150	100
tblAreaCoating	Area_EF_Residential_Exterior	150	100
tblAreaCoating	Area_EF_Residential_Interior	150	100
tblAreaMitigation	UseLowVOCPaintNonresidentialExteriorValue	100	150
tblAreaMitigation	UseLowVOCPaintNonresidentialInteriorValue	100	150
tblAreaMitigation	UseLowVOCPaintResidentialExteriorValue	100	150
tblAreaMitigation	UseLowVOCPaintResidentialInteriorValue	100	150
tblConstDustMitigation	CleanPavedRoadPercentReduction	0	9
tblConstDustMitigation	WaterUnpavedRoadVehicleSpeed	0	5
tblConstructionPhase	PhaseEndDate	2/11/2026	3/24/2023
tblConstructionPhase	PhaseEndDate	4/29/2026	3/15/2024
tblConstructionPhase	PhaseStartDate	11/27/2025	1/9/2023
tblConstructionPhase	PhaseStartDate	2/12/2026	1/1/2024
tblLandUse	LotAcreage	63.96	31.68

tblLandUseChange	CO2peracre	6.20	4.31
tblProjectCharacteristics	UrbanizationLevel	Urban	Rural
tblVehicleTrips	HO_TL	7.90	6.65
tblVehicleTrips	HS_TL	7.10	6.65
tblVehicleTrips	HW_TL	16.80	6.65
tblVehicleTrips	ST_TR	9.54	9.56
tblVehicleTrips	ST_TR	1.96	0.00
tblVehicleTrips	SU_TR	8.55	9.56
tblVehicleTrips	SU_TR	2.19	0.00
tblVehicleTrips	WD_TR	9.44	9.56
tblVehicleTrips	WD_TR	0.78	0.00
tblWoodstoves	NumberCatalytic	31.68	40.00
tblWoodstoves	NumberNoncatalytic	31.68	40.00

2.0 Emissions Summary

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2022	0.1543	1.6059	1.1530	2.4300e-003	0.5962	0.0708	0.6670	0.2615	0.0652	0.3267	0.0000	214.0033	214.0033	0.0667	2.3000e-004	215.7387
2023	0.3129	2.5828	3.1892	7.0200e-003	0.3971	0.1137	0.5108	0.1028	0.1065	0.2093	0.0000	626.1295	626.1295	0.1044	0.0174	633.9129
2024	2.4814	2.0612	2.7427	6.3200e-003	0.2426	0.0844	0.3270	0.0653	0.0795	0.1447	0.0000	566.6765	566.6765	0.0761	0.0182	574.0103
2025	0.2139	1.7053	2.3646	5.4900e-003	0.2108	0.0643	0.2752	0.0567	0.0605	0.1172	0.0000	493.4227	493.4227	0.0674	0.0158	499.8117
Maximum	**2.4814**	**2.5828**	**3.1892**	**7.0200e-003**	**0.5962**	**0.1137**	**0.6670**	**0.2615**	**0.1065**	**0.3267**	**0.0000**	**626.1295**	**626.1295**	**0.1044**	**0.0182**	**633.9129**

2.1 Overall Construction

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2022	0.1543	1.6059	1.1530	2.4300e-003	0.2732	0.0708	0.3440	0.1190	0.0652	0.1842	0.0000	214.0031	214.0031	0.0667	2.3000e-004	215.7385
2023	0.3129	2.5828	3.1892	7.0200e-003	0.2847	0.1137	0.3984	0.0752	0.1065	0.1816	0.0000	626.1291	626.1291	0.1044	0.0174	633.9125
2024	2.4814	2.0612	2.7427	6.3200e-003	0.2242	0.0844	0.3086	0.0607	0.0795	0.1402	0.0000	566.6762	566.6762	0.0761	0.0182	574.0100
2025	0.2139	1.7053	2.3646	5.4900e-003	0.1949	0.0643	0.2592	0.0528	0.0605	0.1133	0.0000	493.4224	493.4224	0.0674	0.0158	499.8114
Maximum	**2.4814**	**2.5828**	**3.1892**	**7.0200e-003**	**0.2847**	**0.1137**	**0.3984**	**0.1190**	**0.1065**	**0.1842**	**0.0000**	**626.1291**	**626.1291**	**0.1044**	**0.0182**	**633.9125**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**32.47**	**0.00**	**26.39**	**36.73**	**0.00**	**22.38**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Quarter	Start Date	End Date	Maximum Unmitigated ROG + NOX (tons/quarter)	Maximum Mitigated ROG + NOX (tons/quarter)
1	**9-1-2022**	**11-30-2022**	1.2918	1.2918
2	**12-1-2022**	**2-28-2023**	1.2438	1.2438
3	**3-1-2023**	**5-31-2023**	0.7060	0.7060
4	**6-1-2023**	**8-31-2023**	0.6070	0.6070
5	**9-1-2023**	**11-30-2023**	0.6041	0.6041
6	**12-1-2023**	**2-29-2024**	2.3441	2.3441
7	**3-1-2024**	**5-31-2024**	1.0126	1.0126
8	**6-1-2024**	**8-31-2024**	0.5702	0.5702

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

9	**9-1-2024**	**11-30-2024**	0.5675	0.5675
10	**12-1-2024**	**2-28-2025**	0.5387	0.5387
11	**3-1-2025**	**5-31-2025**	0.5342	0.5342
12	**6-1-2025**	**8-31-2025**	0.5324	0.5324
13	**9-1-2025**	**9-30-2025**	0.1736	0.1736
		Highest	2.3441	2.3441

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	2.4757	0.2113	8.8958	0.0247		1.2218	1.2218		1.2218	1.2218	161.7089	87.7313	249.4402	0.7599	1.5600e-003	268.9035
Energy	0.0251	0.2148	0.0914	1.3700e-003		0.0174	0.0174		0.0174	0.0174	0.0000	392.8467	392.8467	0.0281	7.3900e-003	395.7499
Mobile	0.7434	1.0649	6.4951	0.0145	1.5089	0.0121	1.5209	0.4034	0.0113	0.4147	0.0000	1,376.1935	1,376.1935	0.0804	0.0740	1,400.2658
Waste						0.0000	0.0000		0.0000	0.0000	45.7237	0.0000	45.7237	2.7022	0.0000	113.2786
Water						0.0000	0.0000		0.0000	0.0000	4.0721	10.1730	14.2451	0.4199	0.0101	27.7446
Total	**3.2442**	**1.4909**	**15.4823**	**0.0406**	**1.5089**	**1.2512**	**2.7600**	**0.4034**	**1.2504**	**1.6538**	**211.5047**	**1,866.9445**	**2,078.4492**	**3.9904**	**0.0931**	**2,205.9423**

2.2 Overall Operational

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	1.7714	0.0905	1.4928	5.5000e-004		0.0141	0.0141		0.0141	0.0141	0.0000	87.7313	87.7313	3.9200e-003	1.5600e-003	88.2956
Energy	0.0251	0.2148	0.0914	1.3700e-003		0.0174	0.0174		0.0174	0.0174	0.0000	392.8467	392.8467	0.0281	7.3900e-003	395.7499
Mobile	0.7426	1.0626	6.4820	0.0145	1.5046	0.0120	1.5166	0.4023	0.0113	0.4135	0.0000	1,372.4225	1,372.4225	0.0803	0.0739	1,396.4453
Waste						0.0000	0.0000		0.0000	0.0000	45.7237	0.0000	45.7237	2.7022	0.0000	113.2786
Water						0.0000	0.0000		0.0000	0.0000	3.2577	8.6593	11.9169	0.3360	8.0700e-003	22.7217
Total	**2.5392**	**1.3679**	**8.0661**	**0.0164**	**1.5046**	**0.0435**	**1.5480**	**0.4023**	**0.0427**	**0.4450**	**48.9814**	**1,861.6598**	**1,910.6412**	**3.1505**	**0.0909**	**2,016.4911**

	ROG	**NOx**	**CO**	**SO2**	**Fugitive PM10**	**Exhaust PM10**	**PM10 Total**	**Fugitive PM2.5**	**Exhaust PM2.5**	**PM2.5 Total**	**Bio- CO2**	**NBio-CO2**	**Total CO2**	**CH4**	**N20**	**CO2e**
Percent Reduction	**21.73**	**8.25**	**47.90**	**59.57**	**0.28**	**96.53**	**43.91**	**0.29**	**96.59**	**73.10**	**76.84**	**0.28**	**8.07**	**21.05**	**2.32**	**8.59**

2.3 Vegetation

Vegetation

	CO2e
Category	MT
Vegetation Land Change	-149.1260
Total	**-149.1260**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Site Preparation	Site Preparation	9/1/2022	10/12/2022	5	30	
2	Grading	Grading	10/13/2022	1/25/2023	5	75	
3	Building Construction	Building Construction	1/26/2023	11/26/2025	5	740	
4	Paving	Paving	1/9/2023	3/24/2023	5	55	
5	Architectural Coating	Architectural Coating	1/1/2024	3/15/2024	5	55	

Acres of Grading (Site Preparation Phase): 45

Acres of Grading (Grading Phase): 225

Acres of Paving: 0

Residential Indoor: 718,065; Residential Outdoor: 239,355; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Site Preparation	Rubber Tired Dozers	3	8.00	247	0.40
Site Preparation	Tractors/Loaders/Backhoes	4	8.00	97	0.37
Grading	Excavators	2	8.00	158	0.38
Grading	Graders	1	8.00	187	0.41
Grading	Rubber Tired Dozers	1	8.00	247	0.40
Grading	Scrapers	2	8.00	367	0.48
Grading	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Building Construction	Cranes	1	7.00	231	0.29
Building Construction	Forklifts	3	8.00	89	0.20
Building Construction	Generator Sets	1	8.00	84	0.74
Building Construction	Tractors/Loaders/Backhoes	3	7.00	97	0.37
Building Construction	Welders	1	8.00	46	0.45
Paving	Pavers	2	8.00	130	0.42
Paving	Paving Equipment	2	8.00	132	0.36
Paving	Rollers	2	8.00	80	0.38
Architectural Coating	Air Compressors	1	6.00	78	0.48

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Site Preparation	7	18.00	0.00	0.00	16.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT
Grading	8	20.00	0.00	0.00	16.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	9	124.00	42.00	0.00	16.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT
Paving	6	15.00	0.00	0.00	16.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	25.00	0.00	0.00	16.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Use Soil Stabilizer

Water Exposed Area

Reduce Vehicle Speed on Unpaved Roads

Clean Paved Roads

3.2 Site Preparation - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.2949	0.0000	0.2949	0.1515	0.0000	0.1515	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0476	0.4963	0.2955	5.7000e-004		0.0242	0.0242		0.0223	0.0223	0.0000	50.1591	50.1591	0.0162	0.0000	50.5647
Total	**0.0476**	**0.4963**	**0.2955**	**5.7000e-004**	**0.2949**	**0.0242**	**0.3191**	**0.1515**	**0.0223**	**0.1738**	**0.0000**	**50.1591**	**50.1591**	**0.0162**	**0.0000**	**50.5647**

3.2 Site Preparation - 2022

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.1100e-003	8.4000e-004	9.6100e-003	3.0000e-005	3.3400e-003	2.0000e-005	3.3600e-003	8.9000e-004	2.0000e-005	9.0000e-004	0.0000	2.7066	2.7066	7.0000e-005	7.0000e-005	2.7301
Total	**1.1100e-003**	**8.4000e-004**	**9.6100e-003**	**3.0000e-005**	**3.3400e-003**	**2.0000e-005**	**3.3600e-003**	**8.9000e-004**	**2.0000e-005**	**9.0000e-004**	**0.0000**	**2.7066**	**2.7066**	**7.0000e-005**	**7.0000e-005**	**2.7301**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.1327	0.0000	0.1327	0.0682	0.0000	0.0682	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0476	0.4963	0.2955	5.7000e-004		0.0242	0.0242		0.0223	0.0223	0.0000	50.1590	50.1590	0.0162	0.0000	50.5646
Total	**0.0476**	**0.4963**	**0.2955**	**5.7000e-004**	**0.1327**	**0.0242**	**0.1569**	**0.0682**	**0.0223**	**0.0904**	**0.0000**	**50.1590**	**50.1590**	**0.0162**	**0.0000**	**50.5646**

3.2 Site Preparation - 2022

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.1100e-003	8.4000e-004	9.6100e-003	3.0000e-005	3.0800e-003	2.0000e-005	3.1000e-003	8.2000e-004	2.0000e-005	8.4000e-004	0.0000	2.7066	2.7066	7.0000e-005	7.0000e-005	2.7301
Total	**1.1100e-003**	**8.4000e-004**	**9.6100e-003**	**3.0000e-005**	**3.0800e-003**	**2.0000e-005**	**3.1000e-003**	**8.2000e-004**	**2.0000e-005**	**8.4000e-004**	**0.0000**	**2.7066**	**2.7066**	**7.0000e-005**	**7.0000e-005**	**2.7301**

3.3 Grading - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.2909	0.0000	0.2909	0.1072	0.0000	0.1072	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.1033	1.1070	0.8277	1.7700e-003		0.0466	0.0466		0.0429	0.0429	0.0000	155.4236	155.4236	0.0503	0.0000	156.6803
Total	**0.1033**	**1.1070**	**0.8277**	**1.7700e-003**	**0.2909**	**0.0466**	**0.3375**	**0.1072**	**0.0429**	**0.1501**	**0.0000**	**155.4236**	**155.4236**	**0.0503**	**0.0000**	**156.6803**

3.3 Grading - 2022

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.3500e-003	1.7700e-003	0.0203	6.0000e-005	7.0600e-003	4.0000e-005	7.0900e-003	1.8800e-003	3.0000e-005	1.9100e-003	0.0000	5.7140	5.7140	1.5000e-004	1.5000e-004	5.7636
Total	**2.3500e-003**	**1.7700e-003**	**0.0203**	**6.0000e-005**	**7.0600e-003**	**4.0000e-005**	**7.0900e-003**	**1.8800e-003**	**3.0000e-005**	**1.9100e-003**	**0.0000**	**5.7140**	**5.7140**	**1.5000e-004**	**1.5000e-004**	**5.7636**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.1309	0.0000	0.1309	0.0483	0.0000	0.0483	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.1033	1.1070	0.8277	1.7700e-003		0.0466	0.0466		0.0429	0.0429	0.0000	155.4234	155.4234	0.0503	0.0000	156.6801
Total	**0.1033**	**1.1070**	**0.8277**	**1.7700e-003**	**0.1309**	**0.0466**	**0.1775**	**0.0483**	**0.0429**	**0.0911**	**0.0000**	**155.4234**	**155.4234**	**0.0503**	**0.0000**	**156.6801**

3.3 Grading - 2022

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.3500e-003	1.7700e-003	0.0203	6.0000e-005	6.5100e-003	4.0000e-005	6.5500e-003	1.7400e-003	3.0000e-005	1.7700e-003	0.0000	5.7140	5.7140	1.5000e-004	1.5000e-004	5.7636
Total	**2.3500e-003**	**1.7700e-003**	**0.0203**	**6.0000e-005**	**6.5100e-003**	**4.0000e-005**	**6.5500e-003**	**1.7400e-003**	**3.0000e-005**	**1.7700e-003**	**0.0000**	**5.7140**	**5.7140**	**1.5000e-004**	**1.5000e-004**	**5.7636**

3.3 Grading - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.1735	0.0000	0.1735	0.0427	0.0000	0.0427	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0299	0.3106	0.2525	5.6000e-004		0.0128	0.0128		0.0118	0.0118	0.0000	49.0817	49.0817	0.0159	0.0000	49.4785
Total	**0.0299**	**0.3106**	**0.2525**	**5.6000e-004**	**0.1735**	**0.0128**	**0.1863**	**0.0427**	**0.0118**	**0.0545**	**0.0000**	**49.0817**	**49.0817**	**0.0159**	**0.0000**	**49.4785**

3.3 Grading - 2023

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	6.8000e-004	4.9000e-004	5.8400e-003	2.0000e-005	2.2300e-003	1.0000e-005	2.2400e-003	5.9000e-004	1.0000e-005	6.0000e-004	0.0000	1.7567	1.7567	4.0000e-005	4.0000e-005	1.7710
Total	**6.8000e-004**	**4.9000e-004**	**5.8400e-003**	**2.0000e-005**	**2.2300e-003**	**1.0000e-005**	**2.2400e-003**	**5.9000e-004**	**1.0000e-005**	**6.0000e-004**	**0.0000**	**1.7567**	**1.7567**	**4.0000e-005**	**4.0000e-005**	**1.7710**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0781	0.0000	0.0781	0.0192	0.0000	0.0192	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0299	0.3106	0.2525	5.6000e-004		0.0128	0.0128		0.0118	0.0118	0.0000	49.0816	49.0816	0.0159	0.0000	49.4785
Total	**0.0299**	**0.3106**	**0.2525**	**5.6000e-004**	**0.0781**	**0.0128**	**0.0909**	**0.0192**	**0.0118**	**0.0310**	**0.0000**	**49.0816**	**49.0816**	**0.0159**	**0.0000**	**49.4785**

3.3 Grading - 2023

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	6.8000e-004	4.9000e-004	5.8400e-003	2.0000e-005	2.0600e-003	1.0000e-005	2.0700e-003	5.5000e-004	1.0000e-005	5.6000e-004	0.0000	1.7567	1.7567	4.0000e-005	4.0000e-005	1.7710
Total	**6.8000e-004**	**4.9000e-004**	**5.8400e-003**	**2.0000e-005**	**2.0600e-003**	**1.0000e-005**	**2.0700e-003**	**5.5000e-004**	**1.0000e-005**	**5.6000e-004**	**0.0000**	**1.7567**	**1.7567**	**4.0000e-005**	**4.0000e-005**	**1.7710**

3.4 Building Construction - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.1903	1.7406	1.9655	3.2600e-003		0.0847	0.0847		0.0797	0.0797	0.0000	280.4837	280.4837	0.0667	0.0000	282.1518
Total	**0.1903**	**1.7406**	**1.9655**	**3.2600e-003**		**0.0847**	**0.0847**		**0.0797**	**0.0797**	**0.0000**	**280.4837**	**280.4837**	**0.0667**	**0.0000**	**282.1518**

3.4 Building Construction - 2023

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	5.1500e-003	0.2092	0.0644	9.3000e-004	0.0304	1.3000e-003	0.0317	8.7800e-003	1.2500e-003	0.0100	0.0000	89.2739	89.2739	4.5000e-004	0.0135	93.3087
Worker	0.0569	0.0404	0.4866	1.5800e-003	0.1858	8.8000e-004	0.1867	0.0494	8.1000e-004	0.0502	0.0000	146.4337	146.4337	3.4000e-003	3.7100e-003	147.6250
Total	**0.0620**	**0.2497**	**0.5510**	**2.5100e-003**	**0.2162**	**2.1800e-003**	**0.2184**	**0.0582**	**2.0600e-003**	**0.0602**	**0.0000**	**235.7076**	**235.7076**	**3.8500e-003**	**0.0172**	**240.9338**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.1903	1.7406	1.9655	3.2600e-003		0.0847	0.0847		0.0797	0.0797	0.0000	280.4834	280.4834	0.0667	0.0000	282.1515
Total	**0.1903**	**1.7406**	**1.9655**	**3.2600e-003**		**0.0847**	**0.0847**		**0.0797**	**0.0797**	**0.0000**	**280.4834**	**280.4834**	**0.0667**	**0.0000**	**282.1515**

3.4 Building Construction - 2023

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	5.1500e-003	0.2092	0.0644	9.3000e-004	0.0285	1.3000e-003	0.0298	8.3100e-003	1.2500e-003	9.5500e-003	0.0000	89.2739	89.2739	4.5000e-004	0.0135	93.3087
Worker	0.0569	0.0404	0.4866	1.5800e-003	0.1714	8.8000e-004	0.1722	0.0458	8.1000e-004	0.0467	0.0000	146.4337	146.4337	3.4000e-003	3.7100e-003	147.6250
Total	**0.0620**	**0.2497**	**0.5510**	**2.5100e-003**	**0.1998**	**2.1800e-003**	**0.2020**	**0.0542**	**2.0600e-003**	**0.0562**	**0.0000**	**235.7076**	**235.7076**	**3.8500e-003**	**0.0172**	**240.9338**

3.4 Building Construction - 2024

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.1928	1.7611	2.1179	3.5300e-003		0.0803	0.0803		0.0756	0.0756	0.0000	303.7223	303.7223	0.0718	0.0000	305.5179
Total	**0.1928**	**1.7611**	**2.1179**	**3.5300e-003**		**0.0803**	**0.0803**		**0.0756**	**0.0756**	**0.0000**	**303.7223**	**303.7223**	**0.0718**	**0.0000**	**305.5179**

3.4 Building Construction - 2024

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	5.4500e-003	0.2266	0.0684	9.9000e-004	0.0329	1.4200e-003	0.0343	9.5100e-003	1.3600e-003	0.0109	0.0000	95.1484	95.1484	4.7000e-004	0.0144	99.4435
Worker	0.0569	0.0383	0.4861	1.6500e-003	0.2012	9.0000e-004	0.2021	0.0535	8.3000e-004	0.0543	0.0000	154.2558	154.2558	3.2900e-003	3.6900e-003	155.4390
Total	**0.0624**	**0.2649**	**0.5545**	**2.6400e-003**	**0.2341**	**2.3200e-003**	**0.2364**	**0.0630**	**2.1900e-003**	**0.0652**	**0.0000**	**249.4041**	**249.4041**	**3.7600e-003**	**0.0181**	**254.8825**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.1928	1.7611	2.1179	3.5300e-003		0.0803	0.0803		0.0756	0.0756	0.0000	303.7220	303.7220	0.0718	0.0000	305.5175
Total	**0.1928**	**1.7611**	**2.1179**	**3.5300e-003**		**0.0803**	**0.0803**		**0.0756**	**0.0756**	**0.0000**	**303.7220**	**303.7220**	**0.0718**	**0.0000**	**305.5175**

3.4 Building Construction - 2024

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	5.4500e-003	0.2266	0.0684	9.9000e-004	0.0308	1.4200e-003	0.0322	8.9900e-003	1.3600e-003	0.0104	0.0000	95.1484	95.1484	4.7000e-004	0.0144	99.4435
Worker	0.0569	0.0383	0.4861	1.6500e-003	0.1855	9.0000e-004	0.1864	0.0496	8.3000e-004	0.0505	0.0000	154.2558	154.2558	3.2900e-003	3.6900e-003	155.4390
Total	**0.0624**	**0.2649**	**0.5545**	**2.6400e-003**	**0.2163**	**2.3200e-003**	**0.2186**	**0.0586**	**2.1900e-003**	**0.0608**	**0.0000**	**249.4041**	**249.4041**	**3.7600e-003**	**0.0181**	**254.8825**

3.4 Building Construction - 2025

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.1614	1.4714	1.8980	3.1800e-003		0.0623	0.0623		0.0586	0.0586	0.0000	273.6650	273.6650	0.0643	0.0000	275.2732
Total	**0.1614**	**1.4714**	**1.8980**	**3.1800e-003**		**0.0623**	**0.0623**		**0.0586**	**0.0586**	**0.0000**	**273.6650**	**273.6650**	**0.0643**	**0.0000**	**275.2732**

3.4 Building Construction - 2025

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	4.8100e-003	0.2034	0.0606	8.8000e-004	0.0296	1.2800e-003	0.0309	8.5600e-003	1.2300e-003	9.7900e-003	0.0000	84.1802	84.1802	4.1000e-004	0.0127	87.9749
Worker	0.0477	0.0305	0.4061	1.4300e-003	0.1812	7.7000e-004	0.1820	0.0482	7.1000e-004	0.0489	0.0000	135.5776	135.5776	2.6500e-003	3.0900e-003	136.5636
Total	**0.0525**	**0.2339**	**0.4667**	**2.3100e-003**	**0.2108**	**2.0500e-003**	**0.2129**	**0.0567**	**1.9400e-003**	**0.0587**	**0.0000**	**219.7578**	**219.7578**	**3.0600e-003**	**0.0158**	**224.5385**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.1614	1.4714	1.8980	3.1800e-003		0.0623	0.0623		0.0586	0.0586	0.0000	273.6646	273.6646	0.0643	0.0000	275.2729
Total	**0.1614**	**1.4714**	**1.8980**	**3.1800e-003**		**0.0623**	**0.0623**		**0.0586**	**0.0586**	**0.0000**	**273.6646**	**273.6646**	**0.0643**	**0.0000**	**275.2729**

3.4 Building Construction - 2025

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	4.8100e-003	0.2034	0.0606	8.8000e-004	0.0278	1.2800e-003	0.0290	8.1000e-003	1.2300e-003	9.3300e-003	0.0000	84.1802	84.1802	4.1000e-004	0.0127	87.9749
Worker	0.0477	0.0305	0.4061	1.4300e-003	0.1671	7.7000e-004	0.1679	0.0447	7.1000e-004	0.0454	0.0000	135.5776	135.5776	2.6500e-003	3.0900e-003	136.5636
Total	**0.0525**	**0.2339**	**0.4667**	**2.3100e-003**	**0.1949**	**2.0500e-003**	**0.1969**	**0.0528**	**1.9400e-003**	**0.0548**	**0.0000**	**219.7578**	**219.7578**	**3.0600e-003**	**0.0158**	**224.5385**

3.5 Paving - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0284	0.2803	0.4011	6.3000e-004		0.0140	0.0140		0.0129	0.0129	0.0000	55.0739	55.0739	0.0178	0.0000	55.5192
Paving	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0284**	**0.2803**	**0.4011**	**6.3000e-004**		**0.0140**	**0.0140**		**0.0129**	**0.0129**	**0.0000**	**55.0739**	**55.0739**	**0.0178**	**0.0000**	**55.5192**

3.5 Paving - 2023

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.5600e-003	1.1100e-003	0.0134	4.0000e-005	5.1100e-003	2.0000e-005	5.1300e-003	1.3600e-003	2.0000e-005	1.3800e-003	0.0000	4.0259	4.0259	9.0000e-005	1.0000e-004	4.0586
Total	**1.5600e-003**	**1.1100e-003**	**0.0134**	**4.0000e-005**	**5.1100e-003**	**2.0000e-005**	**5.1300e-003**	**1.3600e-003**	**2.0000e-005**	**1.3800e-003**	**0.0000**	**4.0259**	**4.0259**	**9.0000e-005**	**1.0000e-004**	**4.0586**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0284	0.2803	0.4011	6.3000e-004		0.0140	0.0140		0.0129	0.0129	0.0000	55.0738	55.0738	0.0178	0.0000	55.5191
Paving	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0284**	**0.2803**	**0.4011**	**6.3000e-004**		**0.0140**	**0.0140**		**0.0129**	**0.0129**	**0.0000**	**55.0738**	**55.0738**	**0.0178**	**0.0000**	**55.5191**

3.5 Paving - 2023

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.5600e-003	1.1100e-003	0.0134	4.0000e-005	4.7100e-003	2.0000e-005	4.7400e-003	1.2600e-003	2.0000e-005	1.2800e-003	0.0000	4.0259	4.0259	9.0000e-005	1.0000e-004	4.0586
Total	**1.5600e-003**	**1.1100e-003**	**0.0134**	**4.0000e-005**	**4.7100e-003**	**2.0000e-005**	**4.7400e-003**	**1.2600e-003**	**2.0000e-005**	**1.2800e-003**	**0.0000**	**4.0259**	**4.0259**	**9.0000e-005**	**1.0000e-004**	**4.0586**

3.6 Architectural Coating - 2024

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	2.2188					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	4.9700e-003	0.0335	0.0498	8.0000e-005		1.6800e-003	1.6800e-003		1.6800e-003	1.6800e-003	0.0000	7.0215	7.0215	4.0000e-004	0.0000	7.0313
Total	**2.2238**	**0.0335**	**0.0498**	**8.0000e-005**		**1.6800e-003**	**1.6800e-003**		**1.6800e-003**	**1.6800e-003**	**0.0000**	**7.0215**	**7.0215**	**4.0000e-004**	**0.0000**	**7.0313**

3.6 Architectural Coating - 2024

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.4100e-003	1.6200e-003	0.0206	7.0000e-005	8.5100e-003	4.0000e-005	8.5500e-003	2.2600e-003	4.0000e-005	2.3000e-003	0.0000	6.5286	6.5286	1.4000e-004	1.6000e-004	6.5787
Total	**2.4100e-003**	**1.6200e-003**	**0.0206**	**7.0000e-005**	**8.5100e-003**	**4.0000e-005**	**8.5500e-003**	**2.2600e-003**	**4.0000e-005**	**2.3000e-003**	**0.0000**	**6.5286**	**6.5286**	**1.4000e-004**	**1.6000e-004**	**6.5787**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	2.2188					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	4.9700e-003	0.0335	0.0498	8.0000e-005		1.6800e-003	1.6800e-003		1.6800e-003	1.6800e-003	0.0000	7.0214	7.0214	4.0000e-004	0.0000	7.0313
Total	**2.2238**	**0.0335**	**0.0498**	**8.0000e-005**		**1.6800e-003**	**1.6800e-003**		**1.6800e-003**	**1.6800e-003**	**0.0000**	**7.0214**	**7.0214**	**4.0000e-004**	**0.0000**	**7.0313**

3.6 Architectural Coating - 2024

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.4100e-003	1.6200e-003	0.0206	7.0000e-005	7.8500e-003	4.0000e-005	7.8900e-003	2.1000e-003	4.0000e-005	2.1400e-003	0.0000	6.5286	6.5286	1.4000e-004	1.6000e-004	6.5787
Total	**2.4100e-003**	**1.6200e-003**	**0.0206**	**7.0000e-005**	**7.8500e-003**	**4.0000e-005**	**7.8900e-003**	**2.1000e-003**	**4.0000e-005**	**2.1400e-003**	**0.0000**	**6.5286**	**6.5286**	**1.4000e-004**	**1.6000e-004**	**6.5787**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

Increase Density

Improve Pedestrian Network

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.7426	1.0626	6.4820	0.0145	1.5046	0.0120	1.5166	0.4023	0.0113	0.4135	0.0000	1,372.4225	1,372.4225	0.0803	0.0739	1,396.4453
Unmitigated	0.7434	1.0649	6.4951	0.0145	1.5089	0.0121	1.5209	0.4034	0.0113	0.4147	0.0000	1,376.1935	1,376.1935	0.0804	0.0740	1,400.2658

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Single Family Housing	1,883.32	1,883.32	1883.32	4,047,960	4,036,423
City Park	0.00	0.00	0.00		
Total	1,883.32	1,883.32	1,883.32	4,047,960	4,036,423

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Single Family Housing	6.65	6.65	6.65	45.60	19.00	35.40	86	11	3
City Park	14.70	6.60	6.60	33.00	48.00	19.00	66	28	6

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Single Family Housing	0.541920	0.052620	0.169871	0.146633	0.025153	0.006100	0.012627	0.016953	0.000467	0.000322	0.022878	0.001103	0.003353
City Park	0.541920	0.052620	0.169871	0.146633	0.025153	0.006100	0.012627	0.016953	0.000467	0.000322	0.022878	0.001103	0.003353

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Electricity Mitigated						0.0000	0.0000		0.0000	0.0000	0.0000	144.1294	144.1294	0.0233	2.8300e-003	145.5546
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000	0.0000	144.1294	144.1294	0.0233	2.8300e-003	145.5546
NaturalGas Mitigated	0.0251	0.2148	0.0914	1.3700e-003		0.0174	0.0174		0.0174	0.0174	0.0000	248.7173	248.7173	4.7700e-003	4.5600e-003	250.1953
NaturalGas Unmitigated	0.0251	0.2148	0.0914	1.3700e-003		0.0174	0.0174		0.0174	0.0174	0.0000	248.7173	248.7173	4.7700e-003	4.5600e-003	250.1953

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
City Park	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Single Family Housing	4.66079e+006	0.0251	0.2148	0.0914	1.3700e-003		0.0174	0.0174		0.0174	0.0174	0.0000	248.7173	248.7173	4.7700e-003	4.5600e-003	250.1953
Total		**0.0251**	**0.2148**	**0.0914**	**1.3700e-003**		**0.0174**	**0.0174**		**0.0174**	**0.0174**	**0.0000**	**248.7173**	**248.7173**	**4.7700e-003**	**4.5600e-003**	**250.1953**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
City Park	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Single Family Housing	4.66079e+006	0.0251	0.2148	0.0914	1.3700e-003		0.0174	0.0174		0.0174	0.0174	0.0000	248.7173	248.7173	4.7700e-003	4.5600e-003	250.1953
Total		**0.0251**	**0.2148**	**0.0914**	**1.3700e-003**		**0.0174**	**0.0174**		**0.0174**	**0.0174**	**0.0000**	**248.7173**	**248.7173**	**4.7700e-003**	**4.5600e-003**	**250.1953**

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
City Park	0	0.0000	0.0000	0.0000	0.0000
Single Family Housing	1.55776e +006	144.1294	0.0233	2.8300e-003	145.5546
Total		**144.1294**	**0.0233**	**2.8300e-003**	**145.5546**

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
City Park	0	0.0000	0.0000	0.0000	0.0000
Single Family Housing	1.55776e +006	144.1294	0.0233	2.8300e-003	145.5546
Total		**144.1294**	**0.0233**	**2.8300e-003**	**145.5546**

6.0 Area Detail

6.1 Mitigation Measures Area

Use Low VOC Paint - Residential Interior

Use Low VOC Paint - Residential Exterior

Use Low VOC Paint - Non-Residential Interior

Use Low VOC Paint - Non-Residential Exterior

Use only Natural Gas Hearths

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	1.7714	0.0905	1.4928	5.5000e-004		0.0141	0.0141		0.0141	0.0141	0.0000	87.7313	87.7313	3.9200e-003	1.5600e-003	88.2956
Unmitigated	2.4757	0.2113	8.8958	0.0247		1.2218	1.2218		1.2218	1.2218	161.7089	87.7313	249.4402	0.7599	1.5600e-003	268.9035

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.2219					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	1.3861					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Hearth	0.8238	0.1945	7.4344	0.0246		1.2136	1.2136		1.2136	1.2136	161.7089	85.3419	247.0508	0.7576	1.5600e-003	266.4568
Landscaping	0.0439	0.0168	1.4614	8.0000e-005		8.1100e-003	8.1100e-003		8.1100e-003	8.1100e-003	0.0000	2.3894	2.3894	2.2900e-003	0.0000	2.4466
Total	**2.4757**	**0.2113**	**8.8958**	**0.0247**		**1.2218**	**1.2218**		**1.2218**	**1.2218**	**161.7089**	**87.7313**	**249.4402**	**0.7599**	**1.5600e-003**	**268.9035**

6.2 Area by SubCategory

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.3328					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	1.3861					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Hearth	8.6200e-003	0.0737	0.0314	4.7000e-004		5.9600e-003	5.9600e-003		5.9600e-003	5.9600e-003	0.0000	85.3419	85.3419	1.6400e-003	1.5600e-003	85.8490
Landscaping	0.0439	0.0168	1.4614	8.0000e-005		8.1100e-003	8.1100e-003		8.1100e-003	8.1100e-003	0.0000	2.3894	2.3894	2.2900e-003	0.0000	2.4466
Total	**1.7714**	**0.0905**	**1.4928**	**5.5000e-004**		**0.0141**	**0.0141**		**0.0141**	**0.0141**	**0.0000**	**87.7313**	**87.7313**	**3.9300e-003**	**1.5600e-003**	**88.2956**

7.0 Water Detail

7.1 Mitigation Measures Water

Install Low Flow Bathroom Faucet

Install Low Flow Kitchen Faucet

Install Low Flow Toilet

Install Low Flow Shower

Use Water Efficient Irrigation System

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated	11.9169	0.3360	8.0700e-003	22.7217
Unmitigated	14.2451	0.4199	0.0101	27.7446

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
City Park	0 / 3.47913	1.1267	1.8000e-004	2.0000e-005	1.1378
Single Family Housing	12.8353 / 8.09185	13.1184	0.4197	0.0101	26.6068
Total		**14.2451**	**0.4199**	**0.0101**	**27.7446**

7.2 Water by Land Use

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
City Park	0 / 3.2669	1.0579	1.7000e-004	2.0000e-005	1.0684
Single Family Housing	10.2683 / 7.59824	10.8590	0.3358	8.0500e-003	21.6533
Total		**11.9169**	**0.3360**	**8.0700e-003**	**22.7217**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated	45.7237	2.7022	0.0000	113.2786
Unmitigated	45.7237	2.7022	0.0000	113.2786

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
City Park	0.25	0.0508	3.0000e-003	0.0000	0.1257
Single Family Housing	225	45.6730	2.6992	0.0000	113.1528
Total		**45.7237**	**2.7022**	**0.0000**	**113.2786**

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
City Park	0.25	0.0508	3.0000e-003	0.0000	0.1257
Single Family Housing	225	45.6730	2.6992	0.0000	113.1528
Total		**45.7237**	**2.7022**	**0.0000**	**113.2786**

9.0 Operational Offroad

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

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

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

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

Boilers

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

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

	Total CO2	CH4	N2O	CO2e
Category	MT			
Unmitigated	-149.1260	0.0000	0.0000	-149.1260

11.1 Vegetation Land Change

Vegetation Type

	Initial/Final	Total CO2	CH4	N2O	CO2e
	Acres	MT			
Cropland	31.14 / 0	-134.2134	0.0000	0.0000	-134.2134
Grassland	3.46 / 0	-14.9126	0.0000	0.0000	-14.9126
Total		**-149.1260**	**0.0000**	**0.0000**	**-149.1260**

DUTRA PROPERTY SUBDIVISION PROJECT

San Joaquin County, Summer

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Single Family Housing	197.00	Dwelling Unit	31.68	354,600.00	612
City Park	2.92	Acre	2.92	127,195.20	0

1.2 Other Project Characteristics

Urbanization	Rural	**Wind Speed (m/s)**	2.7	**Precipitation Freq (Days)**	51
Climate Zone	2			**Operational Year**	2025
Utility Company	Pacific Gas and Electric Company				
CO2 Intensity (lb/MWhr)	203.98	**CH4 Intensity (lb/MWhr)**	0.033	**N2O Intensity (lb/MWhr)**	0.004

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - Actual acreage

Construction Phase - No demolition/vacant land. Site is flat.

Grading - Actual acreage, site will not require import/export, balanced on site.

Architectural Coating - Per rule 4601.

Vehicle Trips - Trip rates per ITE 210 (Kittelson report 2022)

Area Coating - 100 b/L for interior coating limitations provided per rule 4601.

Land Use Change - Assume 90% cropland and 10% grassland existing vegetation land use

Sequestration -

Construction Off-road Equipment Mitigation - Per SJVACPD requirements/rules for dust prohibition.

Mobile Land Use Mitigation -

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Area Mitigation - Per SJVAPCD rules.

Water Mitigation -

Operational Off-Road Equipment -

Stationary Sources - Emergency Generators and Fire Pumps -

Off-road Equipment -

Off-road Equipment -

Off-road Equipment -

Table Name	Column Name	Default Value	New Value
tblArchitecturalCoating	EF_Nonresidential_Exterior	150.00	100.00
tblArchitecturalCoating	EF_Nonresidential_Interior	150.00	100.00
tblArchitecturalCoating	EF_Residential_Exterior	150.00	100.00
tblArchitecturalCoating	EF_Residential_Interior	150.00	100.00
tblAreaCoating	Area_EF_Nonresidential_Exterior	150	100
tblAreaCoating	Area_EF_Nonresidential_Interior	150	100
tblAreaCoating	Area_EF_Residential_Exterior	150	100
tblAreaCoating	Area_EF_Residential_Interior	150	100
tblAreaMitigation	UseLowVOCPaintNonresidentialExteriorValue	100	150
tblAreaMitigation	UseLowVOCPaintNonresidentialInteriorValue	100	150
tblAreaMitigation	UseLowVOCPaintResidentialExteriorValue	100	150
tblAreaMitigation	UseLowVOCPaintResidentialInteriorValue	100	150
tblConstDustMitigation	CleanPavedRoadPercentReduction	0	9
tblConstDustMitigation	WaterUnpavedRoadVehicleSpeed	0	5
tblConstructionPhase	PhaseEndDate	2/11/2026	3/24/2023
tblConstructionPhase	PhaseEndDate	4/29/2026	3/15/2024
tblConstructionPhase	PhaseStartDate	11/27/2025	1/9/2023
tblConstructionPhase	PhaseStartDate	2/12/2026	1/1/2024
tblLandUse	LotAcreage	63.96	31.68

tblLandUseChange	CO2peracre	6.20	4.31
tblProjectCharacteristics	UrbanizationLevel	Urban	Rural
tblVehicleTrips	HO_TL	7.90	6.65
tblVehicleTrips	HS_TL	7.10	6.65
tblVehicleTrips	HW_TL	16.80	6.65
tblVehicleTrips	ST_TR	9.54	9.56
tblVehicleTrips	ST_TR	1.96	0.00
tblVehicleTrips	SU_TR	8.55	9.56
tblVehicleTrips	SU_TR	2.19	0.00
tblVehicleTrips	WD_TR	9.44	9.56
tblVehicleTrips	WD_TR	0.78	0.00
tblWoodstoves	NumberCatalytic	31.68	40.00
tblWoodstoves	NumberNoncatalytic	31.68	40.00

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2022	3.7149	38.8998	29.8598	0.0644	19.8869	1.6361	21.5006	10.1634	1.5052	11.6480	0.0000	6,250.155 1	6,250.155 1	1.9497	5.6000e-003	6,300.565 6
2023	4.4991	44.7928	43.9378	0.0889	9.6507	1.9367	11.5874	3.7723	1.7818	5.5541	0.0000	8,625.715 8	8,625.715 8	2.6668	0.1584	8,695.051 5
2024	82.9477	16.6380	23.5976	0.0538	2.1606	0.6933	2.8540	0.5788	0.6558	1.2346	0.0000	5,321.132 5	5,321.132 5	0.6565	0.1558	5,383.982 2
2025	1.8485	14.3553	20.5251	0.0475	1.8413	0.5449	2.3863	0.4942	0.5127	1.0068	0.0000	4,709.362 9	4,709.362 9	0.6288	0.1455	4,768.452 2
Maximum	**82.9477**	**44.7928**	**43.9378**	**0.0889**	**19.8869**	**1.9367**	**21.5006**	**10.1634**	**1.7818**	**11.6480**	**0.0000**	**8,625.715 8**	**8,625.715 8**	**2.6668**	**0.1584**	**8,695.051 5**

2.1 Overall Construction (Maximum Daily Emission)

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2022	3.7149	38.8998	29.8598	0.0644	9.0576	1.6361	10.6713	4.6027	1.5052	6.0873	0.0000	6,250.1551	6,250.1551	1.9497	5.6000e-003	6,300.5656
2023	4.4991	44.7928	43.9378	0.0889	4.5537	1.9367	6.4904	1.7542	1.7818	3.5360	0.0000	8,625.7158	8,625.7158	2.6668	0.1584	8,695.0514
2024	82.9477	16.6380	23.5976	0.0538	1.9952	0.6933	2.6885	0.5382	0.6558	1.1940	0.0000	5,321.1325	5,321.1325	0.6565	0.1558	5,383.9822
2025	1.8485	14.3553	20.5251	0.0475	1.7009	0.5449	2.2458	0.4597	0.5127	0.9724	0.0000	4,709.3629	4,709.3629	0.6288	0.1455	4,768.4522
Maximum	**82.9477**	**44.7928**	**43.9378**	**0.0889**	**9.0576**	**1.9367**	**10.6713**	**4.6027**	**1.7818**	**6.0873**	**0.0000**	**8,625.7158**	**8,625.7158**	**2.6668**	**0.1584**	**8,695.0514**

	ROG	**NOx**	**CO**	**SO2**	**Fugitive PM10**	**Exhaust PM10**	**PM10 Total**	**Fugitive PM2.5**	**Exhaust PM2.5**	**PM2.5 Total**	**Bio- CO2**	**NBio-CO2**	**Total CO2**	**CH4**	**N20**	**CO2e**
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**48.40**	**0.00**	**42.35**	**51.00**	**0.00**	**39.37**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	29.3912	4.9299	197.5654	0.6014		29.6910	29.6910		29.6910	29.6910	4,347.6480	2,323.7360	6,671.3840	20.3964	0.0421	7,193.8288
Energy	0.1377	1.1768	0.5008	7.5100e-003		0.0951	0.0951		0.0951	0.0951		1,502.2677	1,502.2677	0.0288	0.0275	1,511.1949
Mobile	4.8636	5.4572	36.6244	0.0847	8.5473	0.0663	8.6136	2.2796	0.0621	2.3417		8,829.5061	8,829.5061	0.4551	0.4320	8,969.6242
Total	**34.3926**	**11.5639**	**234.6905**	**0.6936**	**8.5473**	**29.8524**	**38.3997**	**2.2796**	**29.8483**	**32.1279**	**4,347.6480**	**12,655.5098**	**17,003.1578**	**20.8802**	**0.5016**	**17,674.6480**

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	10.1166	1.9844	17.0025	0.0123		0.2354	0.2354		0.2354	0.2354	0.0000	2,323.7360	2,323.7360	0.0720	0.0421	2,338.0716
Energy	0.1377	1.1768	0.5008	7.5100e-003		0.0951	0.0951		0.0951	0.0951		1,502.2677	1,502.2677	0.0288	0.0275	1,511.1949
Mobile	4.8593	5.4458	36.5444	0.0844	8.5229	0.0661	8.5891	2.2731	0.0619	2.3351		8,805.2458	8,805.2458	0.4543	0.4311	8,945.0721
Total	**15.1136**	**8.6070**	**54.0476**	**0.1043**	**8.5229**	**0.3967**	**8.9196**	**2.2731**	**0.3925**	**2.6656**	**0.0000**	**12,631.2495**	**12,631.2495**	**0.5551**	**0.5007**	**12,794.3386**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	56.06	25.57	76.97	84.97	0.29	98.67	76.77	0.28	98.69	91.70	100.00	0.19	25.71	97.34	0.18	27.61

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Site Preparation	Site Preparation	9/1/2022	10/12/2022	5	30	
2	Grading	Grading	10/13/2022	1/25/2023	5	75	
3	Building Construction	Building Construction	1/26/2023	11/26/2025	5	740	
4	Paving	Paving	1/9/2023	3/24/2023	5	55	
5	Architectural Coating	Architectural Coating	1/1/2024	3/15/2024	5	55	

Acres of Grading (Site Preparation Phase): 45

Acres of Grading (Grading Phase): 225

Acres of Paving: 0

Residential Indoor: 718,065; Residential Outdoor: 239,355; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Site Preparation	Rubber Tired Dozers	3	8.00	247	0.40
Site Preparation	Tractors/Loaders/Backhoes	4	8.00	97	0.37
Grading	Excavators	2	8.00	158	0.38
Grading	Graders	1	8.00	187	0.41
Grading	Rubber Tired Dozers	1	8.00	247	0.40
Grading	Scrapers	2	8.00	367	0.48

Grading	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Building Construction	Cranes	1	7.00	231	0.29
Building Construction	Forklifts	3	8.00	89	0.20
Building Construction	Generator Sets	1	8.00	84	0.74
Building Construction	Tractors/Loaders/Backhoes	3	7.00	97	0.37
Building Construction	Welders	1	8.00	46	0.45
Paving	Pavers	2	8.00	130	0.42
Paving	Paving Equipment	2	8.00	132	0.36
Paving	Rollers	2	8.00	80	0.38
Architectural Coating	Air Compressors	1	6.00	78	0.48

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Site Preparation	7	18.00	0.00	0.00	16.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT
Grading	8	20.00	0.00	0.00	16.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	9	124.00	42.00	0.00	16.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT
Paving	6	15.00	0.00	0.00	16.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	25.00	0.00	0.00	16.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Use Soil Stabilizer

Water Exposed Area

Reduce Vehicle Speed on Unpaved Roads

Clean Paved Roads

3.2 Site Preparation - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					19.6570	0.0000	19.6570	10.1025	0.0000	10.1025			0.0000			0.0000
Off-Road	3.1701	33.0835	19.6978	0.0380		1.6126	1.6126		1.4836	1.4836		3,686.0619	3,686.0619	1.1922		3,715.8655
Total	**3.1701**	**33.0835**	**19.6978**	**0.0380**	**19.6570**	**1.6126**	**21.2696**	**10.1025**	**1.4836**	**11.5860**		**3,686.0619**	**3,686.0619**	**1.1922**		**3,715.8655**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0810	0.0507	0.7365	2.1100e-003	0.2299	1.1200e-003	0.2310	0.0610	1.0300e-003	0.0620		214.8701	214.8701	4.9600e-003	5.0400e-003	216.4948
Total	**0.0810**	**0.0507**	**0.7365**	**2.1100e-003**	**0.2299**	**1.1200e-003**	**0.2310**	**0.0610**	**1.0300e-003**	**0.0620**		**214.8701**	**214.8701**	**4.9600e-003**	**5.0400e-003**	**216.4948**

3.2 Site Preparation - 2022

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					8.8457	0.0000	8.8457	4.5461	0.0000	4.5461			0.0000			0.0000
Off-Road	3.1701	33.0835	19.6978	0.0380		1.6126	1.6126		1.4836	1.4836	0.0000	3,686.0619	3,686.0619	1.1922		3,715.8655
Total	**3.1701**	**33.0835**	**19.6978**	**0.0380**	**8.8457**	**1.6126**	**10.4582**	**4.5461**	**1.4836**	**6.0297**	**0.0000**	**3,686.0619**	**3,686.0619**	**1.1922**		**3,715.8655**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0810	0.0507	0.7365	2.1100e-003	0.2119	1.1200e-003	0.2130	0.0566	1.0300e-003	0.0576		214.8701	214.8701	4.9600e-003	5.0400e-003	216.4948
Total	**0.0810**	**0.0507**	**0.7365**	**2.1100e-003**	**0.2119**	**1.1200e-003**	**0.2130**	**0.0566**	**1.0300e-003**	**0.0576**		**214.8701**	**214.8701**	**4.9600e-003**	**5.0400e-003**	**216.4948**

3.3 Grading - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					9.2036	0.0000	9.2036	3.6538	0.0000	3.6538			0.0000			0.0000
Off-Road	3.6248	38.8435	29.0415	0.0621		1.6349	1.6349		1.5041	1.5041		6,011.4105	6,011.4105	1.9442		6,060.0158
Total	**3.6248**	**38.8435**	**29.0415**	**0.0621**	**9.2036**	**1.6349**	**10.8385**	**3.6538**	**1.5041**	**5.1579**		**6,011.4105**	**6,011.4105**	**1.9442**		**6,060.0158**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0900	0.0563	0.8183	2.3500e-003	0.2555	1.2400e-003	0.2567	0.0678	1.1400e-003	0.0689		238.7446	238.7446	5.5100e-003	5.6000e-003	240.5498
Total	**0.0900**	**0.0563**	**0.8183**	**2.3500e-003**	**0.2555**	**1.2400e-003**	**0.2567**	**0.0678**	**1.1400e-003**	**0.0689**		**238.7446**	**238.7446**	**5.5100e-003**	**5.6000e-003**	**240.5498**

3.3 Grading - 2022

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					4.1416	0.0000	4.1416	1.6442	0.0000	1.6442			0.0000			0.0000
Off-Road	3.6248	38.8435	29.0415	0.0621		1.6349	1.6349		1.5041	1.5041	0.0000	6,011.4105	6,011.4105	1.9442		6,060.0158
Total	**3.6248**	**38.8435**	**29.0415**	**0.0621**	**4.1416**	**1.6349**	**5.7765**	**1.6442**	**1.5041**	**3.1483**	**0.0000**	**6,011.4105**	**6,011.4105**	**1.9442**		**6,060.0158**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0900	0.0563	0.8183	2.3500e-003	0.2355	1.2400e-003	0.2367	0.0628	1.1400e-003	0.0640		238.7446	238.7446	5.5100e-003	5.6000e-003	240.5498
Total	**0.0900**	**0.0563**	**0.8183**	**2.3500e-003**	**0.2355**	**1.2400e-003**	**0.2367**	**0.0628**	**1.1400e-003**	**0.0640**		**238.7446**	**238.7446**	**5.5100e-003**	**5.6000e-003**	**240.5498**

3.3 Grading - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					9.2036	0.0000	9.2036	3.6538	0.0000	3.6538			0.0000			0.0000
Off-Road	3.3217	34.5156	28.0512	0.0621		1.4245	1.4245		1.3105	1.3105		6,011.4777	6,011.4777	1.9442		6,060.0836
Total	**3.3217**	**34.5156**	**28.0512**	**0.0621**	**9.2036**	**1.4245**	**10.6281**	**3.6538**	**1.3105**	**4.9643**		**6,011.4777**	**6,011.4777**	**1.9442**		**6,060.0836**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0827	0.0489	0.7442	2.2700e-003	0.2555	1.1700e-003	0.2566	0.0678	1.0800e-003	0.0688		232.3737	232.3737	4.8800e-003	5.1100e-003	234.0196
Total	**0.0827**	**0.0489**	**0.7442**	**2.2700e-003**	**0.2555**	**1.1700e-003**	**0.2566**	**0.0678**	**1.0800e-003**	**0.0688**		**232.3737**	**232.3737**	**4.8800e-003**	**5.1100e-003**	**234.0196**

3.3 Grading - 2023

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					4.1416	0.0000	4.1416	1.6442	0.0000	1.6442			0.0000			0.0000
Off-Road	3.3217	34.5156	28.0512	0.0621		1.4245	1.4245		1.3105	1.3105	0.0000	6,011.4777	6,011.4777	1.9442		6,060.0836
Total	**3.3217**	**34.5156**	**28.0512**	**0.0621**	**4.1416**	**1.4245**	**5.5661**	**1.6442**	**1.3105**	**2.9547**	**0.0000**	**6,011.4777**	**6,011.4777**	**1.9442**		**6,060.0836**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0827	0.0489	0.7442	2.2700e-003	0.2355	1.1700e-003	0.2366	0.0628	1.0800e-003	0.0639		232.3737	232.3737	4.8800e-003	5.1100e-003	234.0196
Total	**0.0827**	**0.0489**	**0.7442**	**2.2700e-003**	**0.2355**	**1.1700e-003**	**0.2366**	**0.0628**	**1.0800e-003**	**0.0639**		**232.3737**	**232.3737**	**4.8800e-003**	**5.1100e-003**	**234.0196**

3.4 Building Construction - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.5728	14.3849	16.2440	0.0269		0.6997	0.6997		0.6584	0.6584		2,555.2099	2,555.2099	0.6079		2,570.4061
Total	**1.5728**	**14.3849**	**16.2440**	**0.0269**		**0.6997**	**0.6997**		**0.6584**	**0.6584**		**2,555.2099**	**2,555.2099**	**0.6079**		**2,570.4061**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0440	1.6563	0.5241	7.6800e-003	0.2574	0.0108	0.2682	0.0741	0.0103	0.0844		812.5748	812.5748	4.1700e-003	0.1228	849.2843
Worker	0.5124	0.3032	4.6141	0.0141	1.5839	7.2700e-003	1.5911	0.4200	6.6900e-003	0.4267		1,440.7169	1,440.7169	0.0303	0.0317	1,450.9215
Total	**0.5564**	**1.9594**	**5.1382**	**0.0218**	**1.8413**	**0.0180**	**1.8593**	**0.4942**	**0.0170**	**0.5111**		**2,253.2916**	**2,253.2916**	**0.0344**	**0.1545**	**2,300.2058**

3.4 Building Construction - 2023

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category						lb/day								lb/day		
Off-Road	1.5728	14.3849	16.2440	0.0269		0.6997	0.6997		0.6584	0.6584	0.0000	2,555.2099	2,555.2099	0.6079		2,570.4061
Total	**1.5728**	**14.3849**	**16.2440**	**0.0269**		**0.6997**	**0.6997**		**0.6584**	**0.6584**	**0.0000**	**2,555.2099**	**2,555.2099**	**0.6079**		**2,570.4061**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category						lb/day								lb/day		
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0440	1.6563	0.5241	7.6800e-003	0.2410	0.0108	0.2517	0.0701	0.0103	0.0804		812.5748	812.5748	4.1700e-003	0.1228	849.2843
Worker	0.5124	0.3032	4.6141	0.0141	1.4599	7.2700e-003	1.4672	0.3896	6.6900e-003	0.3963		1,440.7169	1,440.7169	0.0303	0.0317	1,450.9215
Total	**0.5564**	**1.9594**	**5.1382**	**0.0218**	**1.7009**	**0.0180**	**1.7189**	**0.4597**	**0.0170**	**0.4767**		**2,253.2916**	**2,253.2916**	**0.0344**	**0.1545**	**2,300.2058**

3.4 Building Construction - 2024

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.4716	13.4438	16.1668	0.0270		0.6133	0.6133		0.5769	0.5769		2,555.6989	2,555.6989	0.6044		2,570.8077
Total	**1.4716**	**13.4438**	**16.1668**	**0.0270**		**0.6133**	**0.6133**		**0.5769**	**0.5769**		**2,555.6989**	**2,555.6989**	**0.6044**		**2,570.8077**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0430	1.6570	0.5141	7.5600e-003	0.2575	0.0109	0.2683	0.0741	0.0104	0.0845		799.9295	799.9295	3.9900e-003	0.1208	836.0254
Worker	0.4727	0.2650	4.2497	0.0136	1.5839	6.8600e-003	1.5907	0.4200	6.3100e-003	0.4263		1,401.4963	1,401.4963	0.0269	0.0292	1,410.8578
Total	**0.5157**	**1.9220**	**4.7638**	**0.0212**	**1.8413**	**0.0177**	**1.8590**	**0.4942**	**0.0167**	**0.5109**		**2,201.4258**	**2,201.4258**	**0.0309**	**0.1500**	**2,246.8831**

3.4 Building Construction - 2024

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.4716	13.4438	16.1668	0.0270		0.6133	0.6133		0.5769	0.5769	0.0000	2,555.6989	2,555.6989	0.6044		2,570.8077
Total	**1.4716**	**13.4438**	**16.1668**	**0.0270**		**0.6133**	**0.6133**		**0.5769**	**0.5769**	**0.0000**	**2,555.6989**	**2,555.6989**	**0.6044**		**2,570.8077**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0430	1.6570	0.5141	7.5600e-003	0.2410	0.0109	0.2518	0.0701	0.0104	0.0805		799.9295	799.9295	3.9900e-003	0.1208	836.0254
Worker	0.4727	0.2650	4.2497	0.0136	1.4599	6.8600e-003	1.4668	0.3896	6.3100e-003	0.3959		1,401.4963	1,401.4963	0.0269	0.0292	1,410.8578
Total	**0.5157**	**1.9220**	**4.7638**	**0.0212**	**1.7009**	**0.0177**	**1.7186**	**0.4597**	**0.0167**	**0.4764**		**2,201.4258**	**2,201.4258**	**0.0309**	**0.1500**	**2,246.8831**

3.4 Building Construction - 2025

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.3674	12.4697	16.0847	0.0270		0.5276	0.5276		0.4963	0.4963		2,556.4744	2,556.4744	0.6010		2,571.4981
Total	**1.3674**	**12.4697**	**16.0847**	**0.0270**		**0.5276**	**0.5276**		**0.4963**	**0.4963**		**2,556.4744**	**2,556.4744**	**0.6010**		**2,571.4981**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0421	1.6513	0.5055	7.4300e-003	0.2575	0.0109	0.2683	0.0741	0.0104	0.0845		785.6838	785.6838	3.8400e-003	0.1185	821.0878
Worker	0.4389	0.2343	3.9350	0.0131	1.5839	6.5400e-003	1.5904	0.4200	6.0200e-003	0.4260		1,367.2048	1,367.2048	0.0240	0.0271	1,375.8664
Total	**0.4811**	**1.8856**	**4.4404**	**0.0206**	**1.8413**	**0.0174**	**1.8587**	**0.4942**	**0.0164**	**0.5106**		**2,152.8886**	**2,152.8886**	**0.0279**	**0.1455**	**2,196.9542**

3.4 Building Construction - 2025

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.3674	12.4697	16.0847	0.0270		0.5276	0.5276		0.4963	0.4963	0.0000	2,556.4744	2,556.4744	0.6010		2,571.4981
Total	**1.3674**	**12.4697**	**16.0847**	**0.0270**		**0.5276**	**0.5276**		**0.4963**	**0.4963**	**0.0000**	**2,556.4744**	**2,556.4744**	**0.6010**		**2,571.4981**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0421	1.6513	0.5055	7.4300e-003	0.2410	0.0109	0.2518	0.0701	0.0104	0.0805		785.6838	785.6838	3.8400e-003	0.1185	821.0878
Worker	0.4389	0.2343	3.9350	0.0131	1.4599	6.5400e-003	1.4665	0.3896	6.0200e-003	0.3956		1,367.2048	1,367.2048	0.0240	0.0271	1,375.8664
Total	**0.4811**	**1.8856**	**4.4404**	**0.0206**	**1.7009**	**0.0174**	**1.7183**	**0.4597**	**0.0164**	**0.4761**		**2,152.8886**	**2,152.8886**	**0.0279**	**0.1455**	**2,196.9542**

3.5 Paving - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.0327	10.1917	14.5842	0.0228		0.5102	0.5102		0.4694	0.4694		2,207.5841	2,207.5841	0.7140		2,225.4336
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**1.0327**	**10.1917**	**14.5842**	**0.0228**		**0.5102**	**0.5102**		**0.4694**	**0.4694**		**2,207.5841**	**2,207.5841**	**0.7140**		**2,225.4336**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0620	0.0367	0.5582	1.7000e-003	0.1916	8.8000e-004	0.1925	0.0508	8.1000e-004	0.0516		174.2803	174.2803	3.6600e-003	3.8400e-003	175.5147
Total	**0.0620**	**0.0367**	**0.5582**	**1.7000e-003**	**0.1916**	**8.8000e-004**	**0.1925**	**0.0508**	**8.1000e-004**	**0.0516**		**174.2803**	**174.2803**	**3.6600e-003**	**3.8400e-003**	**175.5147**

3.5 Paving - 2023

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.0327	10.1917	14.5842	0.0228		0.5102	0.5102		0.4694	0.4694	0.0000	2,207.5841	2,207.5841	0.7140		2,225.4336
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**1.0327**	**10.1917**	**14.5842**	**0.0228**		**0.5102**	**0.5102**		**0.4694**	**0.4694**	**0.0000**	**2,207.5841**	**2,207.5841**	**0.7140**		**2,225.4336**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0620	0.0367	0.5582	1.7000e-003	0.1766	8.8000e-004	0.1775	0.0471	8.1000e-004	0.0479		174.2803	174.2803	3.6600e-003	3.8400e-003	175.5147
Total	**0.0620**	**0.0367**	**0.5582**	**1.7000e-003**	**0.1766**	**8.8000e-004**	**0.1775**	**0.0471**	**8.1000e-004**	**0.0479**		**174.2803**	**174.2803**	**3.6600e-003**	**3.8400e-003**	**175.5147**

3.6 Architectural Coating - 2024

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	80.6844					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.1808	1.2188	1.8101	2.9700e-003		0.0609	0.0609		0.0609	0.0609		281.4481	281.4481	0.0159		281.8443
Total	**80.8652**	**1.2188**	**1.8101**	**2.9700e-003**		**0.0609**	**0.0609**		**0.0609**	**0.0609**		**281.4481**	**281.4481**	**0.0159**		**281.8443**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0953	0.0534	0.8568	2.7400e-003	0.3193	1.3800e-003	0.3207	0.0847	1.2700e-003	0.0860		282.5597	282.5597	5.4200e-003	5.8800e-003	284.4471
Total	**0.0953**	**0.0534**	**0.8568**	**2.7400e-003**	**0.3193**	**1.3800e-003**	**0.3207**	**0.0847**	**1.2700e-003**	**0.0860**		**282.5597**	**282.5597**	**5.4200e-003**	**5.8800e-003**	**284.4471**

3.6 Architectural Coating - 2024

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	80.6844					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.1808	1.2188	1.8101	2.9700e-003		0.0609	0.0609		0.0609	0.0609	0.0000	281.4481	281.4481	0.0159		281.8443
Total	**80.8652**	**1.2188**	**1.8101**	**2.9700e-003**		**0.0609**	**0.0609**		**0.0609**	**0.0609**	**0.0000**	**281.4481**	**281.4481**	**0.0159**		**281.8443**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0953	0.0534	0.8568	2.7400e-003	0.2943	1.3800e-003	0.2957	0.0786	1.2700e-003	0.0798		282.5597	282.5597	5.4200e-003	5.8800e-003	284.4471
Total	**0.0953**	**0.0534**	**0.8568**	**2.7400e-003**	**0.2943**	**1.3800e-003**	**0.2957**	**0.0786**	**1.2700e-003**	**0.0798**		**282.5597**	**282.5597**	**5.4200e-003**	**5.8800e-003**	**284.4471**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

Increase Density

Improve Pedestrian Network

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	4.8593	5.4458	36.5444	0.0844	8.5229	0.0661	8.5891	2.2731	0.0619	2.3351		8,805.245 8	8,805.245 8	0.4543	0.4311	8,945.072 1
Unmitigated	4.8636	5.4572	36.6244	0.0847	8.5473	0.0663	8.6136	2.2796	0.0621	2.3417		8,829.506 1	8,829.506 1	0.4551	0.4320	8,969.624 2

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Single Family Housing	1,883.32	1,883.32	1883.32	4,047,960	4,036,423
City Park	0.00	0.00	0.00		
Total	1,883.32	1,883.32	1,883.32	4,047,960	4,036,423

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Single Family Housing	6.65	6.65	6.65	45.60	19.00	35.40	86	11	3
City Park	14.70	6.60	6.60	33.00	48.00	19.00	66	28	6

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Single Family Housing	0.541920	0.052620	0.169871	0.146633	0.025153	0.006100	0.012627	0.016953	0.000467	0.000322	0.022878	0.001103	0.003353
City Park	0.541920	0.052620	0.169871	0.146633	0.025153	0.006100	0.012627	0.016953	0.000467	0.000322	0.022878	0.001103	0.003353

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
NaturalGas Mitigated	0.1377	1.1768	0.5008	7.5100e-003		0.0951	0.0951		0.0951	0.0951		1,502.2677	1,502.2677	0.0288	0.0275	1,511.1949
NaturalGas Unmitigated	0.1377	1.1768	0.5008	7.5100e-003		0.0951	0.0951		0.0951	0.0951		1,502.2677	1,502.2677	0.0288	0.0275	1,511.1949

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
City Park	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Single Family Housing	12769.3	0.1377	1.1768	0.5008	7.5100e-003		0.0951	0.0951		0.0951	0.0951		1,502.2677	1,502.2677	0.0288	0.0275	1,511.1949
Total		**0.1377**	**1.1768**	**0.5008**	**7.5100e-003**		**0.0951**	**0.0951**		**0.0951**	**0.0951**		**1,502.2677**	**1,502.2677**	**0.0288**	**0.0275**	**1,511.1949**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
City Park	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Single Family Housing	12.7693	0.1377	1.1768	0.5008	7.5100e-003		0.0951	0.0951		0.0951	0.0951		1,502.2677	1,502.2677	0.0288	0.0275	1,511.1949
Total		**0.1377**	**1.1768**	**0.5008**	**7.5100e-003**		**0.0951**	**0.0951**		**0.0951**	**0.0951**		**1,502.2677**	**1,502.2677**	**0.0288**	**0.0275**	**1,511.1949**

6.0 Area Detail

6.1 Mitigation Measures Area

Use Low VOC Paint - Residential Interior

Use Low VOC Paint - Residential Exterior

Use Low VOC Paint - Non-Residential Interior

Use Low VOC Paint - Non-Residential Exterior

Use only Natural Gas Hearths

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	10.1166	1.9844	17.0025	0.0123		0.2354	0.2354		0.2354	0.2354	0.0000	2,323.7360	2,323.7360	0.0720	0.0421	2,338.0716
Unmitigated	29.3912	4.9299	197.5654	0.6014		29.6910	29.6910		29.6910	29.6910	4,347.6480	2,323.7360	6,671.3840	20.3964	0.0421	7,193.8288

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	1.2158					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	7.5950					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Hearth	20.0929	4.7429	181.3277	0.6006		29.6009	29.6009		29.6009	29.6009	4,347.6480	2,294.4706	6,642.1186	20.3684	0.0421	7,163.8628
Landscaping	0.4876	0.1870	16.2377	8.6000e-004		0.0901	0.0901		0.0901	0.0901		29.2654	29.2654	0.0280		29.9661
Total	**29.3912**	**4.9299**	**197.5654**	**0.6014**		**29.6910**	**29.6910**		**29.6910**	**29.6910**	**4,347.6480**	**2,323.7360**	**6,671.3840**	**20.3964**	**0.0421**	**7,193.8289**

6.2 Area by SubCategory

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	1.8237					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	7.5950					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Hearth	0.2103	1.7973	0.7648	0.0115		0.1453	0.1453		0.1453	0.1453	0.0000	2,294.4706	2,294.4706	0.0440	0.0421	2,308.1055
Landscaping	0.4876	0.1870	16.2377	8.6000e-004		0.0901	0.0901		0.0901	0.0901		29.2654	29.2654	0.0280		29.9661
Total	**10.1166**	**1.9844**	**17.0025**	**0.0123**		**0.2354**	**0.2354**		**0.2354**	**0.2354**	**0.0000**	**2,323.7360**	**2,323.7360**	**0.0720**	**0.0421**	**2,338.0716**

7.0 Water Detail

7.1 Mitigation Measures Water

Install Low Flow Bathroom Faucet

Install Low Flow Kitchen Faucet

Install Low Flow Toilet

Install Low Flow Shower

Use Water Efficient Irrigation System

8.0 Waste Detail

8.1 Mitigation Measures Waste

9.0 Operational Offroad

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

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

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

Boilers

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

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

DUTRA PROPERTY SUBDIVISION PROJECT

San Joaquin County, Winter

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Single Family Housing	197.00	Dwelling Unit	31.68	354,600.00	612
City Park	2.92	Acre	2.92	127,195.20	0

1.2 Other Project Characteristics

Urbanization	Rural	**Wind Speed (m/s)**	2.7	**Precipitation Freq (Days)**	51
Climate Zone	2			**Operational Year**	2025
Utility Company	Pacific Gas and Electric Company				
CO2 Intensity (lb/MWhr)	203.98	**CH4 Intensity (lb/MWhr)**	0.033	**N2O Intensity (lb/MWhr)**	0.004

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - Actual acreage

Construction Phase - No demolition/vacant land. Site is flat.

Grading - Actual acreage, site will not require import/export, balanced on site.

Architectural Coating - Per rule 4601.

Vehicle Trips - Trip rates per ITE 210 (Kittelson report 2022)

Area Coating - 100 b/L for interior coating limitations provided per rule 4601.

Land Use Change - Assume 90% cropland and 10% grassland existing vegetation land use

Sequestration -

Construction Off-road Equipment Mitigation - Per SJVACPD requirements/rules for dust prohibition.

Mobile Land Use Mitigation -

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Area Mitigation - Per SJVAPCD rules.

Water Mitigation -

Operational Off-Road Equipment -

Stationary Sources - Emergency Generators and Fire Pumps -

Off-road Equipment -

Off-road Equipment -

Off-road Equipment -

Table Name	Column Name	Default Value	New Value
tblArchitecturalCoating	EF_Nonresidential_Exterior	150.00	100.00
tblArchitecturalCoating	EF_Nonresidential_Interior	150.00	100.00
tblArchitecturalCoating	EF_Residential_Exterior	150.00	100.00
tblArchitecturalCoating	EF_Residential_Interior	150.00	100.00
tblAreaCoating	Area_EF_Nonresidential_Exterior	150	100
tblAreaCoating	Area_EF_Nonresidential_Interior	150	100
tblAreaCoating	Area_EF_Residential_Exterior	150	100
tblAreaCoating	Area_EF_Residential_Interior	150	100
tblAreaMitigation	UseLowVOCPaintNonresidentialExteriorValue	100	150
tblAreaMitigation	UseLowVOCPaintNonresidentialInteriorValue	100	150
tblAreaMitigation	UseLowVOCPaintResidentialExteriorValue	100	150
tblAreaMitigation	UseLowVOCPaintResidentialInteriorValue	100	150
tblConstDustMitigation	CleanPavedRoadPercentReduction	0	9
tblConstDustMitigation	WaterUnpavedRoadVehicleSpeed	0	5
tblConstructionPhase	PhaseEndDate	2/11/2026	3/24/2023
tblConstructionPhase	PhaseEndDate	4/29/2026	3/15/2024
tblConstructionPhase	PhaseStartDate	11/27/2025	1/9/2023
tblConstructionPhase	PhaseStartDate	2/12/2026	1/1/2024
tblLandUse	LotAcreage	63.96	31.68

tblLandUseChange	CO2peracre	6.20	4.31
tblProjectCharacteristics	UrbanizationLevel	Urban	Rural
tblVehicleTrips	HO_TL	7.90	6.65
tblVehicleTrips	HS_TL	7.10	6.65
tblVehicleTrips	HW_TL	16.80	6.65
tblVehicleTrips	ST_TR	9.54	9.56
tblVehicleTrips	ST_TR	1.96	0.00
tblVehicleTrips	SU_TR	8.55	9.56
tblVehicleTrips	SU_TR	2.19	0.00
tblVehicleTrips	WD_TR	9.44	9.56
tblVehicleTrips	WD_TR	0.78	0.00
tblWoodstoves	NumberCatalytic	31.68	40.00
tblWoodstoves	NumberNoncatalytic	31.68	40.00

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2022	3.7133	38.9117	29.7445	0.0642	19.8869	1.6361	21.5006	10.1634	1.5052	11.6480	0.0000	6,226.8688	6,226.8688	1.9501	6.3600e-003	6,277.5181
2023	4.4972	44.8109	43.7584	0.0885	9.6507	1.9367	11.5874	3.7723	1.7818	5.5541	0.0000	8,586.1809	8,586.1809	2.6674	0.1636	8,655.8972
2024	82.9401	16.8196	22.9272	0.0522	2.1606	0.6934	2.8540	0.5788	0.6558	1.2347	0.0000	5,159.5575	5,159.5575	0.6591	0.1609	5,223.9923
2025	1.8436	14.5186	20.0225	0.0463	1.8413	0.5450	2.3863	0.4942	0.5127	1.0069	0.0000	4,578.8364	4,578.8364	0.6308	0.1495	4,639.1652
Maximum	**82.9401**	**44.8109**	**43.7584**	**0.0885**	**19.8869**	**1.9367**	**21.5006**	**10.1634**	**1.7818**	**11.6480**	**0.0000**	**8,586.1809**	**8,586.1809**	**2.6674**	**0.1636**	**8,655.8972**

2.1 Overall Construction (Maximum Daily Emission)

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2022	3.7133	38.9117	29.7445	0.0642	9.0576	1.6361	10.6713	4.6027	1.5052	6.0873	0.0000	6,226.868 8	6,226.868 8	1.9501	6.3600e-003	6,277.518 1
2023	4.4972	44.8109	43.7584	0.0885	4.5537	1.9367	6.4904	1.7542	1.7818	3.5360	0.0000	8,586.180 9	8,586.180 9	2.6674	0.1636	8,655.897 2
2024	82.9401	16.8196	22.9272	0.0522	1.9952	0.6934	2.6886	0.5382	0.6558	1.1941	0.0000	5,159.557 5	5,159.557 5	0.6591	0.1609	5,223.992 3
2025	1.8436	14.5186	20.0225	0.0463	1.7009	0.5450	2.2459	0.4597	0.5127	0.9724	0.0000	4,578.836 4	4,578.836 4	0.6308	0.1495	4,639.165 2
Maximum	**82.9401**	**44.8109**	**43.7584**	**0.0885**	**9.0576**	**1.9367**	**10.6713**	**4.6027**	**1.7818**	**6.0873**	**0.0000**	**8,586.180 9**	**8,586.180 9**	**2.6674**	**0.1636**	**8,655.897 2**

	ROG	**NOx**	**CO**	**SO2**	**Fugitive PM10**	**Exhaust PM10**	**PM10 Total**	**Fugitive PM2.5**	**Exhaust PM2.5**	**PM2.5 Total**	**Bio- CO2**	**NBio-CO2**	**Total CO2**	**CH4**	**N20**	**CO2e**
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**48.40**	**0.00**	**42.35**	**51.00**	**0.00**	**39.36**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	29.3912	4.9299	197.5654	0.6014		29.6910	29.6910		29.6910	29.6910	4,347.6480	2,323.7360	6,671.3840	20.3964	0.0421	7,193.8288
Energy	0.1377	1.1768	0.5008	7.5100e-003		0.0951	0.0951		0.0951	0.0951		1,502.2677	1,502.2677	0.0288	0.0275	1,511.1949
Mobile	3.9398	6.1689	37.8989	0.0786	8.5473	0.0663	8.6136	2.2796	0.0621	2.3418		8,197.9781	8,197.9781	0.5232	0.4653	8,349.7142
Total	**33.4687**	**12.2756**	**235.9650**	**0.6875**	**8.5473**	**29.8525**	**38.3998**	**2.2796**	**29.8483**	**32.1279**	**4,347.6480**	**12,023.9818**	**16,371.6298**	**20.9484**	**0.5349**	**17,054.7379**

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	10.1166	1.9844	17.0025	0.0123		0.2354	0.2354		0.2354	0.2354	0.0000	2,323.7360	2,323.7360	0.0720	0.0421	2,338.0716
Energy	0.1377	1.1768	0.5008	7.5100e-003		0.0951	0.0951		0.0951	0.0951		1,502.2677	1,502.2677	0.0288	0.0275	1,511.1949
Mobile	3.9354	6.1561	37.8261	0.0784	8.5229	0.0662	8.5891	2.2731	0.0620	2.3351		8,175.5455	8,175.5455	0.5224	0.4643	8,326.9732
Total	**14.1896**	**9.3173**	**55.3293**	**0.0982**	**8.5229**	**0.3967**	**8.9197**	**2.2731**	**0.3925**	**2.6657**	**0.0000**	**12,001.5493**	**12,001.5493**	**0.6232**	**0.5339**	**12,176.2397**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	57.60	24.10	76.55	85.72	0.29	98.67	76.77	0.28	98.68	91.70	100.00	0.19	26.69	97.02	0.18	28.60

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Site Preparation	Site Preparation	9/1/2022	10/12/2022	5	30	
2	Grading	Grading	10/13/2022	1/25/2023	5	75	
3	Building Construction	Building Construction	1/26/2023	11/26/2025	5	740	
4	Paving	Paving	1/9/2023	3/24/2023	5	55	
5	Architectural Coating	Architectural Coating	1/1/2024	3/15/2024	5	55	

Acres of Grading (Site Preparation Phase): 45

Acres of Grading (Grading Phase): 225

Acres of Paving: 0

Residential Indoor: 718,065; Residential Outdoor: 239,355; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Site Preparation	Rubber Tired Dozers	3	8.00	247	0.40
Site Preparation	Tractors/Loaders/Backhoes	4	8.00	97	0.37
Grading	Excavators	2	8.00	158	0.38
Grading	Graders	1	8.00	187	0.41
Grading	Rubber Tired Dozers	1	8.00	247	0.40
Grading	Scrapers	2	8.00	367	0.48

Grading	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Building Construction	Cranes	1	7.00	231	0.29
Building Construction	Forklifts	3	8.00	89	0.20
Building Construction	Generator Sets	1	8.00	84	0.74
Building Construction	Tractors/Loaders/Backhoes	3	7.00	97	0.37
Building Construction	Welders	1	8.00	46	0.45
Paving	Pavers	2	8.00	130	0.42
Paving	Paving Equipment	2	8.00	132	0.36
Paving	Rollers	2	8.00	80	0.38
Architectural Coating	Air Compressors	1	6.00	78	0.48

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Site Preparation	7	18.00	0.00	0.00	16.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT
Grading	8	20.00	0.00	0.00	16.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	9	124.00	42.00	0.00	16.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT
Paving	6	15.00	0.00	0.00	16.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	25.00	0.00	0.00	16.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Use Soil Stabilizer

Water Exposed Area

Reduce Vehicle Speed on Unpaved Roads

Clean Paved Roads

3.2 Site Preparation - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					19.6570	0.0000	19.6570	10.1025	0.0000	10.1025			0.0000			0.0000
Off-Road	3.1701	33.0835	19.6978	0.0380		1.6126	1.6126		1.4836	1.4836		3,686.0619	3,686.0619	1.1922		3,715.8655
Total	**3.1701**	**33.0835**	**19.6978**	**0.0380**	**19.6570**	**1.6126**	**21.2696**	**10.1025**	**1.4836**	**11.5860**		**3,686.0619**	**3,686.0619**	**1.1922**		**3,715.8655**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0796	0.0614	0.6327	1.9100e-003	0.2299	1.1200e-003	0.2310	0.0610	1.0300e-003	0.0620		193.9124	193.9124	5.3200e-003	5.7300e-003	195.7520
Total	**0.0796**	**0.0614**	**0.6327**	**1.9100e-003**	**0.2299**	**1.1200e-003**	**0.2310**	**0.0610**	**1.0300e-003**	**0.0620**		**193.9124**	**193.9124**	**5.3200e-003**	**5.7300e-003**	**195.7520**

3.2 Site Preparation - 2022

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					8.8457	0.0000	8.8457	4.5461	0.0000	4.5461			0.0000			0.0000
Off-Road	3.1701	33.0835	19.6978	0.0380		1.6126	1.6126		1.4836	1.4836	0.0000	3,686.0619	3,686.0619	1.1922		3,715.8655
Total	**3.1701**	**33.0835**	**19.6978**	**0.0380**	**8.8457**	**1.6126**	**10.4582**	**4.5461**	**1.4836**	**6.0297**	**0.0000**	**3,686.0619**	**3,686.0619**	**1.1922**		**3,715.8655**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0796	0.0614	0.6327	1.9100e-003	0.2119	1.1200e-003	0.2130	0.0566	1.0300e-003	0.0576		193.9124	193.9124	5.3200e-003	5.7300e-003	195.7520
Total	**0.0796**	**0.0614**	**0.6327**	**1.9100e-003**	**0.2119**	**1.1200e-003**	**0.2130**	**0.0566**	**1.0300e-003**	**0.0576**		**193.9124**	**193.9124**	**5.3200e-003**	**5.7300e-003**	**195.7520**

3.3 Grading - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					9.2036	0.0000	9.2036	3.6538	0.0000	3.6538			0.0000			0.0000
Off-Road	3.6248	38.8435	29.0415	0.0621		1.6349	1.6349		1.5041	1.5041		6,011.4105	6,011.4105	1.9442		6,060.0158
Total	**3.6248**	**38.8435**	**29.0415**	**0.0621**	**9.2036**	**1.6349**	**10.8385**	**3.6538**	**1.5041**	**5.1579**		**6,011.4105**	**6,011.4105**	**1.9442**		**6,060.0158**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0885	0.0683	0.7030	2.1200e-003	0.2555	1.2400e-003	0.2567	0.0678	1.1400e-003	0.0689		215.4582	215.4582	5.9100e-003	6.3600e-003	217.5022
Total	**0.0885**	**0.0683**	**0.7030**	**2.1200e-003**	**0.2555**	**1.2400e-003**	**0.2567**	**0.0678**	**1.1400e-003**	**0.0689**		**215.4582**	**215.4582**	**5.9100e-003**	**6.3600e-003**	**217.5022**

3.3 Grading - 2022

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					4.1416	0.0000	4.1416	1.6442	0.0000	1.6442			0.0000			0.0000
Off-Road	3.6248	38.8435	29.0415	0.0621		1.6349	1.6349		1.5041	1.5041	0.0000	6,011.4105	6,011.4105	1.9442		6,060.0158
Total	**3.6248**	**38.8435**	**29.0415**	**0.0621**	**4.1416**	**1.6349**	**5.7765**	**1.6442**	**1.5041**	**3.1483**	**0.0000**	**6,011.4105**	**6,011.4105**	**1.9442**		**6,060.0158**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0885	0.0683	0.7030	2.1200e-003	0.2355	1.2400e-003	0.2367	0.0628	1.1400e-003	0.0640		215.4582	215.4582	5.9100e-003	6.3600e-003	217.5022
Total	**0.0885**	**0.0683**	**0.7030**	**2.1200e-003**	**0.2355**	**1.2400e-003**	**0.2367**	**0.0628**	**1.1400e-003**	**0.0640**		**215.4582**	**215.4582**	**5.9100e-003**	**6.3600e-003**	**217.5022**

3.3 Grading - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					9.2036	0.0000	9.2036	3.6538	0.0000	3.6538			0.0000			0.0000
Off-Road	3.3217	34.5156	28.0512	0.0621		1.4245	1.4245		1.3105	1.3105		6,011.4777	6,011.4777	1.9442		6,060.0836
Total	**3.3217**	**34.5156**	**28.0512**	**0.0621**	**9.2036**	**1.4245**	**10.6281**	**3.6538**	**1.3105**	**4.9643**		**6,011.4777**	**6,011.4777**	**1.9442**		**6,060.0836**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0816	0.0592	0.6417	2.0500e-003	0.2555	1.1700e-003	0.2566	0.0678	1.0800e-003	0.0688		209.7823	209.7823	5.2600e-003	5.8100e-003	211.6457
Total	**0.0816**	**0.0592**	**0.6417**	**2.0500e-003**	**0.2555**	**1.1700e-003**	**0.2566**	**0.0678**	**1.0800e-003**	**0.0688**		**209.7823**	**209.7823**	**5.2600e-003**	**5.8100e-003**	**211.6457**

3.3 Grading - 2023

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					4.1416	0.0000	4.1416	1.6442	0.0000	1.6442			0.0000			0.0000
Off-Road	3.3217	34.5156	28.0512	0.0621		1.4245	1.4245		1.3105	1.3105	0.0000	6,011.4777	6,011.4777	1.9442		6,060.0836
Total	**3.3217**	**34.5156**	**28.0512**	**0.0621**	**4.1416**	**1.4245**	**5.5661**	**1.6442**	**1.3105**	**2.9547**	**0.0000**	**6,011.4777**	**6,011.4777**	**1.9442**		**6,060.0836**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0816	0.0592	0.6417	2.0500e-003	0.2355	1.1700e-003	0.2366	0.0628	1.0800e-003	0.0639		209.7823	209.7823	5.2600e-003	5.8100e-003	211.6457
Total	**0.0816**	**0.0592**	**0.6417**	**2.0500e-003**	**0.2355**	**1.1700e-003**	**0.2366**	**0.0628**	**1.0800e-003**	**0.0639**		**209.7823**	**209.7823**	**5.2600e-003**	**5.8100e-003**	**211.6457**

3.4 Building Construction - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.5728	14.3849	16.2440	0.0269		0.6997	0.6997		0.6584	0.6584		2,555.2099	2,555.2099	0.6079		2,570.4061
Total	**1.5728**	**14.3849**	**16.2440**	**0.0269**		**0.6997**	**0.6997**		**0.6584**	**0.6584**		**2,555.2099**	**2,555.2099**	**0.6079**		**2,570.4061**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0413	1.7708	0.5426	7.7000e-003	0.2574	0.0108	0.2682	0.0741	0.0103	0.0845		814.2721	814.2721	4.0400e-003	0.1232	851.0843
Worker	0.5057	0.3672	3.9787	0.0127	1.5839	7.2700e-003	1.5911	0.4200	6.6900e-003	0.4267		1,300.6503	1,300.6503	0.0326	0.0360	1,312.2035
Total	**0.5470**	**2.1380**	**4.5213**	**0.0204**	**1.8413**	**0.0181**	**1.8594**	**0.4942**	**0.0170**	**0.5112**		**2,114.9224**	**2,114.9224**	**0.0367**	**0.1592**	**2,163.2878**

3.4 Building Construction - 2023

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.5728	14.3849	16.2440	0.0269		0.6997	0.6997		0.6584	0.6584	0.0000	2,555.2099	2,555.2099	0.6079		2,570.4061
Total	**1.5728**	**14.3849**	**16.2440**	**0.0269**		**0.6997**	**0.6997**		**0.6584**	**0.6584**	**0.0000**	**2,555.2099**	**2,555.2099**	**0.6079**		**2,570.4061**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0413	1.7708	0.5426	7.7000e-003	0.2410	0.0108	0.2517	0.0701	0.0103	0.0804		814.2721	814.2721	4.0400e-003	0.1232	851.0843
Worker	0.5057	0.3672	3.9787	0.0127	1.4599	7.2700e-003	1.4672	0.3896	6.6900e-003	0.3963		1,300.6503	1,300.6503	0.0326	0.0360	1,312.2035
Total	**0.5470**	**2.1380**	**4.5213**	**0.0204**	**1.7009**	**0.0181**	**1.7189**	**0.4597**	**0.0170**	**0.4767**		**2,114.9224**	**2,114.9224**	**0.0367**	**0.1592**	**2,163.2878**

3.4 Building Construction - 2024

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.4716	13.4438	16.1668	0.0270		0.6133	0.6133		0.5769	0.5769		2,555.6989	2,555.6989	0.6044		2,570.8077
Total	**1.4716**	**13.4438**	**16.1668**	**0.0270**		**0.6133**	**0.6133**		**0.5769**	**0.5769**		**2,555.6989**	**2,555.6989**	**0.6044**		**2,570.8077**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0403	1.7715	0.5325	7.5800e-003	0.2575	0.0109	0.2683	0.0741	0.0104	0.0846		801.6111	801.6111	3.8700e-003	0.1211	837.8066
Worker	0.4686	0.3209	3.6766	0.0123	1.5839	6.8600e-003	1.5907	0.4200	6.3100e-003	0.4263		1,265.6318	1,265.6318	0.0292	0.0331	1,276.2295
Total	**0.5089**	**2.0924**	**4.2090**	**0.0199**	**1.8413**	**0.0177**	**1.8591**	**0.4942**	**0.0167**	**0.5109**		**2,067.2429**	**2,067.2429**	**0.0330**	**0.1543**	**2,114.0361**

3.4 Building Construction - 2024

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.4716	13.4438	16.1668	0.0270		0.6133	0.6133		0.5769	0.5769	0.0000	2,555.6989	2,555.6989	0.6044		2,570.8077
Total	**1.4716**	**13.4438**	**16.1668**	**0.0270**		**0.6133**	**0.6133**		**0.5769**	**0.5769**	**0.0000**	**2,555.6989**	**2,555.6989**	**0.6044**		**2,570.8077**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0403	1.7715	0.5325	7.5800e-003	0.2410	0.0109	0.2518	0.0701	0.0104	0.0805		801.6111	801.6111	3.8700e-003	0.1211	837.8066
Worker	0.4686	0.3209	3.6766	0.0123	1.4599	6.8600e-003	1.4668	0.3896	6.3100e-003	0.3959		1,265.6318	1,265.6318	0.0292	0.0331	1,276.2295
Total	**0.5089**	**2.0924**	**4.2090**	**0.0199**	**1.7009**	**0.0177**	**1.7186**	**0.4597**	**0.0167**	**0.4764**		**2,067.2429**	**2,067.2429**	**0.0330**	**0.1543**	**2,114.0361**

3.4 Building Construction - 2025

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.3674	12.4697	16.0847	0.0270		0.5276	0.5276		0.4963	0.4963		2,556.4744	2,556.4744	0.6010		2,571.4981
Total	**1.3674**	**12.4697**	**16.0847**	**0.0270**		**0.5276**	**0.5276**		**0.4963**	**0.4963**		**2,556.4744**	**2,556.4744**	**0.6010**		**2,571.4981**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0394	1.7653	0.5237	7.4400e-003	0.2575	0.0109	0.2683	0.0741	0.0104	0.0846		787.3435	787.3435	3.7200e-003	0.1188	822.8443
Worker	0.4368	0.2836	3.4141	0.0119	1.5839	6.5400e-003	1.5904	0.4200	6.0200e-003	0.4260		1,235.0185	1,235.0185	0.0262	0.0307	1,244.8228
Total	**0.4762**	**2.0489**	**3.9378**	**0.0193**	**1.8413**	**0.0174**	**1.8587**	**0.4942**	**0.0164**	**0.5106**		**2,022.3620**	**2,022.3620**	**0.0299**	**0.1495**	**2,067.6672**

3.4 Building Construction - 2025

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.3674	12.4697	16.0847	0.0270		0.5276	0.5276		0.4963	0.4963	0.0000	2,556.4744	2,556.4744	0.6010		2,571.4981
Total	**1.3674**	**12.4697**	**16.0847**	**0.0270**		**0.5276**	**0.5276**		**0.4963**	**0.4963**	**0.0000**	**2,556.4744**	**2,556.4744**	**0.6010**		**2,571.4981**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0394	1.7653	0.5237	7.4400e-003	0.2410	0.0109	0.2518	0.0701	0.0104	0.0805		787.3435	787.3435	3.7200e-003	0.1188	822.8443
Worker	0.4368	0.2836	3.4141	0.0119	1.4599	6.5400e-003	1.4665	0.3896	6.0200e-003	0.3956		1,235.0185	1,235.0185	0.0262	0.0307	1,244.8228
Total	**0.4762**	**2.0489**	**3.9378**	**0.0193**	**1.7009**	**0.0174**	**1.7183**	**0.4597**	**0.0164**	**0.4761**		**2,022.3620**	**2,022.3620**	**0.0299**	**0.1495**	**2,067.6672**

3.5 Paving - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.0327	10.1917	14.5842	0.0228		0.5102	0.5102		0.4694	0.4694		2,207.5841	2,207.5841	0.7140		2,225.4336
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**1.0327**	**10.1917**	**14.5842**	**0.0228**		**0.5102**	**0.5102**		**0.4694**	**0.4694**		**2,207.5841**	**2,207.5841**	**0.7140**		**2,225.4336**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0612	0.0444	0.4813	1.5400e-003	0.1916	8.8000e-004	0.1925	0.0508	8.1000e-004	0.0516		157.3367	157.3367	3.9500e-003	4.3600e-003	158.7343
Total	**0.0612**	**0.0444**	**0.4813**	**1.5400e-003**	**0.1916**	**8.8000e-004**	**0.1925**	**0.0508**	**8.1000e-004**	**0.0516**		**157.3367**	**157.3367**	**3.9500e-003**	**4.3600e-003**	**158.7343**

3.5 Paving - 2023

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.0327	10.1917	14.5842	0.0228		0.5102	0.5102		0.4694	0.4694	0.0000	2,207.5841	2,207.5841	0.7140		2,225.4336
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**1.0327**	**10.1917**	**14.5842**	**0.0228**		**0.5102**	**0.5102**		**0.4694**	**0.4694**	**0.0000**	**2,207.5841**	**2,207.5841**	**0.7140**		**2,225.4336**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0612	0.0444	0.4813	1.5400e-003	0.1766	8.8000e-004	0.1775	0.0471	8.1000e-004	0.0479		157.3367	157.3367	3.9500e-003	4.3600e-003	158.7343
Total	**0.0612**	**0.0444**	**0.4813**	**1.5400e-003**	**0.1766**	**8.8000e-004**	**0.1775**	**0.0471**	**8.1000e-004**	**0.0479**		**157.3367**	**157.3367**	**3.9500e-003**	**4.3600e-003**	**158.7343**

3.6 Architectural Coating - 2024

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	80.6844					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.1808	1.2188	1.8101	2.9700e-003		0.0609	0.0609		0.0609	0.0609		281.4481	281.4481	0.0159		281.8443
Total	**80.8652**	**1.2188**	**1.8101**	**2.9700e-003**		**0.0609**	**0.0609**		**0.0609**	**0.0609**		**281.4481**	**281.4481**	**0.0159**		**281.8443**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0945	0.0647	0.7412	2.4700e-003	0.3193	1.3800e-003	0.3207	0.0847	1.2700e-003	0.0860		255.1677	255.1677	5.8800e-003	6.6800e-003	257.3043
Total	**0.0945**	**0.0647**	**0.7412**	**2.4700e-003**	**0.3193**	**1.3800e-003**	**0.3207**	**0.0847**	**1.2700e-003**	**0.0860**		**255.1677**	**255.1677**	**5.8800e-003**	**6.6800e-003**	**257.3043**

3.6 Architectural Coating - 2024

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	80.6844					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.1808	1.2188	1.8101	2.9700e-003		0.0609	0.0609		0.0609	0.0609	0.0000	281.4481	281.4481	0.0159		281.8443
Total	**80.8652**	**1.2188**	**1.8101**	**2.9700e-003**		**0.0609**	**0.0609**		**0.0609**	**0.0609**	**0.0000**	**281.4481**	**281.4481**	**0.0159**		**281.8443**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0945	0.0647	0.7412	2.4700e-003	0.2943	1.3800e-003	0.2957	0.0786	1.2700e-003	0.0798		255.1677	255.1677	5.8800e-003	6.6800e-003	257.3043
Total	**0.0945**	**0.0647**	**0.7412**	**2.4700e-003**	**0.2943**	**1.3800e-003**	**0.2957**	**0.0786**	**1.2700e-003**	**0.0798**		**255.1677**	**255.1677**	**5.8800e-003**	**6.6800e-003**	**257.3043**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

Increase Density

Improve Pedestrian Network

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	3.9354	6.1561	37.8261	0.0784	8.5229	0.0662	8.5891	2.2731	0.0620	2.3351		8,175.545 5	8,175.545 5	0.5224	0.4643	8,326.973 2
Unmitigated	3.9398	6.1689	37.8989	0.0786	8.5473	0.0663	8.6136	2.2796	0.0621	2.3418		8,197.978 1	8,197.978 1	0.5232	0.4653	8,349.714 2

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Single Family Housing	1,883.32	1,883.32	1883.32	4,047,960	4,036,423
City Park	0.00	0.00	0.00		
Total	1,883.32	1,883.32	1,883.32	4,047,960	4,036,423

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Single Family Housing	6.65	6.65	6.65	45.60	19.00	35.40	86	11	3
City Park	14.70	6.60	6.60	33.00	48.00	19.00	66	28	6

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Single Family Housing	0.541920	0.052620	0.169871	0.146633	0.025153	0.006100	0.012627	0.016953	0.000467	0.000322	0.022878	0.001103	0.003353
City Park	0.541920	0.052620	0.169871	0.146633	0.025153	0.006100	0.012627	0.016953	0.000467	0.000322	0.022878	0.001103	0.003353

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
NaturalGas Mitigated	0.1377	1.1768	0.5008	7.5100e-003		0.0951	0.0951		0.0951	0.0951		1,502.2677	1,502.2677	0.0288	0.0275	1,511.1949
NaturalGas Unmitigated	0.1377	1.1768	0.5008	7.5100e-003		0.0951	0.0951		0.0951	0.0951		1,502.2677	1,502.2677	0.0288	0.0275	1,511.1949

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
City Park	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Single Family Housing	12769.3	0.1377	1.1768	0.5008	7.5100e-003		0.0951	0.0951		0.0951	0.0951		1,502.2677	1,502.2677	0.0288	0.0275	1,511.1949
Total		**0.1377**	**1.1768**	**0.5008**	**7.5100e-003**		**0.0951**	**0.0951**		**0.0951**	**0.0951**		**1,502.2677**	**1,502.2677**	**0.0288**	**0.0275**	**1,511.1949**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
City Park	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Single Family Housing	12.7693	0.1377	1.1768	0.5008	7.5100e-003		0.0951	0.0951		0.0951	0.0951		1,502.2677	1,502.2677	0.0288	0.0275	1,511.1949
Total		**0.1377**	**1.1768**	**0.5008**	**7.5100e-003**		**0.0951**	**0.0951**		**0.0951**	**0.0951**		**1,502.2677**	**1,502.2677**	**0.0288**	**0.0275**	**1,511.1949**

6.0 Area Detail

6.1 Mitigation Measures Area

Use Low VOC Paint - Residential Interior

Use Low VOC Paint - Residential Exterior

Use Low VOC Paint - Non-Residential Interior

Use Low VOC Paint - Non-Residential Exterior

Use only Natural Gas Hearths

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	10.1166	1.9844	17.0025	0.0123		0.2354	0.2354		0.2354	0.2354	0.0000	2,323.7360	2,323.7360	0.0720	0.0421	2,338.0716
Unmitigated	29.3912	4.9299	197.5654	0.6014		29.6910	29.6910		29.6910	29.6910	4,347.6480	2,323.7360	6,671.3840	20.3964	0.0421	7,193.8288

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	1.2158					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	7.5950					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Hearth	20.0929	4.7429	181.3277	0.6006		29.6009	29.6009		29.6009	29.6009	4,347.6480	2,294.4706	6,642.1186	20.3684	0.0421	7,163.8628
Landscaping	0.4876	0.1870	16.2377	8.6000e-004		0.0901	0.0901		0.0901	0.0901		29.2654	29.2654	0.0280		29.9661
Total	**29.3912**	**4.9299**	**197.5654**	**0.6014**		**29.6910**	**29.6910**		**29.6910**	**29.6910**	**4,347.6480**	**2,323.7360**	**6,671.3840**	**20.3964**	**0.0421**	**7,193.8289**

6.2 Area by SubCategory

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	1.8237					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	7.5950					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Hearth	0.2103	1.7973	0.7648	0.0115		0.1453	0.1453		0.1453	0.1453	0.0000	2,294.4706	2,294.4706	0.0440	0.0421	2,308.1055
Landscaping	0.4876	0.1870	16.2377	8.6000e-004		0.0901	0.0901		0.0901	0.0901		29.2654	29.2654	0.0280		29.9661
Total	**10.1166**	**1.9844**	**17.0025**	**0.0123**		**0.2354**	**0.2354**		**0.2354**	**0.2354**	**0.0000**	**2,323.7360**	**2,323.7360**	**0.0720**	**0.0421**	**2,338.0716**

7.0 Water Detail

7.1 Mitigation Measures Water

Install Low Flow Bathroom Faucet

Install Low Flow Kitchen Faucet

Install Low Flow Toilet

Install Low Flow Shower

Use Water Efficient Irrigation System

8.0 Waste Detail

8.1 Mitigation Measures Waste

9.0 Operational Offroad

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

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

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

Boilers

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

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

Source: EMFAC2021 (v1.0.1) Emissions Inventory
Region Type: County
Region: San Joaquin
Calendar Year: 2022, 2025
Season: Annual
Vehicle Classification: EMFAC202x Categories
Units: miles/year for CVMT and EVMT, trips/year for Trips, kWh/year for Energy Consumption, tons/year for Emissions, 1000 gallons/year for Fuel Consumption

Region	Calendar Year	Vehicle Category	Model Year	Speed	Fuel	Population	Total VMT	Fuel Consumption	**MPG (Derived)**		
San Joaquin	2022	All Other Buses	Aggregate	Aggregate	Diesel	64.18276106	983114.264	113.790052	**8.64**		
San Joaquin	2022	LDA	Aggregate	Aggregate	Gasoline	245832.5119	3415793856	121526.7684	**28.11**		
San Joaquin	2022	LDA	Aggregate	Aggregate	Diesel	747.597033	8552210.78	202.5712829	**42.22**		
San Joaquin	2022	LDT1	Aggregate	Aggregate	Gasoline	22627.08052	254906082	10869.91585	**23.45**		
San Joaquin	2022	LDT1	Aggregate	Aggregate	Diesel	7.047782881	28643.3341	1.17050914	**24.47**		
San Joaquin	2022	LDT2	Aggregate	Aggregate	Gasoline	97154.07981	1327006241	59035.46063	**22.48**		
San Joaquin	2022	LDT2	Aggregate	Aggregate	Diesel	248.8605386	3715266.01	118.6311075	**31.32**		
San Joaquin	2022	LHD1	Aggregate	Aggregate	Gasoline	10032.88768	112383474	12349.75639	**9.10**		
San Joaquin	2022	LHD1	Aggregate	Aggregate	Diesel	9047.421916	103983413	6588.299532	**15.78**		
San Joaquin	2022	LHD2	Aggregate	Aggregate	Gasoline	1192.956774	13475070.2	1640.891005	**8.21**		
San Joaquin	2022	LHD2	Aggregate	Aggregate	Diesel	3132.378704	37931319	2924.634355	**12.97**		
San Joaquin	2022	MCY	Aggregate	Aggregate	Gasoline	12156.83121	22852866.9	574.2253718	**39.80**		
San Joaquin	2022	MDV	Aggregate	Aggregate	Gasoline	95564.44336	1148172249	62988.61289	**18.23**		
San Joaquin	2022	MDV	Aggregate	Aggregate	Diesel	1375.554752	18880934.9	797.8242725	**23.67**		
San Joaquin	2022	MH	Aggregate	Aggregate	Gasoline	1600.88645	4527842.04	1026.718509	**4.41**		
San Joaquin	2022	MH	Aggregate	Aggregate	Diesel	647.0575838	1864836.86	198.2342323	**9.41**		
San Joaquin	2022	Motor Coach	Aggregate	Aggregate	Diesel	17.36532658	725245.332	132.125375	**5.49**		
San Joaquin	2022	OBUS	Aggregate	Aggregate	Gasoline	190.8863856	2783028.98	598.6307691	**4.65**		
San Joaquin	2022	PTO	Aggregate	Aggregate	Diesel	0	6090118.27	1257.295456	**4.84**		
San Joaquin	2022	SBUS	Aggregate	Aggregate	Gasoline	125.3894152	2223699.45	219.7856778	**10.12**		
San Joaquin	2022	SBUS	Aggregate	Aggregate	Diesel	485.9784004	3614694.55	443.7107543	**8.15**	**MHD**	
San Joaquin	2022	T6 CAIRP Class 4	Aggregate	Aggregate	Diesel	10.0890437	210293.223	23.84738494	**8.82**		**8.35**
San Joaquin	2022	T6 CAIRP Class 5	Aggregate	Aggregate	Diesel	13.58227373	288484.486	32.62553013	**8.84**		
San Joaquin	2022	T6 CAIRP Class 6	Aggregate	Aggregate	Diesel	41.03348839	753818.215	84.43793674	**8.93**		
San Joaquin	2022	T6 CAIRP Class 7	Aggregate	Aggregate	Diesel	72.78191568	4728328.86	495.7091624	**9.54**		
San Joaquin	2022	T6 Instate Delivery C	Aggregate	Aggregate	Diesel	239.0980349	2541147.72	312.100003	**8.14**		
San Joaquin	2022	T6 Instate Delivery C	Aggregate	Aggregate	Diesel	153.4261699	1652891.97	204.7820753	**8.07**		
San Joaquin	2022	T6 Instate Delivery C	Aggregate	Aggregate	Diesel	669.7781872	7173217.66	882.4034098	**8.13**		
San Joaquin	2022	T6 Instate Delivery C	Aggregate	Aggregate	Diesel	121.8173307	2064596.8	253.4340811	**8.15**		
San Joaquin	2022	T6 Instate Other Cla	Aggregate	Aggregate	Diesel	458.6664735	5647630.51	670.5535241	**8.42**		
San Joaquin	2022	T6 Instate Other Cla	Aggregate	Aggregate	Diesel	1145.440922	15945159.9	1880.533752	**8.48**		
San Joaquin	2022	T6 Instate Other Cla	Aggregate	Aggregate	Diesel	900.2348993	11843070.7	1391.681049	**8.51**		
San Joaquin	2022	T6 Instate Other Cla	Aggregate	Aggregate	Diesel	546.2729605	7887492	908.6706235	**8.68**		
San Joaquin	2022	T6 Instate Tractor Cl	Aggregate	Aggregate	Diesel	10.69873229	156796.758	18.49124984	**8.48**		
San Joaquin	2022	T6 Instate Tractor Cl	Aggregate	Aggregate	Diesel	714.4980333	13263547.8	1484.370826	**8.94**		
San Joaquin	2022	T6 OOS Class 4	Aggregate	Aggregate	Diesel	5.824249623	120402.604	13.64837299	**8.82**		
San Joaquin	2022	T6 OOS Class 5	Aggregate	Aggregate	Diesel	7.810009498	165170.722	18.67768852	**8.84**		
San Joaquin	2022	T6 OOS Class 6	Aggregate	Aggregate	Diesel	23.64662077	431595.821	48.34053567	**8.93**		
San Joaquin	2022	T6 OOS Class 7	Aggregate	Aggregate	Diesel	39.99335241	3138238.3	328.4621548	**9.55**		
San Joaquin	2022	T6 Public Class 4	Aggregate	Aggregate	Diesel	32.46897249	328830.712	44.34689082	**7.41**		
San Joaquin	2022	T6 Public Class 5	Aggregate	Aggregate	Diesel	75.18627001	860300.203	112.646177	**7.64**		
San Joaquin	2022	T6 Public Class 6	Aggregate	Aggregate	Diesel	127.0726581	1381351.21	180.6444001	**7.65**		
San Joaquin	2022	T6 Public Class 7	Aggregate	Aggregate	Diesel	155.0745132	2102170.5	278.5009366	**7.55**		
San Joaquin	2022	T6 Utility Class 5	Aggregate	Aggregate	Diesel	33.0723596	420846.454	48.44157823	**8.69**		
San Joaquin	2022	T6 Utility Class 6	Aggregate	Aggregate	Diesel	6.301149589	79368.9293	9.17296451	**8.65**		
San Joaquin	2022	T6 Utility Class 7	Aggregate	Aggregate	Diesel	7.184731387	110634.864	12.6401735	**8.75**		
San Joaquin	2022	T6TS	Aggregate	Aggregate	Gasoline	579.4901376	8873213.88	1932.185198	**4.59**	**HHD**	
San Joaquin	2022	T7 CAIRP Class 8	Aggregate	Aggregate	Diesel	1465.651998	94322580.1	15770.2762	**5.98**		**5.53**
San Joaquin	2022	T7 NNOOS Class 8	Aggregate	Aggregate	Diesel	1314.51908	111518369	18648.32321	**5.98**		
San Joaquin	2022	T7 NOOS Class 8	Aggregate	Aggregate	Diesel	547.746265	40512642.7	6815.550603	**5.94**		
San Joaquin	2022	T7 Other Port Class 8	Aggregate	Aggregate	Diesel	29.96782331	1613813.41	275.8291853	**5.85**		
San Joaquin	2022	T7 POAK Class 8	Aggregate	Aggregate	Diesel	130.9212733	4012315.2	701.2895659	**5.72**		
San Joaquin	2022	T7 POLA Class 8	Aggregate	Aggregate	Diesel	133.7447014	5448794.58	952.8299882	**5.72**		
San Joaquin	2022	T7 Public Class 8	Aggregate	Aggregate	Diesel	387.8868943	5120839.78	1005.029197	**5.10**		
San Joaquin	2022	T7 Single Concrete/T	Aggregate	Aggregate	Diesel	116.7544211	2677818.42	460.6989897	**5.81**		
San Joaquin	2022	T7 Single Dump Clas	Aggregate	Aggregate	Diesel	478.1812367	9536301.57	1654.245052	**5.76**		
San Joaquin	2022	T7 Single Other Clas	Aggregate	Aggregate	Diesel	984.7457086	17434952.9	2999.030833	**5.81**		
San Joaquin	2022	T7 SWCV Class 8	Aggregate	Aggregate	Diesel	177.8487212	3596616.49	1442.776049	**2.49**		
San Joaquin	2022	T7 Tractor Class 8	Aggregate	Aggregate	Diesel	2518.433603	64864115.8	10747.18356	**6.04**		
San Joaquin	2022	T7 Utility Class 8	Aggregate	Aggregate	Diesel	22.55419755	333131.857	58.51013889	**5.69**		
San Joaquin	2022	T7IS	Aggregate	Aggregate	Gasoline	2.652755373	18719.5003	6.072843609	**3.08**		
San Joaquin	2022	UBUS	Aggregate	Aggregate	Gasoline	48.76869755	1201484.84	255.7319762	**4.70**		
San Joaquin	2022	UBUS	Aggregate	Aggregate	Diesel	81.19085432	1839458.61	209.6089245	**8.78**		
San Joaquin	2025	All Other Buses	Aggregate	Aggregate	Diesel	67.92171408	1008649.64	115.4389681	**8.74**		
San Joaquin	2025	LDA	Aggregate	Aggregate	Gasoline	247812.193	3492700281	118201.3801	**29.55**		
San Joaquin	2025	LDA	Aggregate	Aggregate	Diesel	620.8563183	6911454.9	159.5928886	**43.31**		
San Joaquin	2025	LDT1	Aggregate	Aggregate	Gasoline	20969.62889	244462724	9908.364365	**24.67**		
San Joaquin	2025	LDT1	Aggregate	Aggregate	Diesel	5.057977491	19015.1044	0.774762876	**24.54**		
San Joaquin	2025	LDT2	Aggregate	Aggregate	Gasoline	105887.2734	1491240807	62119.72849	**24.01**		
San Joaquin	2025	LDT2	Aggregate	Aggregate	Diesel	305.5941154	4704771.26	142.5143879	**33.01**		
San Joaquin	2025	LHD1	Aggregate	Aggregate	Gasoline	9450.489324	109731396	11412.81478	**9.61**		
San Joaquin	2025	LHD1	Aggregate	Aggregate	Diesel	8447.684296	95550048.1	6010.794683	**15.90**		

San Joaquin	2025	LHD2	Aggregate	Aggregate	Gasoline	1129.168714	12915271.7	1504.493476	**8.58**
San Joaquin	2025	LHD2	Aggregate	Aggregate	Diesel	3098.911716	36654158.2	2777.276916	**13.20**
San Joaquin	2025	MCY	Aggregate	Aggregate	Gasoline	12009.69999	22426985.7	554.841798	**40.42**
San Joaquin	2025	MDV	Aggregate	Aggregate	Gasoline	92446.53152	1129031435	58653.64404	**19.25**
San Joaquin	2025	MDV	Aggregate	Aggregate	Diesel	1393.091492	18027336.1	742.2377967	**24.29**
San Joaquin	2025	MH	Aggregate	Aggregate	Gasoline	1345.73466	3838358.07	869.8310644	**4.41**
San Joaquin	2025	MH	Aggregate	Aggregate	Diesel	631.6240768	1783209.86	189.7527239	**9.40**
San Joaquin	2025	Motor Coach	Aggregate	Aggregate	Diesel	18.80772922	734238.384	132.2519529	**5.55**
San Joaquin	2025	OBUS	Aggregate	Aggregate	Gasoline	170.8324994	2390052.89	497.8515618	**4.80**
San Joaquin	2025	PTO	Aggregate	Aggregate	Diesel	0	6272891.87	1243.092383	**5.05**
San Joaquin	2025	SBUS	Aggregate	Aggregate	Gasoline	131.6189784	2377713.36	233.2858287	**10.19**
San Joaquin	2025	SBUS	Aggregate	Aggregate	Diesel	490.2787139	3547837.12	431.8825669	**8.21**
San Joaquin	2025	T6 CAIRP Class 4	Aggregate	Aggregate	Diesel	10.57610418	217695.643	24.19520454	**9.00**
San Joaquin	2025	T6 CAIRP Class 5	Aggregate	Aggregate	Diesel	14.00551629	299131.801	33.26474705	**8.99**
San Joaquin	2025	T6 CAIRP Class 6	Aggregate	Aggregate	Diesel	47.29566683	776366.856	84.99709252	**9.13**
San Joaquin	2025	T6 CAIRP Class 7	Aggregate	Aggregate	Diesel	78.11014265	4920888.12	500.9743873	**9.82**
San Joaquin	2025	T6 Instate Delivery C	Aggregate	Aggregate	Diesel	252.424868	2644503.24	317.9642821	**8.32**
San Joaquin	2025	T6 Instate Delivery C	Aggregate	Aggregate	Diesel	162.4907366	1721270.98	207.9013282	**8.28**
San Joaquin	2025	T6 Instate Delivery C	Aggregate	Aggregate	Diesel	708.1406495	7466807.32	897.8999389	**8.32**
San Joaquin	2025	T6 Instate Delivery C	Aggregate	Aggregate	Diesel	127.2799027	2161896.47	257.7010729	**8.39**
San Joaquin	2025	T6 Instate Other Cla	Aggregate	Aggregate	Diesel	457.3843802	5877813.57	686.4083684	**8.56**
San Joaquin	2025	T6 Instate Other Cla	Aggregate	Aggregate	Diesel	1233.945904	16615339.9	1936.948273	**8.58**
San Joaquin	2025	T6 Instate Other Cla	Aggregate	Aggregate	Diesel	939.5521797	12333897.2	1429.638292	**8.63**
San Joaquin	2025	T6 Instate Other Cla	Aggregate	Aggregate	Diesel	601.2468734	8213942.3	936.9187819	**8.77**
San Joaquin	2025	T6 Instate Tractor Cl	Aggregate	Aggregate	Diesel	11.09411194	162636.728	18.98089348	**8.57**
San Joaquin	2025	T6 Instate Tractor Cl	Aggregate	Aggregate	Diesel	742.8431118	13802724.4	1522.174701	**9.07**
San Joaquin	2025	T6 OOS Class 4	Aggregate	Aggregate	Diesel	6.191325924	126520.831	13.89828216	**9.10**
San Joaquin	2025	T6 OOS Class 5	Aggregate	Aggregate	Diesel	8.158025029	173563.829	19.10165507	**9.09**
San Joaquin	2025	T6 OOS Class 6	Aggregate	Aggregate	Diesel	27.75525515	453527.25	48.89681922	**9.28**
San Joaquin	2025	T6 OOS Class 7	Aggregate	Aggregate	Diesel	42.05361037	3297707.06	332.8593114	**9.91**
San Joaquin	2025	T6 Public Class 4	Aggregate	Aggregate	Diesel	30.96340517	327842.68	42.76001382	**7.67**
San Joaquin	2025	T6 Public Class 5	Aggregate	Aggregate	Diesel	77.40598482	869203.844	111.606731	**7.79**
San Joaquin	2025	T6 Public Class 6	Aggregate	Aggregate	Diesel	124.4648645	1387327.51	176.7337032	**7.85**
San Joaquin	2025	T6 Public Class 7	Aggregate	Aggregate	Diesel	148.2002736	2103649.58	267.2910594	**7.87**
San Joaquin	2025	T6 Utility Class 5	Aggregate	Aggregate	Diesel	33.80713566	427833.947	48.06448058	**8.90**
San Joaquin	2025	T6 Utility Class 6	Aggregate	Aggregate	Diesel	6.404694197	80731.1835	9.043234548	**8.93**
San Joaquin	2025	T6 Utility Class 7	Aggregate	Aggregate	Diesel	7.233394318	112132.632	12.46881994	**8.99**
San Joaquin	2025	T6TS	Aggregate	Aggregate	Gasoline	531.0756316	8934143.57	1862.590487	**4.80**
San Joaquin	2025	T7 CAIRP Class 8	Aggregate	Aggregate	Diesel	1559.383676	99045693.2	15966.77291	**6.20**
San Joaquin	2025	T7 NNOOS Class 8	Aggregate	Aggregate	Diesel	1399.986354	118494949	18565.26766	**6.38**
San Joaquin	2025	T7 NOOS Class 8	Aggregate	Aggregate	Diesel	592.9033383	43047110.1	6907.520992	**6.23**
San Joaquin	2025	T7 Other Port Class 8	Aggregate	Aggregate	Diesel	31.09466321	1801298.82	301.2206022	**5.98**
San Joaquin	2025	T7 POAK Class 8	Aggregate	Aggregate	Diesel	137.4284865	4268358.61	728.20542	**5.86**
San Joaquin	2025	T7 POLA Class 8	Aggregate	Aggregate	Diesel	157.478818	6193144.48	1066.910146	**5.80**
San Joaquin	2025	T7 Public Class 8	Aggregate	Aggregate	Diesel	386.4284577	5184020.71	985.2844376	**5.26**
San Joaquin	2025	T7 Single Concrete/T	Aggregate	Aggregate	Diesel	121.0999578	2662430.63	445.7482649	**5.97**
San Joaquin	2025	T7 Single Dump Clas	Aggregate	Aggregate	Diesel	518.3758674	9626829.16	1662.437597	**5.79**
San Joaquin	2025	T7 Single Other Clas	Aggregate	Aggregate	Diesel	1163.187559	18274499.1	3087.884625	**5.92**
San Joaquin	2025	T7 SWCV Class 8	Aggregate	Aggregate	Diesel	167.5568448	3389049.07	1318.861734	**2.57**
San Joaquin	2025	T7 Tractor Class 8	Aggregate	Aggregate	Diesel	2947.082282	68517023.3	11148.15001	**6.15**
San Joaquin	2025	T7 Utility Class 8	Aggregate	Aggregate	Diesel	24.5522509	342122.268	58.52858431	**5.85**
San Joaquin	2025	T7IS	Aggregate	Aggregate	Gasoline	1.372290651	17754.5231	4.872376123	**3.64**
San Joaquin	2025	UBUS	Aggregate	Aggregate	Gasoline	50.67993554	1248539.35	265.760222	**4.70**
San Joaquin	2025	UBUS	Aggregate	Aggregate	Diesel	73.34639924	1627535.46	172.1102373	**9.46**

On-road Mobile (Operational) Energy Usage

Note: Assumes that all vehicles that are generated as part of proposed project use gasoline as a fuel source (for simplicity), since the vast majority of vehicles generated by the project would use gasoline.

Unmitigated:

Step 1:

Therefore:

Average Daily VMT:

1,883 Source: Kittelson & Associates, 2022 (Kiper Dutra Transportation Impact Analysis)

Step 2: Given:

Fleet Mix (CalEEMod Output)

LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
54.19%	5.26%	16.99%	14.66%	2.52%	0.61%	1.26%	1.70%	0.05%	0.03%	2.29%	0.11%	0.34%

And:

Gasoline MPG Factors for each Vehicle Class - Year 2025 (EMFAC2021 Output)

LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
29.55	24.67	24.01	19.25	9.61	8.58	N/A	N/A	4.80	4.70	40.42	10.19	4.41

Therefore:

Weighted Average MPG Factors

Gasoline: **25.5**

Step 3: **Therefore:**

74 daily gallons of gasoline

or

26,995 annual gallons of gasoline

Off-road (i.e. On-site) Mobile (Construction) Energy Usage

Note: For the sake of simplicity, and as a conservative estimation, it was assumed that all off-road vehicles use diesel fuel as an energy source.
Site preparation and grading off-road mobile vehicle on-site gallons of fuel are calculated below.

Given Factor:	**207.2**	**metric tons**	**CO2**	**(provided in CalEEMod Output File)**
Conversion Factor:	2204.6262	pounds	per metric ton	
Intermediate Result:	**456,897**	**pounds**	**CO2**	
Conversion Factor:	22.38	pounds	CO2 per 1 gallon of diesel fuel	Source: U.S. EIA, 2016
Final Result:	**20,415**	**gallons**	**diesel fuel**	http://www.eia.gov/tools/faqs/faq.cfm?id=307&t=11

Mitigated Onsite Scenario	Total CO2 (MT/yr) (provided in CalEEMod Output File)
Site Preparation	50.5646
Grading	156.6801

On-road Mobile (Construction) Energy Usage - Site Preparation

Note: Year 2022 MPG factors were derived for construction-releated energy consumption (for the sake of a conservative estimate).

Step 1: **Total Daily Worker Trips (CalEEMod Output)**

18

Worker Trip Length (miles) (CalEEMod Output)

16.8

Therefore:

Average Worker Daily VMT:

302

Step 2: Given:

Assumed Fleet Mix for Workers (Percentage mix is provided on Appendix A: Calculation Details for CalEEMOD p. 15)

LDA	LDT1	LDT2
0.5	0.25	0.25

And:

Gasoline MPG Factors for each Vehicle Class (from EMFAC2021) - Year 2022

LDA	LDT1	LDT2
28.11	23.45	22.48

Therefore:

Weighted Average Worker MPG Factor

25.54

Step 3: **Therefore:**

12 Worker daily gallons of gasoline

Step 4: 30 **# of Days (CalEEMod Output)**

Therefore:

Result: **355** **Total gallons of gasoline**

On-road Mobile (Construction) Energy Usage - Grading

Note: Year 2022 MPG factors were derived for construction-releated energy consumption (for the sake of a conservative estimate).

Step 1: **Total Daily Worker Trips (CalEEMod Output)**

20

Worker Trip Length (miles) (CalEEMod Output)

16.8

Therefore:

Average Worker Daily VMT:

336

Step 2: Given:

Assumed Fleet Mix for Workers (Percentage mix is provided on Appendix A: Calculation Details for CalEEMOD p. 15)

LDA	**LDT1**	**LDT2**
0.5	0.25	0.25

And:

Gasoline MPG Factors for each Vehicle Class (from EMFAC2021) - Year 2022

LDA	**LDT1**	**LDT2**
28.11	23.45	22.48

Therefore:

Weighted Average Worker MPG Factor

25.54

Step 3: **Therefore:**

13 Worker daily gallons of gasoline

Step 4: 75 **# of Days (CalEEMod Output)**

Therefore:

Result: **987** **Total gallons of gasoline**

On-road Mobile (Construction) Energy Usage - Building Construction

Note: Year 2022 MPG factors were derived for construction-releated energy consumption (for the sake of a conservative estimate).

Step 1:

Total Daily Worker Trips (CalEEMod Output)
124

Total Daily Vendor Trips (CalEEMod Output)
42

Worker Trip Length (miles) (CalEEMod Output)
16.8

Vendor Trip Length (miles) (CalEEMod Output)
6.6

Therefore:

Average Worker Daily VMT:
2,083

Average Vendor Daily VMT:
277

Step 2: Given:

Assumed Fleet Mix for Workers (Percentage mix is provided on Appendix A: Calculation Details for CalEEMOD p. 15)

LDA	LDT1	LDT2
0.5	0.25	0.25

Assumed Fleet Mix for Vendors

Fleet Mix for Workers (CalEEMod Output)

MHD	HHD
43%	57%

And:

MPG Factors for each Vehicle Class (from EMFAC2021) - Year 2022

Gasoline:

LDA	LDT1	LDT2
28.11	23.45	22.48

Diesel:

MHD	HHD
8.35	5.53

Therefore:

Weighted Average Worker (Gasoline) MPG Factor
25.54

Weighted Average Vendor (Diesel) MPG Factor
6.74

Step 3:

Therefore:
82 Worker daily gallons of gasoline

Therefore:
41 Vendor daily gallons of diesel

Step 4:

740 **# of Days (CalEEMod Output)**

Therefore:
60,369 Total gallons of gasoline

Therefore:
30,455 Total gallons of diesel

On-road Mobile (Construction) Energy Usage - Paving

Note: Year 2022 MPG factors were derived for construction-releated energy consumption (for the sake of a conservative estimate).

Step 1: **Total Daily Worker Trips (CalEEMod Output)**

15

Worker Trip Length (miles) (CalEEMod Output)

16.8

Therefore:

Average Worker Daily VMT:

252

Step 2: Given:

Assumed Fleet Mix for Workers (Percentage mix is provided on Appendix A: Calculation Details for CalEEMOD p. 15)

LDA	LDT1	LDT2
0.5	0.25	0.25

And:

Gasoline MPG Factors for each Vehicle Class (from EMFAC2021) - Year 2022

LDA	LDT1	LDT2
28.11	23.45	22.48

Therefore:

Weighted Average Worker MPG Factor

25.5

Step 3: **Therefore:**

10 Worker daily gallons of gasoline

Step 4: 55 **# of Days (CalEEMod Output)**

Therefore:

Result: **543 Total gallons of gasoline**

On-road Mobile (Construction) Energy Usage - Architectural Coating

Note: Year 2022 MPG factors were derived for construction-releated energy consumption (for the sake of a conservative estimate).

Step 1: **Total Daily Worker Trips (CalEEMod Output)**

25

Worker Trip Length (miles) (CalEEMod Output)

16.8

Therefore:

Average Worker Daily VMT:

420

Step 2: Given:

Assumed Fleet Mix for Workers (Percentage mix is provided on Appendix A: Calculation Details for CalEEMOD p. 15)

LDA	LDT1	LDT2
0.5	0.25	0.25

And:

Gasoline MPG Factors for each Vehicle Class (EMFAC2021 Output) - Year 2022

LDA	LDT1	LDT2
28.11	23.45	22.48

Therefore:

Weighted Average Worker MPG Factor

25.5

Step 3: **Therefore:**

16 Worker daily gallons of gasoline

Step 4: 55 **# of Days (CalEEMod Output)**

Therefore:

Result: 905 Total gallons of gasoline

APPENDIX B: CULTURAL RESOURCES REPORT

CULTURAL RESOURCE ASSESSMENT FOR THE DUTRA PROPERTY SUBDIVISION, CITY OF MANTECA, SAN JOAQUIN COUNTY, CALIFORNIA

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December 21, 2021
(Job #21-060)

INTRODUCTION

The proposed Dutra Property Subdivision includes the annexation of 34.6 acres of land into the City of Manteca for the subdivision and development of 197 residential units, construction of a 2.92-acre Park/Basin (Lot A), installation of frontage/entry landscaping (Lots B/C/D), expansion of an existing storm drainage basin (Wackerly Basin), and retention of two lots (Lots E/F) that have existing residential homes along Oleander Avenue.

The residential density is approximately 5.7 units/acre, with typical lot sizes of 50 feet by 80 feet or 4,000 square feet. Each lot would contain a two-car garage and two driveway parking spaces. The two existing residential buildings within the Project site would be retained on Lot E and F, along with the ancillary structures associated with the residences. All other facilities and structures would be removed, including septic tanks, leach fields, wells, irrigation facilities, and electric lines, per City of Manteca and SSJID standards and specifications.

Residences would front on Oleander Avenue, consistent with the existing residential orientation along the street. Access to the subdivision will occur from the east along Oleander Avenue, and from the south along Peach Road. The internal circulation design includes roadway stubs to access the property to the south and to the west in accordance with the City's requirement

A general plan amendment would not be required for the project.

The Project site is located within the southwest quarter of Section 7 of Township 2 South, Range 7 East Mount Diablo Base and Meridian (MDBM), mapped on the USGS 7.5' Manteca, California, 7.5-minute series quadrangle map (Figure 2).

Melinda Peak served as principal investigator for the project, with Michael Lawson completing the field survey. Resumes are included in Appendix 1.

STATE REGULATIONS

State historic preservation regulations affecting this project include the statutes and guidelines contained in the California Environmental Quality Act (CEQA; Public Resources Code sections 21083.2 and 21084.1 and sections 15064.5 and 15126.4 (b) of the CEQA Guidelines). CEQA Section 15064.5 requires that lead agencies determine whether projects may have a significant effect on archaeological and historical resources. Public Resources Code Section 21098.1 further cites: A project that may cause a substantial adverse change in the significance of an historical resource is a project that may have a significant effect on the environment.

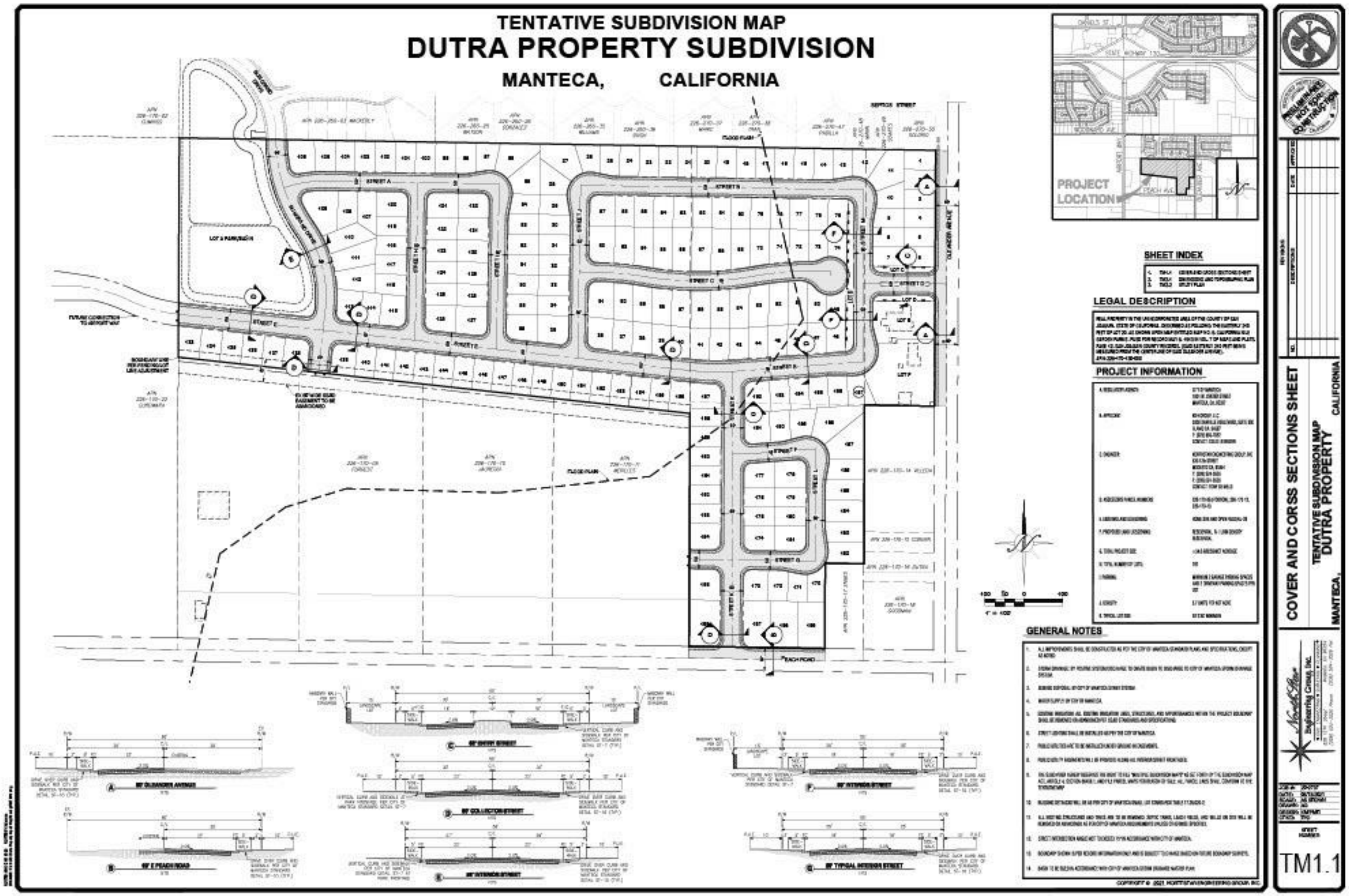

TENTATIVE SUBDIVISION MAP
DUTRA PROPERTY SUBDIVISION
MANTECA, CALIFORNIA
PROJECT LOCATION
SHEET INDEX
LEGAL DESCRIPTION
PROJECT INFORMATION
GENERAL NOTES
LOT A PARK/BASIN
PEACH ROAD
FLOOD PLAIN
COVER AND CORSS SECTIONS SHEET
TENTATIVE SUBDIVISION MAP
DUTRA PROPERTY
MANTECA, CALIFORNIA
TM1.1

FIGURE 1

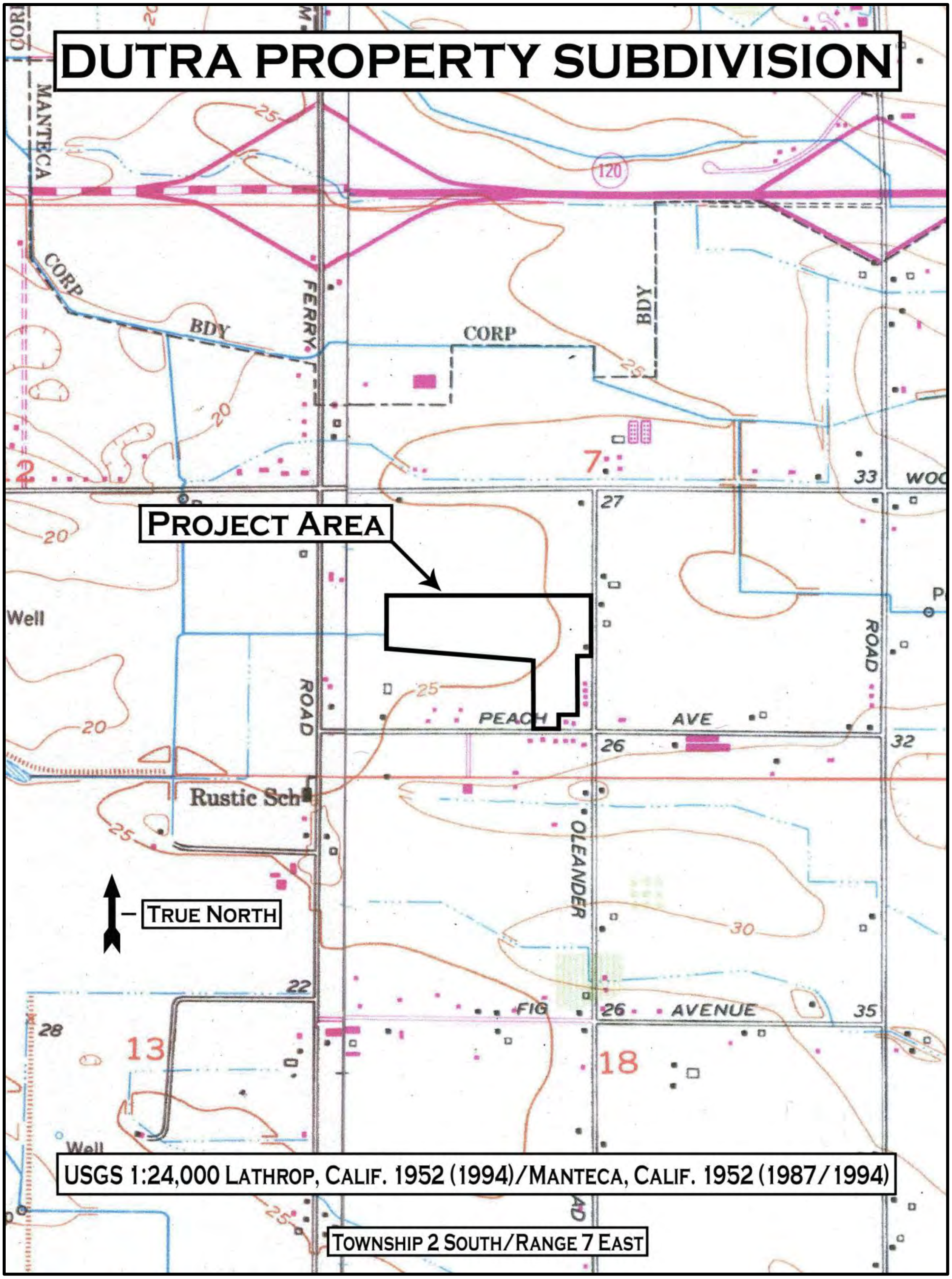

DUTRA PROPERTY SUBDIVISION
PROJECT AREA
TRUE NORTH
USGS 1:24,000 LATHROP, CALIF. 1952 (1994)/MANTECA, CALIF. 1952 (1987/1994)
TOWNSHIP 2 SOUTH/RANGE 7 EAST
MANTECA
CORP
BDY
FERRY
ROAD
PEACH
AVE
OLEANDER
FIG
AVENUE
Rustic Sch
Well
120
7
13
18

Figure 2

An "historical resource" includes, but is not limited to, any object, building, structure, site, area, place, record or manuscript that is historically or archaeologically significant (Public Resources Code section 5020.1).

Advice on procedures to identify such resources, evaluate their importance, and estimate potential effects is given in several agency publications such as the series produced by the Governor's Office of Planning and Research (OPR), *CEQA and Archaeological Resources,* 1994. The technical advice series produced by OPR strongly recommends that Native American concerns and the concerns of other interested persons and corporate entities, including, but not limited to, museums, historical commissions, associations and societies be solicited as part of the process of cultural resources inventory. In addition, California law protects Native American burials, skeletal remains, and associated grave goods regardless of the antiquity and provides for the sensitive treatment and disposition of those remains (California Health and Safety Code Section 7050.5, California Public Resources Codes Sections 5097.94 et al).

The California Register of Historical Resources (Public Resources Code Section 5020 et seq.)

The State Historic Preservation Office (SHPO) maintains the California Register of Historical Resources (CRHR). Properties listed, or formally designated as eligible for listing, on the National Register of Historic Places are automatically listed on the CRHR, as are State Landmarks and Points of Interest. The CRHR also includes properties designated under local ordinances or identified through local historical resource surveys.

For the purposes of CEQA, an historical resource is a resource listed in, or determined eligible for listing in the California Register of Historical Resources. When a project will impact a site, it needs to be determined whether the site is an historical resource. The criteria are set forth in Section 15064.5(a) (3) of the CEQA Guidelines, and are defined as any resource that does any of the following:

A. Is associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage;

B. Is associated with the lives of persons important in our past;

C. Embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of an important creative individual, or possesses high artistic values; or

D. Has yielded, or may be likely to yield, information important in prehistory or history.

In addition, the CEQA Guidelines, Section 15064.5(a) (4) states:

The fact that a resource is not listed in, or determined to be eligible for listing in the California Register of Historical Resources, not included in a local register of historical resources (pursuant to section 5020.1(k) of the Public Resources Code), or identified in an historical resources survey (meeting the criteria in section 5024.1(g) of the Public Resources Code) does not preclude a lead agency from determining that the resource may be an historical resource as defined in Public Resources Code section 5020.1(j) or 5024.1.

California Health and Safety Code Sections 7050.5, 7051, And 7054

These sections collectively address the illegality of interference with human burial remains, as well as the disposition of Native American burials in archaeological sites. The law protects such remains from disturbance, vandalism, or inadvertent destruction, and establishes procedures to be implemented if Native American skeletal remains are discovered during construction of a project, including the treatment of remains prior to, during, and after evaluation, and reburial procedures.

California Public Resources Code Section 15064.5(e)

This law addresses the disposition of Native American burials in archaeological sites and protects such remains from disturbance, vandalism, or inadvertent destruction. The section establishes procedures to be implemented if Native American skeletal remains are discovered during construction of a project and establishes the Native American Heritage Commission as the entity responsible to resolve disputes regarding the disposition of such remains.

Senate Bill 18

Senate Bill (SB) 18, requires local (city and county) governments to consult with California Native American tribes to aid in the protection of traditional tribal cultural places ("cultural places") through local land use planning. This legislation, which amended §65040.2, §65092, §65351, §65352, and §65560, and added §65352.3, §653524, and §65562.5 to the Government Code; also requires the Governor's Office of Planning and Research (OPR) to include in the General Plan Guidelines advice to local governments on how to conduct these consultations. The intent of SB 18 is to provide California Native American tribes an opportunity to participate in local land use decisions at an early planning stage, for the purpose of protecting, or mitigating impacts to, cultural places. These consultation and notice requirements apply to adoption and amendment of both general plans (defined in Government Code §65300 et seq.) and specific plans (defined in Government Code §65450 et seq.).

Assembly Bill 52

Assembly Bill (AB) 52 establishes a formal consultation process for California tribes as part of CEQA and equates significant impacts on tribal cultural resources with significant environmental impacts. AB 52 defines a "California Native American Tribe" as a Native American tribe located in California that is on the contact list maintained by the Native American Heritage Commission. AB 52 requires formal consultation with California Native American Tribes prior to determining the level of environmental document if a tribe has requested to be informed by the lead agency of proposed projects. AB 52 also requires that consultation address project alternatives, mitigation measures, for significant effects, if requested by the California Native American Tribe, and that consultation be considered concluded when either the parties agree to measures to mitigate or avoid a significant effect, or the agency concludes that mutual agreement cannot be reached. Under AB 52, such measures shall be recommended for inclusion in the environmental document and adopted mitigation monitoring program if determined to avoid or lessen a significant impact on a tribal cultural resource.

CULTURAL SETTING

Prehistory

The Central Valley region was among the first in the state to attract intensive fieldwork, and research has continued to the present day. This has resulted in a substantial accumulation of data.

In the early decades of the 1900s, E.J. Dawson explored numerous sites near Stockton and Lodi, later collaborating with W.E. Schenck (Schenck and Dawson 1929). By 1933, the focus of work was directed to the Cosumnes locality, where survey and excavation studies were conducted by the Sacramento Junior College (Lillard and Purves 1936). Excavation data, in particular from the stratified Windmiller site (CA-Sac-107), suggested two temporally distinct cultural traditions. Later work at other mounds by Sacramento Junior College and the University of California, Berkeley, enabled the investigators to identify a third cultural tradition, intermediate between the previously postulated Early and Late Horizons. The three-horizon sequence, based on discrete changes in ornamental artifacts and mortuary practices, as well as on observed differences in soils within sites (Lillard, Heizer and Fenenga 1939), was later refined by Beardsley (1954). An expanded definition of artifacts diagnostic of each time period was developed, and its application extended to parts of the central California coast. Traits held in common allow the application of this system within certain limits of time and space to other areas of prehistoric central California.

The Windmiller Culture (Early Horizon) is characterized by ventrally-extended burials (some dorsal extensions are known), with westerly orientation of heads; a high percentage of burials with grave goods; frequent presence of red ocher in graves; large projectile points, of which 60 percent are of materials other than obsidian; rectangular *Haliotis* beads; *Olivella* shell beads (types A1a and L); rare use of bone; some use of baked clay objects; and well-fashioned charm stones, usually perforated.

The Cosumnes Culture (Middle Horizon) displays considerable changes from the preceding cultural expression. The burial mode is predominately flexed, with variable cardinal orientation and some cremations present. There are a lower percentage of burials with grave goods, and ocher staining is common in graves. *Olivella* beads of types C1, F and G predominate, and there is abundant use of green *Haliotis sp.* rather than red *Haliotis sp.* Other characteristic artifacts include perforated and canid teeth; asymmetrical and "fishtail" charm stones, usually unperforated; cobble mortars and evidence of wooden mortars; extensive use of bone for tools and ornaments; large projectile points, with considerable use of rock other than obsidian; and use of baked clay.

Hotchkiss Culture (Late Horizon) -- The burial pattern retains the use of the flexed mode, and there is wide spread evidence of cremation, lesser use of red ocher, heavy use of baked clay, *Olivella* beads of Types E and M, extensive use of *Haliotis* ornaments of many elaborate shapes and forms, shaped mortars and cylindrical pestles, bird-bone tubes with elaborate geometric designs, clam shell disc beads, small projectile points indicative of the introduction of the bow and arrow, flanged tubular pipes of steatite and schist, and use of magnesite (Moratto 1984:181-183). The characteristics noted are not all-inclusive, but cover the more important traits.

Schulz (1981), in an extensive examination of the central California evidence for the use of acorns, used the terms Early, Middle and Late Complexes, but the traits attributed to them remain generally the same. While it is not altogether clear, Schulz seemingly uses the term "Complex" to refer to the particular archeological entities (above called "Horizons") as defined in this region. Ragir's (1972) cultures are the same as Schulz's complexes.

Bennyhoff and Hughes (1984) have presented alternative dating schemes for the Central California Archeological Sequence. The primary emphasis is a more elaborate division of the horizons to reflect what is seen as cultural/temporal changes within the three horizons and a compression of the temporal span.

There have been other chronologies proposed, including Fredrickson (1973), and since it is correlated with Bennyhoff's (1977) work, it does merit discussion. The particular archeological cultural entities Fredrickson has defined, based upon the work of Bennyhoff, are patterns, phases and aspects. Bennyhoff's (1977) work in the Plains Miwok area is the best definition of the Cosumnes District, which likely conforms to Fredrickson's pattern. Fredrickson also proposed periods of time associated heavily with economic modes, which provides a temporal term for comparing contemporary cultural entities. It corresponds with Willey and Phillips' (1958) earlier "tradition", although it is tied more specifically to the archeological record in California.

Ethnohistory

The Project site lies within the northern portion of the ethnographic territory of the Yokuts people. The Yokuts were members of the Penutian language family which held all of the Central Valley, San Francisco Bay Area, and the Pacific Coast from Marin County to near Point Sur. The Yokuts differed from other ethnographic groups in California as they had true tribal divisions with group names (Kroeber 1925; Latta 1949). Each tribe spoke a particular dialect, common to its members, but similar enough to other Yokuts that they were mutually intelligible (Kroeber 1925).

The Yokuts held portions of the San Joaquin Valley from the Tehachapi mountains in the south to Stockton in the north. On the north they were bordered by the Plains Miwok, and on the west by the Saclan or Bay Miwok and Costonoan peoples. Although neighbors were often from distinct language families, differences between the people appear to have been more influenced by environmental factors as opposed to linguistic affinities. Thus, the Plains Miwok were more similar to the nearby Yokuts than to foothill members of their own language group. Similarities in cultural inventory co-varied with distance from other groups and proximity to culturally diverse people. The material culture of the southern San Joaquin Yokuts was therefore more closely related to that of their non-Yokuts neighbors than to that of Delta members of their own language group.

Trade was well developed, with mutually beneficial interchange of needed or desired goods. Obsidian, rare in the San Joaquin Valley, was obtained by trade with Paiute and Shoshoni groups on the eastern side of the Sierra Nevada, where numerous sources of this material are located, and to some extent from the Napa Valley to the north. Shell beads, obtained by the Yokuts from coastal people, and acorns, rare in the Great Basin, were among many items exported to the east by Yokuts traders (Davis 1961).

Economic subsistence was based on the acorn, with substantial dependency on gathering and processing of wild seeds and other vegetable foods. The rivers, streams, and sloughs that formed a maze within the valley provided abundant food resources such as fish, shellfish, and turtles.

Game, wild fowl, and small mammals were trapped and hunted to provide protein augmentation of the diet. In general, the eastern portion of the San Joaquin Valley provided a lush environment of varied food resources, with the estimated large population centers reflecting this abundance (Cook 1955; Baumhoff 1963).

Settlements were oriented along the water ways, with their village sites normally placed adjacent to these features for their nearby water and food resources. House structures varied in size and shape (Latta 1949; Kroeber 1925), with most constructed from the readily available tules found in the extensive marshes of the low-lying valley areas. The housepit depressions for the structures ranged in diameter from 3 meters to 18 meters (Wallace 1978:470).

Historical Background

The first extensive wheat-growing in the San Joaquin Valley took place on the sand plains in the region between Stockton and Manteca and on the west side of the valley between Tracy and Newman. The wheat growing was due to an initial experiment of John Wheeler Jones, who planted 160 acres to wheat in 1855 which included the central town site of what is now Manteca. He plowed his fields with a walking plow. The famous Stockton gang-plow was reported to be invented near the present site of Manteca (Smith 1960: 221, 243).

When the Visalia Branch of the Central Pacific Railroad (later the Fresno Branch of the Southern Pacific) was completed through the San Joaquin Valley, a shipping point was set up in the region and named Cowell or Cowell Station for Joshua Cowell, who had donated the right of way for the railroad. Maps of the area printed in the early San Joaquin County history shows scattered ranches in the area on large tracts of land (Thompson and West 1879). The town became a supply center for the region.

The station was re-named Manteca in 1904 or 1905 by the Southern Pacific for a local creamery that had taken its name from the Spanish word for “butter” or “lard” (Gudde 1969: 191). Another version of the naming of the town is that the Southern Pacific misprinted the name of the “Monteca” as “Manteca”, and would not change the spelling (Hillman and Covello 1985).

After irrigation systems were developed, the large tracts of land formerly cultivated by dry land crops such as grain could be converted to use for orchards, alfalfa, diversified crops and large-scale dairying. Within a short time after the completion of the first irrigation system in the region by the Stanislaus and San Joaquin Water Company, the population of the town grew from 80 to about 500. Further growth occurred with the creation of the South San Joaquin Irrigation District in 1909 and the completion of Goodwin Dam on the Stanislaus River and associated canals in 1913 (Hillman and Covello 1985).

Industries in the area were agricultural in nature for many years, with stockyards, dairy farms, pumpkins and sugar beets being important economically. The Spreckels Sugar Company opened a mill in 1918 that remained an important industry in the region.

The population of Manteca began to grow at a rapid rate in the early 1950s, with the town serving as a bedroom community for industrial plants in San Joaquin County communities. Beginning in the 1970s, improvements to community infrastructure and the attractive pricing of homes brought even more growth (Hillman and Covelo 1985). The pattern of rapid growth continues to this day, with industrial development in the area, as well as many residents commuting regularly to the Bay Area.

RESEARCH

Records of previously recorded cultural resources and cultural resource investigations were examined by the Central California Information Center of the California Historical Resources Information System on for the Project site and a ¼-mile radius (CCIC File # 11953L, Appendix 2) on October 8, 2021.

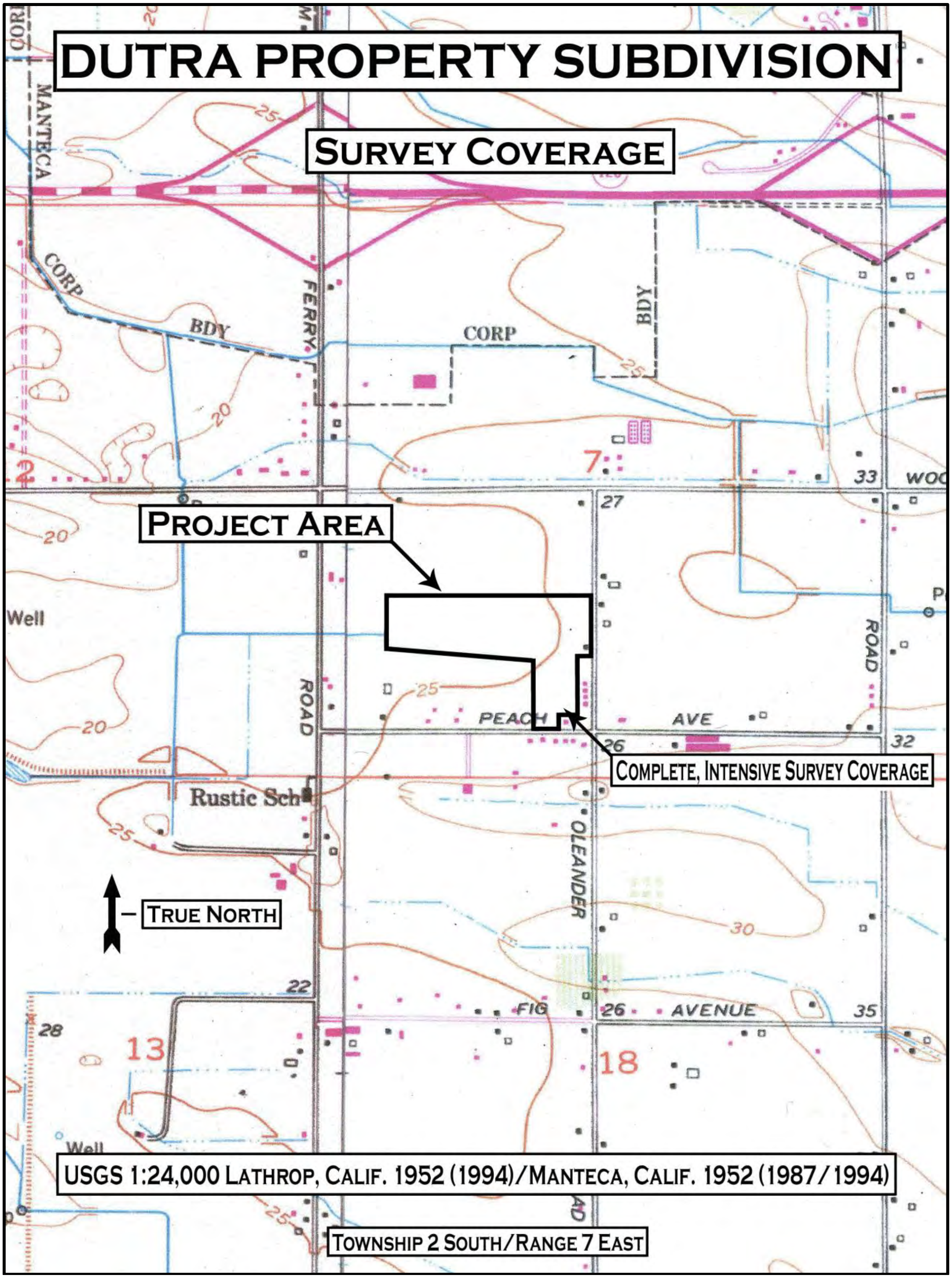
There are no resources recorded in the Project site. In the ¼-mile radius search area, the Tesla-Salado-Manteca 115 kV Transmission Line has been recorded as P-39-005337.

The Project site is shown as included as part of report done for the Windmiller and Napoli in 2002 (SJ-04786). This is an overview, with limited survey, and most private property would not have been surveyed in 2002. No previous survey had been conducted of the Project site.

Several other linear studies have been conducted in the record search radius (complete citations in the Report List in Appendix 2).

FIELD INVESTIGATIONS

The Project site was surveyed on November 11, 2021 by Michael Lawson of Peak & Associates. He investigated the property by walking linear transects spaced no more than ten meters apart across the entire property. Transects were narrowed in portions of the property such as near the buildings and other features (Figure 3).



DUTRA PROPERTY SUBDIVISION
SURVEY COVERAGE
PROJECT AREA
COMPLETE, INTENSIVE SURVEY COVERAGE
TRUE NORTH
USGS 1:24,000 LATHROP, CALIF. 1952 (1994)/MANTECA, CALIF. 1952 (1987/1994)
TOWNSHIP 2 SOUTH/RANGE 7 EAST
MANTECA
CORP
BDY
FERRY
ROAD
PEACH
AVE
OLEANDER
FIG
AVENUE
Rustic Sch
Well
7
13
18

Figure 3

The project area is mostly flat, likely graded for irrigation for farming. Hay grass is currently growing in most of the parcel. Modern irrigation equipment is placed at the edges of fields. The east side of the survey area has several houses and outbuildings, as well as horses.

Soil throughout the farm field portion of survey area is uniformly light tan sandy loam, with light inclusion of water-rounded pebbles formed of granitic elements such as quartz and feldspar. Meta-volcanic pebbles are less abundant. Areas that are disturbed by vehicular roads, animal trails and animal burrowing exhibit the same soil. No variation in soils color was observed. Soil in the animal pens at the east side of the parcel is medium brown loam, heavy in organic material, with little or no visible pebbles or gravel.

Aside from hay grass, mostly nonnative grasses and small bushes were observed near the perimeter of the survey area. There are a few native oaks and nonnative trees within the yards of the homes on the eastern side.

For the open acreage parallel transects no wider than ten meters were used, but closer transects and overlapping paths were required within animal pens and near houses.

Two homes are currently present on Oleander Avenue, at the eastern side of the parcel. Both date to about 1990. A third building lies to the south of the two modern residences, appearing to be an outbuilding.

No prehistoric period or historical period resources were observed during the survey.

RECOMMENDATIONS

Although unlikely, there is always a slight possibility that a site may exist in the Project site and be obscured by vegetation, siltation or historic activities, leaving no surface evidence. In order to assist in the recognition of cultural resources, a training session for all workers should be conducted in advance of the initiation of construction activities at the site. The training session will provide information on recognition of artifacts, human remains, and cultural deposits to help in the recognition of potential issues.

Discovery of Human Remains

In the event of discovery or recognition of any human remains in any location other than a dedicated cemetery, there shall be no further excavation or disturbance of the site or any nearby area suspected to overlie adjacent remains until the San Joaquin County Coroner has determined that the remains are not subject to any provisions of law concerning investigation of the circumstances, manner and cause of death, and the recommendations concerning the treatment and disposition of the human remains have been made to the person responsible for the excavation, or to his or her authorized representative. The coroner shall make his or her determination within two working days from the time the person responsible for the excavation, or his or her authorized representative, notifies the coroner of the discovery or recognition of the human remains.

If the San Joaquin County Coroner determines that the remains are not subject to his or her authority and if the County Coroner recognizes the human remains to be those of a Native American, or has reason to believe that they are those of a Native American, he or she shall contact, by telephone the Native American Heritage Commission (NAHC).

After notification, the NAHC will follow the procedures outlined in Public Resources Code Section 5097.98, that include notification of most likely descendants (MLDs), and recommendations for treatment of the remains. The MLDs will have 48 hours after notification by the NAHC to make their recommendations (PRC Section 5097.98).

BIBLIOGRAPHY

Baumhoff, Martin A.

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

Beardsley, Richard K.

1954 Temporal and Areal Relationships in Central California Archeology (Parts 1 and 11). *University of California Archaeological Survey Reports* 24, 25. Berkeley.

Bennyhoff, James A.

1977 Ethnogeography of the Plains Miwok. *Center for Archaeological Research at Davis, Publications* 5. University of California, Davis.

Bennyhoff, James A. and Robert F. Heizer

1958 Cross-Dating Great Basin Sites by Californian Shell Beads. *University of California Archaeological Survey Report*, 42:60-92. Berkeley.

Cook, Sherburne F.

1955 The Aboriginal Populations of the San Joaquin Valley, California. *University of California Anthropological Records* 16(2). Berkeley.

Davis, James T.

1961 Trade Routes and Economic Exchange among the Indians of California. *University of California Archaeological Survey Reports* 54:1-71. Berkeley.

Fredrickson, David A.

1973 *Early Cultures of the North Coast Ranges, California*. Unpublished Ph.D. dissertation, Department of Anthropology, University of California, Davis.

Gilbert, Colonel F.T.

1879 *History of San Joaquin County, California*. Thompson & West, Oakland.

Gudde, Erwin

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

Hillman, Raymond W. and Leonard A. Covello

1985 *Cities & Towns of San Joaquin County Since 1847*. Panorama West Books, Fresno.

Hoover, Mildred, Hero E. Rensch, Ethel G. Rensch and William N. Abeloe

1990 *Historic Spots in California* (Fourth Edition), revised by Douglas E. Kyle. Stanford University Press, Stanford.

Kroeber, Alfred L.

1953 *Handbook of the California Indians*. California Book Company, Ltd., Berkeley.

Latta, F. F.

1949 *Handbook of the Yokuts Indians*. Bear State Books, Oildale, California.

Lillard, Jeremiah B., Robert F. Heizer and Franklin Fenenga

1939 An Introduction to the Archaeology of Central California. *Sacramento Junior College, Department of Anthropology Bulletin* 2. Sacramento.

Lillard, Jeremiah B. and William K. Purves

1936 The Archaeology of the Deer Creek-Cosumnes Area, Sacramento County, California. *Sacramento Junior College, Department of Anthropology Bulletin* 1. Sacramento.

Moratto, Michael J.

1984 *California Archaeology*. Academic Press, New York.

Ragir, Sonia

1972 The Early Horizon in Central California Prehistory. *University of California Research Contributions* 15. Berkeley.

Schulz, Peter D.

1981 *Osteoarchaeology and Subsistence Change in Prehistoric Central California*. Unpublished Ph.D. dissertation, Department of Anthropology, University of California, Davis.

Schenck, W. Egbert and Elmer Dawson

1929 Archaeology of the Northern San Joaquin Valley. *University of California Publications in American Archaeology and Ethnology* 25(4):289-413. Berkeley.

Shippee, L. W.

1890 *An Illustrated History of San Joaquin County, California*. The Lewis Publishing Company, Chicago.

Smith, Wallace

1960 *Garden of the Sun*. Eighth edition. Original publication in 1939, privately printed.

Thompson and West

1879 *History of San Joaquin County, California, with Illustrations*. Reprinted in 1968 by Howell-North Books, Berkeley.

Tinkham, George H.

1923 *History of San Joaquin County, California*. The Historic Record Company, Los Angeles.

Wallace, William J.

1978 Northern Valley Yokuts. In *California*, edited by Robert F. Heizer, pp. 462-470. Handbook of North American Indians, vol. 8, William G. Sturtevant, general editor. Smithsonian Institution, Washington, D.C.

Willey, Gordon R. and Phillip Phillips

1958 *Method and Theory in American Archaeology*. The University of Chicago Press, Chicago.

APPENDIX 1

Resumes

PEAK & ASSOCIATES, INC.

RESUME

MELINDA A. PEAK **January 2021**
Senior Historian/Archeologist
3941 Park Drive, Suite 20 #329
El Dorado Hills, CA 95762
(916) 939-2405

PROFESSIONAL EXPERIENCE

Ms. Peak has served as the principal investigator on a wide range of prehistoric and historic excavations throughout California. She has directed laboratory analyses of archeological materials, including the historic period. She has also conducted a wide variety of cultural resource assessments in California, including documentary research, field survey, Native American consultation and report preparation.

In addition, Ms. Peak has developed a second field of expertise in applied history, specializing in site-specific research for historic period resources. She is a registered professional historian and has completed a number of historical research projects for a wide variety of site types.

Through her education and experience, Ms. Peak meets the Secretary of Interior Standards for historian, architectural historian, prehistoric archeologist and historic archeologist.

EDUCATION

M.A. - History - California State University, Sacramento, 1989

Thesis: *The Bellevue Mine: A Historical Resources Management Site Study in Plumas and Sierra Counties, California*

B.A. - Anthropology - University of California, Berkeley

PROJECTS

In recent years, Ms. Peak has led the team completing the cultural resource sections for General Plan and General Plan Updates, for a number of cities/neighborhoods including Campbell, Milpitas, Yountville, Manteca, The Springs, Sebastopol, Martinez, Brentwood, Colusa County and Foster City. Older General Plan efforts include Wheatland, Rocklin, Sheridan, Granite Bay and South Sutter County.

In recent months, Ms. Peak has completed a number of determinations of eligibility and effect documents in coordination with the Corps of Engineers for projects requiring federal permits, assessing the eligibility of a number of sites for the National Register of Historic Places.

She has also completed historical research projects on a wide variety of topics for a number of projects including the development of a winery in a ranch in Folsom, commercial buildings in the City of Davis, a lumber mill in Clovis, older farmhouses dating to the 1860s, an early roadhouse, bridges, canals, former small-town site, and a section of an electric railway line.

In recent years, Ms. Peak has prepared a number of cultural resource overviews and predictive models for blocks of land proposed for future development for general and specific plans. She has been able to direct a number of surveys of these areas, allowing the model to be tested.

Ms. Peak completed the cultural resource research and contributed to the text prepared for the DeSabla-Centerville PAD for the initial stage of the FERC relicensing. She also served cultural resource project manager for the FERC relicensing of the Beardsley-Donnells Project. For the South Feather Power Project and the Woodleaf-Palermo and Sly Creek Transmission Lines, her team completing the technical work for the project.

She served as principal investigator for the multi-phase Twelve Bridges Golf Club project in Placer County. She served as liaison with the various agencies, helped prepare the historic properties treatment plan, managed the various phases of test and data recovery excavations, and completed the final report on the analysis of the test phase excavations of a number of prehistoric sites. She is currently involved as the principal investigator for the Clover Valley Lakes project adjacent to Twelve Bridges in the City of Rocklin, coordinating contacts with Native Americans, the Corps of Engineers and the Office of Historic Preservation.

Ms. Peak has served as project manager for a number of major survey and excavation projects in recent years, including the many surveys and site definition excavations for the 172-mile-long Pacific Pipeline proposed for construction in Santa Barbara, Ventura and Los Angeles counties. She also completed an archival study in the City of Los Angeles for the project, and served as principal investigator for a major coaxial cable removal project for AT&T.

Additionally, she completed a number of small surveys, served as a construction monitor at several urban sites, and conducted emergency recovery excavations for sites found during monitoring. She has directed the excavations of several historic complexes in Sacramento, Placer and El Dorado Counties.

Ms. Peak is the author of a chapter and two sections of a published history (1999) of Sacramento County, *Sacramento: Gold Rush Legacy, Metropolitan Legacy*. She served as the consultant for a children's book on California, published by Capstone Press in 2003 in the Land of Liberty series.

PEAK & ASSOCIATES, INC.
RESUME

MICHAEL LAWSON **January 2021**
Archeological Specialist
3941 Park Drive, Suite 20-329
El Dorado Hills, CA 95672
(916) 939-2405

PROFESSIONAL EXPERIENCE

Mr. Lawson has compiled an excellent record of supervision of excavation and survey projects for both the public and private sectors over the past twenty-two years. He has conducted a number of surveys throughout northern and central California, as well as serving as an archeological technician and crew chief for a number of excavation projects.

EDUCATION

B.A. - Anthropology - California State University, Sacramento

Special Course: Comparative Osteology. University of Tennessee, Knoxville. Forensic Anthropology Center. January 2018.

> Intensive lab and outdoor study with human example from outdoor research facility, including typical and non-metric examples, compared with fifty non-human species most commonly confused with human remains. Outdoor research facility "The Body Farm" study included survey, photography, collection and identification of faunal and human bone fragments, with a Power Point presentation discussing finds.

EXPERIENCE

- Extensive monitoring of open space, streets and project development areas for prehistoric period and historic period resources. Areas monitored include Sutter Street in Folsom; Mud Creek Archeological District in Chico; Camp Roberts, San Luis Obispo County; Avila Beach, San Luis Obispo County; Edgewood Golf Course, South Lake Tahoe; Davis Water Project, Davis; Star Bend levee section, Sutter County; Feather River levees, Sutter County; Bodega Bay, Sonoma County; San Jose BART line extension, Santa Clara County; and numerous sites for PG&E in San Francisco.
- Over twenty years of experience working in CRM, volunteer, and academic settings in California historic, proto-historic, and prehistoric archaeology.
- Expertise in pedestrian survey, excavation, feature (including burial) exposure, laboratory techniques, research. Field positions include crew chief and lead technician.

APPENDIX 2

Record Search

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

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

Date: 10/25/2021

Records Search File No.:11953L
Project: Dutra Lopez Project

Robert Gerry
Peak & Associates, Inc.
3941 Park Drive, Suite 30-329
El Dorado Hills, CA 95762
916-939-2405

Invoice phone: 916-283-5238
peakinc@surewest.net

Dear Mr. Gerry:

The Central California Information Center received your record search request for the project area referenced above, located on the Manteca 7.5' quadrangle in San Joaquin County. The following reflects the results of the records search for the project study area and radius:

As per data currently available at the CCaIC, the locations of resources/reports are provided in the following format: ☒ custom GIS maps ☐ GIS Data/shape files ☐ hand-drawn maps

Summary Data:

Resources within the project area:	None formally reported to the Information Center.
Resources within the 1/4-mile radius:	1: P-39-005337
Reports within the project area:	2: SJ-01900, 4786
Reports within the 1/4-mile radius:	5: SJ-05309, 6625, 7769, 7770, 8979

Resource Database Printout (list): ☒ enclosed ☐ not requested ☐ nothing listed
Resource Database Printout (details): ☐ enclosed ☒ not requested ☐ nothing listed
Resource Digital Database Records: ☐ enclosed ☒ not requested ☐ nothing listed
Report Database Printout (list): ☒ enclosed ☐ not requested ☐ nothing listed
Report Database Printout (details): ☐ enclosed ☒ not requested ☐ nothing listed
Report Digital Database Records: ☐ enclosed ☒ not requested ☐ nothing listed
Resource Record Copies: ☒ enclosed ☐ not requested ☐ nothing listed
Report Copies: ☐ enclosed ☒ not requested ☐ nothing listed
OHP Historic Properties Directory: New Excel File: Built Environment Resource Directory (BERD)
Dated 12/17/2019 ☐ enclosed ☐ not requested ☒ nothing listed
Archaeological Determinations of Eligibility: ☐ enclosed ☐ not requested ☒ nothing listed

CA Inventory of Historic Resources (1976): ☐ enclosed ☒ not requested ☐ nothing listed
Caltrans Bridge Survey: ☐ enclosed ☒ not requested ☐ nothing listed
Ethnographic Information: ☐ enclosed ☒ not requested ☐ nothing listed
Historical Literature: ☐ enclosed ☒ not requested ☐ nothing listed
Historical Maps: ☐ enclosed ☒ not requested ☐ nothing listed
Local Inventories: ☐ enclosed ☒ not requested ☐ nothing listed
GLO and/or Rancho Plat Maps: ☐ enclosed ☒ not requested ☐ nothing listed
Shipwreck Inventory: ☒ not available at CCIC; please go to
http://shipwrecks.slc.ca.gov/ShipwrecksDatabase/Shipwrecks_Database.asp
Soil Survey Maps: ☒ not available at CCIC; please go to
http://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx

Please forward a copy of any resulting reports from this project to the office as soon as possible. Due to the sensitive nature of archaeological site location data, we ask that you do not include resource location maps and resource location descriptions in your report if the report is for public distribution. If you have any questions regarding the results presented herein, please contact the office at the phone number listed above.

The provision of CHRIS Data via this records search response does not in any way constitute public disclosure of records otherwise exempt from disclosure under the California Public Records Act or any other law, including, but not limited to, records related to archeological site information maintained by or on behalf of, or in the possession of, the State of California, Department of Parks and Recreation, State Historic Preservation Officer, Office of Historic Preservation, or the State Historical Resources Commission.

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

Should you require any additional information for the above referenced project, reference the record search number listed above when making inquiries. Requests made after initial invoicing will result in the preparation of a separate invoice.

Thank you for using the California Historical Resources Information System (CHRIS).

Note: Billing will be transmitted separately via email by our Financial Services office *($231.00), payable within 60 days of receipt of the invoice.

If you wish to include payment by Credit Card, you must wait to receive the official invoice from Financial Services so that you can reference the CMP # (Invoice Number), and then

contact the link below:

https://commerce.cashnet.com/ANTHROPOLOGY

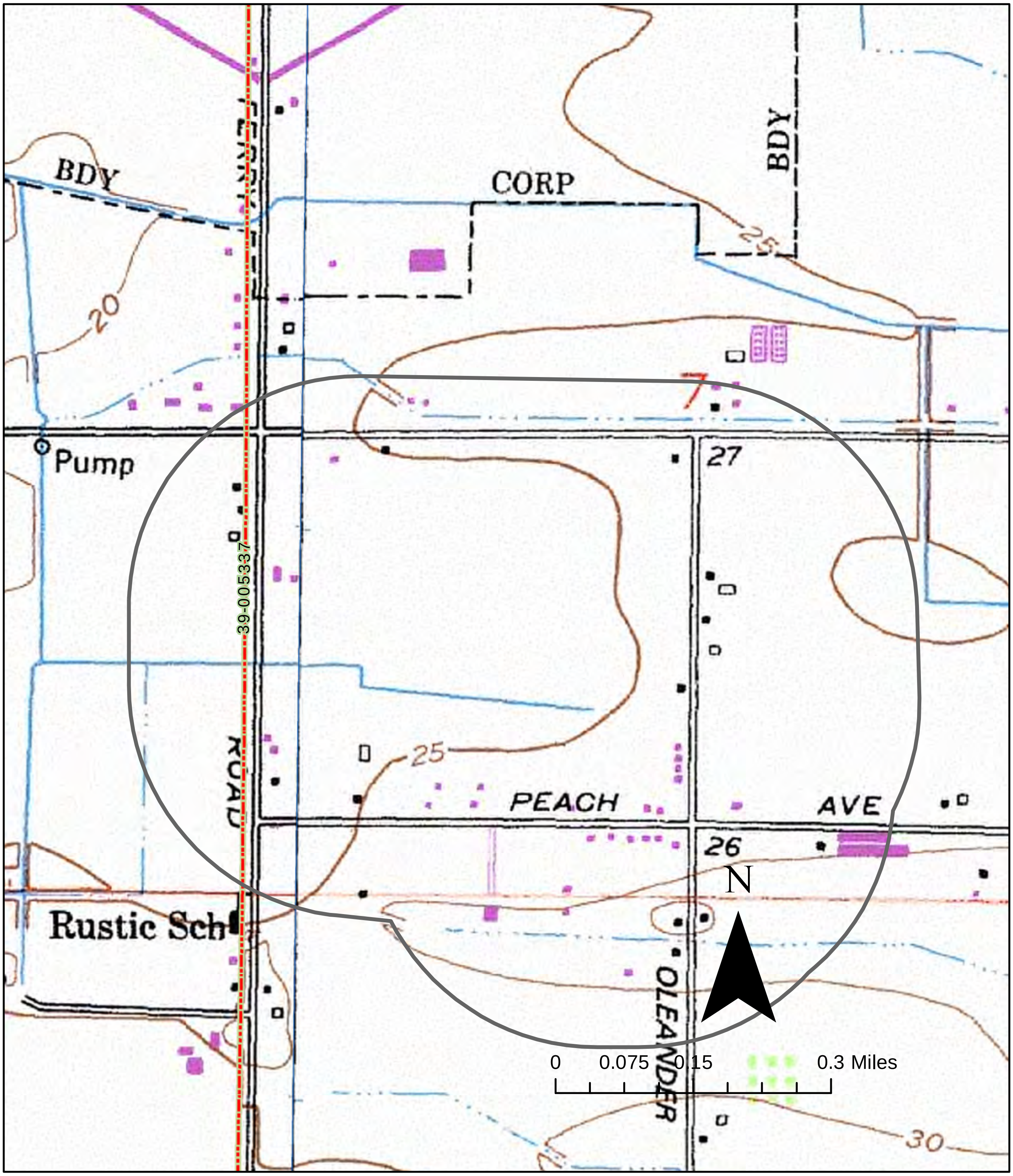
Sincerely,

E. A. Greathouse

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

* Invoice Request sent to: ARBilling@csustan.edu, CSU Stanislaus Financial Services

CCaIC 11953L Dutra Lopez Project
Resource 1/4-mile radius 1:10,000-scale
Manteca USGS 7.5' Quadrangle



Resource List

Primary No.	Trinomial	Other IDs	Type	Age	Attribute codes	Recorded by	Reports
P-39-005337		Resource Name - Tesla-Salado-Manteca 115 kV Transmission Line	Structure	Historic	HP11	2017 (M. Walker, Cardno, Inc., for PG&E)	SJ-09022

CCaIC 11953L Dutra Lopez Project
Reports 1/4-mile radius 1:10,000-scale
Manteca USGS 7.5' Quadrangle

Report List

Report No.	Other IDs	Year	Author(s)	Title	Affiliation	Resources
SJ-01900	NADB-R - 1360590	1993	Napton, L. K.	A Preliminary Cultural Resources Investigation of the South Manteca Area Plan, 7,800 acres in San Joaquin County, California.	CSU Stanislaus, Institute for Archaeological Research	39-000282
SJ-04786	NADB-R - 1364725	2002	Windmiller, Ric and Donald Napoli	City of Manteca--General Plan Update, Background Reports: Archaeological Resources, Historical Resources, Records Search Results.	Ric Windmiller, Consulting Archaeologist (and) Donald Napoli, of Historic Preservation Planning; for Wade Associates, Sacramento, CA	39-000002, 39-000015, 39-000098, 39-000099, 39-000102, 39-000103, 39-000111, 39-000282, 39-000354, 39-000681, 39-000682, 39-000683, 39-000684, 39-004148, 39-004188, 39-004189, 39-004190, 39-004191, 39-004192
SJ-05309	NADB-R - 1365195	2004	Baloian, M., R. Baloian, and W. Nettles	Cultural Resources Investigations for the South San Joaquin Irrigation District in San Joaquin County, California.	Applied Earthworks, Inc.; prepared for Russell Associates, Palo Alto, CA	39-000002, 39-000015, 39-000098, 39-000099, 39-000103, 39-000354, 39-004400, 39-004401, 39-004402, 39-004403, 39-004404, 39-004405, 39-004406, 39-004407, 39-004408, 39-004409, 39-004410, 39-004411, 39-004412, 39-004413, 39-004414, 39-004415, 39-004416, 39-004417
SJ-06625	NADB-R - 1367290	1998	ASI Archaeology and Cultural Resource Management	Cultural Resources Survey, South County Surface Water Project, San Joaquin County, California, South San Joaquin Irrigation District	ASI Archaeology and Cultural Resource Management (prepared for Environmental Science Associates, Inc.)	39-000002, 39-000098, 39-000129, 39-000317, 39-000531, 39-000548, 50-000001
SJ-07769	NADB-R - 1368146	2007	Jones & Stokes	Draft: Cultural Resources Inventory and Evaluation Report for the Machado Development Project, San Joaquin County, California. [Appendix B with Site Records not attached]	Jones & Stokes; for City of Manteca Community Development Dept.	
SJ-07770	NADB-R - 1368147	2013	Holman, M. P.	Letter Report: Cultural Resources Study of the Machado Property, 20329 South Airport Parkway, Manteca, San Joaquin County, California, APN 241-320-18.	Holman & Associates; for UPC/LLC	
SJ-08979		2017	Roper, C. K.	A Cultural Resources Assessment for the Proposed Nile Garden School Water Supply Project, 5700 E. Nile Road, Manteca, San Joaquin County, California	Sierra Valley Cultural Planning for C2 Consult Corp.	39-005101

APPENDIX C: NOISE REPORT

Environmental Noise Assessment

Dutra-Lopez Property

City of Manteca, California

March 5, 2022

Project #211009

Prepared for:

De Novo Planning Group
1020 Suncast Lane, Suite 106
El Dorado Hills, CA 95762

Prepared by:

Saxelby Acoustics LLC

Luke Saxelby, INCE Bd. Cert.
Principal Consultant
Board Certified, Institute of Noise Control Engineering (INCE)

(916) 760-8821
www.SaxNoise.com | Luke@SaxNoise.com
915 Highland Pointe Drive, Suite 250
Roseville, CA 95678

This section provides a general description of the existing noise sources in the Project vicinity, a discussion of the regulatory setting, and identifies potential noise impacts associated with the proposed Project. Project impacts are evaluated relative to applicable noise level criteria and to the existing ambient noise environment. Mitigation measures have been identified for significant noise-related impacts.

There were no comments received during the NOP scoping process related to this environmental topic.

3.11.1 ENVIRONMENTAL SETTING

KEY TERMS

Acoustics	The science of sound.
Ambient Noise	The distinctive acoustical characteristics of a given area consisting of all noise sources audible at that location. In many cases, the term ambient is used to describe an existing or pre-project condition such as the setting in an environmental noise study.
Attenuation	The reduction of noise.
A-Weighting	A frequency-response adjustment of a sound level meter that conditions the output signal to approximate human response. A-weighted dB values are expressed as dBA.
Decibel or dB	Fundamental unit of sound, defined as ten times the logarithm of the ratio of the sound pressure squared over the reference pressure squared.
CNEL	Community noise equivalent level. Defined as the 24-hour average noise level with noise occurring during evening hours (7 - 10 p.m.) weighted by a factor of three and nighttime hours weighted by a factor of 10 prior to averaging.
Frequency	The measure of the rapidity of alterations of a periodic acoustic signal, expressed in cycles per second or Hertz.
Impulsive	Sound of short duration, usually less than one second, with an abrupt onset and rapid decay.
L_{dn}	Day/Night Average Sound Level. Similar to CNEL but with no evening weighting.
L_{eq}	Equivalent or energy-averaged sound level.
L_{max}	The highest root-mean-square (RMS) sound level measured over a given period of time.
$L_{(n)}$	The sound level exceeded a described percentile over a measurement period. For instance, an hourly L_{50} is the sound level exceeded 50 percent of the time during the one hour period.
Loudness	A subjective term for the sensation of the magnitude of sound.
Noise	Unwanted sound.
SEL	Sound exposure levels. A rating, in decibels, of a discrete event, such as an aircraft flyover or train passby, that compresses the total sound energy into a one-second event.

FUNDAMENTALS OF ACOUSTICS

Acoustics is the science of sound. Sound may be thought of as mechanical energy of a vibrating object transmitted by pressure waves through a medium to human (or animal) ears. If the pressure variations occur frequently enough (at least 20 times per second), then they can be heard and are called sound. The number of pressure variations per second is called the frequency of sound, and is expressed as cycles per second or Hertz (Hz).

Noise is a subjective reaction to different types of sounds. Noise is typically defined as (airborne) sound that is loud, unpleasant, unexpected or undesired, and may therefore be classified as a more specific group of sounds. Perceptions of sound and noise are highly subjective from person to person.

Measuring sound directly in terms of pressure would require a very large and awkward range of numbers. To avoid this, the decibel scale was devised. The decibel scale uses the hearing threshold (20 micropascals), as a point of reference, defined as 0 dB. Other sound pressures are then compared to this reference pressure, and the logarithm is taken to keep the numbers in a practical range. The decibel scale allows a million-fold increase in pressure to be expressed as 120 dB, and changes in levels (dB) correspond closely to human perception of relative loudness.

The perceived loudness of sounds is dependent upon many factors, including sound pressure level and frequency content. However, within the usual range of environmental noise levels, perception of loudness is relatively predictable, and can be approximated by A-weighted sound levels. There is a strong correlation between A-weighted sound levels (expressed as dB) and the way the human ear perceives sound. For this reason, the A-weighted sound level has become the standard tool of environmental noise assessment. All noise levels reported in this section are in terms of A-weighted levels, but are expressed as dB, unless otherwise noted.

The decibel scale is logarithmic, not linear. In other words, two sound levels 10 dB apart differ in acoustic energy by a factor of 10. When the standard logarithmic decibel is A-weighted, an increase of 10 dB is generally perceived as a doubling in loudness. For example, a 70-dB sound is half as loud as an 80-dB sound, and twice as loud as a 60-dB sound.

Community noise is commonly described in terms of the ambient noise level, which is defined as the all-encompassing noise level associated with a given environment. A common statistical tool to measure the ambient noise level is the average, or equivalent, sound level (L_{eq}), which corresponds to a steady-state A weighted sound level containing the same total energy as a time varying signal over a given time period (usually one hour). The L_{eq} is the foundation of the composite noise descriptor, L_{dn}, and shows very good correlation with community response to noise.

The day/night average level (L_{dn}) is based upon the average noise level over a 24-hour day, with a +10 decibel weighing applied to noise occurring during nighttime (10:00 p.m. to 7:00 a.m.) hours. The nighttime penalty is based upon the assumption that people react to nighttime noise exposures as though they were twice as loud as daytime exposures. Because L_{dn} represents a 24-hour average, it tends to disguise short-term variations in the noise environment. CNEL is similar to L_{dn}, but includes a +5-dB penalty for evening noise. Table 3.11-1 lists several examples of the noise levels associated with common situations.

TABLE 3.11-1: TYPICAL NOISE LEVELS

COMMON OUTDOOR ACTIVITIES	*NOISE LEVEL (DB)*	*COMMON INDOOR ACTIVITIES*
	--110--	Rock Band
Jet Fly-over at 300 m (1,000 ft)	--100--	
Gas Lawn Mower at 1 m (3 ft)	--90--	
Diesel Truck at 15 m (50 ft), at 80 km/hr (50 mph)	--80--	Food Blender at 1 m (3 ft) Garbage Disposal at 1 m (3 ft)
Noisy Urban Area, Daytime Gas Lawn Mower, 30 m (100 ft)	--70--	Vacuum Cleaner at 3 m (10 ft)
Commercial Area Heavy Traffic at 90 m (300 ft)	--60--	Normal Speech at 1 m (3 ft)
Quiet Urban Daytime	--50--	Large Business Office Dishwasher in Next Room
Quiet Urban Nighttime	--40--	Theater, Large Conference Room (Background)
Quiet Suburban Nighttime	--30--	Library
Quiet Rural Nighttime	--20--	Bedroom at Night, Concert Hall (Background)
	--10--	Broadcast/Recording Studio
Lowest Threshold of Human Hearing	--0--	Lowest Threshold of Human Hearing

SOURCE: CALTRANS, TECHNICAL NOISE SUPPLEMENT, TRAFFIC NOISE ANALYSIS PROTOCOL. SEPTEMBER 2013.

EFFECTS OF NOISE ON PEOPLE

The effects of noise on people can be placed in three categories:

- Subjective effects of annoyance, nuisance, and dissatisfaction;
- Interference with activities such as speech, sleep, and learning; and
- Physiological effects such as hearing loss or sudden startling.

Environmental noise typically produces effects in the first two categories. Workers in industrial plants can experience noise in the last category. There is no completely satisfactory way to measure the subjective effects of noise or the corresponding reactions of annoyance and dissatisfaction. A wide variation in individual thresholds of annoyance exists and different tolerances to noise tend to develop based on an individual's past experiences with noise.

Thus, an important way of predicting a human reaction to a new noise environment is the way it compares to the existing environment to which one has adapted: the so-called ambient noise level. In general, the more a new noise exceeds the previously existing ambient noise level, the less acceptable the new noise will be judged by those hearing it. With regard to increases in A-weighted noise level, the following relationships occur:

- Except in carefully controlled laboratory experiments, a 1 dB change cannot be perceived;
- Outside of the laboratory, a 3-dB change is considered a just-perceivable difference;
- A change in level of at least 5-dB is required before any noticeable change in human response would be expected; and

- A 10-dB change is subjectively heard as approximately a doubling in loudness, and can cause an adverse response.

Stationary point sources of noise – including stationary mobile sources such as idling vehicles – attenuate (lessen) at a rate of approximately 6 dB per doubling of distance from the source, depending on environmental conditions (i.e. atmospheric conditions and either vegetative or manufactured noise barriers, etc.). Widely distributed noises, such as a large industrial facility spread over many acres, or a street with moving vehicles, would typically attenuate at a lower rate.

EXISTING AND FUTURE NOISE AND VIBRATION ENVIRONMENTS

Existing and Surrounding Land Uses

North: Existing single family residential uses and farmland border the north side of the project site.

East: Single family residential uses border the eastern boundary of the site.

South: East Peach Road and single-family residences border the southern boundary of the project site.

West: Farm land borders the western boundary of the project site.

Existing Ambient Noise Levels

To quantify the existing ambient noise environment in the Project Vicinity, continuous (24-hour) noise level measurements were conducted on the project site on November 11th – November 12th, 2021. The noise measurement locations are shown on Figure 3.10-1. The noise level measurement survey results are provided in Table 3.10-2. Appendix B of Appendix F shows the complete results of the noise monitoring survey.

The sound level meters were programmed to collect hourly noise level intervals at each site during the survey. The maximum value (L_{max}) represents the highest noise level measured during an interval. The average value (L_{eq}) represents the energy average of all of the noise measured during an interval. The median value (L_{50}) represents the sound level exceeded 50 percent of the time during an interval.

TABLE 3.11-2: SUMMARY OF EXISTING BACKGROUND NOISE MEASUREMENT DATA

SITE	*LOCATION*	*DATE/TIME*	L_{DN}	*AVERAGE MEASURED HOURLY NOISE LEVELS, DB*					
				DAYTIME (7AM-10PM)			*NIGHTTIME (10PM-7AM)*		
				L_{EQ}	L_{50}	L_{MAX}	L_{EQ}	L_{50}	L_{MAX}
Continuous (24-hour) Noise Level Measurements1									
LT-1	West of Project Site, 30 ft. to Airport Way Median	11/11/2021-11/12/2021	71	70	56	88	63	46	85
LT-2	South side of project site, 90 ft. to Union Road Median	11/11/2021-11/12/2021	52	50	44	68	44	42	65

SOURCE: SAXELBY ACOUSTICS, 2021.

Larson Davis Laboratories (LDL) Model 820 precision integrating sound level meters were used for the ambient noise level measurement survey. The meters were calibrated before and after use with an LDL Model CAL200 acoustical calibrator to ensure the accuracy of the measurements. The equipment used meets all pertinent specifications of the American National Standards Institute for Type 1 sound level meters (ANSI S1.4).

Existing and Future Traffic Noise Environment at Sensitive Receptors

OFF-SITE TRAFFIC NOISE IMPACT ASSESSMENT METHODOLOGY

To predict existing and cumulative noise levels due to traffic, the Federal Highway Administration (FHWA) Highway Traffic Noise Prediction Model (FHWA RD-77-108) was used. The model is based upon the Calveno reference noise emission factors for automobiles, medium trucks, and heavy trucks, with consideration given to vehicle volume, speed, roadway configuration, distance to the receiver, and the acoustical characteristics of the site. The FHWA model was developed to predict hourly L_{eq} values for free-flowing traffic conditions.

Traffic volumes for existing conditions were obtained from the traffic data prepared for the Project (Kittelson & Associates, 2022). Truck percentages and vehicle speeds on the local area roadways were estimated from field observations.

Traffic noise levels are predicted at the sensitive receptors located at the closest typical setback distance along each Project-area roadway segment. Where traffic noise barriers are predominately along a roadway segment, a -5 offset was added to the noise prediction model to account for various noise barrier heights. A -5 to dB offset was also applied where outdoor activity areas are shielded by intervening buildings. In some locations, sensitive receptors may be located at distances which vary from the assumed calculation distance and may experience shielding from intervening barriers or sound walls. However, the traffic noise analysis is believed to be representative of the majority of sensitive receptors located closest to the Project-area roadway segments analyzed in this report.

Table 3.11-3 shows the existing traffic noise levels in terms of L_{dn} at closest sensitive receptors along each roadway segment. A complete listing of the FHWA Model input data is contained in Appendix C of Appendix F.

TABLE 3.11-3: EXISTING TRAFFIC NOISE LEVELS

ROADWAY	*SEGMENT*	*EXTERIOR TRAFFIC NOISE LEVEL, DB L_{DN}*
Airport Way	North of Woodward Ave.	65.1
Woodward Ave.	Airport Way	57.4
Airport Way	South of Woodward Ave.	57.4
Union Rd.	North of Woodward Ave.	59.4
Woodward Ave.	East of Union Rd.	57.1
Woodward Ave.	West of Union Rd.	58.2
Union Rd.	South of Woodward Ave.	62.9
Peach Ave.	East of Oleander Ave.	N/A
Oleander Ave.	North of Street D	47.2
Oleander Ave.	South of Street D	47.2
E Peach Ave.	West of Street K	44.8

SOURCE: FHWA-RD-77-108 WITH INPUTS FROM KITTELSON & ASSOCIATES AND SAXELBY ACOUSTICS. 2022.

PREDICTED EXTERIOR TRAFFIC NOISE LEVELS

Implementation of the proposed Project would result in an increase in ADT volumes on the local roadway network, and consequently, an increase in noise levels from traffic sources along affected segments. Tables 3.11-4 and 3.11-5 show the predicted traffic noise level increases on the local roadway network for Existing, Existing + Project, Cumulative No Project, and Cumulative + Project conditions. Appendix C of Appendix F provides the complete inputs and results of the FHWA traffic noise modeling.

TABLE 3.11-4: EXISTING AND EXISTING PLUS PROJECT TRAFFIC NOISE LEVELS

ROADWAY	*SEGMENT*	*NOISE LEVELS (L_{DN}, DB) AT NEAREST SENSITIVE RECEPTORS*				
		EXISTING	*EXISTING + PROJECT*	*CHANGE*	*EX. GP CRITERIA*[1] / *PROPOSED GP CRITERIA*[2]	*SIGNIFICANT UNDER EX. GP?* / *SIGNIFICANT UNDER GP UPDATE?*
Airport Way	North of Woodward Ave.	66.7	67.3	0.6	+5-10 dBA	No
					+1.5 dBA	No
Woodward Ave.	West of Airport Way	62.8	63.8	1.0	+5-10 dBA	No
					+3 dBA	No
Airport Way	South of Woodward Ave.	67.2	67.6	0.4	+5-10 dBA	No
					+ 1.5 dBA	No

ROADWAY	SEGMENT	NOISE LEVELS (L_{DN}, DB) AT NEAREST SENSITIVE RECEPTORS				
		EXISTING	EXISTING + PROJECT	CHANGE	EX. GP CRITERIA[1] / PROPOSED GP CRITERIA[2]	SIGNIFICANT UNDER EX. GP? / SIGNIFICANT UNDER GP UPDATE?
Union Rd.	North of Woodward Ave.	59.4	59.5	0.1	>60 dBA	No
					+5 dBA	No
Woodward Ave.	East of Union Rd.	57.5	57.8	0.3	>60 dBA	No
					+5 dBA	No
Woodward Ave.	West of Union Rd.	58.6	59.0	0.4	>60 dBA	No
					+5 dBA	No
Union Rd.	South of Woodward Ave.	62.9	63.1	0.2	+5-10 dBA	No
					+3 dBA	No
Peach Ave.	East of Oleander Ave.	46.0	49.7	3.7	>60 dBA	No
					+5 dBA	No
Oleander Ave.	North of Street D	**45.0**	**54.2**	**9.2**	>60 dBA	No
					+5 dBA	**Yes**
Oleander Ave.	South of Street D	45.0	45.5	0.5	>60 dBA	No
					+5 dBA	No
E Peach Ave.	West of Street K	42.6	47.0	4.4	>60 dBA	No
					+5 dBA	No

[1] *EXISTING GP CRITERIA - IN MAKING A DETERMINATION OF IMPACT UNDER THE CALIFORNIA ENVIRONMENTAL QUALITY ACT (CEQA), A SUBSTANTIAL INCREASE WILL OCCUR IF AMBIENT NOISE LEVELS ARE INCREASED BY 10 DB OR MORE. AN INCREASE FROM 5-10 DB MAY BE SUBSTANTIAL. FACTORS TO BE CONSIDERED IN DETERMINING THE SIGNIFICANCE OF INCREASES FROM 5-10 DB INCLUDE:*

- *THE RESULTING NOISE LEVELS*
- *THE DURATION AND FREQUENCY OF THE NOISE*
- *THE NUMBER OF PEOPLE AFFECTED*
- *THE LAND USE DESIGNATION OF THE AFFECTED RECEPTOR SITES*
- *PUBLIC REACTIONS/CONTROVERSY AS DEMONSTRATED AT WORKSHOPS/HEARINGS, OR BY CORRESPONDENCE*
- *PRIOR CEQA DETERMINATIONS BY OTHER AGENCIES SPECIFIC TO THE PROJECT*

[2] *PROPOSED GP CRITERIA - IN MAKING A DETERMINATION OF IMPACT UNDER THE CALIFORNIA ENVIRONMENTAL QUALITY ACT (CEQA), A SUBSTANTIAL INCREASE WILL OCCUR IF AMBIENT NOISE LEVELS ARE HAVE A SUBSTANTIAL INCREASE. GENERALLY, A 3 DB INCREASE IN NOISE LEVELS IS BARELY PERCEPTIBLE, AND A 5 DB INCREASE IN NOISE LEVELS IS CLEARLY PERCEPTIBLE. THEREFORE, INCREASES IN NOISE LEVELS SHALL BE CONSIDERED TO BE SUBSTANTIAL WHEN THE FOLLOWING OCCURS:*

- *WHEN EXISTING NOISE LEVELS ARE LESS THAN 60 DB, A 5 DB INCREASE IN NOISE WILL BE CONSIDERED SUBSTANTIAL;*
- *WHEN EXISTING NOISE LEVELS ARE BETWEEN 60 DB AND 65 DB, A 3 DB INCREASE IN NOISE WILL BE CONSIDERED SUBSTANTIAL;*
- *WHEN EXISTING NOISE LEVELS EXCEED 65 DB, A 1.5 DB INCREASE IN NOISE WILL BE CONSIDERED SUBSTANTIAL.*

SOURCE: FHWA-RD-77-108 WITH INPUTS FROM KITTELSON & ASSOCIATES AND SAXELBY ACOUSTICS. 2022.

TABLE 3.11-5: CUMULATIVE AND CUMULATIVE + PROJECT TRAFFIC NOISE LEVELS

ROADWAY	SEGMENT	NOISE LEVELS (L_{DN}, DB) AT NEAREST SENSITIVE RECEPTORS				
		CUMULATIVE	CUMULATIVE + PROJECT	CHANGE	EX. GP CRITERIA[1] / PROPOSED GP CRITERIA[2]	SIGNIFICANT UNDER EX. GP? / SIGNIFICANT UNDER GP UPDATE?
Airport Way	North of Woodward Ave.	71.8	72.0	0.2	+5-10 dBA	No
					+1.5 dBA	No
Woodward Ave.	West of Airport Way	64.5	65.2	0.7	+5-10 dBA	No
					+3 dBA	No
Airport Way	South of Woodward Ave.	74.8	74.9	0.1	+5-10 dBA	No
					+1.5 dBA	No
Union Rd.	North of Woodward Ave.	62.4	62.5	0.1	+5-10 dBA	No
					+3 dBA	No
Woodward Ave.	East of Union Rd.	60.8	60.9	0.1	+5-10 dBA	No
					+3 dBA	No
Woodward Ave.	West of Union Rd.	59.4	59.7	0.3	>60 dBA	No
					+5 dBA	No
Union Rd.	South of Woodward Ave.	65.4	65.5	0.1	+5-10 dBA	No
					+1.5 dBA	No
Peach Ave.	East of Oleander Ave.	46.0	49.7	3.7	>60 dBA	No
					+5 dBA	No
Oleander Ave.	North of Street D	**45.0**	**54.2**	**9.2**	>60 dBA	No
					+5 dBA	**Yes**
Oleander Ave.	South of Street D	45.0	45.5	0.5	>60 dBA	No
					+5 dBA	No
E Peach Ave.	West of Street K	42.6	47.0	4.4	>60 dBA	No
					+5 dBA	No

[1] *EXISTING GP CRITERIA - IN MAKING A DETERMINATION OF IMPACT UNDER THE CALIFORNIA ENVIRONMENTAL QUALITY ACT (CEQA), A SUBSTANTIAL INCREASE WILL OCCUR IF AMBIENT NOISE LEVELS ARE INCREASED BY 10 DB OR MORE. AN INCREASE FROM 5-10 DB MAY BE SUBSTANTIAL. FACTORS TO BE CONSIDERED IN DETERMINING THE SIGNIFICANCE OF INCREASES FROM 5-10 DB INCLUDE:*

- *THE RESULTING NOISE LEVELS*
- *THE DURATION AND FREQUENCY OF THE NOISE*
- *THE NUMBER OF PEOPLE AFFECTED*
- *THE LAND USE DESIGNATION OF THE AFFECTED RECEPTOR SITES*
- *PUBLIC REACTIONS/CONTROVERSY AS DEMONSTRATED AT WORKSHOPS/HEARINGS, OR BY CORRESPONDENCE*
- *PRIOR CEQA DETERMINATIONS BY OTHER AGENCIES SPECIFIC TO THE PROJECT*

[2] *PROPOSED GP CRITERIA - IN MAKING A DETERMINATION OF IMPACT UNDER THE CALIFORNIA ENVIRONMENTAL QUALITY ACT (CEQA), A SUBSTANTIAL INCREASE WILL OCCUR IF AMBIENT NOISE LEVELS ARE HAVE A SUBSTANTIAL INCREASE. GENERALLY, A 3 DB INCREASE IN NOISE LEVELS IS BARELY PERCEPTIBLE, AND A 5 DB INCREASE IN NOISE LEVELS IS CLEARLY PERCEPTIBLE. THEREFORE,*

INCREASES IN NOISE LEVELS SHALL BE CONSIDERED TO BE SUBSTANTIAL WHEN THE FOLLOWING OCCURS:

- *WHEN EXISTING NOISE LEVELS ARE LESS THAN 60 DB, A 5 DB INCREASE IN NOISE WILL BE CONSIDERED SUBSTANTIAL;*
- *WHEN EXISTING NOISE LEVELS ARE BETWEEN 60 DB AND 65 DB, A 3 DB INCREASE IN NOISE WILL BE CONSIDERED SUBSTANTIAL;*
- *WHEN EXISTING NOISE LEVELS EXCEED 65 DB, A 1.5 DB INCREASE IN NOISE WILL BE CONSIDERED SUBSTANTIAL.*

SOURCE: FHWA-RD-77-108 WITH INPUTS FROM KITTELSON & ASSOCIATES AND SAXELBY ACOUSTICS. 2021.

Based upon data in Tables 3.11-4 and 3.11-5, the proposed Project is predicted to result in a maximum traffic noise level increase of 9.2 dB.

EVALUATION OF TRANSPORTATION NOISE ON OVERALL PROJECT SITE

Traffic Noise Levels

Airport Way

Cumulative plus project traffic noise levels are predicted to be 75 dB L_{dn} at a distance of 50 feet from the centerline of Airport Way, assuming no shielding from intervening buildings or sound walls. The proposed residential uses are located approximately 630 feet from the centerline Airport Way. Therefore, maximum exterior noise levels of 58 dB L_{dn} are predicted for these uses.

Peach Road

Cumulative plus Project traffic noise levels are predicted to be 52 dB L_{dn} at a distance of 50 feet from the centerline of Peach Road, assuming no shielding from intervening buildings or sound walls. The backyards of the proposed residential uses are located approximately 130 feet from the centerline this road. Therefore, maximum exterior noise levels of 46 dB L_{dn} are predicted for these uses.

Oleander Avenue

Cumulative plus Project traffic noise levels are predicted to be 55 dB L_{dn} at a distance of 50 feet from the centerline of Lovelace Road, assuming no shielding from intervening buildings or sound walls. The backyards of the proposed residential uses are located approximately 90 feet from the centerline this road. Therefore, maximum exterior noise levels of 51 dB L_{dn} are predicted for these uses.

CONSTRUCTION NOISE ENVIRONMENT

During the construction of the proposed Project, including roads, water, and sewer lines and related infrastructure, noise from construction activities would add to the noise environment in the Project vicinity. As indicated in Table 3.11-6, activities involved in construction would generate maximum noise levels ranging from 76 to 90 dB at a distance of 50 feet.

TABLE 3.11-6: CONSTRUCTION EQUIPMENT NOISE

TYPE OF EQUIPMENT	*MAXIMUM LEVEL, DB*	
	25 FEET	*50 FEET*
Backhoe	84	78
Compactor	89	83
Compressor (air)	84	78
Concrete Saw	96	90
Dozer	88	82
Dump Truck	82	76
Excavator	87	81
Generator	87	81
Jackhammer	94	89
Pneumatic Tools	91	85

SOURCE: ROADWAY CONSTRUCTION NOISE MODEL USER'S GUIDE. FEDERAL HIGHWAY ADMINISTRATION. FHWA-HEP-05-054. JANUARY 2006.

CONSTRUCTION VIBRATION ENVIRONMENT

The primary vibration-generating activities associated with the proposed Project would happen during construction when activities such as grading, utilities placement, and road construction occur. Table 3.11-7 shows the typical vibration levels produced by construction placement.

TABLE 3.11-7: VIBRATION LEVELS FOR VARIOUS CONSTRUCTION EQUIPMENT

TYPE OF EQUIPMENT	*PEAK PARTICLE VELOCITY @ 25 FEET (INCHES/SECOND)*	*PEAK PARTICLE VELOCITY @ 100 FEET (INCHES/SECOND)*
Large Bulldozer	0.089	0.011
Loaded Trucks	0.076	0.010
Small Bulldozer	0.003	0.000
Auger/drill Rigs	0.089	0.011
Jackhammer	0.035	0.004
Vibratory Hammer	0.070	0.009
Vibratory Compactor/roller	0.210	0.026

SOURCE: FEDERAL TRANSIT ADMINISTRATION, TRANSIT NOISE AND VIBRATION IMPACT ASSESSMENT GUIDELINES, MAY 2006

3.11.2 REGULATORY SETTING

FEDERAL

There are no federal regulations related to noise that apply to the proposed Project.

STATE

California Environmental Quality Act

The California Environmental Quality Act (CEQA) Guidelines, Appendix G, indicate that a significant noise impact may occur if a Project exposes persons to noise or vibration levels in excess of local general plans or noise ordinance standards, or cause a substantial permanent or temporary increase in ambient noise levels. CEQA standards are discussed more below under the Thresholds of Significance section.

California State Building Codes

The State Building Code, Title 24, Part 2 of the State of California Code of Regulations establishes uniform minimum noise insulation performance standards to protect persons within new buildings which house people, including hotels, motels, dormitories, apartment houses and dwellings other than single-family dwellings. Title 24 mandates that interior noise levels attributable to exterior sources shall not exceed 45 dB L_{dn} or CNEL in any habitable room.

Title 24 also mandates that for structures containing noise-sensitive uses to be located where the L_{dn} or CNEL exceeds 60 dB, an acoustical analysis must be prepared to identify mechanisms for limiting exterior noise to the prescribed allowable interior levels. If the interior allowable noise levels are met by requiring that windows be kept closed, the design for the structure must also specify a ventilation or air conditioning system to provide a habitable interior environment

CITY OF MANTECA

The City of Manteca General Plan – Existing (2003) General Plan

The City of Manteca General Plan Noise Element contains goals, policies, and implementation measures for assessing noise impacts within the City. Listed below are the noise goals, policies, and implementation measures that are applicable to the proposed Project (City of Manteca as amended through 2016):

GOALS: NOISE

- N-1. Protect the residents of Manteca from the harmful and annoying effects of exposure to excessive noise.
- N-3. Ensure that the downtown core noise levels remain acceptable and compatible with commercial and higher density residential land uses.

- N-4. Protect public health and welfare by eliminating existing noise problems where feasible, by establishing standards for acceptable indoor and outdoor noise, and by preventing significant increases in noise levels.
- N-5. Incorporate noise considerations into land use planning decisions, and guide the location and design of transportation facilities to minimize the effects of noise on adjacent land uses.

POLICIES: NOISE

- N-P-2. New development of residential or other noise-sensitive land uses will not be permitted in noise-impacted areas unless effective mitigation measures are incorporated into the Project design to satisfy the performance standards in Table 9-1 [Table 3.11-8].

TABLE 3.11-8: MAXIMUM ALLOWABLE NOISE EXPOSURE MOBILE NOISE SOURCES

LAND USE[4]	*OUTDOOR ACTIVITY AREAS*[1]	*INTERIOR SPACES*	
		L_{DN}*/CNEL, DB*	L_{EQ}*/CNEL, DB*[3]
Residential	60[2]	45	--
Transient Lodging	60[2]	45	--
Hospitals, Nursing Homes	60[2]	45	--
Theatres, Auditoriums, Music Halls	--	--	35
Churches, Music Halls	60[2]	--	40
Office Buildings	65	--	45
Schools, Libraries, Museums	--	--	45
Playgrounds, Neighborhood Parks	70	--	--

NOTES: [1] OUTDOOR ACTIVITY AREAS FOR RESIDENTIAL DEVELOPMENT ARE CONSIDERED TO BE BACKYARD PATIOS OR DECKS OF SINGLE FAMILY DWELLINGS, AND THE COMMON AREAS WHERE PEOPLE GENERALLY CONGREGATE FOR MULTI-FAMILY DEVELOPMENTS. OUTDOOR ACTIVITY AREAS FOR NON-RESIDENTIAL DEVELOPMENTS ARE CONSIDERED TO BE THOSE COMMON AREAS WHERE PEOPLE GENERALLY CONGREGATE, INCLUDING PEDESTRIAN PLAZAS, SEATING AREAS, AND OUTSIDE LUNCH FACILITIES. WHERE THE LOCATION OF OUTDOOR ACTIVITY AREAS IS UNKNOWN, THE EXTERIOR NOISE LEVEL STANDARD SHALL BE APPLIED TO THE PROPERTY LINE OF THE RECEIVING LAND USE.

[2] IN AREAS WHERE IT IS NOT POSSIBLE TO REDUCE EXTERIOR NOISE LEVELS TO 60 DB L_{DN} OR BELOW USING A PRACTICAL APPLICATION OF THE BEST NOISE-REDUCTION TECHNOLOGY, AN EXTERIOR NOISE LEVEL OF UP TO 65 L_{DN} WILL BE ALLOWED.

[3] DETERMINED FOR A TYPICAL WORST-CASE HOUR DURING PERIODS OF USE.

[4] WHERE A PROPOSED USE IS NOT SPECIFICALLY LISTED ON THE TABLE, THE USE SHALL COMPLY WITH THE NOISE EXPOSURE STANDARDS FOR THE NEAREST SIMILAR USE AS DETERMINED BY THE CITY.

SOURCE: CITY OF MANTECA GENERAL PLAN, NOISE ELEMENT, TABLE 9-1.

- N-P-3. The City may permit the development of new noise-sensitive uses only where the noise level due to fixed (non-transportation) noise sources satisfies the noise level standards of Table 9-2 [Table 3.11-9]. Noise mitigation may be required to meet Table 9-2 [Table 3.11-9] performance standards.

TABLE 3.11-9: PERFORMANCE STANDARDS FOR STATIONARY NOISE SOURCES OR PROJECTS AFFECTED BY STATIONARY NOISE SOURCES [1,2]

NOISE LEVEL DESCRIPTOR	*DAYTIME (7 AM – 10 PM)*	*NIGHTTIME (10 PM – 7 AM)*
Hourly L_{eq}, dB	50	45
Maximum Level, dB	70	65

NOTES: [1] *EACH OF THE NOISE LEVELS SPECIFIED ABOVE SHOULD BE LOWERED BY FIVE (5) DB FOR SIMPLE NOISE TONES, NOISES CONSISTING PRIMARILY OF SPEECH OR MUSIC, OR RECURRING IMPULSIVE NOISES. SUCH NOISES ARE GENERALLY CONSIDERED BY RESIDENTS TO BE PARTICULARLY ANNOYING AND ARE A PRIMARY SOURCE OF NOISE COMPLAINTS.*
[2] *NO STANDARDS HAVE BEEN INCLUDED FOR INTERIOR NOISE LEVELS. STANDARD CONSTRUCTION PRACTICES SHOULD, WITH THE EXTERIOR NOISE LEVELS IDENTIFIED, RESULT IN ACCEPTABLE INTERIOR NOISE LEVELS.*
SOURCE: CITY OF MANTECA GENERAL PLAN, NOISE ELEMENT, TABLE 9-2.

- N-P-5. In accord with the Table 9-2 [Table 3.11-9] standards, the City shall regulate construction-related noise impacts on adjacent uses.

IMPLEMENTATION MEASURES: NOISE

- N-I-1. New development in residential areas with an actual or projected exterior noise level of greater than 60 dB L_{dn} will be conditioned to use mitigation measures to reduce exterior noise levels to less than or equal to 60 dB L_{dn}.
- N-I-3. In making a determination of impact under the California Environmental Quality Act (CEQA), a substantial increase will occur if ambient noise levels are increased by 10 dB or more. An increase from 5-10 dB may be substantial. Factors to be considered in determining the significance of increases from 5-10 dB include:
  - the resulting noise levels
  - the duration and frequency of the noise
  - the number of people affected
  - the land use designation of the affected receptor sites
  - public reactions or controversy as demonstrated at workshops or hearings, or by correspondence
  - prior CEQA determinations by other agencies specific to the project
- N-I-4. Control noise at the source through use of insulation, berms, building design and orientation, buffer space, staggered operating hours and other techniques. Use noise barriers to attenuate noise to acceptable levels.

The City of Manteca General Plan – Proposed General Plan Update

The General Plan includes several policies relevant to public services. It is noted that the currently adopted General Plan is the 2023 General Plan; however, the City is currently undergoing an Update to the General Plan. Both 2023 General Plan policies and proposed General Plan Update policies applicable to the Project are identified below:

2023 GENERAL PLAN (EXISTING)

Policies: Safety

- S-5.1. Incorporate noise considerations into land use, transportation, and infrastructure planning decisions, and guide the location and design of noise-producing uses to minimize the effects of noise on adjacent noise-sensitive land uses, including residential uses and schools.
- S-5.2. Ensure that Downtown noise levels remain acceptable and compatible with a pedestrian-oriented environment and higher density residential land uses.
- S-5.3. Areas within Manteca exposed to existing or projected exterior noise levels from mobile noise sources exceeding the performance standards in Table S-1 shall be designated as noise-impacted areas.
- S-5.4. Require residential and other noise-sensitive development projects to satisfy the noise level criteria in Tables S-1 and S-2.
- S-5.5. Require new stationary noise sources proposed adjacent to noise sensitive uses to be mitigated so as to not exceed the noise level performance standards in Table S-2, or a substantial increase in noise levels established through a detailed ambient noise survey.
- S-5.6. Regulate construction-related noise to reduce impacts on adjacent uses to the criteria identified in Table S-2 or, if the criteria in Table S-2 cannot be met, to the maximum level feasible using best management practices and complying with the MMC Chapter 9.52.
- S-5.7. Where the development of residential or other noise-sensitive land use is proposed for a noise-impacted area or where the development of a stationary noise source is proposed in the vicinity of noise-sensitive uses, an acoustical analysis is required as part of the environmental review process so that noise mitigation may be considered in the project design. The acoustical analysis shall:
    - Be the responsibility of the applicant.
    - Be prepared by a qualified acoustical consultant experienced in the fields of environmental noise assessment and architectural acoustics.
    - Include representative noise level measurements with sufficient sampling periods and locations to adequately describe local conditions and the predominant noise sources.
    - Estimate existing and projected (20 years) noise levels in terms of the standards of Table S-1 or Table S-2, and compare those levels to the adopted policies of the Noise

Element.

- Recommend appropriate mitigation measures to achieve compliance with the adopted policies and standards of the Noise Element.
- Estimate noise exposure after the prescribed mitigation measures have been implemented.
- If necessary, describe a post-project assessment program to monitor the effectiveness of the proposed mitigation measures.

- S-5.8. Apply noise level criteria applied to land uses other than residential or other noise-sensitive uses consistent with noise performance levels of Table S-1 and Table S-2.
- S-5.9. Enforce the Sound Transmission Control Standards of the California Building Code concerning the construction of new multiple occupancy dwellings such as hotels, apartments, and condominiums.
- S-5.10. Ensure that new equipment and vehicles purchased by the City comply with noise level performance standards consistent with the best available noise reduction technology.
- S-5.11. Require the Manteca Police Department to actively enforce requirements of the California Vehicle Code relating to vehicle mufflers and modified exhaust systems.
- S-5.12. For new residential development backing on to a freeway or railroad right-of-way, the developer shall be required to provide appropriate mitigation measures to satisfy the performance standards in Table S-1.
- S-5.13. It is recognized that the City and surrounding areas are considered to be urban in nature and rely upon both the industrial and agricultural economy of the area. Therefore, it is recognized that noise sources of existing uses may exceed generally accepted standards.
- S-5.14. Carefully review and give potentially affected residents an opportunity to fully review any proposals for the establishment of helipads or heliports.
- S-5.15. Recognizing that existing noise-sensitive uses may be exposed to increase noise levels due to circulation improvement projects associated with development under the General Plan and that it may not be feasible to reduce increased traffic noise levels to the criteria identified in Table S-1, the following criteria may be used to determine the significance of noise impacts associated with circulation improvement projects:
  - Where existing traffic noise levels are less than 60 dB Ldn at the outdoor activity areas of noise-sensitive uses, a +5 dB Ldn increase in noise levels due to roadway improvement projects will be considered significant; and
  - Where existing traffic noise levels range between 60 and 65 dB Ldn at the outdoor activity areas of noise-sensitive uses, a +3 dB Ldn increase in noise levels due to roadway improvement projects will be considered significant; and
  - Where existing traffic noise levels are greater than 65 dB Ldn at the outdoor activity areas of noise-sensitive uses, a + 1.5 dB Ldn increase in noise levels due to roadway

improvement projects will be considered significant.

- S-5.16. Work with the Federal Railroad Administration and passenger and freight rail operators to reduce exposure to rail and train noise, including establishing train horn “quiet zones” consistent with the federal regulations.

Implementation: Safety

S-5a Require an acoustical analysis that complies with the requirements of S-5.7 where:

- Noise sensitive land uses are proposed in areas exposed to existing or projected noise levels exceeding the levels specified in Table S-1 or S-2.
- Proposed transportation projects are likely to produce noise levels exceeding the levels specified in Table S-1 or S-2 at existing or planned noise sensitive uses.

S-5b Assist in enforcing compliance with noise emissions standards for all types of vehicles, established by the California Vehicle Code and by federal regulations, through coordination with the Manteca Police Department and the California Highway Patrol.

S-5c Update the City’s Noise Ordinance (Chapter 9.52) to reflect the noise standards established in this Noise Element and proactively enforce the City’s Noise Ordinance, including requiring the following measures for construction:

- Restrict construction activities to the hours of 7:00 a.m. to 7:00 p.m. on Monday through Friday, and 8:00 a.m. to 6:00 p.m. on Saturdays. No construction shall be permitted outside of these hours or on Sundays or federal holidays, without a specific exemption issued by the City.
- A Construction Noise Management Plan shall be submitted by the applicant for construction projects, when determined necessary by the City. The Construction Noise Management Plan shall include proper posting of construction schedules, appointment of a noise disturbance coordinator, and methods for assisting in noise reduction measures.
- Noise reduction measures may include, but are not limited to, the following:
  a. Equipment and trucks used for project construction shall utilize the best available noise control techniques (e.g., improved mufflers, equipment redesign, use of intake silencers, ducts, engine enclosures and acoustically attenuating shields or shrouds) wherever feasible.
  b. Except as provided herein, impact tools (e.g., jack hammers, pavement breakers, and rock drills) used for project construction shall be hydraulically or electrically powered to avoid noise associated with compressed air exhaust from pneumatically powered tools. However, where use of pneumatic tools is unavoidable, an exhaust muffler on the compressed air exhaust shall be used. This muffler can lower noise levels from the exhaust by up to about 10 dBA. External jackets on the tools themselves shall be used, if such jackets are commercially available. this could achieve a reduction of 5 dBA. Quieter procedures shall be used, such as drills rather than impact equipment, whenever such procedures are available and consistent with construction procedures.

c. Temporary power poles shall be used instead of generators where feasible.

d. Stationary noise sources shall be located as far from adjacent properties as possible, and they shall be muffled and enclosed within temporary sheds, incorporate insulation barriers, or use other measures as determined by the City of provide equivalent noise reduction.

e. The noisiest phases of construction shall be limited to less than 10 days at a time. Exceptions may be allowed if the City determines an extension is necessary and all available noise reduction controls are implemented.

f. Delivery of materials shall observe the hours of operation described above.

g. Truck traffic should avoid residential areas to the extent possible.

S-5d In making a determination of impact under the California Environmental Quality Act (CEQA), a substantial increase will occur if ambient noise levels are have a substantial increase. Generally, a 3 dB increase in noise levels is barely perceptible, and a 5 dB increase in noise levels is clearly perceptible. Therefore, increases in noise levels shall be considered to be substantial when the following occurs:

- When existing noise levels are less than 60 dB, a 5 dB increase in noise will be considered substantial;
- When existing noise levels are between 60 dB and 65 dB, a 3 dB increase in noise will be considered substantial;
- When existing noise levels exceed 65 dB, a 1.5 dB increase in noise will be considered substantial.

Additional or alternative criteria can be used for determining a substantial increase in noise levels. For instance, if the overall increase in noise levels occurs where no noise-sensitive uses are located, then the City may use their discretion in determining if there is any impact at all. In such a case, the following alternative factors may be used for determining a substantial increase in noise levels:

- the resulting noise levels;
- the duration and frequency of the noise;
- the number of people affected;
- conforming or non-conforming land uses;
- the land use designation of the affected receptor sites;
- public reactions or controversy as demonstrated at workshops or hearings, or by correspondence; and
- prior CEQA determinations by other agencies specific to the project.

S-5e Control noise at the source through use of insulation, berms, building design and orientation, buffer space, staggered operating hours, and similar techniques. Where such techniques would not meet acceptable levels, use noise barriers to attenuate noise associated with new noise sources to acceptable levels.

S-5f Require that all noise-attenuating features are designed to be attractive and to minimize maintenance.

S-5g Evaluate new transportation projects, such as truck routes, rail or public transit routes, and transit stations, using the standards contained in Table S-1. However, noise from these projects may be allowed to exceed the standards contained in Table S-1, if the City Council finds that there are special overriding circumstances.

S-5h Work with the Federal Rail Authority and passenger and freight rail service providers to establish a Quiet Zone at at-grade crossings in the City. Where new development would be affected by the train and rail noise, require project applicants to fund a fair-share of: a) studies associated with the application for a Quiet Zone, and b) alternative safety measures associated with the Quiet Zone (including, but not limited to signage, gates, lights, etc.).

S-5i Work in cooperation with Caltrans, the Union Pacific Railroad, San Joaquin Regional Rail Commission, and other agencies where appropriate to maintain noise level standards for both new and existing projects in compliance with Table S-1.

S-5j The City shall require new residential projects located adjacent to major freeways, truck routes, hard rail lines, or light rail lines to follow the FTA screening distance criteria to ensure that groundborne vibrations to do not exceed acceptable levels.

TABLE S-1: MAXIMUM ALLOWABLE NOISE EXPOSURE FROM MOBILE NOISE SOURCES

Land Use[1]	*Outdoor Activity Areas*[2,3]	*Interior Spaces*	
		Ldn/ CNEL, dBA	*Leq, dBA*[4]
Residential	60	45	-
Motels/Hotels	65	45	-
Mixed-Use	65	45	
Hospitals, Nursing Homes	60	45	-
Theaters, Auditoriums	-	-	35
Churches	60	-	40
Office Buildings	65	-	45
Schools, Libraries, Museums	70	-	45
Playgrounds, Neighborhood Parks	70	-	-
Industrial	75	-	45
Golf Courses, Water Recreation	70	-	-

[1]Where a proposed use is not specifically listed, the use shall comply with the standards for the most similar use as determined by the City.

[2]Outdoor activity areas for residential development are considered to be the back yard patios or decks of single family units and the common areas where people generally congregate for multi-family developments. Where common outdoor activity areas for multi-family developments comply with the outdoor noise level standard, the standard will not be applied at patios or decks of individual units provided noise-reducing measures are incorporated (e.g., orientation of patio/deck, screening of patio with masonry or other noise-attenuating material). Outdoor activity areas for non-residential developments are the common areas where people generally congregate, including pedestrian

plazas, seating areas, and outside lunch facilities; not all residential developments include outdoor activity areas.

[3]In areas where it is not possible to reduce exterior noise levels to achieve the outdoor activity area standard w using a practical application of the best noise-reduction technology, an increase of up to 5 Ldn over the standard will be allowed provided that available exterior noise reduction measures have been implemented and interior noise levels are in compliance with this table

[4]Determined for a typical worst-case hour during periods of use.

TABLE S-2: PERFORMANCE STANDARDS FOR STATIONARY NOISE SOURCES, INCLUDING AFFECTED PROJECTS[1,2,3,4]

NOISE LEVEL DESCRIPTOR	*DAYTIME*	*NIGHTTIME*
	7 AM TO 10 PM	*10 PM TO 7 AM*
Hourly Leq, dBA	55	45

[1]Each of the noise levels specified above should be lowered by 5 dB for simple noise tones, noises consisting primarily of speech or music, or recurring impulsive noises. Such noises are generally considered to be particularly annoying and are a primary source of noise complaints.

[2]No standards have been included for interior noise levels. Standard construction practices should, with the exterior noise levels identified, result in acceptable interior noise levels.

[3]Stationary noise sources which are typically of concern include, but are not limited to, the following:

HVAC Systems	*Cooling Towers/Evaporative Condensers*
Pump Stations	*Lift Stations*
Emergency Generators	*Boilers*
Steam Valves	*Steam Turbines*
Generators	*Fans*
Air Compressors	*Heavy Equipment*
Conveyor Systems	*Transformers*
Pile Drivers	*Grinders*
Drill Rigs	*Gas or Diesel Motors*
Welders	*Cutting Equipment*
Outdoor Speakers	*Blowers*

[4]The types of uses which may typically produce the noise sources described above include but are not limited to: industrial facilities, pump stations, trucking operations, tire shops, auto maintenance shops, metal fabricating shops, shopping centers, drive-up windows, car washes, loading docks, public works projects, batch plants, bottling and canning plants, recycling centers, electric generating stations, race tracks, landfills, sand and gravel operations, and athletic fields.

City of Manteca Municipal Code Noise Ordinance

Section 9.52.030 of the City of Manteca Municipal Code prohibits excessive or annoying noise or vibration to residential and commercial properties in the City. The following general rules are outline in the ordinance:

9.52.030 PROHIBITED NOISES—GENERAL STANDARD

No person shall make, or cause to suffer, or permit to be made upon any public property, public right-of-way or private property, any unnecessary and unreasonable noises, sounds or vibrations which are physically annoying to reasonable persons of ordinary sensitivity or which are so harsh or so prolonged or unnatural or unusual in their use, time or place as to cause or contribute to the unnecessary and unreasonable discomfort of any persons within the neighborhood from which said noises emanate or which interfere with the peace and comfort of residents or their guests, or the operators or customers in places of business in the vicinity, or which may detrimentally or adversely affect such residences or places of business. (Ord. 1374 § 1(part), 2007)

17.58.050 D. EXEMPT ACTIVITIES

8. Construction activities when conducted as part of an approved Building Permit, except as prohibited in Subsection 17.58.050(E)(1) (Prohibited Activities) below.

17.58.050 E. Prohibited Activities

1. Construction Noise. Operating or causing the operation of tools or equipment on private property used in alteration, construction, demolition, drilling, or repair work daily between the hours of 7:00 p.m. and 7:00 a.m., so that the sound creates a noise disturbance across a residential property line, except for emergency work of public service utilities.

VIBRATION STANDARDS

Vibration is like noise in that it involves a source, a transmission path, and a receiver. While vibration is related to noise, it differs in that in that noise is generally considered to be pressure waves transmitted through air, whereas vibration usually consists of the excitation of a structure or surface. As with noise, vibration consists of an amplitude and frequency. A person's perception to the vibration will depend on their individual sensitivity to vibration, as well as the amplitude and frequency of the source and the response of the system which is vibrating.

Vibration can be measured in terms of acceleration, velocity, or displacement. A common practice is to monitor vibration measures in terms of peak particle velocities in inches per second. Standards pertaining to perception as well as damage to structures have been developed for vibration levels defined in terms of peak particle velocities.

The City does not have specific policies pertaining to vibration levels. However, vibration levels associated with construction activities are addressed as potential noise impacts associated with Project implementation.

Human and structural response to different vibration levels is influenced by several factors, including ground type, distance between source and receptor, duration, and the number of perceived vibration events. Table 3.11-10 indicates that the threshold for damage to structures ranges from 0.2 to 0.6 peak particle velocity in inches per second (in/sec p.p.v). A threshold of 0.20 in/sec p.p.v. is considered to be a reasonable threshold for short-term construction projects.

TABLE 3.11-10: EFFECTS OF VIBRATION ON PEOPLE AND BUILDINGS

PEAK PARTICLE VELOCITY		*HUMAN REACTION*	*EFFECT ON BUILDINGS*
MM/SEC.	*IN./SEC.*		
0.15-0.30	0.006-0.019	Threshold of perception; possibility of intrusion	Vibrations unlikely to cause damage of any type
2.0	0.08	Vibrations readily perceptible	Recommended upper level of the vibration to which ruins and ancient monuments should be subjected
2.5	0.10	Level at which continuous vibrations begin to annoy people	Virtually no risk of "architectural" damage to normal buildings
5.0	0.20	Vibrations annoying to people in buildings (this agrees with the levels established for people standing on bridges and subjected to relative short periods of vibrations)	Threshold at which there is a risk of "architectural" damage to normal dwelling - houses with plastered walls and ceilings. Special types of finish such as lining of walls, flexible ceiling treatment, etc., would minimize "architectural" damage
10-15	0.4-0.6	Vibrations considered unpleasant by people subjected to continuous vibrations and unacceptable to some people walking on bridges	Vibrations at a greater level than normally expected from traffic, but would cause "architectural" damage and possibly minor structural damage.

SOURCE: CALTRANS. TRANSPORTATION RELATED EARTHBORN VIBRATIONS. TAV-02-01-R9601 FEBRUARY 20, 2002.

3.11.3 IMPACTS AND MITIGATION MEASURES

THRESHOLDS OF SIGNIFICANCE

Consistent with Appendix G of the CEQA Guidelines, the Project will have a significant impact related to noise if it will result in:

Would the Project:

a. Generate a substantial temporary or permanent increase in ambient noise levels in the vicinity of the Project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?
b. Generate excessive groundborne vibration or groundborne noise levels?
c. For a Project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the Project expose people residing or working in the Project area to excessive noise levels?

Determination of a Significant Increase in Noise Levels

Existing (2003) General Plan Policies

The CEQA guidelines define a significant impact of a Project if it "increases substantially the ambient noise levels for adjoining areas". Implementation Measure N-I-3 of the City of Manteca General Plan Noise Element provides specific guidance for assessing increases in ambient noise, as follows:

In making a determination of impact under the California Environmental Quality Act (CEQA), a substantial increase will occur if ambient noise levels are increased by 10 dB or more. An increase from 5-10 dB may be substantial. Factors to be considered in determining the significance of increases from 5-10 dB include:

- *the resulting noise levels*
- *the duration and frequency of the noise*
- *the number of people affected*
- *the land use designation of the affected receptor sites*
- *public reactions/controversy as demonstrated at workshops/hearings, or by correspondence*
- *prior CEQA determinations by other agencies specific to the Project*

Proposed General Plan Policies

Under the City's proposed General Plan Update, the following policy S-5d will apply when evaluating substantial noise increases:

In making a determination of impact under the California Environmental Quality Act (CEQA), a substantial increase will occur if ambient noise levels increase substantially. Generally, a 3 dB increase in noise levels is barely perceptible, and a 5 dB increase in noise levels is clearly perceptible. Therefore, increases in noise levels shall be considered to be substantial when the following occurs:

- When existing noise levels are less than 60 dB, a 5 dB increase in noise will be considered substantial;
- When existing noise levels are between 60 dB and 65 dB, a 3 dB increase in noise will be considered substantial;
- When existing noise levels exceed 65 dB, a 1.5 dB increase in noise will be considered substantial.

Additional or alternative criteria can be used for determining a substantial increase in noise levels. For instance, if the overall increase in noise levels occurs where no noise-sensitive uses are located, then the City may use their discretion in determining if there is any impact at all. In such a case, the following alternative factors may be used for determining a substantial increase in noise levels:

- the resulting noise levels;
- the duration and frequency of the noise;
- the number of people affected;
- conforming or non-conforming land uses;
- the land use designation of the affected receptor sites;

- public reactions or controversy as demonstrated at workshops or hearings, or by correspondence; and
- prior CEQA determinations by other agencies specific to the Project.

IMPACTS AND MITIGATION MEASURES

Impact 3.11-1: The Proposed Project has the potential to generate a substantial temporary or permanent increase in ambient noise levels in the vicinity of the Project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies. (Less than Significant)

TRAFFIC NOISE INCREASES UNDER EXISTING (2003) GENERAL PLAN STANDARDS

As shown in Tables 3.11-4 and 3.11-5, some noise-sensitive receptors located along the Project-area roadways within and outside of the Project site are currently exposed to exterior traffic noise levels exceeding the City of Manteca 60 dB L_{dn} exterior noise level standard for residential uses. These receptors would continue to experience elevated exterior noise levels with implementation of the proposed Project. For example, sensitive receptors under Existing conditions located adjacent to Airport Way, north of Woodward Avenue, experience an exterior noise level of approximately 66.7 dB L_{dn}. Under Existing + Project conditions, exterior traffic noise levels are predicted to be approximately 67.3 dB L_{dn}. Exterior noise levels in both scenarios exceed the City's exterior noise level standard of 60 dB L_{dn}. Under the City's existing General Plan, the Project's contribution of 0.6 dB would not exceed the City's increase criteria of 5-10 dB.

On Oleandar Avenue north of Street D, the predicted noise increase is 9.2 dBA under plus project conditions. However, the noise levels under cumulative plus project conditions are predicted to be 54.2 dBA Ldn which meets the City's 60 dBA Ldn exterior noise standard. Under the existing General Plan standards, the increase of 9.2 dBA would not likely be considered significant considering that the resulting noise level is within the City's acceptable exterior noise standard limit of 60 dBA Ldn.

TRAFFIC NOISE INCREASES UNDER PROPOSED GENERAL PLAN STANDARDS

The Proposed City of Manteca General Plan Noise Element specifies criteria to determine the significance of traffic noise impacts. An increase in the traffic noise level of 1.5 dB or more would be significant where the pre-Project noise levels are greater than 65 dB L_{dn}, 3.0 dB or more where existing noise levels are between 60-65 dB $L_{dn,}$ and 5 dB or more where existing noise levels are less than 60 dBA L_{dn}.

According to Tables 3.11-4 and 3.11-5, the maximum noise level increase due to Project traffic is predicted to be 9.2 dBA L_{dn}. For this segment of Oleander Avenue, the existing traffic noise level at the nearest sensitive receptor is approximately 45.0 dBA. Therefore, an increase of 5 dB would be required to be considered a significant impact. The existing plus project increase of 9.2 dB would be significant under this scenario. All other roadway segments analyzed in the traffic study do not exceed the Proposed General Plan Standards for significant impacts.

In order to reduce this impact, the use of sound walls or quiet pavement would be required. Construction of new six-foot-tall sound walls is not a feasible mitigation measure as the impacted residential uses are fronted onto Oleander Drive.

Quiet pavements are typically assumed to provide a 3 to 5 dBA reduction. Assuming a minimum reduction of 3 dBA, quiet pavement placed along sensitive receptor areas on the previously listed roadway segment could reduce Project noise level increases, as outlined below:

- **Oleander Avenue from "Street D" to East Woodward Avenue** – noise levels are predicted to increase by 9.2 dB without mitigation. Use of quiet pavement would reduce this increase to approximately 4.2 to 6.2 dBA, depending on the performance of the quiet pavement. Resulting noise levels would be expected to be in the range of 49.2-51.2 dB Ldn. Approximately 1,200 feet (approximately 0.28 miles) of quiet pavement would be required. See Figure 3.10-2 for approximate required pavement locations.

With the use of quiet pavement on Oleander Avenue traffic noise level increases are expected to be in the range of 4.2 to 6.2 dBA, with resulting noise levels of no more than 51.2 dBA Ldn. This is well within the City's 60 dBA Ldn exterior noise standard. Therefore, with implementation of Mitigation Measure 3.10-1, traffic noise impacts would be ***less-than-significant***.

OPERATIONAL NOISE INCREASES

The proposed Project would include typical residential noise sources which would be compatible with the adjacent existing residential uses (a.k.a. neighborhood traffic, yard equipment, truck deliveries, garbage collected, etc.). Typical maximum noise levels from a park playground or sports field is 55 dBA Leq at a distance of 50 feet from the center of the play area. The proposed Lot A park/basin is located approximately 550 feet from the nearest existing off-site receptors, as measured from the center of the park. At this distance park noise levels would be expected to be approximately 34 dBA Leq. This is well under the City's 50 dBA Leq daytime and 45 dBA Leq nighttime noise standards for stationary noise sources.

CONSTRUCTION NOISE

During the construction of the Project, including roads, water, sewer lines, and related infrastructure, noise from construction activities would add to the noise environment in the Project vicinity. Existing receptors adjacent to the proposed construction activities are located north, south west, and east of the site.

As indicated in Table 3.11-6, activities involved in construction would generate maximum noise levels ranging from 82 to 96 dB L_{max} at a distance of 50 feet. Noise would also be generated during the construction phase by increased truck traffic on area roadways. A significant Project-generated noise source would be truck traffic associated with transport of heavy materials and equipment to and from construction sites. This noise increase would be of short duration and would likely occur primarily during daytime hours.

Construction activities would be temporary in nature and are exempt from noise regulation during the hours of 7:00 AM to 7:00 PM, as outlined in the City's Municipal Code:

> **17.58.050 D. Exempt Activities**
>
> 8. Construction activities when conducted as part of an approved Building Permit, except as prohibited in Subsection 17.58.050(E)(1) (Prohibited Activities) below.
>
> **17.58.050 E. Prohibited Activities**
>
> 1. Construction Noise. Operating or causing the operation of tools or equipment on private property used in alteration, construction, demolition, drilling, or repair work daily between the hours of 7:00 p.m. and 7:00 a.m., so that the sound creates a noise disturbance across a residential property line, except for emergency work of public service utilities.

Therefore, with implementation of MM 3.11-1, temporary construction noise impacts would be reduced to less than significant.

EXTERIOR TRAFFIC NOISE AT PROPOSED USES

Table 3.11-11 shows the predicted traffic noise levels at the proposed residential uses adjacent to the major Project-area arterial roadways and highways. Based upon Tables 3.11-11, exterior noise levels would comply with the City's 60 dBA L_{dn} normally acceptable exterior noise standard. Therefore, no additional noise control measures would be required.

TABLE 3.11-11: CUMULATIVE + PROJECT TRANSPORTATION NOISE LEVELS AT PROPOSED RESIDENTIAL USES – DUTRA/LOPEZ PROPERTY

SEGMENT	*APPROXIMATE RESIDENTIAL SETBACK, FEET[1]*	*PREDICTED NOISE LEVELS, DB L_{DN}*
Airport Way	630	58
Peach Road	130	46
Oleander Avenue	90	51

NOTES:
[1] SETBACK DISTANCES ARE MEASURED IN FEET FROM THE CENTERLINES OF THE ROADWAYS TO THE CENTER OF RESIDENTIAL BACKYARDS.
SOURCE: SAXELBY ACOUSTICS. 2022.

INTERIOR NOISE IMPACTS AT PROPOSED RESIDENTIAL USES

Modern construction typically provides a 25-dB exterior-to-interior noise level reduction with windows closed. Therefore, sensitive receptors exposed to exterior noise of 70 dB L_{dn}, or less, will typically comply with the City of Manteca 45 dB L_{dn} interior noise level standard. Additional noise reduction measures, such as acoustically-rated windows, are generally required for exterior noise levels exceeding 70 dB L_{dn}.

The proposed residential uses are predicted to be exposed to unmitigated first-floor exterior transportation noise levels up to 58 dBA L_{dn} at the proposed residential uses east of Airport Way. The second-floor locations may be exposed to noise levels 2-3 dB higher than ground floor receivers. Therefore, noise levels of 61 dB L_{dn} are expected at the second-floor facades along Airport Way.

Based upon a 25-dB exterior-to-interior noise level reduction, interior noise levels are predicted to be up to 36 at second floors and 33 dBA L_{dn} at first floors. Accordingly, predicted interior noise levels along the first row of residential uses along Airport Way are predicted to comply with the City's 45 dB L_{dn} interior noise level standard.

Therefore, this is a **less than significant** impact and no mitigation measures are required.

MITIGATION MEASURE(S)

Mitigation Measure 3.11-1: *To reduce traffic noise increases to, the following roadway segments shall be paved with quiet pavement:*

- Oleander Avenue from "Street D" to Woodward Avenue.

This requirement shall be noted on the Project improvement plans. Approximate pavement locations are shown on Figure 3.11-2.

Mitigation Measure 3.11-2a: *Construction activities shall adhere to the requirements of the City of Manteca Municipal Code with respect to hours of operation. This requirement shall be noted in the improvements plans prior to approval by the City's Public Works Department.*

Mitigation Measure 3.11-2b: *All equipment shall be fitted with factory equipped mufflers, and in good working order. This requirement shall be noted in the improvements plans prior to approval by the City's Public Works Department.*

Impact 3.11-2: The proposed Project has the potential to generate excessive groundborne vibration or groundborne noise levels. (Less than Significant)

Construction vibration impacts include human annoyance and building structural damage. Human annoyance occurs when construction vibration rises significantly above the threshold of perception. Building damage can take the form of cosmetic or structural damage.

With the exception of vibratory compactors, the Table 3.11-7 data indicate that construction vibration levels anticipated for the Project are less than the 0.2 in/sec threshold at a distance of 25 feet. Use of vibratory compactors within 26 feet of the adjacent buildings could cause vibrations in excess of 0.2 in/sec. Sensitive receptors which could be impacted by construction-related vibrations, especially vibratory compactors/rollers, are located approximately 10-15 feet, or further, from the Project site.

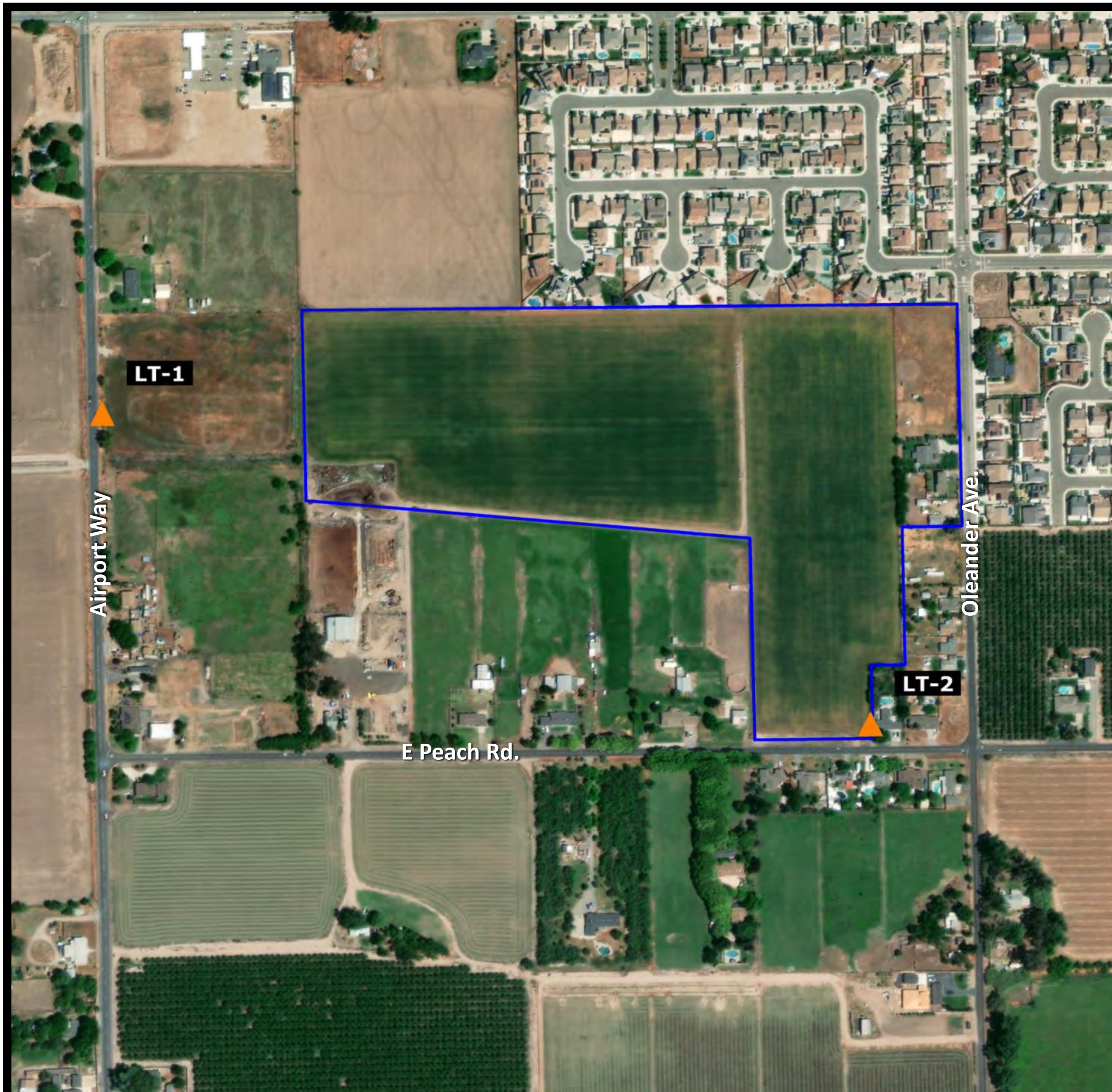
Implementation of the following mitigation measure will ensure that these potential impacts are reduced to a **less than significant** level.

MITIGATION MEASURE(S)

Mitigation Measure 3.11-3: *Any compaction required less than 26 feet from the adjacent residential structures shall be accomplished by using static drum rollers which use weight instead of vibrations to achieve soil compaction. As an alternative to this requirement, pre-construction crack documentation and construction vibration monitoring could be conducted to ensure that construction vibrations do not cause damage to any adjacent structures.*

Impact 3.11-3: For a Project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the Project expose people residing or working in the Project area to excessive noise levels. (Less Than Significant)

There are no airports within two miles of the Project vicinity. Therefore, this impact is not applicable to the proposed Project.



Dutra/Lopez Property

City of Manteca, California

Figure 3.11-1

Noise Measurement Sites

Legend

Project Site

Noise Measurement Site - Long Term

0 ft 1000 ft 2000 ft 3000 ft 4000 ft 5000 ft

Projection: UTM Zone 10 / WGS84 / meters
Rev. Date: 03/03/2022

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Acoustics · Noise · Vibration

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Dutra-Lopez Property

City of Manteca, California

Figure 3.10-2

Quiet Pavement Location

Legend

- Project Site
- Recommended Quiet Pavement

0 m 50 m 100 m 200 m

Projection: UTM Zone 10 / WGS84 / meters
Rev. Date: 03/05/2022

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Appendix A: Acoustical Terminology

Acoustics	The science of sound.
Ambient Noise	The distinctive acoustical characteristics of a given space consisting of all noise sources audible at that location. In many cases, the term ambient is used to describe an existing or pre-project condition such as the setting in an environmental noise study.
ASTC	Apparent Sound Transmission Class. Similar to STC but includes sound from flanking paths and correct for room reverberation. A larger number means more attenuation. The scale, like the decibel scale for sound, is logarithmic.
Attenuation	The reduction of an acoustic signal.
A-Weighting	A frequency-response adjustment of a sound level meter that conditions the output signal to approximate human response.
Decibel or dB	Fundamental unit of sound, A Bell is defined as the logarithm of the ratio of the sound pressure squared over the reference pressure squared. A Decibel is one-tenth of a Bell.
CNEL	Community Noise Equivalent Level. Defined as the 24-hour average noise level with noise occurring during evening hours (7 - 10 p.m.) weighted by +5 dBA and nighttime hours weighted by +10 dBA.
DNL	See definition of Ldn.
IIC	Impact Insulation Class. An integer-number rating of how well a building floor attenuates impact sounds, such as footsteps. A larger number means more attenuation. The scale, like the decibel scale for sound, is logarithmic.
Frequency	The measure of the rapidity of alterations of a periodic signal, expressed in cycles per second or hertz (Hz).
Ldn	Day/Night Average Sound Level. Similar to CNEL but with no evening weighting.
Leq	Equivalent or energy-averaged sound level.
Lmax	The highest root-mean-square (RMS) sound level measured over a given period of time.
L(n)	The sound level exceeded a described percentile over a measurement period. For instance, an hourly L50 is the sound level exceeded 50% of the time during the one-hour period.
Loudness	A subjective term for the sensation of the magnitude of sound.
NIC	Noise Isolation Class. A rating of the noise reduction between two spaces. Similar to STC but includes sound from flanking paths and no correction for room reverberation.
NNIC	Normalized Noise Isolation Class. Similar to NIC but includes a correction for room reverberation.
Noise	Unwanted sound.
NRC	Noise Reduction Coefficient. NRC is a single-number rating of the sound-absorption of a material equal to the arithmetic mean of the sound-absorption coefficients in the 250, 500, 1000, and 2,000 Hz octave frequency bands rounded to the nearest multiple of 0.05. It is a representation of the amount of sound energy absorbed upon striking a particular surface. An NRC of 0 indicates perfect reflection; an NRC of 1 indicates perfect absorption.
RT60	The time it takes reverberant sound to decay by 60 dB once the source has been removed.
Sabin	The unit of sound absorption. One square foot of material absorbing 100% of incident sound has an absorption of 1 Sabin.
SEL	Sound Exposure Level. SEL is a rating, in decibels, of a discrete event, such as an aircraft flyover or train pass by, that compresses the total sound energy into a one-second event.
SPC	Speech Privacy Class. SPC is a method of rating speech privacy in buildings. It is designed to measure the degree of speech privacy provided by a closed room, indicating the degree to which conversations occurring within are kept private from listeners outside the room.
STC	Sound Transmission Class. STC is an integer rating of how well a building partition attenuates airborne sound. It is widely used to rate interior partitions, ceilings/floors, doors, windows and exterior wall configurations. The STC rating is typically used to rate the sound transmission of a specific building element when tested in laboratory conditions where flanking paths around the assembly don't exist. A larger number means more attenuation. The scale, like the decibel scale for sound, is logarithmic.
Threshold of Hearing	The lowest sound that can be perceived by the human auditory system, generally considered to be 0 dB for persons with perfect hearing.
Threshold of Pain	Approximately 120 dB above the threshold of hearing.
Impulsive	Sound of short duration, usually less than one second, with an abrupt onset and rapid decay.
Simple Tone	Any sound which can be judged as audible as a single pitch or set of single pitches.

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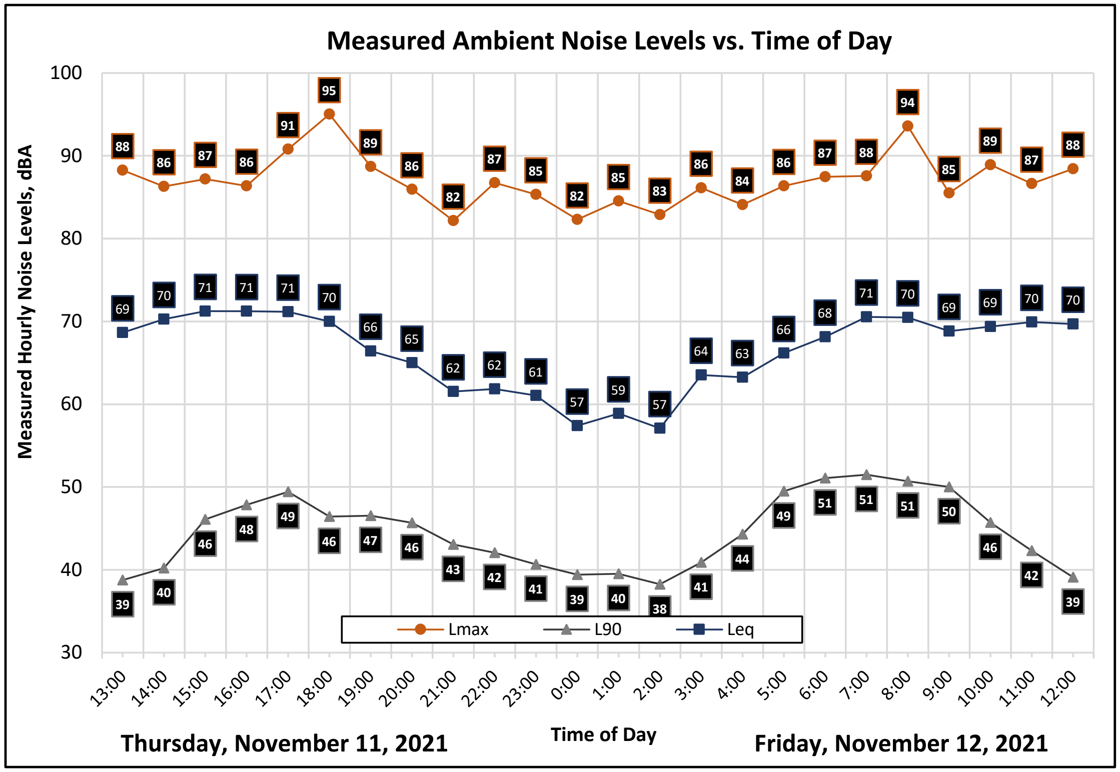
Appendix B: Continuous Ambient Noise Measurement Results

Appendix B1: Continuous Noise Monitoring Results

Site: LT-1
Project: Dutra-Lopez Property
Location: Southeastern Project Boundary
Coordinates: 37.7696795°, -121.2522519°
Meter: LDL 812-2
Calibrator: CAL200

Date	Time	Measured Level, dBA			
		L_{eq}	L_{max}	L_{50}	L_{90}
Thursday, November 11, 2021	13:00	69	88	53	39
Thursday, November 11, 2021	14:00	70	86	58	40
Thursday, November 11, 2021	15:00	71	87	63	46
Thursday, November 11, 2021	16:00	71	86	63	48
Thursday, November 11, 2021	17:00	71	91	62	49
Thursday, November 11, 2021	18:00	70	95	56	46
Thursday, November 11, 2021	19:00	66	89	51	47
Thursday, November 11, 2021	20:00	65	86	49	46
Thursday, November 11, 2021	21:00	62	82	46	43
Thursday, November 11, 2021	22:00	62	87	45	42
Thursday, November 11, 2021	23:00	61	85	43	41
Friday, November 12, 2021	0:00	57	82	42	39
Friday, November 12, 2021	1:00	59	85	42	40
Friday, November 12, 2021	2:00	57	83	40	38
Friday, November 12, 2021	3:00	64	86	43	41
Friday, November 12, 2021	4:00	63	84	48	44
Friday, November 12, 2021	5:00	66	86	53	49
Friday, November 12, 2021	6:00	68	87	55	51
Friday, November 12, 2021	7:00	71	88	59	51
Friday, November 12, 2021	8:00	70	94	57	51
Friday, November 12, 2021	9:00	69	85	54	50
Friday, November 12, 2021	10:00	69	89	55	46
Friday, November 12, 2021	11:00	70	87	56	42
Friday, November 12, 2021	12:00	70	88	56	39

Statistics	Leq	Lmax	L50	L90
Day Average	70	88	56	46
Night Average	63	85	46	43
Day Low	62	82	46	39
Day High	71	95	63	51
Night Low	57	82	40	38
Night High	68	87	55	51
Ldn	71	Day %		87
CNEL	72	Night %		13

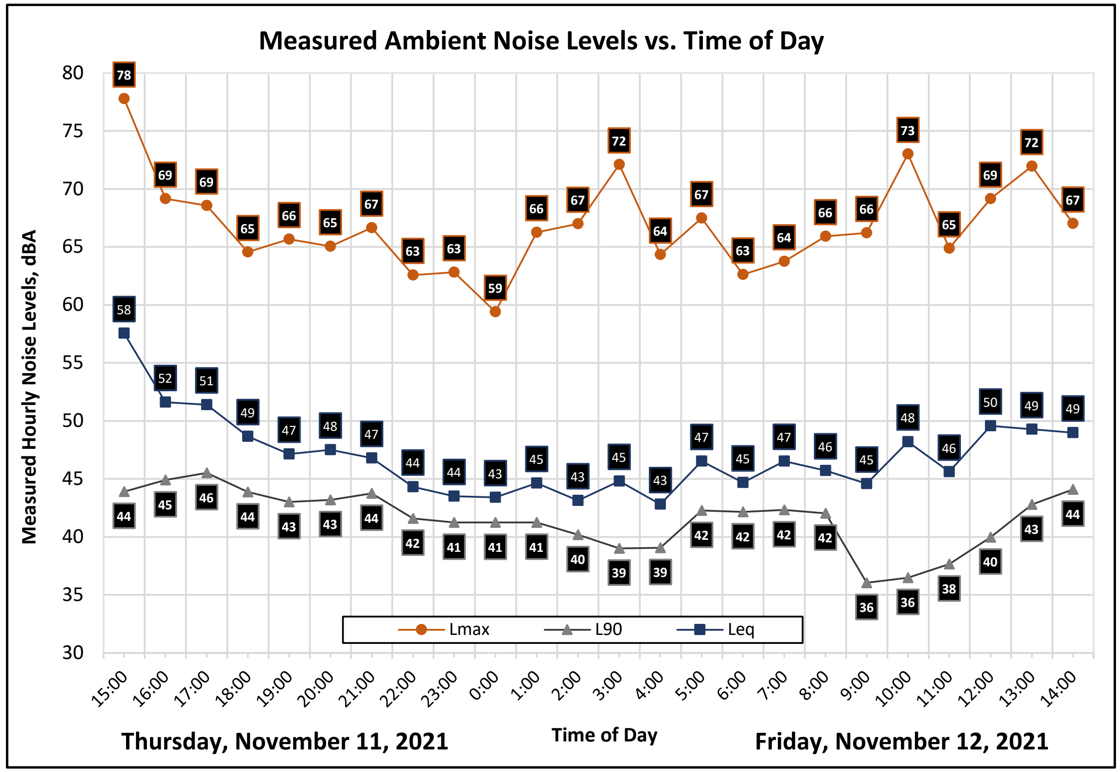


Appendix B2: Continuous Noise Monitoring Results

Site: LT-2
Project: Dutra-Lopez Property
Location: Southwestern Project Boundary
Coordinates: 37.7697259°, -121.2442022°
Meter: LDL 820-1
Calibrator: CAL200

Date	Time	Measured Level, dBA			
		L_{eq}	L_{max}	L_{50}	L_{90}
Thursday, November 11, 2021	15:00	58	78	50	44
Thursday, November 11, 2021	16:00	52	69	49	45
Thursday, November 11, 2021	17:00	51	69	48	46
Thursday, November 11, 2021	18:00	49	65	46	44
Thursday, November 11, 2021	19:00	47	66	44	43
Thursday, November 11, 2021	20:00	48	65	45	43
Thursday, November 11, 2021	21:00	47	67	45	44
Thursday, November 11, 2021	22:00	44	63	43	42
Thursday, November 11, 2021	23:00	44	63	43	41
Friday, November 12, 2021	0:00	43	59	43	41
Friday, November 12, 2021	1:00	45	66	42	41
Friday, November 12, 2021	2:00	43	67	42	40
Friday, November 12, 2021	3:00	45	72	40	39
Friday, November 12, 2021	4:00	43	64	40	39
Friday, November 12, 2021	5:00	47	67	43	42
Friday, November 12, 2021	6:00	45	63	43	42
Friday, November 12, 2021	7:00	47	64	43	42
Friday, November 12, 2021	8:00	46	66	43	42
Friday, November 12, 2021	9:00	45	66	38	36
Friday, November 12, 2021	10:00	48	73	38	36
Friday, November 12, 2021	11:00	46	65	40	38
Friday, November 12, 2021	12:00	50	69	43	40
Friday, November 12, 2021	13:00	49	72	44	43
Friday, November 12, 2021	14:00	49	67	46	44

Statistics	Leq	Lmax	L50	L90
Day Average	50	68	44	42
Night Average	44	65	42	41
Day Low	45	64	38	36
Day High	58	78	50	46
Night Low	43	59	40	39
Night High	47	72	43	42
Ldn	52	Day %		86
CNEL	52	Night %		14



Appendix C: Traffic Noise Calculation Inputs and Results

Appendix C-1

FHWA-RD-77-108 Highway Traffic Noise Prediction Model

Project #: 211009

Description: Dutra-Lopez Property - Existing Traffic

Ldn/CNEL: Ldn

Hard/Soft: Soft

Segment	Roadway	Segment	ADT	Day %	Eve %	Night %	% Med. Trucks	% Hvy. Trucks	Speed	Distance	Offset (dB)	Contours (ft.) - No Offset 60 dBA	65 dBA	70 dBA	Level, dBA
1	Airport Way	North of Woodward Ave.	7,820	90	0	10	2.0%	5.0%	55	70	0	195	91	42	66.7
2	Woodward Ave.	West of Airport Way	3,120	77	0	23	1.0%	1.0%	35	35	0	54	25	12	62.8
3	Airport Way	South of Woodward Ave.	4,660	87	0	13	2.0%	5.0%	55	50	0	151	70	33	67.2
4	Union Rd.	North of Woodward Ave.	8,830	90	0	10	1.0%	1.0%	45	60	-5	118	55	25	59.4
5	Woodward Ave.	East of Union Rd.	4,950	77	0	23	1.0%	1.0%	35	50	-5	73	34	16	57.5
6	Woodward Ave.	West of Union Rd.	3,840	77	0	23	1.0%	1.0%	30	65	0	53	24	11	58.6
7	Union Rd.	South of Woodward Ave.	4,800	80	0	20	1.0%	1.0%	45	65	0	102	47	22	62.9
8	Peach Ave.	East of Oleander Ave.	300	86	0	14	0.1%	0.1%	35	65	0	8	4	2	46.0
9	Oleander Ave.	North of Street D	160	86	0	14	0.1%	0.1%	35	50	0	5	2	1	45.0
10	Oleander Ave.	South of Street D	160	86	0	14	0.1%	0.1%	35	50	0	5	2	1	45.0
11	E Peach Ave.	West of Street K	260	86	0	14	0.1%	0.1%	35	100	0	7	3	1	42.6

Appendix C-2

FHWA-RD-77-108 Highway Traffic Noise Prediction Model

Project #: 211009

Description: Dutra-Lopez Property - Existing Plus Project Traffic

Ldn/CNEL: Ldn

Hard/Soft: Soft

Segment	Roadway	Segment	ADT	Day %	Eve %	Night %	% Med. Trucks	% Hvy. Trucks	Speed	Distance	Offset (dB)	Contours (ft.) - No Offset 60 dBA	65 dBA	70 dBA	Level, dBA
1	Airport Way	North of Woodward Ave.	9,030	90	0	10	2.0%	5.0%	55	70	0	215	100	46	67.3
2	Woodward Ave.	West of Airport Way	3,910	77	0	23	1.0%	1.0%	35	35	0	63	29	13	63.8
3	Airport Way	South of Woodward Ave.	5,100	87	0	13	2.0%	5.0%	55	50	0	160	74	35	67.6
4	Union Rd.	North of Woodward Ave.	9,120	90	0	10	1.0%	1.0%	45	60	-5	120	56	26	59.5
5	Woodward Ave.	East of Union Rd.	5,260	77	0	23	1.0%	1.0%	35	50	-5	76	35	16	57.8
6	Woodward Ave.	West of Union Rd.	4,230	77	0	23	1.0%	1.0%	30	65	0	56	26	12	59.0
7	Union Rd.	South of Woodward Ave.	5,010	80	0	20	1.0%	1.0%	45	65	0	105	49	23	63.1
8	Peach Ave.	East of Oleander Ave.	700	86	0	14	0.1%	0.1%	35	65	0	13	6	3	49.7
9	Oleander Ave.	North of Street D	1,340	86	0	14	0.1%	0.1%	35	50	0	21	10	4	54.2
10	Oleander Ave.	South of Street D	180	86	0	14	0.1%	0.1%	35	50	0	5	3	1	45.5
11	E Peach Ave.	West of Street K	720	86	0	14	0.1%	0.1%	35	100	0	14	6	3	47.0

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Appendix C-3
FHWA-RD-77-108 Highway Traffic Noise Prediction Model

Project #: 211009
Description: Dutra-Lopez Property - Cumulative
Ldn/CNEL: Ldn
Hard/Soft: Soft

Segment	Roadway	Segment	ADT	Day %	Eve %	Night %	% Med. Trucks	% Hvy. Trucks	Speed	Distance	Offset (dB)	Contours (ft.) - No Offset 60 dBA	65 dBA	70 dBA	Level, dBA
1	Airport Way	North of Woodward Ave.	25,620	90	0	10	2.0%	5.0%	55	70	0	430	200	93	71.8
2	Woodward Ave.	West of Airport Way	4,580	77	0	23	1.0%	1.0%	35	35	0	70	32	15	64.5
3	Airport Way	South of Woodward Ave.	26,740	87	0	13	2.0%	5.0%	55	50	0	484	225	104	74.8
4	Union Rd.	North of Woodward Ave.	17,760	90	0	10	1.0%	1.0%	45	60	-5	188	87	40	62.4
5	Woodward Ave.	East of Union Rd.	10,490	77	0	23	1.0%	1.0%	35	50	-5	121	56	26	60.8
6	Woodward Ave.	West of Union Rd.	4,610	77	0	23	1.0%	1.0%	30	65	0	59	28	13	59.4
7	Union Rd.	South of Woodward Ave.	8,540	80	0	20	1.0%	1.0%	45	65	0	149	69	32	65.4
8	Peach Ave.	East of Oleander Ave.	300	86	0	14	0.1%	0.1%	35	65	0	8	4	2	46.0
9	Oleander Ave.	North of Street D	160	86	0	14	0.1%	0.1%	35	50	0	5	2	1	45.0
10	Oleander Ave.	South of Street D	160	86	0	14	0.1%	0.1%	35	50	0	5	2	1	45.0
11	E Peach Ave.	West of Street K	260	86	0	14	0.1%	0.1%	35	100	0	7	3	1	42.6

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Appendix C-4

FHWA-RD-77-108 Highway Traffic Noise Prediction Model

Project #: 211009

Description: Dutra-Lopez Property - Cumulative Plus Project

Ldn/CNEL: Ldn

Hard/Soft: Soft

Segment	Roadway	Segment	ADT	Day %	Eve %	Night %	% Med. Trucks	% Hvy. Trucks	Speed	Distance	Offset (dB)	Contours (ft.) - No Offset 60 dBA	65 dBA	70 dBA	Level, dBA
1	Airport Way	North of Woodward Ave.	26,810	90	0	10	2.0%	5.0%	55	70	0	443	206	96	72.0
2	Woodward Ave.	West of Airport Way	5,370	77	0	23	1.0%	1.0%	35	35	0	77	36	17	65.2
3	Airport Way	South of Woodward Ave.	27,160	87	0	13	2.0%	5.0%	55	50	0	489	227	105	74.9
4	Union Rd.	North of Woodward Ave.	18,010	90	0	10	1.0%	1.0%	45	60	-5	189	88	41	62.5
5	Woodward Ave.	East of Union Rd.	10,800	77	0	23	1.0%	1.0%	35	50	-5	123	57	27	60.9
6	Woodward Ave.	West of Union Rd.	4,960	77	0	23	1.0%	1.0%	30	65	0	62	29	13	59.7
7	Union Rd.	South of Woodward Ave.	8,750	80	0	20	1.0%	1.0%	45	65	0	152	70	33	65.5
8	Peach Ave.	East of Oleander Ave.	700	86	0	14	0.1%	0.1%	35	65	0	13	6	3	49.7
9	Oleander Ave.	North of Street D	1,340	86	0	14	0.1%	0.1%	35	50	0	21	10	4	54.2
10	Oleander Ave.	South of Street D	180	86	0	14	0.1%	0.1%	35	50	0	5	3	1	45.5
11	E Peach Ave.	West of Street K	720	86	0	14	0.1%	0.1%	35	100	0	14	6	3	47.0

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APPENDIX D: TRANSPORTATION IMPACT ANALYSIS REPORT

DUTRA PROPERTY TRANSPORTATION IMPACT ANALYSIS

MANTECA, CA

February 21, 2022

Dutra Property Transportation Impact Analysis

Manteca, CA

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Prepared by:
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Project Analyst:
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Project Number 26781

February 21, 2022

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Section 1
Introduction and Summary

INTRODUCTION AND SUMMARY

This report presents the findings of the transportation impact analysis (TIA) conducted for the proposed Dutra Property residential development, located in the northwest quadrant of the intersection of Oleander Avenue & Peach Road in the City of Manteca, California.

INTRODUCTION

PROJECT DESCRIPTION

The proposed Dutra Property residential development (the "project") would develop vacant land located in the northwest quadrant of the intersection of Oleander Avenue & Peach Road, as shown in **Figure 1**. The proposed project would construct 197 single family residential units. Access would be provided via one driveway along Peach Road (Street K) and one driveway along Oleander Avenue (Street D). A future connection to Airport Way is anticipated via extension of Street E in the future when the vacant land west of the project site is developed. The project conceptual plan is presented in **Figure 2**.

SURROUNDING LAND USES

Surrounding land uses in the southern portion of the City of Manteca in the project vicinity primarily consist of agricultural and residential uses.

SCOPE OF TRANSPORTATION IMPACT ANALYSIS

The transportation impact analysis includes two levels of evaluation:

- California Environmental Quality Act (CEQA) transportation analysis
- Local transportation analysis

CEQA Transportation Analysis

The CEQA transportation analysis includes four transportation impact areas:

a. Conflicts with circulation system programs
b. Vehicle-miles of travel (VMT)
c. Hazards
d. Emergency access

These are the transportation impact areas that may be considered in environmental documentation for the project. Other transportation issues would not be part of the environmental evaluation under CEQA but may be considered as part of a local transportation analysis.

Local Transportation Analysis

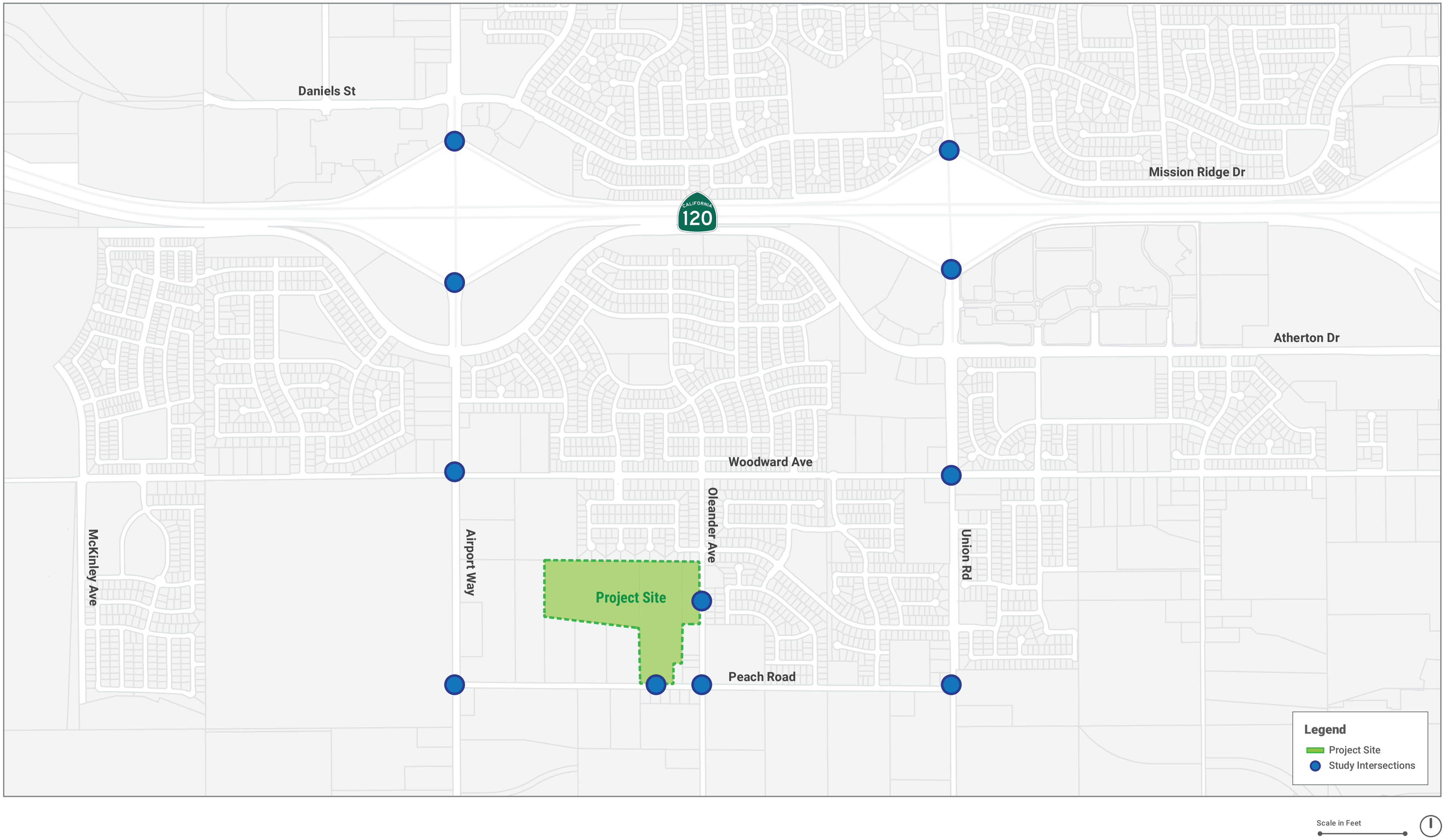
The local transportation analysis evaluates the project's potential effects on the transportation system relative to City of Manteca policies and standards. The transportation issues considered in the local transportation analysis include:

- Traffic operations at study intersections
- Site access and circulation
- Parking

Traffic operations were evaluated at nine study intersections as well as two project driveways, as shown in **Figure 1**, for the following four scenarios:

- Existing Conditions without Project
- Existing Plus Project Conditions
- Cumulative (2040) Conditions without Project
- Cumulative (2040) Plus Project Conditions

The Cumulative conditions consider land use development consistent with the Manteca General Plan and committed transportation improvements for the 2040 horizon year.



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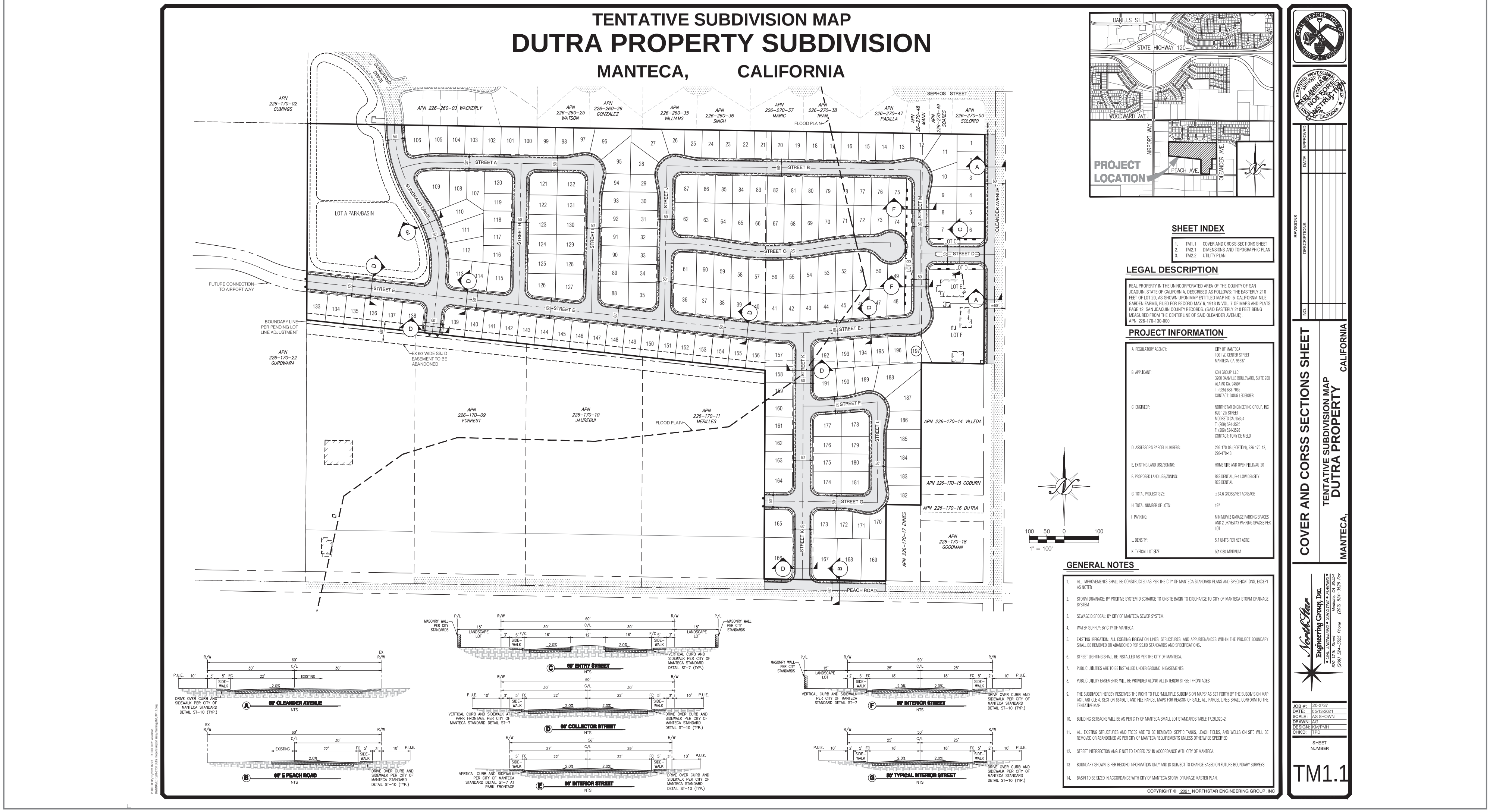
Manteca, CA. Dutra Property | Traffic Impact Analysis

FIGURE 1 | **Study Area and Project Site**


TENTATIVE SUBDIVISION MAP
DUTRA PROPERTY SUBDIVISION
MANTECA, CALIFORNIA
PROJECT LOCATION
SHEET INDEX
LEGAL DESCRIPTION
PROJECT INFORMATION
GENERAL NOTES
COVER AND CORSS SECTIONS SHEET
TENTATIVE SUBDIVISION MAP
DUTRA PROPERTY
MANTECA, CALIFORNIA
TM1.1

SUMMARY

CEQA TRANSPORTATION ANALYSIS

- The proposed Dutra Property Residential Development (the "project") is not anticipated to cause any signficant impacts on the transportation sytem in terms of conflicts with plans, VMT, hazards or emergency access.
- The project's VMT per household under cumulative conditions is estimated to be 38.7 percent lower than the existing baseline VMT per household in Manteca, which is below the 15 percent VMT impact threshold recommended by the State of California.

LOCAL TRANSPORTATION ANALYSIS

Intersection Operations

- All study intersections operate at level of service D or better in existing conditions, consistent with General Plan policies, except for the following all way stop control intersection:
  - Union Road & Woodward Avenue (LOS F in the AM peak hour, LOS E in the PM peak hour)
- With traffic added by the proposed project, all study intersections would continue to operate at level of service D or better in existing plus project conditions, consistent with General Plan policies, except for the following all way stop controlled intersections:
  - Union Road & Woodward Avenue (LOS F in the AM peak hour, LOS F in the PM peak hour)
  - Airport Way & Woodward Avenue (LOS E in the AM peak)
- With 2040 cumulative growth and committed street improvements per the City's Transportation Public Facilities Implementation Plan (PFIP), all study intersections would operate at level of service D or better except:
  - Airport Way and SR 120 Westbound Ramps (LOS F in AM and PM peak hours)
  - Airport Way and SR 120 Eastbound Ramps (LOS F in AM and PM peak hours)
- This location is identified for improvements in the PFIP, however, conceptual plans are not available at the time of this study. Improvements such as widening the SR 120 Ramps to three lanes in each direction are recommended to provide future cumulative intersection operations that meet the LOS D policy from the City's General Plan.

Site Access and Circulation

- The project's proposed driveways along Peach Road and Oleander Avenue are assumed to provide one shared left and right turn lane for site egress and one shared thru-left turn lane and one shared thru-right turn lane for site ingress. The driveways will be sidestreet stop controlled. Both driveways are anticipated to operate at LOS A in both Existing Plus Project and Cumulative Plus Project conditions based upon the operational analyses conducted as part of this study.
- The proposed site plan would provide good pedestrian circulation and access for all vehicle types.
- It is recommended that the project provide parking that would meet the City's municipal code requirements for single-family dwellings (2 covered spaces/dwelling). It is also recommended for the project to design it's internal roadways to allow onstreet parking where feasible, similar to nearby residential communities and consistent with City design requirements.

- It is recommended that Manteca Transit consider extending Dial-a-Ride service to include the southern portion of the City, including the project site, as development continues to occur.

Section 2
Existing Conditions

EXISTING CONDITIONS

This chapter provides a description of the existing roadway, traffic, transit, bicycle, and pedestrian components of the transportation system within the study area.

DATA COLLECTION

Intersection turning movement count data were collected on Tuesday, September 14, 2021 (Intersections #1 and #2) and Wednesday, December 8, 2021 (Intersections #3 through #9), during the AM (7:00-9:00 AM) and PM (4:00-6:00PM) peak periods at nine of the 11 study intersections (excluding the two Project access points which do not yet exist). Peak hour traffic count data are provided in **Figure 3**.

Existing traffic control, transit service, bicycle and pedestrian facilities, and planned transportation improvement information was compiled as part of the data collection efforts.

ROAD NETWORK

The roadway system in the study area consists of regional freeways and local streets that serve local and regional travel demand.

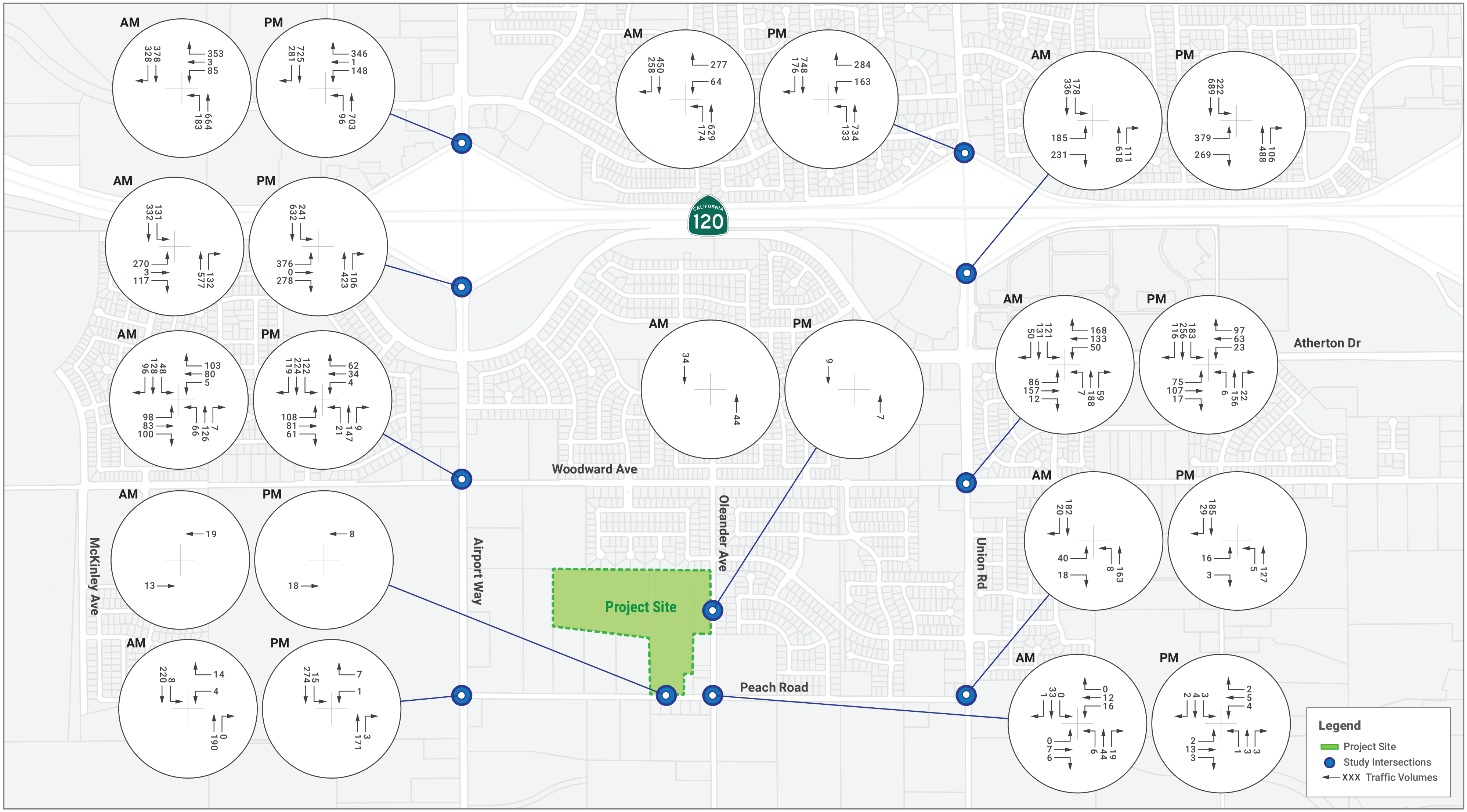
FREEWAYS

State Route (SR) 120 is a freeway/highway providing a connection between Intersate 5 (I-5) and SR 99 through Manteca. SR 120 continues as a non-freeway highway east of SR 99 connecting to Escalon, Oakdale and Yosemite National Park. Between the I-5 interchange and the SR 99 interchange, SR 120 is a freeway with two 12-foot general purpose lanes in each direction. East of SR 99, SR 120 is a conventional highway with one general purpose lane in each direction, with some sections providing two general purpose lanes in each direction or a center median/turn lane. Access to and from SR 120 is provided via interchanges at Airport Way, Union Road, and South Main Street. The posted speed limit on the freeway portion of SR 120 is 65 miles per hour (mph); the posted speed limit on the highway portion east of SR 99 is 45 mph.

LOCAL STREETS

Airport Way is classified as an arterial by the City of Manteca. It provides connectivity from Stockton to the north to rural San Joaquin County to the south. It is primarily a two-lane road within the city. Outside Manteca, the facility operates as a two-lane rural road providing access primarily to rural residential, agricultural and some industrial land uses. The curb-to-curb width is generally about 30 feet, with two 12-foot lanes and two 3-foot shoulders. Street parking is not present along Airport Way in the study area. The posted speed limit is 45 mph.

Peach Road is an approximately one-mile long, two-lane, undivided, east-west roadway. It intersects north-south study roadways including Airport Way, Oleander Avenue, and Union Road. It primarily provides connectivity to agricultural and residential land uses. The curb-to-curb width is generally about 26 feet, with two 10-foot lanes and two 3-foot paved shoulders. An approximately 1,300 foot long Class II bike lane is provided for westbound cyclists east of Oleander Avenue and west of Al Fonseca Lane. The posted speed limit is 35 mph.



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Manteca, CA. Dutra Property | Traffic Impact Analysis

FIGURE 3 | **Existing Traffic Volumes**

Union Road is a north-south road classified as an arterial that provides connectivity to City's north and south residential and agricultural land uses, as well as SR 120 via eastbound and westbound on- and off-ramps. A diverging diamond interchange (DDI) has been constructed for the SR 120 & Union Road interchange. Union Road is primarily a two-lane road in the project vicinity, with sections alternating between divided and undivided lanes. The curb-to-curb width generally ranges between 100 and 35-feet, with between four and two travel lanes, paved shoulders, and raised medians (where divided). Street parking is not present along Union Road in the study area. The southbound posted speed limit is 55 mph south of Peach Road and 40 mph north of Peach Road in the project vicinity. The northbound posted speed limit is 55 mph south of Peach Road and 35 mph north of Peach Road in the project vicinity.

Woodward Avenue is an approximately six-mile long, east-west roadway. It provides connectivity from west Manteca to Moffat Boulevard, intersecting Airport Way, Union Road, and Oleander Avenue. West of Airport Way, it is a two-lane, undivided roadway with an approximately 30-foot cross-section including two 12-foot lanes and two 3-foot paved shoulders. From Airport Way to east of Union Road, it is primarily a two-lane divided roadway. The curb-to-curb width is generally about 45-feet, with two 12-foot lanes, one 15-foot median, and two 3-foot paved shoulders. The posted speed limit is 35 mph west of Airport Way and 30 mph east of Airport Way in the study area. Parallel on-street parking bays exist along Woodward Avenue from west of Harvest Lane to east of Al Fonseca Lane.

Oleander Avenue is an approximately three-mile, north-south roadway extending from Ripon Road in the south to Atherton Drive in the north. It provides connectivity between the new and planned residential dvelopments north of Peach Road as well as to the agricultural land uses in the south. It intersects Peach Road and Woodward Avenue in the project vicinity. It is a two-lane roadway that provides two approximately 11-foot vehicle lanes and approximately 10-foot shared bike lane and parallel on-street parking lanes on both sides of the road from north of Woodward Avenue to Sephos Street. An approximately 11-foot shared bike lane and parallel on-street parking is provided along the east side of Oleander Avenue from Sephos Street to approximately 750-feet to the south. From north of Peach Road to the south in the project vicinity, Oleander Avenue is a two-lane undivided roadway with two approximately 10-foot vehicle lanes, and 3-foot paved shoulders.

TRANSIT SERVICES

The transit system in the study area consists of local bus and regional rail service. Transit service in the area is provided by Manteca Transit, the San Joaquin Regional Transit District, and the Modesto Area Express. Regional rail service is provided by the Altamont Commuter Express. The transit facilities in the study area are discussed below

MANTECA TRANSIT

Manteca Transit provides bus service in the study area. Manteca Transit bus routes and local bus stops are shown on **Figure 4** and listed in **Table 1**.

Table 1: Existing Manteca Transit Weekday Service

Route	Loop Direction	Key Destinations	Peak/Off-Peak Frequency (minutes)
1	Counterclockwise	▪ Manteca Transit Center ▪ Daniels Street at Stadium Center ▪ Spreckles Shopping Area	60/60
2	Clockwise	▪ Manteca Transit Center ▪ Mission Ridge Shopping Center ▪ Promenade Shops at Orchard Valley	60/60
3	Counterclockwise	▪ Manteca Transit Center ▪ McParland School ▪ Louise Avenue ▪ Manteca Golf Course	60/60
4	Clockwise	▪ Manteca Transit Center ▪ McParland School ▪ Woodward Avenue ▪ Manteca Golf Course	60/60

Source: Manteca Transit Ride Guide / System Map

Generally, curbside transit stops in the study area are identified with posted signs and do not include passenger amenities such as a shelter, seating, landscaping, bicycle parking, or pedestrian-scale lighting.

The transit stop closest to the Project site is located approximately ½ mile to the northeast along Woodward Avenue, west of Al Fonseca Lane. This stop serves Manteca Transit Route 4.

The Project site is not within the Manteca Transit's current Dial-A-Ride service area.

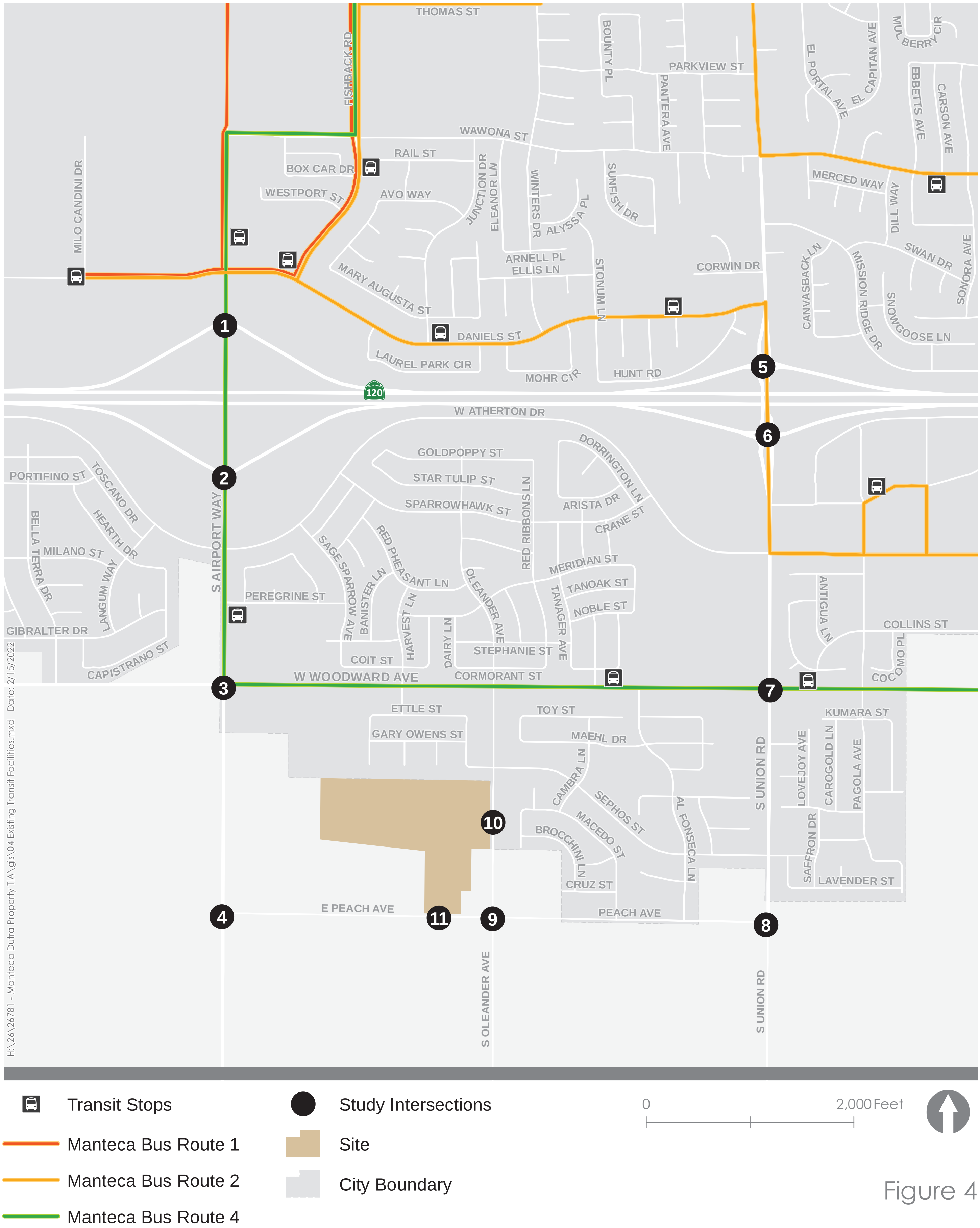


Figure 4

KITTELSON & ASSOCIATES

Existing Transit Facilities
Manteca, California

MODESTO AREA EXPRESS (MAX)

The Modesto Area Express (MAX) offers express commuter Service to the Manteca/Lathrop ACE train station from the Modesto Transit Center.

SAN JOAQUIN REGIONAL TRANSIT DISTRICT (RTD)

The San Joaquin Regional Transit District (RTD) provides regional service between Modesto and Stockton through Manteca via Hopper Routes 91, 95, and 97 along South Main Street (closest routes to the project site).

ALTAMONT CORRIDOR EXPRESS (ACE)

The Altamont Corridor Express (ACE) provides service from Stockton to San Jose (in the morning) and from San Jose to Stockton (in the afternoon). The Manteca Transit Center serves as the Lathrop/Manteca stop.

MANTECA TRANSIT CENTER

The Manteca Transit Center provides service to all four bus routes and the San Joaquin RTD Route 91. The ACE Lathrop/Manteca Station provides connection to Altamont Corridor Express (ACE), Modesto Area Express (MAX), and RTD Route 91. The Manteca Transit Shuttle runs between the Manteca Transit Center and the ACE Lathrop/Manteca station five times per day. The Park & Ride Lot provides access to RTD Route 91.

BICYCLE FACILITIES

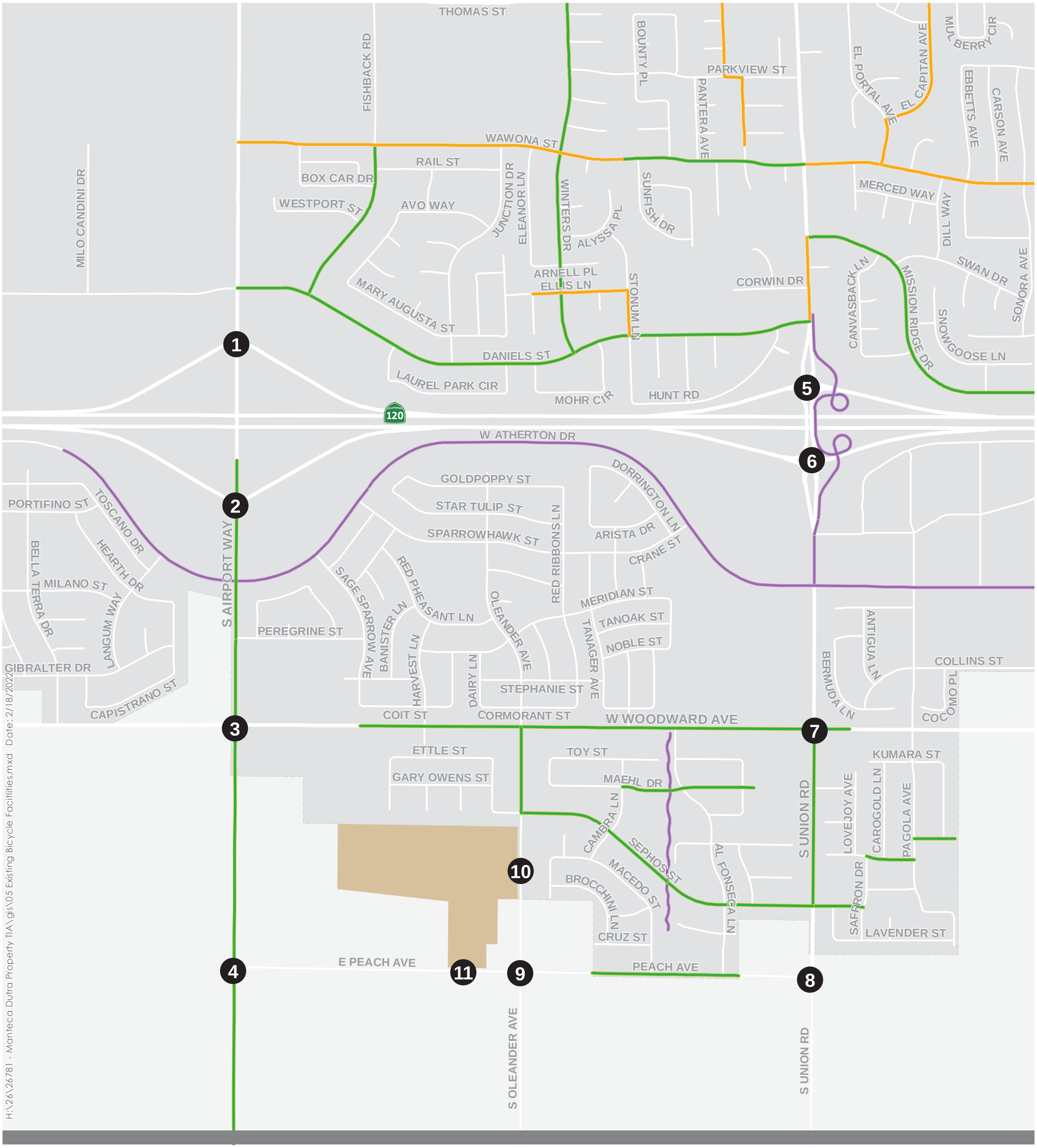
This section describes the existing bicycle facilities within the study area and **Figure 5** graphically shows the locations of the existing facilities.

Bicycle facilities are categorized into four types, as described below:

- **Class I Bikeway (Bike Path**). Also known as a shared path or multi-use path, a bike path is a paved right-of-way for bicycle travel that is completely separate from any street or highway.
- **Class II Bikeway (Bike Lane)**. A striped and stenciled lane for one-way bicycle travel on a street or highway. This facility could include a buffered space between the bike lane and vehicle lane and the bike lane could be adjacent to on-street parking.
- **Class III Bikeway (Bike Route)**. A signed route along a street where the bicyclist shares the right-of-way with motor vehicles. This facility can also be designated using a shared-lane marking (sharrow).
- **Class IV Bikeway (Separated Bike Lane)**. A bikeway for the exclusive use of bicycles including a separation required between the separated bikeway and the through vehicular traffic. The separation may include, but is not limited to, grade separation, flexible posts, inflexible physical barriers, or on-street parking.

As shown in **Figure 5**, the existing bicycle facilities within the study area include:

- Class I bicycle path along Atherton Drive from west of Airport Way to east of Union Road.
- Class II bicycle lanes along Airport Way from SR 120 ramps to south of Peach Avenue.
- Class II bicycle lanes along Woodward Avenue from east of Airport Way to east of Union Road.
- Class II bicycle lanes north of SR 120 along segments Daniels Street, Fishback Road, Winters Drive, and Mission Ridge Drive.
- Class III bicycle lanes north of SR 120 along segments of Wawona Street, Union Road, Stonum Lane, and Ellis Lane.



Class I Bike Path

Class II Bike Lane

Class III Bike Route

Study Intersections

Site

City Boundary

0 2,000 Feet

Figure 5

Existing Bicycle Facilities
Manteca, California

KITTELSON & ASSOCIATES

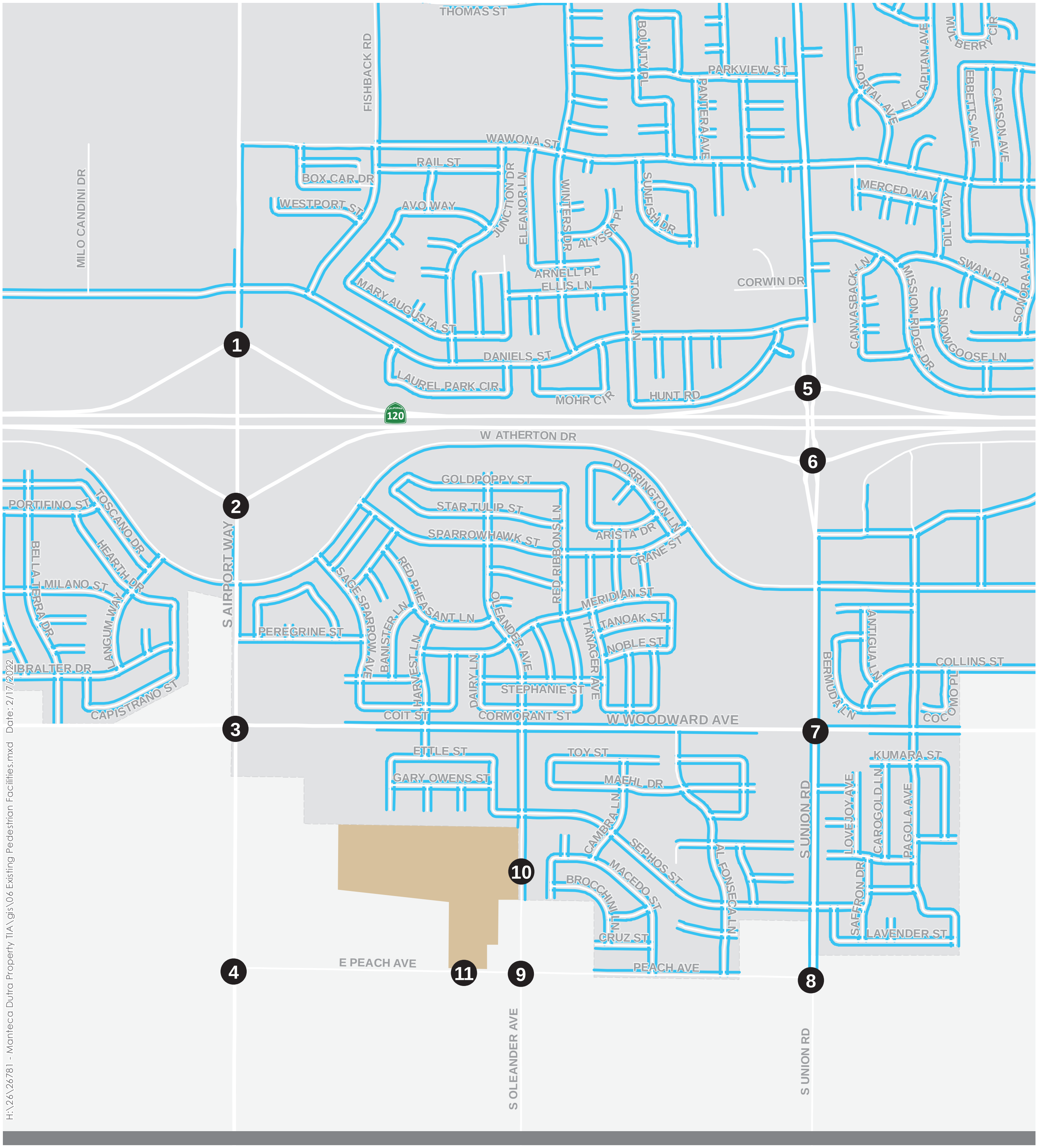
PEDESTRIAN FACILITIES

The study area offers several types of facilities and amenities that support walking (**Figure 6**). The availability and quality of pedestrian facilities can be analyzed using seven key factors as shown in Table 2.

Table 2: Pedestrian Facility Conditions

Factor	Description	Assessment
Sidewalk Availability	Sidewalk availability is core to supporting walkability and safety separating pedestrians from vehicles and other modes. In addition, it is important that sidewalks are present on both sides of the roadway and are available along the entire segment rather than end midblock.	Sidewalk along both sides of the street are generally provided within the residential developments within the study area. The project is located in the southern portion of the City which includes agricultural land uses and minimal sidewalks. No sidewalk currently exists along the project's proposed frontages on Peach Road or Oleander Avenue. Sidewalk does exist along the east side of Oleander Avenue across from the project site and along both sides of Oleander Avenue north of the project site. Sidewalk also exists along the (residentially) developed segments of Woodward Avenue, Atherton Drive, Airport Way, and Union Road.
Sidewalk Conditions	Cracked, broken, or otherwise damaged sidewalks can pose a safety hazard and discourage walking.	Existing sidewalks within walking distance of the project site are generally in good condition, free of cracks or uplifts.
Crosswalk Availability	Marked crosswalks can safely accommodate pedestrians that need to cross streets. A lack of marked crosswalks could hinder walkability since pedestrians need to travel greater distances to reach a safe marked crossing point. Drivers may also be less likely to yield to intersections at unmarked crossings.	Standard crosswalks are consistently provided at major signalized study intersections along Union Road and Airport Way. Pedestrian facilities do not exist at Union Road & SR 120 ramps, however, the recently constructed Union Road & SR 120 diverging diamond interchange provides multi-use access. Unsignalized intersections within the study in general do not provide marked crosswalks, except for Oleander Avenue & Sephose Street and Oleander Avenue & Woodward Avenue, north of the project site. Midblock crosswalks do not exist within walking distance of the project site.
Shading	Shading, whether natural or artificial, can encourage walking in areas such as California, particularly Manteca, which are relatively warm with limited rainfall, especially in the summer.	Pedestrian shading is generally lacking in the study area due to minimal tree landscaping along study roadways with sidewalk facilities.

Factor	Description	Assessment
Flat Grade	Steep hills and ravines can discourage walking, especially for pedestrians with limited mobility.	Major streets in the study area are relatively flat, though some rolling hills are present on Airport Way.
Buffer	Buffers which provide separation between pedestrians and moving vehicles can help improve the walking experience, and can include landscaping, parked vehicles, and bulbouts, which serve to both reduce pedestrian crossing distances at intersections and as a traffic calming measure.	Woodward Avenue provides an approximately 10 foot buffer along the recently developed residential segments. Within residential neighborhoods in the study area, buffers in the form of street landscaping and/or parked cars are also present. In general, arterials within the study area do not provide buffers with the sidewalk coming out directly to the edge of the road or bicycle lane.
Amenities	In addition to physical facilities that accommodate walking, useful or interesting amenities along sidewalks create a more interesting walking environment and increase pedestrian comfort. Amenities can include sidewalk-adjacent retail and restaurants, landscaping, and street furniture.	Pedestrian amenities primarily consist of street landscaping along residentially developed segments within the study area including study segments of Oleander Avenue and Woodward Avenue near the project site.



Existing Sidewalk

Study Intersections

Site

City Boundary

0 2,000 Feet

Figure 6

Existing Pedestrian Facilities
Manteca, California

KITTELSON & ASSOCIATES

EXISTING TRAFFIC OPERATIONS

This section provides information on the existing operating conditions for study intersections in the vicinity of the project site.

LEVEL OF SERVICE METHODOLOGY

Methodologies outlined in the Transportation Research Board's *Highway Capacity Manual* (HCM) are used to evaluate level of service for the study intersections and is described in this section.

Level of Service

Level of service (LOS) describes the operating conditions experienced by individuals on a transportation system. For motorized vehicles, level of service is a qualitative measure of the effects of a number of factors, including speed and travel time, traffic interruptions, freedom to maneuver, driving comfort, and convenience. Levels of service are designated LOS "A" through "F," from best to worst, which cover the entire range of traffic operations that might occur. Levels of service A through E generally represent traffic volumes at less than roadway capacity, while LOS F represents conditions where traffic demands exceed capacity and the flow of traffic breaks down, resulting in stop-and-go conditions and long queues of vehicles.

The City of Manteca General Plan Policy C-1.2 states that to the extent feasible, strive for a vehicular LOS of D or better during weekday AM and PM peak hours at all streets and intersections, except in the Downtown area.

Intersection LOS was analyzed using methodologies described in the 6th Edition of the *Highway Capacity Manual* (HCM 6), as implemented in the analysis software program Synchro 11.

Signalized Intersections

At signalized intersections, the level of service is determined by the weighted average delay for all vehicles entering the intersection and the calculated average total delay per vehicle and level of service for the intersection as a whole. **Table 3** presents the average delay criteria used to determine the level of service at signalized intersections.

Table 3: Level of Service Definition for Signalized Intersections

Level of Service (LOS)	Average Delay (seconds/vehicle)	Description
A	≤ 10	**Very Low Delay:** This level of service occurs when progression is extremely favorable, and most vehicles arrive during a green phase. Most vehicles do not stop at all. Short cycle lengths may also contribute to low delay.
B	> 10 and ≤ 20	**Minimal Delays:** This level of service generally occurs with good progression, short cycle lengths, or both. More vehicles stop than at LOS A, causing higher levels of average delay.
C	> 20 and ≤ 35	**Acceptable Delay:** Delay increases due to fair progression, longer cycle lengths, or both. Individual cycle failures may begin to appear at this level of service. The number of vehicles stopping is significant, though many still pass through the intersection without stopping.
D	> 35 and ≤ 55	**Approaching Unstable Operation/Significant Delays:** The influence of congestion becomes more noticeable. Longer delays may result from some combination of unfavorable progression, long cycle lengths, or high volume / capacity ratios. Many vehicles stop, and the proportion of vehicles not stopping declines. Individual cycle failures are noticeable.
E	> 55 and ≤ 80	**Unstable Operation/Substantial Delays:** These high delay values generally indicate poor progression, long cycle lengths, and high volume / capacity ratios. Individual cycle failures are frequent occurrences.
F	> 80	**Excessive Delays:** This level, considered unacceptable to most drivers, often occurs with oversaturation (that is, when arrival traffic volumes exceed the capacity of the intersection). It may also occur at high volume / capacity ratios below 1.0 with many individual cycle failures. Poor progression and long cycle lengths may also be major contributing causes to such delay levels.

Source: *Highway Capacity Manual 6th Edition* (HCM 6)

Unsignalized Intersections

For all-way stop control intersections, the HCM procedures calculate an average control delay per vehicle for each approach and the intersection as a whole and assign a LOS designation based upon the average intersection delay.

For unsignalized one or two-way stop-controlled intersections, the methodology calculates an average total delay per vehicle for each minor street movement and for the major street left-turn movements based on the availability of adequate gaps in through traffic on the main street. A level of service designation is assigned to individual movements or to combinations of movements in the case of shared lanes, based on delay. It is not unusual for some of the minor street movements to have LOS “D,” “E,” or “F” conditions while the major street movements have LOS “A,” “B,” or “C” conditions. In such a case, the minor street traffic experiences delay that can be substantial for individual minor street vehicles, but the majority of vehicles using the intersection have very little delay.

Table 4 presents the average delay criteria used to determine the level of service at unsignalized intersections.

Table 4: Level of Service Definition for Unsignalized Intersections

Level of Service (LOS)	Average Delay (seconds/vehicle)	Description
A	≤ 10	Very Low Delay
B	> 10 and ≤ 15	Minimal Delays
C	> 15 and ≤ 25	Acceptable Delay
D	> 25 and ≤ 35	Approaching Unstable Operation and/or Significant Delays
E	> 35 and ≤ 50	Unstable Operation and/or Substantial Delays
F	> 50	Excessive Delays

Source: Highway Capacity Manual 6th Edition (HCM 6)
Notes: At two-way stop-controlled intersections, LOS is determined for each minor street movement and major street left turn. At all-way stop-controlled intersections, LOS is determined for each individual approach and for the entire intersections based on average control delay.

Roundabouts

At roundabout intersections, "roundabouts should be designed to operate at no more than 85 percent of their estimated capacity. Beyond this threshold, delays and queues vary significantly from their mean values" (Source: Roundabouts: An Informational Guide, FHWA). The Sidra version 9 software package was used to conduct the roundabout analyses in this study with default parameters and HCM 6 Edition methodology.

Signal Warrants

The potential need for traffic signals at unsignalized intersections where the minor street movements experience substantial delay is evaluated in accordance with the California Manual on Uniform Traffic Control Devices (CA MUTCD).

The analysis for the proposed project focuses on the peak hour warrant (Warrant 3). The peak hour warrant is being used as an indicator of the likelihood of an unsignalized intersection warranting a traffic signal in the future. Intersections that exceed the peak hour warrant are considered for the purposes of this analysis to be likely to meet one or more of the other signal warrants, such as the 4-hour or 8-hour warrants. This peak hour analysis is not intended to replace a rigorous and complete traffic signal warrant analysis by the responsible jurisdiction.

Signal Operations

Kittelson requested and received signal timing information directly from Caltrans District 10 staff for the following state-maintained signalized intersections.

- Airport Way & SR 120 Westbound Ramps
- Airport Way & SR 120 Eastbound Ramps
- Union Road & SR 120 Westbound Ramps

- Union Road & SR 120 Southbound Ramps

EXISTING INTERSECTION OPERATIONS

Intersection turning movement volumes, lane configurations, and traffic control were used to calculate the levels of service at the study intersections for the weekday AM and PM peak hours (**Table 5**). All study intersections operate at an existing LOS D or better, except for the all-way stop controlled intersection of Union Road & Woodward Avenue which operates at LOS F during the AM peak and LOS E during the PM peak.

Table 5: Intersection Operations, Existing Conditions

No.	Intersection	Traffic Control[2]	Peak Hour	LOS[3] (Delay)[4]
1	Airport Way & SR 120 WB Ramps	Signal	AM	C (20.3)
			PM	C (22.3)
2	Airport Way & SR 120 EB Ramps	Signal	AM	B (14.7)
			PM	B (16.9)
3	Airport Way & Woodward Avenue	AWSC	AM	D (26.7)
			PM	C (17.6)
4	Airport Way & Peach Road	TWSC	AM	B (11.3)
			PM	A (9.8)
5	Union Road & SR 120 WB Ramps	Signal	AM	B (14.4)
		(DDI)	PM	B (17.3)
6	Union Road & SR 120 EB Ramps	Signal	AM	B (18.0)
		(DDI)	PM	C (23.0)
7	Union Road & Woodward Avenue	AWSC	AM	**F (75.3)**
			PM	**E (46.5)**
8	Union Road & Peach Road	TWSC	AM	B (13.8)
			PM	B (11.3)
9	Peach Road & Oleander Avenue	TWSC	AM	B (11.0)
			PM	A (9.2)
10	Oleander Avenue & Project Driveway #1 (Street D)[1]	None	AM	N/A
			PM	N/A
11	Peach Road & Project Driveway #2 (Street K)[1]	None	AM	N/A
			PM	N/A

Source: Kittelson & Associates, Inc. 2021.
Notes:
[1] Intersection does not exist without the project.
[2] Signal = Signalized Intersection, TWSC = Two- or One-Way Stop Control intersection, AWSC = All-Way Stop Control Intersection.
[3] LOS = Level of Service
[4] Delay = Average vehicle delay reported in seconds per vehicle.

Section 3
Regulatory Setting

REGULATORY SETTING

This section summarizes applicable federal, state, regional, and local plans, laws, and regulations that are relevant to this analysis. This information provides a context for the discussion related to the Project's consistency with applicable policies, plans, laws, and regulations.

FEDERAL REGULATIONS

This section summarizes federal agencies and laws pertinent to the proposed project.

FEDERAL HIGHWAY ADMINISTRATION

The Federal Highway Administration (FHWA) is the agency of the United States Department of Transportation (DOT) responsible for the federally funded roadway system, including the interstate highway network and portions of the primary state highway network.

STATE REGULATIONS

This section summarizes State of California agencies, regulations, and policies that pertain to transportation in Manteca.

CALIFORNIA ENVIRONMENTAL QUALITY ACT (CEQA)

The California Environmental Quality Act (CEQA) Guidelines, Appendix G Environmental Checklist Form describes four recommended categories of impacts related to transportation and traffic. These categories are recommended for formal environmental review of projects but are referenced as appropriate for this TIA.

A project's impact is considered to be significant if it would:

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

b. Conflict or be inconsistent with CEQA Guideline section 15064.3, subdivision (b).

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

d. Result in inadequate emergency access.

Significance criteria "b" is related to the implementation of vehicle miles traveled (VMT) as the primary performance metric consistent with Senate Bill 743 as described below.

SENATE BILL 743

Senate Bill 743 (SB 743) was signed into law in September 2013. Senate Bill 743 (Steinberg, 2013) required changes to the California Environmental Quality Act (CEQA) Guidelines regarding the analysis of transportation impacts. The purpose of SB 743 is to promote the reduction of greenhouse gas emissions, the development of multimodal transportation networks, and a diversity of land uses.

Prior to implementation of SB 743, CEQA transportation analyses of individual projects typically determined impacts on the circulation system in terms of roadway delay and/or capacity usage at specific locations, such as street intersections or freeway segments. The SB 743 changes include the elimination of auto delay, level of service (LOS), and other similar measures of vehicular capacity or traffic congestion as a basis for determining significant impacts.

Under SB 743, a project's effect on automobile delay shall not constitute a significant environmental impact. Therefore, level of service (LOS) and other similar vehicle delay or capacity metrics can no longer serve as transportation impact metrics for CEQA analysis. The California Office of Planning and Research (OPR) updated the CEQA Guidelines and provided a final technical advisory in December 2018, which recommends vehicle miles traveled (VMT) as the most appropriate measure of transportation impacts under CEQA. The California Natural Resources Agency certified and adopted the CEQA Guidelines including the Guidelines section implementing SB 743. The changes have been approved by the Office of the Administrative Law and are now in effect.

Revisions to CEQA transportation analysis requirements do not preclude the application of local general plan policies, municipal and zoning codes, conditions of approval, or any other planning requirements through a city's planning approval process. These requirements aim to ensure adequate operation of the transportation system in terms of transportation congestion measures related to vehicular delay and roadway capacity.

CALIFORNIA DEPARTMENT OF TRANSPORTATION

The California Department of Transportation (Caltrans) is the primary State agency responsible for transportation issues. As owner/operator of the State Highway System, Caltrans may review projects and plans as a commenting agency or responsible agency under the California Environmental Quality Act (CEQA). IN relation to this role, Caltrans published the Vehicle Miles Traveled-Focused Transportation Impact Study Guide" in May 2020. This replaced the "Guide for the Preparation of Traffic Impact Studies" (December 2002), which established Measures of Effectiveness based on level of service targets.

Caltrans recommends following the guidance on methods of VMT assessment found in OPR's Technical Advisory. Caltrans comments on a CEQA document may note methodological deviations from those methods and may recommend that significance determinations and mitigation be aligned with state greenhouse gas reduction goals as articulated in OPR's guidance, the California Air Resources Board's Scoping Plan, and related documentation.

Caltrans facilities within the Manteca study area include State Route 120 and its on- and off-ramps.

For projects that may physically affect facilities under its administration, Caltrans requires encroachment permits before any construction work may be undertaken.

REGIONAL REGULATIONS

This section summarizes regional agencies, plans, and policies that pertain to transportation in Manteca.

SAN JOAQUIN COUNCIL OF GOVERNMENTS REGIONAL CONGESTION MANAGEMENT PROGRAM

The San Joaquin Council of Governments (SJCOG) is responsible for the Regional Congestion Management Program (RCMP). The purpose of the RCM) is to monitor congestion, identify congestion problems, and establish a programming mechanism aimed at reducing congestion. Designation of a regional transportation system supports RCMP monitoring activities and focuses the implementation of the RCMP on a core network of key transportation facilities that facilitate regional travel within San Joaquin County.

The RCMP network includes the following facilities in the project study area:

- State Route 120
- Airport Way
- Union Road
- Woodward Road

The RCMP also designates multimodal corridors where quality of transportation service is monitored for transit, bicycles and pedestrians as well as vehicles. No multimodal corridors are designated within the Project study area.

Prior to 2021, the RCMP included LOS standards for the RCMP network that would affect the evaluation of local development traffic impacts. Consistent with the implementation of SB 743 CEQA streamlining legislation, the 2021 RCMP discontinues the use of LOS for the evaluation of RCMP congestion deficiencies.

The RCMP identifies deficient corridors based on combined speed-based congestion and reliability metrics. None of the deficient corridors identified in the 2021 RCMP are in the Manteca study area.

LOCAL REGULATIONS

This section summarizes City policies and regulations that pertain to transportation in Manteca.

MANTECA GENERAL PLAN

The 2021 update of the Manteca General Plan includes the following policies relevant to the transportation evaluation of the project are summarized in **Table 6**.

Table 6: Selected Manteca General Plan Policies

No.	Policy
C-1.1	Strive to balance levels of service (LOS) for all modes (vehicle, transit, bicycle, and pedestrian) to maintain a high level of access and mobility, while developing a safe, complete, and efficient circulation system. The impact of new development and land use proposals on VMT, LOS, and accessibility for all modes should be considered in the review process.
C-1.2	To the extent feasible, strive for a vehicular LOS of D or better during weekday AM and PM peak hours at all streets and intersections, except in the Downtown area or in accordance with Policy C-1.3.
C-1.3	At the discretion of the City Council or Planning Commission, certain locations may be allowed to fall below the City's LOS standard established by C-1.2 under the following circumstances: ▪ a. Where constructing facilities with enough capacity to provide LOS D is found to be unreasonably expensive. ▪ b. Where conditions are worse than LOS D and caused primarily by traffic from adjacent jurisdictions. ▪ c. Where maintaining LOS D will be a disincentive to use transit and active transportation modes (i.e., walking and bicycling) or to the implementation of transportation or land use improvements that would reduce vehicle travel. Examples include roadway or intersection widening in areas with substantial pedestrian activity or near major transit centers.
C-2.2	Design roadway improvements to occur in a contiguous, orderly fashion and strive to build roadway improvements in advance of new development particularly when addressing existing deficiencies. However, major circulation improvements shall be constructed no later than when abutting lands develop or redevelop, with dedication of right-of-way and construction of improvements, or participation in construction of such improvements, required as a condition of approval.
C-2.3	Require new development to pay a fair share of the costs of street and other transportation improvements based on impacts in conformance with the goals and policies established in this Circulation Element and the Public Facilities Implementation Program (PFIP).
C-2.13	Require development projects to arrange streets in an interconnected block pattern, so that pedestrians, bicyclists, and drivers are not forced onto arterial streets for inter- or intra-neighborhood travel. This approach will also ensure safe and efficient movement of emergency responders and ensure that vehicle miles traveled are minimized within the community. The street pattern shall include measures to provide a high level of connectivity and decrease vehicle miles traveled.

No.	Policy
C-2.14	Residential subdivisions with lots fronting on an existing arterial street shall provide for separate roadway access to the maximum extent feasible, with access to residential lots provided from residential or collector streets. For those properties that currently front arterial streets, consideration should be given to providing separate roadway access as a condition of approval for any redevelopment or subdivision of the property.
C-2.15	Ensure that development and infrastructure projects are designed in a way that provides pedestrian and bicycle connectivity to adjacent neighborhoods and areas (such as ensuring that sound walls, berms, and similar physical barriers are considered and gaps or other measures are provided to ensure connectivity).
C-2.19	In the development of new projects, give special attention to maintaining/ensuring adequate corner-sight distances appropriate for the speed and type of facility, including intersections of city streets and private access drives and roadways.

Source: Manteca General Plan, March 2021, pp, 4-2 to 4-11

TRANSPORTATION IMPACT ANALYSIS REQUIREMENTS

The City of Manteca does not have a document that establishes specific requirements for transportation impact analysis studies. The methodologies and standards used in this TIA are based on the General Plan, state requirements and guidance, prior studies conducted in the City of Manteca, and industry best practices.

Section 4
CEQA Transportation Analysis

CEQA TRANSPORTATION ANALYSIS

The project is evaluated for transportation impacts relative to the four impact types in the CEQA checklist:

e. Conflicts with circulation system programs
f. Vehicle-miles of travel (VMT)
g. Hazards
h. Emergency access

CONFLICTS WITH PROGRAMS

The project would have an impact if it would conflict with a program, plan, ordinance, or policy addressing the circulation system, including transit, roadway, bicycle, and pedestrian facilities.

The project would be consistent with the City of Manteca General Plan and PFIP in terms of provisions for roadways, bicycle and pedestrian facilities:

- The project frontage improvements along Oleander Avenue and Peach Road would not conflict with city plans.
- The project will provide ADA compliant sidewalks along both sides of internal roadways and throughout the project site to enhance local pedestrian circulation, similar to the other residential developments that exist near the site.
- The project would not conflict with other road, transit bicycle or pedestrian plans documented by the city.

Impact 1: Less than significant

Mitigation 1: No mitigation required

VEHICLE MILES OF TRAVEL

The project was assessed for VMT to comply with SB 743 requirements and CEQA Guideline section 15064.3, subdivision (b). The City of Manteca does not have published guidelines for VMT analysis for development projects. The methodology used is similar to a prior Manteca transportation impact study provided as an example[1]. Project VMT per capita to determine impact findings for the project is estimated based on the Manteca/Lathrop Travel Demand Model. Should the project have significant impacts for VMT, trip reductions with appropriate TDM measures would be recommended.

SCREENING CRITERIA

The proposed development was evaluated against the screening criteria in the Office of Planning and Research (OPR) Technical Advisory. The following criteria are applicable to residential developments:

[1] Fehr & Peers, "Lumina at Machado Ranch – Transportation Analysis," June, 2021

- Small projects – projects consistent with a Sustainable Communities Strategy and local general plan that generate or attract fewer than 110 trips per day.
- Projects near major transit stops – certain projects (residential, retail, office, or a mix of these uses) proposed within ½ mile of an existing major transit stop or an existing stop along a high-quality transit corridor.
- Affordable residential development – a project consisting of a high percentage of affordable housing may be a basis to find a less-than-significant impact on VMT.
- Projects in low VMT areas – residential and office projects that incorporate similar features (i.e., density, mix of uses, transit accessibility) as existing development in areas with low VMT will tend to exhibit similarly low VMT.

The proposed Dutra Property Residential Development Project would generate more than 110 trips per day, would not be within ½ mile of a major transit stop, would not have a high percentage of affordable housing units, and would not be in an area already designated as a low VMT area. Since the Project would not meet the screening criteria, a VMT analysis is required.

VMT IMPACT CRITERIA

The methodology used in other Manteca studies is based on a comparison of future VMT conditions with the project to existing baseline VMT conditions. The calculated residential VMT for the "with project" scenario is compared with baseline citywide VMT per single family residential household. If the development would generate vehicle travel exceeding 15 percent below the established baseline, there is a significant impact.

The travel model developed for the City of Manteca General Plan Update was used to develop baseline (2019) VMT per single family residential household. The established baseline VMT per single family household is 103.8. Therefore, single family residential projects that exceed 88.2 VMT per household (15 percent below base year levels) would be considered to have a significant transportation impact. Projects that generate less than 88.2 VMT per household would be considered to have a less than significant transportation impact.

PROJECT VMT ANALYSIS

The project was added to the travel model, the total daily VMT was calculated based on the results and is summarized in **Table 7** below. The project VMT per household would be 38.7 percent lower than the baseline VMT per household, which is a greater reduction than the threshold of 15 percent lower than the baseline. Therefore, the project would not cause a VMT significant impact.

Table 7: Project VMT Evaluation

Scenario	Residential Units	Daily VMT	VMT per Unit
2019 Manteca Baseline	21,226	2,203,915	103.8
2040 Project	197	12,531	63.6
Comparison to Baseline			-38.7%

Source: Kittelson & Associates 2021 based on Manteca/Lathrop Travel Demand Model

Impact 2: Less than significant

Mitigation 2: No mitigation required

HAZARDS

The project would have an impact if it would substantially increase hazards due to a geometric design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment).

- The project proposes to provide access via two side-street stop-sign controlled connections – one along Oleander Avenue and one along Peach Road - as shown in the conceptual site plan provided in **Figure 2** and is not anticipated to introduce hazardous geometric design features if designed consistent with accepted design guidelines for safety. The relatively straight and level alignment of Oleander Avenue and Peach Road near the project site should not hinder adequate sight distance being provided.
- Proposed roadway geometries/cross-sections and design features should be reviewed as part of the City's site plan review to confirm that proposed designs are consistent with the local code and design standards and to confirm that design features (such as trees, fountains, on-street parking, etc.) do not limit site distance
- Based on the conceptual site plan provided, the internal project streets would provide sidewalks along each side of internal roadways so that pedestrians would be separated from vehicle traffic, as well as along the project frontages of Oleander Avenue and Peach Road, consistent with other nearby residential neighborhoods.

Impact 3: Less than significant

Mitigation 3: No mitigation required

EMERGENCY ACCESS

The project would have an impact if it would result in inadequate emergency access.

- The Project would have access to all parcels via two driveways (one along Oleander Avenue and another along Peach Road) and an interior street system. All streets are recommended to be designed to accommodate emergency vehicles.
- As parcels adjacent to the project develop in the future, the project site plan allows for a future street connection to the west which would provide an additional emergency access route from/to Airport Way.

Impact 4: Less than significant

Mitigation 4: No mitigation required

Section 5
Local Transportation Analysis

LOCAL TRANSPORTATION ANALYSIS

The local transportation impact analysis assesses how the study area's transportation system would operate with the implementation of the proposed project.

PROJECT TRIP GENERATION

Automobile trip generation by the project was derived from rates contained in the Institute of Transportation Engineers (ITE) *Trip Generation Manual* 11th Edition.

The proposed land use for the proposed project consists of detached single-family homes. The proposed residential development type matches ITE land use code 210 Single-Family Detached Housing which is defined as:

- **Single Family Detached Housing (ITE 210)** - Single-family detached housing includes any single-family detached home on an individual lot. A typical site surveyed is a suburban subdivision.

Trip generation rates derived from the published ITE fitted curve equations are provided in **Table 8**.

Table 8: Trip Generation Rates

Land Use	Unit	Daily	Weekday AM Peak Hour			Weekday PM Peak Hour		
			Total	In	Out	Total	In	Out
Single Family Detached Housing (210)	Dwelling Units	9.56	0.70	0.18	0.52	0.95	0.60	0.36

Source: Institute of Transportation Engineers, *Trip Generation Manual*, 11th Edition.
Note: Rates based upon division of fitted equation results by number of dwelling units.

Table 9 summarizes the ITE trip generation for the proposed 197 single family residential units that will be constructed as part of this Project.

Table 9: Proposed Project Trip Generation

Land Use	Dwelling Units	Daily	Weekday AM Peak Hour			Weekday PM Peak Hour		
			Total	In	Out	Total	In	Out
Single Family Detached Housing (210)	197	1,883	138	36	102	188	118	70

Source: Kittelson & Associates, 2021.
Note: ITE fitted curve equations used for weekday daily (R^2=0.95), as well as AM peak hour (R^2=0.90) and PM peak hour (R^2=0.92) of adjacent street traffic. Daily: Ln(T) = 0.92Ln(X)+2.68, AM Peak: Ln(T) = 0.91Ln(X)+0.12, and PM Peak: Ln(T) = 0.94Ln(X)+0.27.

PROJECT TRIP DISTRIBUTION

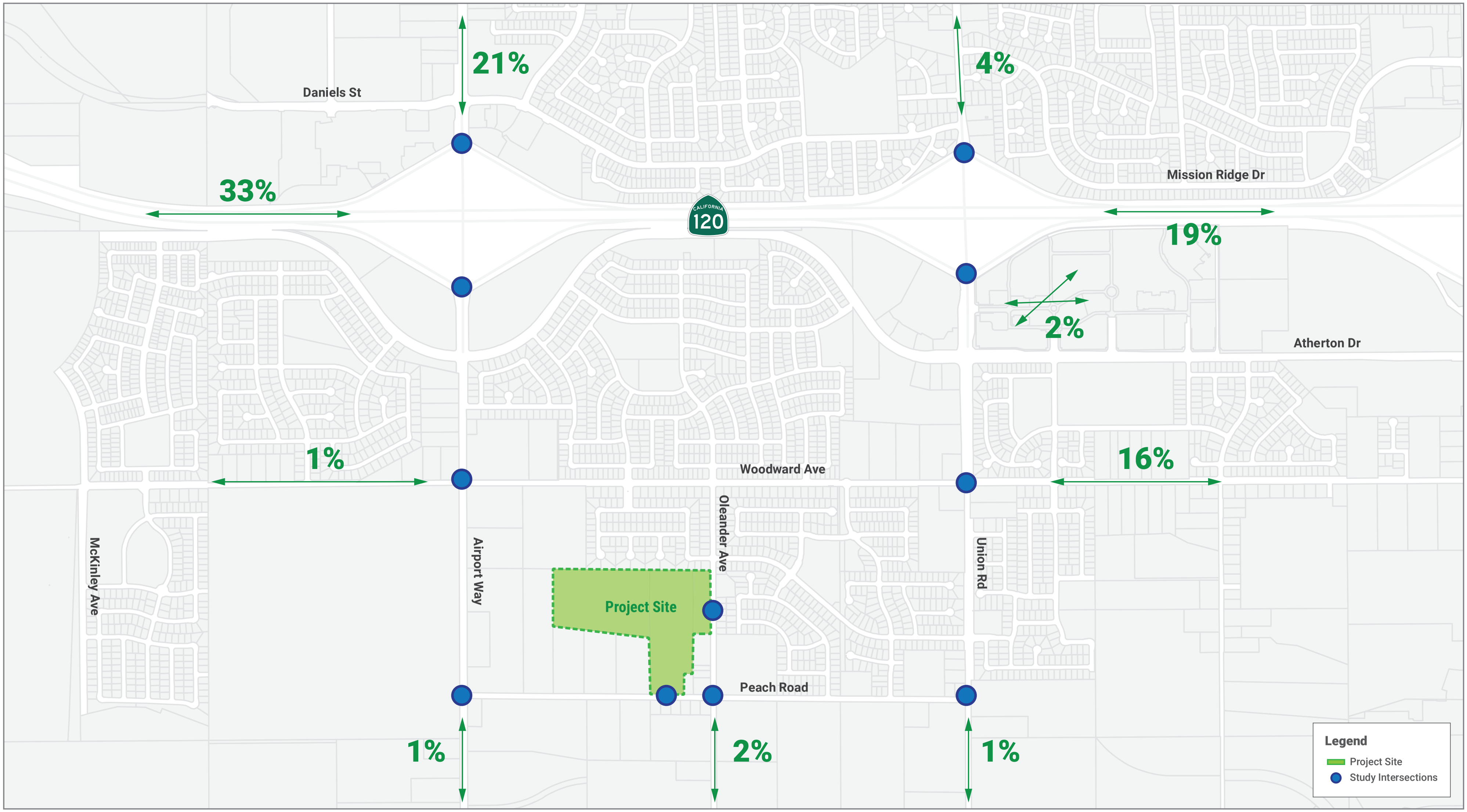
Trip distribution refers to the percentages of trips on routes leading to and from the project. The trip distribution was estimated based on the Manteca/Lathrop Travel Demand Model. The project was coded into the travel demand model and a "select zone" assignment was used to track the estimated trips to and from the Project site for the AM and PM peak periods and hours.

Both base year and future cumulative model scenarios were reviewed and considered in developing the trip distribution estimates for the project, as well as engineering judgment and knowledge of the area.

The following summarizes the trip distribution estimates for project traffic (**Figure 7)**:

- 21% along Airport Way, north of SR 120
- 33% along SR 120, west of Airport Way
- 1% along Woodward Avenue, west of Airport Way
- 1% along Airport Way, south of Peach Road
- 2% along Oleander Avenue, south of Peach Road
- 1% along Union Road, south of Peach Road
- 16% along Woodward Avenue, east of Union Road
- 19% along SR 120, east of Union Road
- 4% along Union Road, north of SR 120
- 2% to the commercial land uses along Union Road, south of SR 120

The project proposes to provide two driveway access points at initial development – one driveway along Oleander Avenue and one along Peach Road. An additional roadway connection is anticipated from the project's western boundary to Airport Way that would be constructed when the adjacent properties are developed. It is anticipated that when this future roadway is connected, some project traffic would reroute from the two initial driveways to the Airport Way driveway. This reroute of project traffic due to the potential future connection would result in lower traffic volumes at the project's two proposed driveways. Since the timing of the future connection is unknown, and Airport Way intersections are evaluated within this study, it is assumed that this study sufficiently and conservatively evaluates project traffic conditions.



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Manteca, CA. Dutra Property | Traffic Impact Analysis

FIGURE 7 | **Project Trip Distribution**

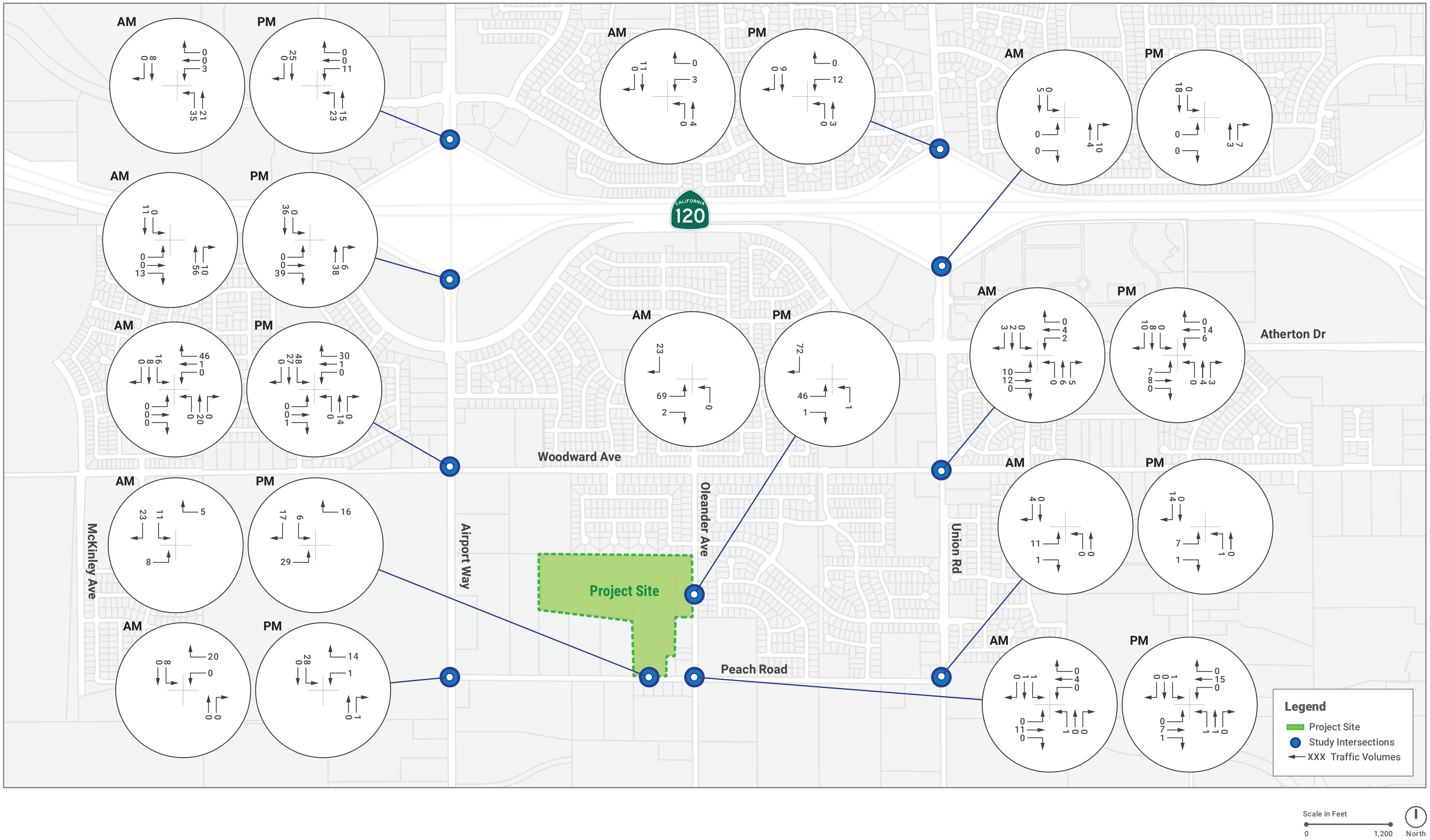

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FIGURE 7.1 | **Project Peak Hour Trip Assignment**

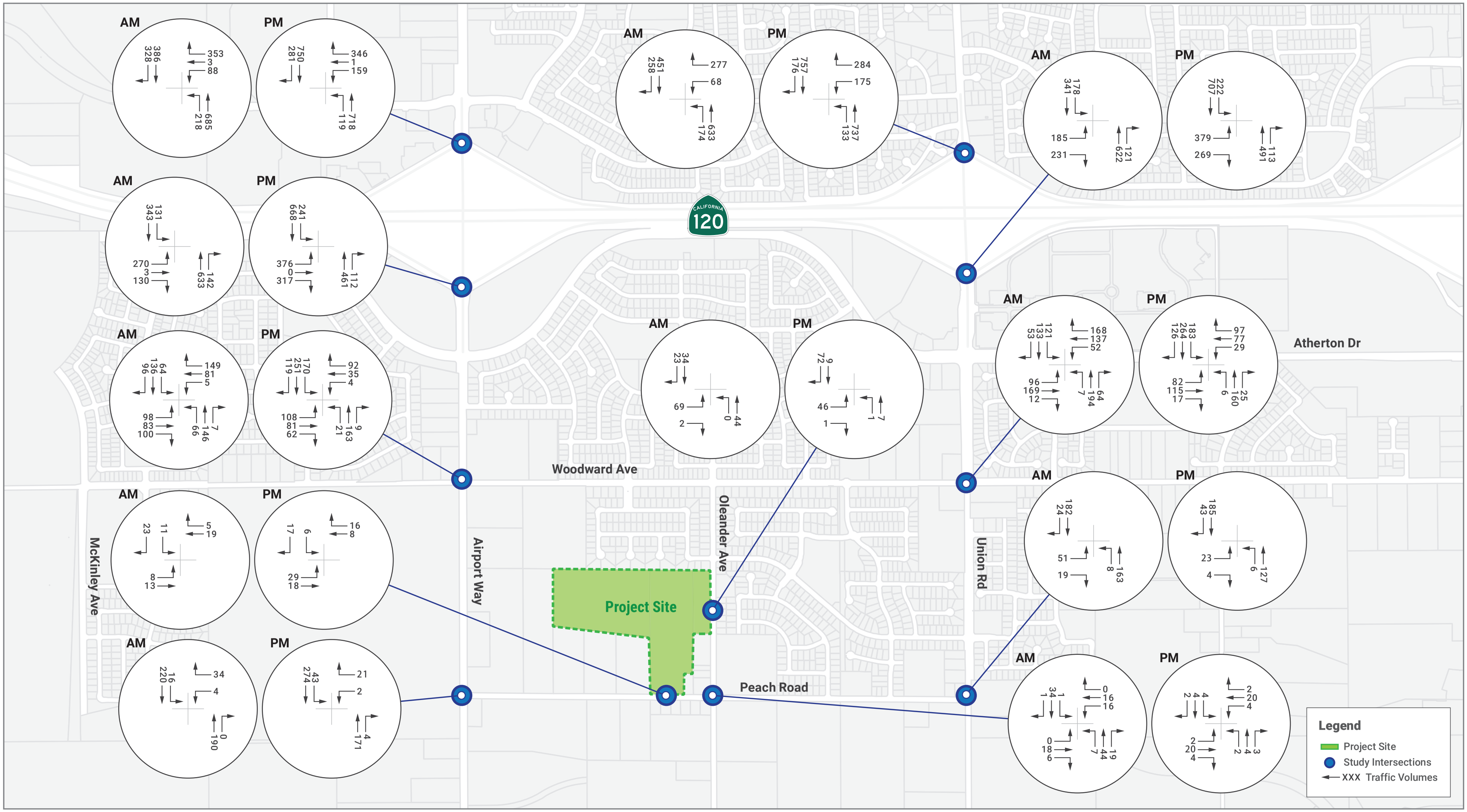

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FIGURE 7.2 | **Existing plus Project Peak Hour Traffic Volumes**

EXISTING PLUS PROJECT TRAFFIC OPERATIONS

Intersection operations were assessed for Existing plus Project conditions and compared to existing conditions (**Table 10**). The Project would cause the following changes in level of service:

- Airport Way & Woodward Avenue: From LOS D to E during the AM peak hour and from LOS C to LOS D during the PM peak hour
- Union Road & Woodward Ave: From LOS E to F during the PM peak hour

All study intersections would operate at LOS D or better with the Project in Existing Plus Project Conditions, consistent with General Plan policies, except for the following locations:

- Airport Way & Woodward Avenue (LOS E during the AM peak hour)
    - This all-way stop controlled intersection meets CAMUTCD peak hour signal warrant #3 with existing traffic and signalization is planned in the future based on the City's PFIP. Signalization of this intersection would result in acceptable LOS in existing plus project conditions. Existing plus project operational results with signalization is presented in **Table 13**, and the peak hour signal warrant evaluation is presented in the **Signal Warrants** section of this report.
- Union Road & Woodward Ave (LOS F during the AM and PM peak hours)

    This all-way stop controlled intersection meets CAMUTCD peak hour signal warrant #3 with existing traffic and signalization is planned in the future based on the City's PFIP. Signalization of this intersection would result in acceptable LOS in existing and existing plus project conditions. Existing plus project operational results with signalization is presented in **Table 13**, and the peak hour signal warrant evaluation is presented in the **Signal Warrants** section of this report.

Table 10: Intersection Operations, Existing Plus Project Conditions

No.	Intersection	Traffic Control[2]	Peak Hour	Existing LOS[3] (Delay)[4]	Existing + Project LOS[3] (Delay)[4]
1	Airport Way & SR 120 WB Ramps	Signal	AM	C (20.3)	C (22.2)
			PM	C (22.3)	C (25.5)
2	Airport Way & SR 120 EB Ramps	Signal	AM	B (14.7)	B (17.4)
			PM	B (16.9)	B (18.7)
3	Airport Way & Woodward Avenue	AWSC	AM	D (26.7)	**E (50.0)**
			PM	C (17.6)	D (29.3)
4	Airport Way & Peach Road	TWSC	AM	B (11.3)	B (11.1)
			PM	A (9.8)	A (9.9)
5	Union Road & SR 120 WB Ramps	Signal	AM	B (14.4)	B (14.4)
		DDI	PM	B (17.3)	B (17.5)
6	Union Road & SR 120 EB Ramps	Signal	AM	B (18.0)	B (18.1)
		DDI	PM	C (23.0)	C (22.5)
7	Union Road & Woodward Avenue	AWSC	AM	**F (75.3)**	**F (83.6)**
			PM	**E (46.5)**	**F (53.8)**
8	Union Road & Peach Road	TWSC	AM	B (13.8)	B (14.5)
			PM	B (11.3)	B (11.5)
9	Peach Road & Oleander Avenue	TWSC	AM	B (11.0)	B (11.5)
			PM	A (9.2)	A (9.3)
10	Oleander Avenue & Project Driveway #1 (Street D)[1]	TWSC	AM	N/A	A (9.4)
			PM	N/A	A (9.0)
11	Peach Road & Project Driveway #2 (Street K)[1]	TWSC	AM	N/A	A (8.7)
			PM	N/A	A (8.7)

Source: Kittelson & Associates, Inc. 2021.
Notes:
[1] Intersection does not exist without the project.
[2] Signal = Signalized Intersection, TWSC = Two- or One-Way Stop Control intersection, AWSC = All-Way Stop Control Intersection.
[3] LOS = Level of Service
[4] Delay = Average vehicle delay reported in seconds per vehicle.

CUMULATIVE TRAFFIC OPERATIONS

The Cumulative and Cumulative Plus Project analysis forecasts how the study area's transportation system would operate with growth and changes of the surrounding community by the year 2040. The changes of the surrounding community and associated traffic changes by 2040 were derived from the Manteca/Lathrop Travel Demand Model. This model includes all of the approved and reasonably foreseeable growth anticipated in Manteca and the surrounding jurisdictions by 2040.

TRANSPORTATION IMPROVEMENTS

The cumulative conditions assume street improvements documented in the Transportation Public Facilities Implementation Plan (PFIP) version effective January 1, 2018. The following summarizes the planned roadway capacity improvements within the project study area based upon the PFIP:

- Airport Way (between Antone Raymus Pkwy. and SR 120 EB Ramps):
  - 2-lane existing cross section widened to 4-lane cross section with 11 ft lanes and 5 ft bike lanes on both sides (PLATE E-2.03 and 2.07 in PFIP).
- Union Road (between Woodward Ave. and Antone Raymus Pkwy.):
  - 2-lane existing cross section widened to 4-lane cross section with 11 ft lanes and 5 feet bike lanes on both sides (PLATE E-2.03 and 2.07 in PFIP).
- Install signalized intersections with one left turn pocket, one right turn pocket, and right turn overlap phasing on each approach widened per Plates E-1.03, E-2.03, E-2.04, and E-2.06 where applicable:
  - Airport Way & Woodward Avenue
  - Union Road & Woodward Avenue
- Install two to four lane typical roundabout per Plate E-3.09 where applicable:
  - Airport Way & Peach Road
  - Union Road & Peach Road
- Interchange (I/C2) Airport Way & SR 120: The PFIP indicates that interchange improvements are part of the PFIP, as shown in PLATE E-1.05, but no specific information or conceptual layouts documenting future improvements are available at the time of this study. Recommendations are made in this report in regards to what capacity improvements could result in acceptable operations.

TRAFFIC FORECASTS

The traffic forecasts for cumulative conditions are based on the Manteca/Lathrop Travel Demand Model. The travel model was recently updated in support of the 2021 Manteca General Plan Update and includes future assumptions for land use development and transportation improvements consistent with the General Plan.

Traffic forecasts for specific intersections were based on an incremental adjustment methodology to minimize the effects of differences between the travel model and observed traffic counts. For each study intersection turning movement, the increment was calculated between the model's 2018 base year and the model's 2040 forecast traffic volumes and added to the observed traffic count to create the future AM and PM peak hour intersection turning movement traffic volumes. The adjusted turn movements were then checked to ensure logical growth and continuity between locations.

CUMULATIVE INTERSECTION OPERATIONS

Intersection operations were assessed for Cumulative Conditions (2040 growth without the Project). The operations analysis assumes intersection improvements consistent with the information provided in the PFIP as listed above. Cumulative conditions intersection geometries assumed in these analyses are summarized and provided in the **Appendix**. Cumulative peak hour traffic volumes without project traffic are shown in **Figure 8**.

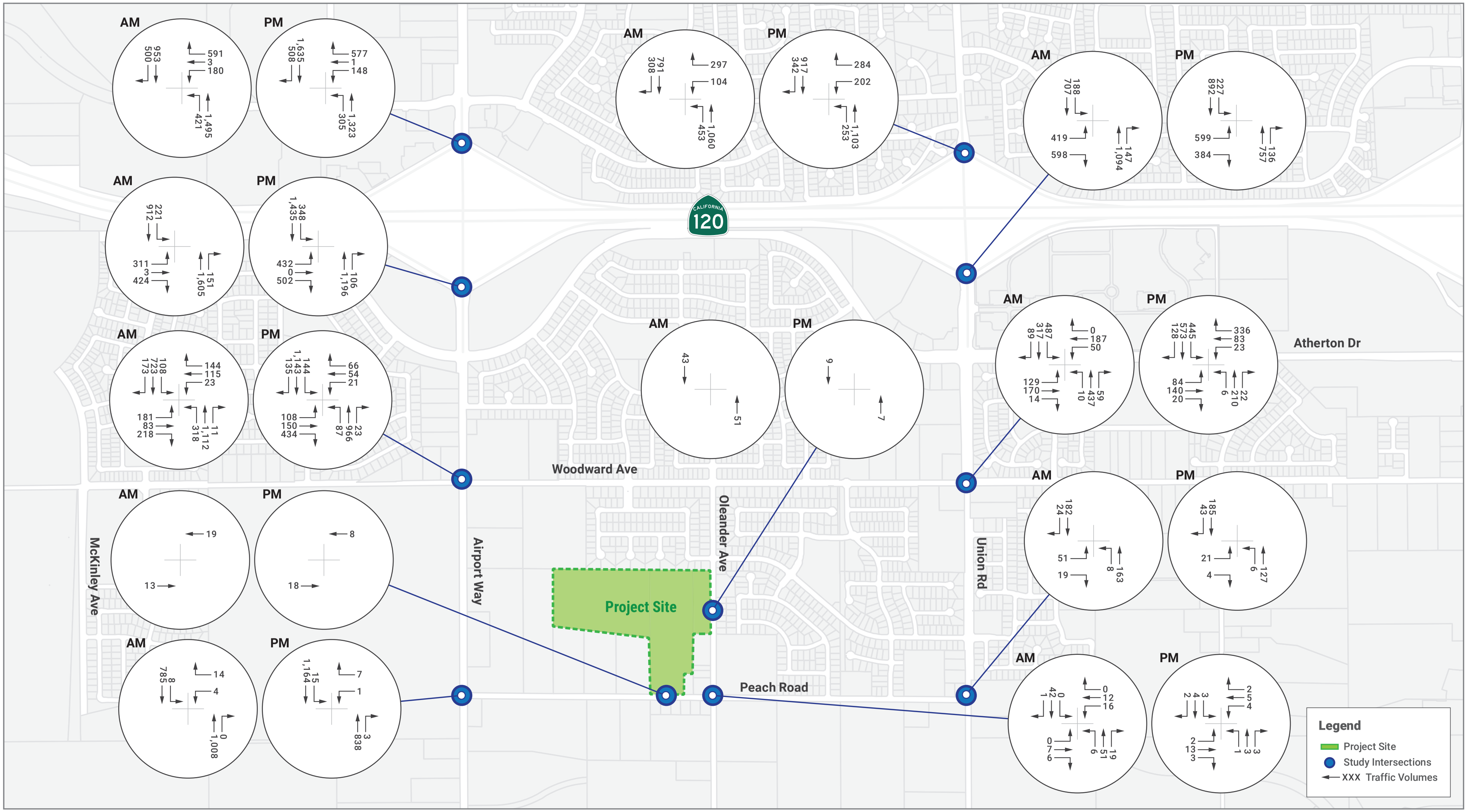
Intersection turning movement volumes, lane configurations, and traffic control were used to estimate the average vehicle delay and levels of service at the study intersections for the AM and PM peak hours (**Table 11**). All study intersections would operate at an acceptable LOS D or better during the Cumulative Conditions weekday AM and PM peak hours without project traffic except for the following:

- Airport Way & SR 120 WB Ramps (LOS F during AM and PM peak hours)
- Airport Way & SR 120 EB Ramps (LOS F during AM and PM peak hours)

Table 11: Intersection Operations, Cumulative Conditions

No.	Intersection	Traffic Control[2]	Peak Hour	LOS[3] (Delay)[4]
1	Airport Way & SR 120 WB Ramps	Signal	AM	**F (216.8)**
			PM	**F (329.5)**
2	Airport Way & SR 120 EB Ramps	Signal	AM	**F (330.4)**
			PM	**F (248.2)**
3	Airport Way & Woodward Avenue	Signal	AM	D (36.9)
			PM	D (37.4)
4	Airport Way & Peach Road[5]	Roundabout	AM	A (6.0)
			PM	A (6.6)
5	Union Road & SR 120 WB Ramps	Signal	AM	B (18.2)
		DDI	PM	B (19.8)
6	Union Road & SR 120 EB Ramps	Signal	AM	C (20.1)
		DDI	PM	C (21.1)
7	Union Road & Woodward Avenue	Signal	AM	C (27.9)
			PM	B (16.6)
8	Union Road & Peach Road[5]	Roundabout	AM	A (4.1)
			PM	A (4.0)
9	Peach Road & Oleander Avenue	TWSC	AM	A (9.7)
			PM	A (9.1)
10	Oleander Avenue & Project Driveway #1 (Street D)[1]	None	AM	N/A
			PM	N/A
11	Peach Road & Project Driveway #2 (Street K)[1]	None	AM	N/A
			PM	N/A

Source: Kittelson & Associates, Inc. 2021.
Notes:
[1] Intersection does not exist without the project.
[2] Signal = Signalized Intersection, TWSC = Two- or One-Way Stop Control intersection, AWSC = All-Way Stop Control Intersection.
[3] LOS = Level of Service
[4] Delay = Average vehicle delay reported in seconds per vehicle.
[5] All roundabout approaches have a v/c ratio of 0.50 or better (acceptable operations assumed at 0.85 v/c or less).



Manteca, CA. Dutra Property | Traffic Impact Analysis

FIGURE 8 | **Cumulative Peak Hour Traffic Volumes**

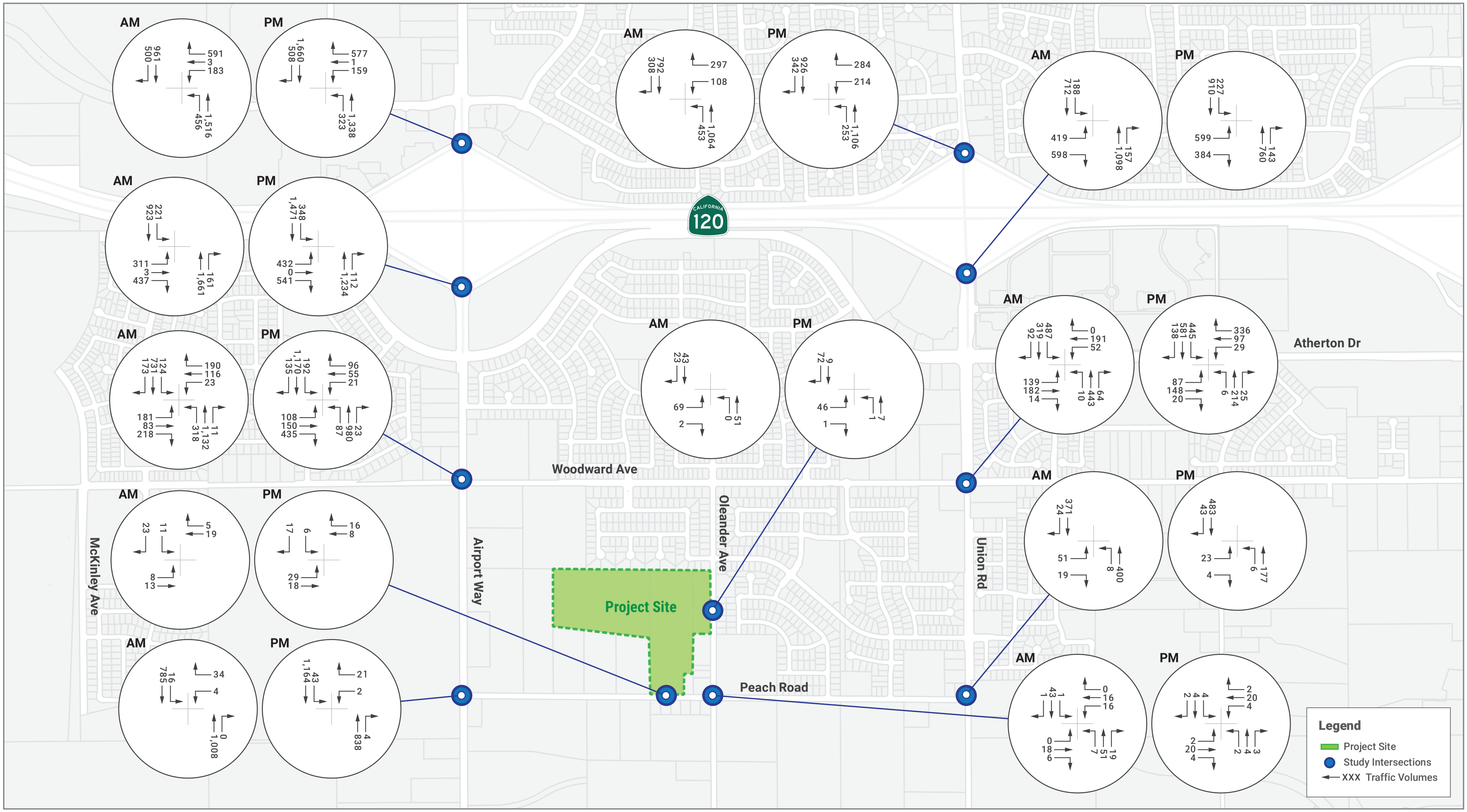
CUMULATIVE PLUS PROJECT TRAFFIC OPERATIONS

Intersection operations were assessed for Cumulative (2040 growth without the project) and Cumulative Plus Project conditions and the analysis results are shown in **Table 12**. The operations analysis assumes intersection improvements consistent with the information provided in the PFIP as listed above.

Cumulative conditions intersection geometries assumed in these analyses are summarized and provided in the **Appendix** and the assumed project driveway control/geometry are described in the project description section of this report. Cumulative plus Project peak hour traffic volumes are shown in Figure 9.

All study intersections operate at an acceptable LOS D or better during the Cumulative plus Project Conditions weekday AM and PM peak hours except for the following:

- Airport Way & SR 120 WB Ramps (LOS F during AM and PM peak hours)
- Airport Way & SR 120 EB Ramps (LOS F during AM and PM peak hours)



Scale in Feet
0 1,200
North

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Manteca, CA. Dutra Property | Traffic Impact Analysis

FIGURE 9 | **Cumulative plus Project Peak Hour Traffic Volumes**

Table 12: Intersection Operations, Cumulative Plus Project Conditions

No.	Intersection	Traffic Control[2]	Peak Hour	Cumulative LOS[3] (Delay)[4]	Cumulative + Project LOS[3] (Delay)[4]
1	Airport Way & SR 120 WB Ramps	Signal	AM	**F (216.8)**	**F (225.5)**
			PM	**F (329.5)**	**F (337.0)**
2	Airport Way & SR 120 EB Ramps	Signal	AM	**F (330.4)**	**F (352.2)**
			PM	**F (248.2)**	**F (269.1)**
3	Airport Way & Woodward Avenue	Signal	AM	D (36.9)	D (44.1)
			PM	D (37.4)	D (43.7)
4	Airport Way & Peach Road[5]	Roundabout	AM	A (6.0)	A (6.1)
			PM	A (6.6)	A (6.8)
5	Union Road & SR 120 WB Ramps	Signal	AM	B (18.2)	B (18.2)
		DDI	PM	B (19.8)	B (19.9)
6	Union Road & SR 120 EB Ramps	Signal	AM	C (20.1)	C (20.2)
		DDI	PM	C (21.1)	C (21.2)
7	Union Road & Woodward Avenue	Signal	AM	C (27.9)	C (29.1)
			PM	B (16.6)	B (16.9)
8	Union Road & Peach Road[5]	Roundabout	AM	A (4.1)	A (4.1)
			PM	A (4.0)	A (4.1)
9	Peach Road & Oleander Avenue	TWSC	AM	A (9.7)	A (9.9)
			PM	A (9.1)	A (9.2)
10	Oleander Avenue & Project Driveway #1 (Street D)[1]	TWSC	AM	-	A (9.5)
			PM	-	A (9.0)
11	Peach Road & Project Driveway #2 (Street K)[1]	TWSC	AM	-	A (8.7)
			PM	-	A (8.7)

Source: Kittelson & Associates, Inc. 2021.
Notes:
[1] Intersection does not exist without the project.
[2] Signal = Signalized Intersection, TWSC = Two- or One-Way Stop Control intersection, AWSC = All-Way Stop Control Intersection.
[3] LOS = Level of Service
[4] Delay = Average vehicle delay reported in seconds per vehicle.
[5] All roundabout approaches have a v/c ratio of 0.50 or better (acceptable v/c is assumed as 0.85 or less).

The travel model indicates large increases in traffic volumes along Airport Way and the intersecting roads for the 2040 forecast year. Therefore, the SR 120 ramp intersections with Airport Way are anticipated to experience demands that exceed the committed capacity, resulting in LOS F conditions at each ramp.

Based on the analysis results, the project is anticipated to cause incremental increases delays at the intersections studied but is not anticipated to change the LOS at any study intersection in Cumulative Plus Project Conditions when comparing to Cumulative (No-Project) Conditions. The project would increase delays but would not change the LOS at any study intersection. Changes in average delay at the deficient SR 120 & Airport Way ramps due to the Project are anticipated to range between 2 percent and 9 percent.

Recommended Intersection Improvements

The following improvements are recommended to provide future intersection operations consistent with the General Plan Policy C-1.2 which specifies that the city shall strive for LOS D operations outside the Downtown area.

Airport Way & Woodward Avenue

Under Existing plus project conditions, Airport Way and Woodward Avenue operates at unacceptable LOS E in the AM peak hour as presented in **Table 10**, and operates at acceptable LOS Existing conditions as presented in **Table 5**. The PFIP indicates that this intersection will ultimately be signalized. The Airport Way & Woodward Avenue intersection meets the CAMUTCD Peak Hour signal warrant (Warrant #3) under Existing conditions as presented in the **Signal Warrants** section of this report and is assumed to also meet Warrant #3 in Existing plus project, Cumulative, and Cumulative plus project conditions since the Plus Project and future traffic volumes are anticipate to be greater than existing conditions as development continues to occur within the City. Installation of a traffic signal at Airport Way & Woodward Avenue provides acceptable LOS operations.

Union Road & Woodward Avenue

Under Existing plus project conditions, Union Road and Woodward Avenue operates at unacceptable LOS F in the AM and PM peak hours as presented in **Table 10**, and operates at unacceptable LOS F and E in the AM and PM peak hours, respectively, as presented in **Table 5**. The PFIP indicates that this intersection will ultimately be a signal. Union Road and Woodward Avenue meets Warrant #3 Peak Hour under Existing conditions as presented in the **Signal Warrants** section of this report and is assumed to also meet Warrant #3 in Existing plus project, Cumulative, and Cumulative plus project conditions since the Plus Project and future traffic volumes are anticipate to be greater than existing conditions as development continues to occur within the City. Installation of a traffic signal at Union Road & Woodward Avenue provides acceptable LOS operations.

Implementation of a traffic signal described above is anticipated to result in acceptable operations at the previously deficient study intersections. Analysis results for Airport Way & Woodward Avenue and Union Road & Woodward Avenue summarized in **Table 13**.

Table 13: Intersection Operations, Existing Plus Project with Recommended Improvements

No.	Intersection	Traffic Control[1]	Peak Hour	Existing + Project LOS[2] (Delay)[3]
3	Airport Way & Woodward Avenue	Signal	AM	B (12.1)
			PM	C (27.6)
4	Union Road & Woodward Avenue	Signal	AM	A (9.0)
			PM	B (17.5)

[1] Signal = Signalized Intersection
[2] LOS = Level of Service
[3] Delay = Average vehicle delay reported in seconds per vehicle.

Airport Way & SR 120 Ramps (westbound and eastbound)

The Manteca General Plan Major Streets Circulation Plan indicates an ultimate width of six lanes for Airport Way south of Daniels Street to Atherton Drive. The PFIP also identifies the interchange as one that will be improved; however, the future configuration is not specified. The following configuration is expected to provide LOS D or better operations:

- Airport Way and SR 120 Westbound Ramps
    - Three northbound and southbound through lanes
    - One northbound left turn lane
    - One southbound right turn lane
    - Two westbound right turn lanes and one westbound left turn lane
- Airport Way and SR 120 Eastbound Ramps
    - Three northbound and southbound through lanes
    - One northbound right turn lane
    - One southbound left turn lane
    - Two eastbound left turn lanes and one eastbound right turn lane

Implementation of the recommended improvements described above is anticipated to result in acceptable operations at the previously deficient study intersections. Analysis results for Airport Way and SR 120 Ramps are summarized in **Table 14**.

Table 14: Intersection Operations, Cumulative Plus Project with Recommended Improvements

No.	Intersection	Traffic Control[1]	Peak Hour	Cumulative + Project LOS[2] (Delay)[3]
1	Airport Way & SR 120 WB Ramps	Signal	AM	D (43.9)
			PM	C (32.2)
2	Airport Way & SR 120 EB Ramps	Signal	AM	D (35.6)
			PM	D (40.9)

[1] Signal = Signalized Intersection
[2] LOS = Level of Service
[3] Delay = Average vehicle delay reported in seconds per vehicle.

PROJECT SITE CIRCULATION

The Project site plan was evaluated in terms of access, circulation, and parking, which is discussed in the follow sections.

The Project proposes to provide two side-street stop-controlled access points – one along the east side of Oleander Avenue and one along Peach Road. Along Oleander Avenue and Peach Road, a shared through/left turn lane, and a shared through/right turn lane would provide acceptable operations at the Project driveways and turn pockets would not be required. As noted in the traffic operations analysis, Project driveway would provide acceptable traffic operations in Existing Plus Project and Cumulative Plus Project conditions.

Future development of parcels to the west of the Project site may provide the opportunity for an additional access point at Airport Way.

Sidewalks are shown in the project site plan along both sides of all streets within the site and along the site frontages on Oleander Avenue and Peach Road. The sidewalks should be constructed consistent with the City's policies and design standards and ADA compliant.

EMERGENCY ACCESS

The project proposes to provide two side-street stop-controlled access points – one along the east side of Oleander Avenue and one along Peach Road and a potential additional connection is anticipated west of the site when the vacant land west of the site is developed.

The proposed onsite street widths range between 50 and 60 feet and are proposed to accommodate a single vehicle travel lane in each direction and allow on-street parking. It is recommended that the detailed site plan be reviewed when provided to confirm that adequate turning space for larger emergency vehicles will be provided.

PARKING

The Manteca Municipal Code 17.52.050 includes the following requirements for single-family residential uses:

- Single-Family Dwelling Unit: 2 covered spaces/dwelling
- Small-Lot Single Family: 1 covered space/dwelling

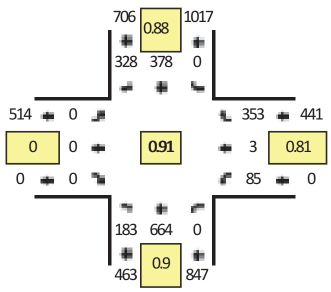
To satisfy Municipal Code requirements, it is recommended that parking be provided consistent with the Single-Family Dwelling Unit (2 covered spaces/dwelling) requirement. On-street parking is anticipated along the internal streets, consistent with similar nearby residential developments.

Section 6
Appendix

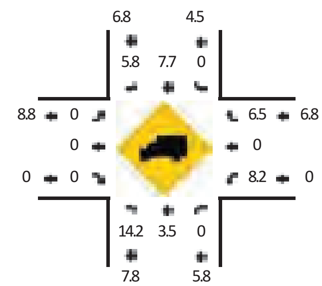
APPENDIX

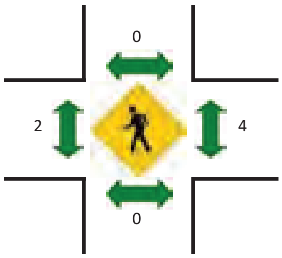
EXISTING TURNING MOVEMENT COUNTS

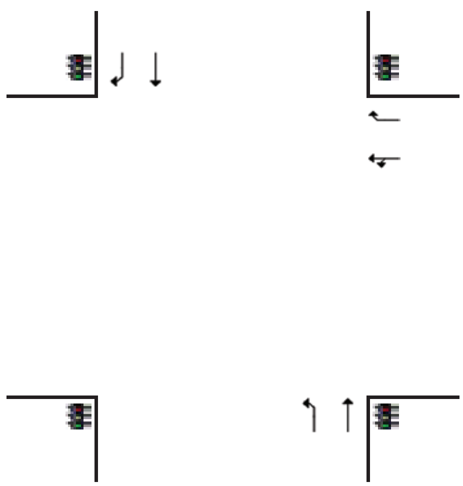
LOCATION: Airport Wy -- SR 120 WB Ramps **QC JOB #:** 15549307
CITY/STATE: Manteca, CA **DATE:** Tue, Sep 14 2021

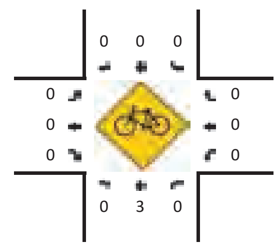


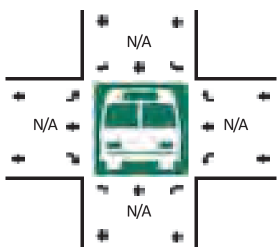
Peak-Hour: 8:00 AM -- 9:00 AM
Peak 15-Min: 8:45 AM -- 9:00 AM

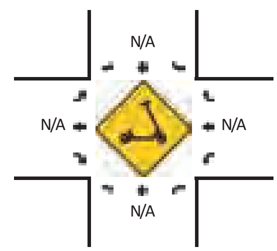












15-Min Count Period Beginning At	Airport Wy (Northbound)				Airport Wy (Southbound)				SR 120 WB Ramps (Eastbound)				SR 120 WB Ramps (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
7:00 AM	70	87	0	0	0	46	84	0	0	0	0	0	16	1	51	0	355	
7:15 AM	58	90	0	0	0	59	91	0	0	0	0	0	19	0	55	0	372	
7:30 AM	74	120	0	0	0	62	78	0	0	0	0	0	21	1	70	0	426	
7:45 AM	46	157	0	0	0	86	85	0	0	0	0	0	17	8	96	0	495	1648
8:00 AM	52	143	0	0	0	93	107	0	0	0	0	0	25	2	98	0	520	1813
8:15 AM	46	146	0	0	0	83	81	0	0	0	0	0	20	0	64	0	440	1881
8:30 AM	48	187	0	0	0	82	75	0	0	0	0	0	20	0	76	0	488	1943
8:45 AM	37	188	0	0	0	120	65	0	0	0	0	0	20	1	115	0	546	1994

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	148	752	0	0	0	480	260	0	0	0	0	0	80	4	460	0	2184
Heavy Trucks	20	20	0		0	28	16		0	0	0		4	0	28		116
Buses																	
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Scooters																	

Comments:

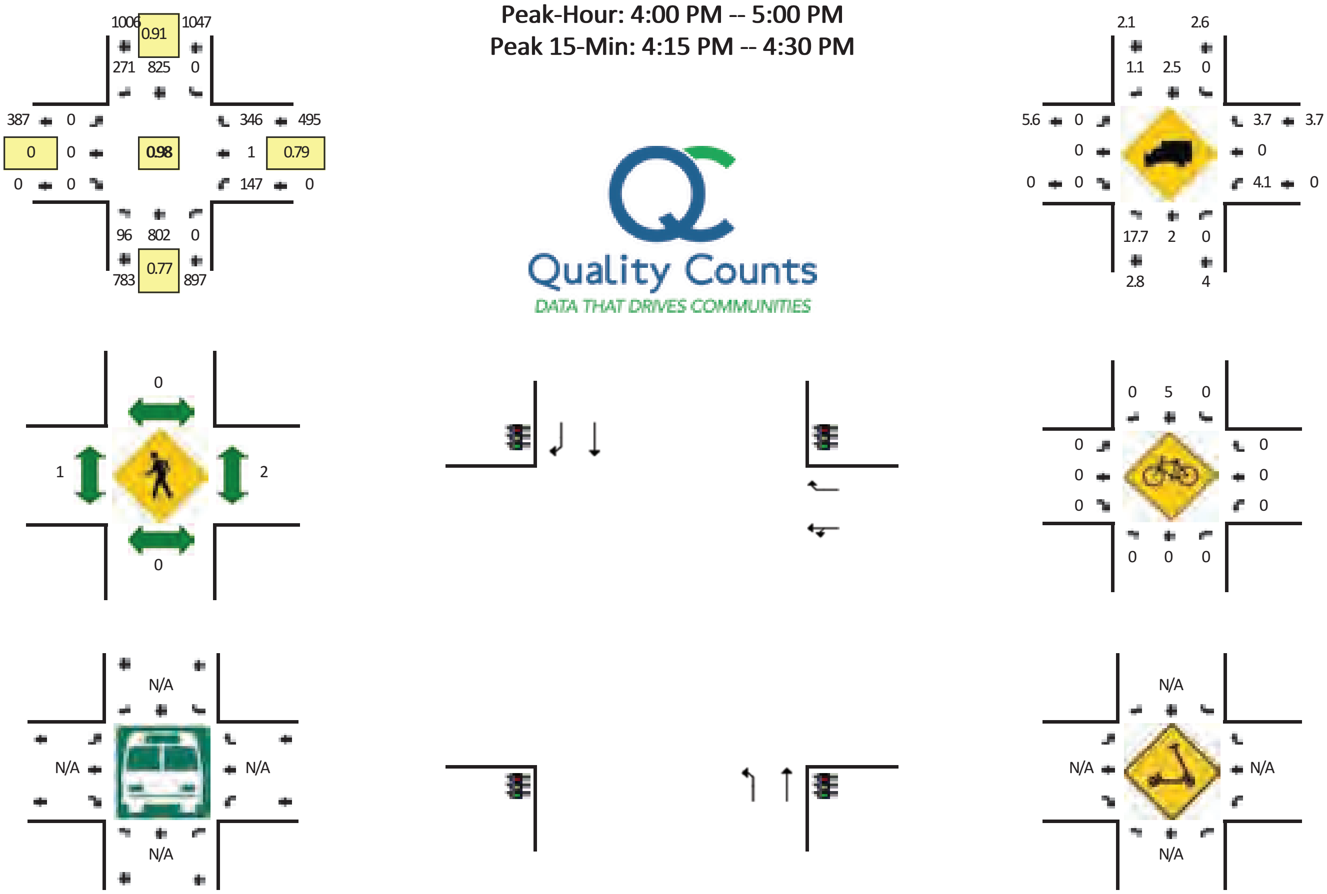
Type of peak hour being reported: Intersection Peak | Method for determining peak hour: Total Entering Volume

LOCATION: Airport Wy -- SR 120 WB Ramps | **QC JOB #:** 15549307

CITY/STATE: Manteca, CA | **DATE:** Tue, Sep 14 2021

Peak-Hour: 4:00 PM -- 5:00 PM

Peak 15-Min: 4:15 PM -- 4:30 PM



15-Min Count Period Beginning At	Airport Wy (Northbound) Left	Thru	Right	U	Airport Wy (Southbound) Left	Thru	Right	U	SR 120 WB Ramps (Eastbound) Left	Thru	Right	U	SR 120 WB Ramps (Westbound) Left	Thru	Right	U	Total	Hourly Totals
4:00 PM	29	199	0	0	0	168	69	0	0	0	0	0	30	0	88	0	581	
4:15 PM	24	180	0	0	0	208	67	0	0	0	0	0	48	1	87	0	595	
4:30 PM	28	164	0	0	0	178	79	0	0	0	0	0	36	0	78	0	590	
4:45 PM	16	169	0	0	0	164	55	0	0	0	0	0	35	0	104	0	543	2299
5:00 PM	34	165	0	0	0	138	71	0	0	0	0	0	33	0	98	0	548	2285
5:15 PM	33	146	0	0	0	156	57	0	0	0	0	0	34	0	115	0	542	2222
5:30 PM	22	201	0	0	0	167	83	0	0	0	0	0	35	0	94	0	593	2225
5:45 PM	27	193	0	0	0	157	88	0	0	0	0	0	38	1	108	0	601	2273

Peak 15-Min Flowrates	Northbound Left	Thru	Right	U	Southbound Left	Thru	Right	U	Eastbound Left	Thru	Right	U	Westbound Left	Thru	Right	U	Total
All Vehicles	96	670	0	0	0	727	282	0	0	0	0	0	177	4	312	0	2370
Heavy Trucks	20	16	0		0	12	0		0	0	0		4	0	12		64
Buses																	
Pedestrians		0				0				0				4			4
Bicycles	0	0	0		0	12	0		0	0	0		0	0	0		12
Scooters																	

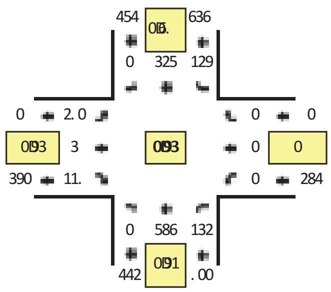
Comments:

Report generated on 9/23/2021 1:19 PM | SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-788-570-2212

Type of peak hour being reported: Intersection Peak Method for determining peak hour: Total Entering Volume

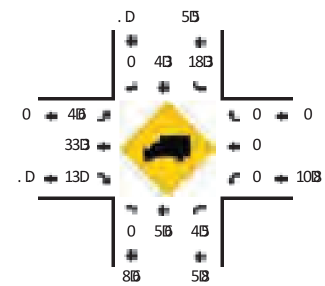
LOCATION: Airport Wy -- SR 120 EB Ramps **QC JOB #:** 15549309

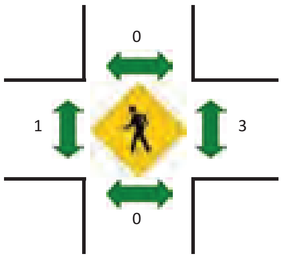
CIT7YSTATE: Manteca/CA **, ATE:** Tue/Sep 14 2021

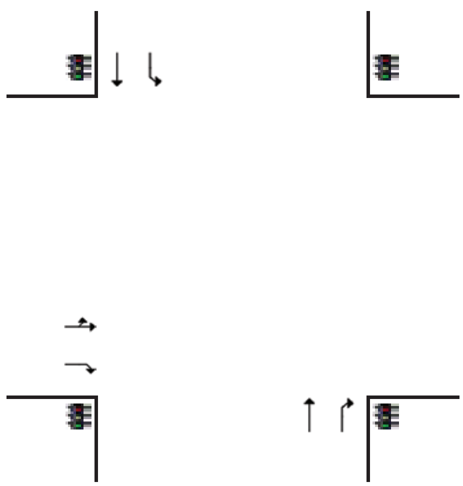


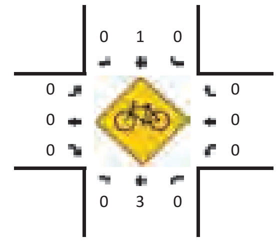
Peak-Hour: 6:00 AM -- 9:00 AM

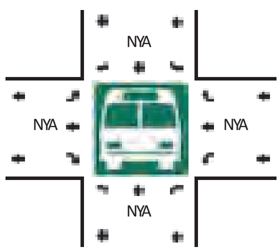
Peak 15-Min: 6:45 AM -- 9:00 AM

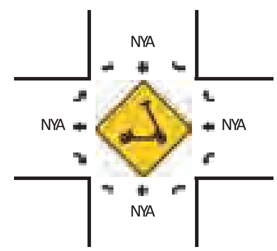












15-Min Count Period Beginning At	Airport Wy (Northbound)				Airport Wy (Southbound)				SR 120 EB Ramps (Eastbound)				SR 120 EB Ramps (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
. :00 AM	0	109	40	0	25	44	0	0	3.	1	18	0	0	0	0	0	2. 2	
. :15 AM	0	111	40	0	2.	54	0	0	41	0	25	0	0	0	0	0	296	
. :30 AM	0	141	48	0	24	50	0	0	46	0	3.	0	0	0	0	0	348	
. :45 AM	0	136	48	0	30	. 2	0	0	86	2	36	0	0	0	0	0	394	1310
6:00 AM	0	122	33	0	34	68	0	0	. 0	0	35	0	0	0	0	0	360	1416
6:15 AM	0	130	35	0	3.	86	0	0	56	2	35	0	0	0	0	0	385	1465
6:30 AM	0	159	34	0	25	. 4	0	0	. 1	0	21	0	0	0	0	0	364	1523
6:45 AM	0	15.	30	0	33	9.	0	0	. 1	1	28	0	0	0	0	0	415	1544

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	826	120	0	132	366	0	0	264	4	104	0	0	0	0	0	1880
Heavy Trucks	0	26	0		12	12	0		6	0	6		0	0	0		86
Buses																	
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Scooters																	

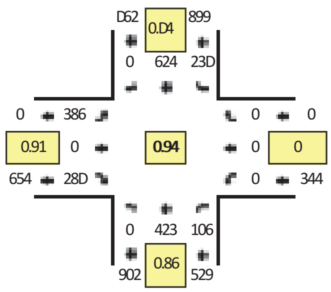
Comments:

Report generated on 9Y23Y2021 1:19 PM SOURCE: Quality Counts/LLC (http:YYwwwDqualitycountsDnet) 1-6. . -560-2212

Type of peak hour being reported: Intersection Peak — Method for determining peak hour: Total Entering Volume

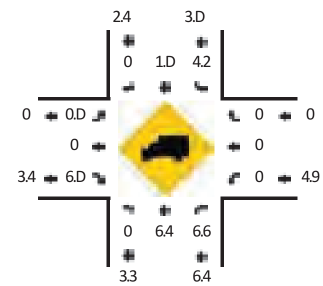
LOCATION: Airport Wy -- SR 120 EB Ramps — **QC JOB #:** 15549310

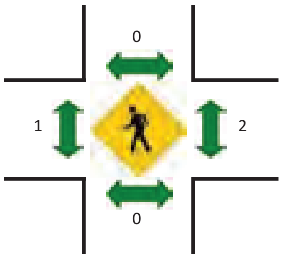
CIT7YSTATE: Manteca/CA — **, ATE:** Tue/Sep 14 2021

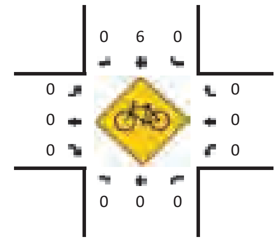


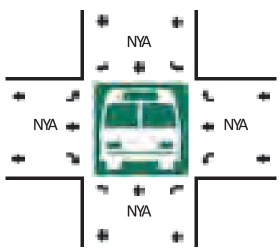
Peak-Hour: 4:00 PM -- 5:00 PM

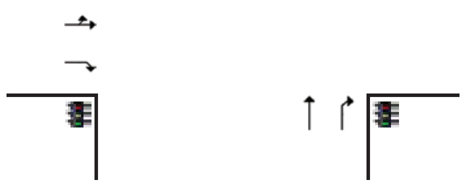
Peak 15-Min: 4:15 PM -- 4:30 PM

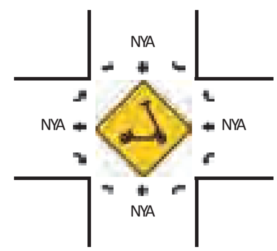












15-Min Count Period Beginning At	Airport Wy (Northbound)				Airport Wy (Southbound)				SR 120 EB Ramps (Eastbound)				SR 120 EB Ramps (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	0	149	24	0	50	135	0	0	8D	0	59	0	0	0	0	0	495	
4:15 PM	0	95	25	0	5D	199	0	0	95	0	81	0	0	0	0	0	543	
4:30 PM	0	92	26	0	68	145	0	0	102	0	80	0	0	0	0	0	502	
4:45 PM	0	D8	31	0	63	145	0	0	101	0	8D	0	0	0	0	0	505	2045
5:00 PM	0	108	12	0	52	11D	0	0	93	0	63	0	0	0	0	0	445	1995
5:15 PM	0	D4	26	0	89	113	0	0	94	0	D1	0	0	0	0	0	488	1929
5:30 PM	0	98	31	0	66	135	0	0	128	0	54	0	0	0	0	0	510	1938
5:45 PM	0	109	34	0	61	128	0	0	108	0	62	0	0	0	0	0	500	1932

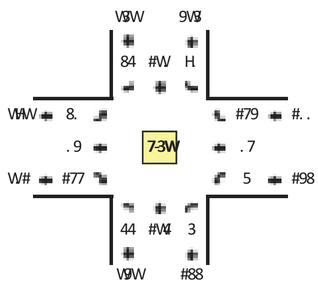
Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	0	3D0	100	0	232	896	0	0	3D0	0	2D4	0	0	0	0	0	2182
Heavy Trucks	0	32	16		D	D	0		4	0	32		0	0	0		100
Buses																	
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	20	0		0	0	0		0	0	0		20
Scooters																	

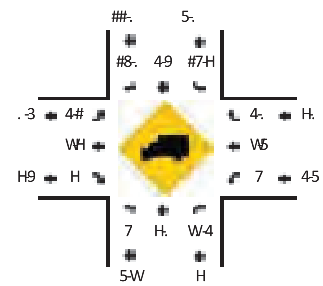
Comments:

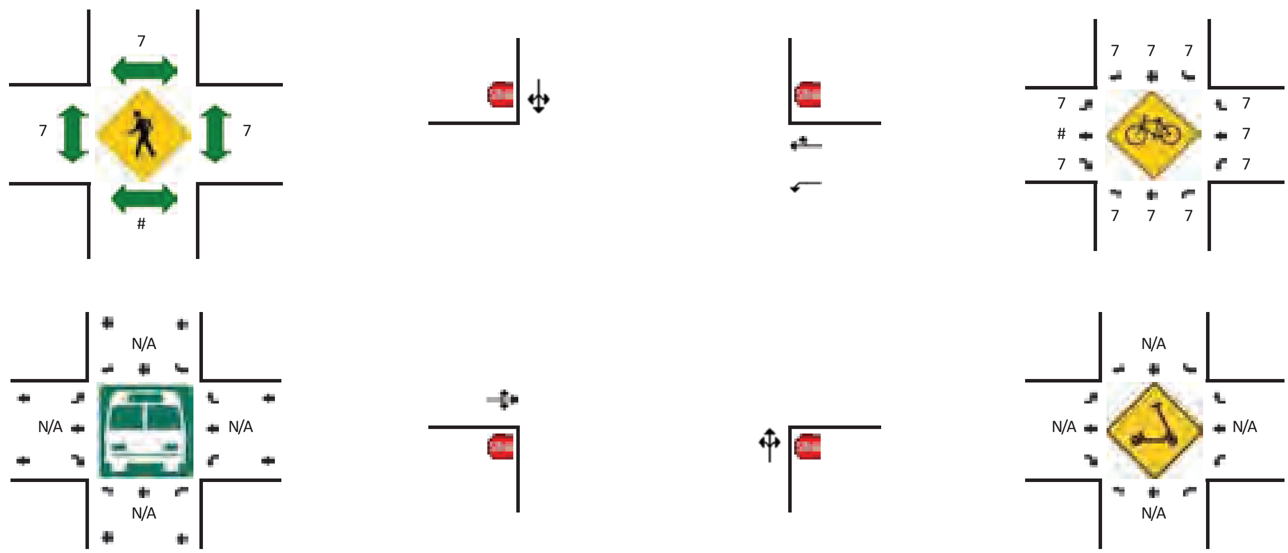
Report generated on 9Y23Y2021 1:19 PM — SOURCE: Quality Counts/LLC (http:YYwww.qualitycounts.net) 1-D88-5D0-2212

LOCATION: W Airport S y RRS S ood1 ard A2e **0 C BOQJ :** #5493W79
CITY/, TATE: MantecaDCA **6 ATE:** S edD6 ec . W7W#

PeakR(our: 3:#7 AM RR. :#7 AM
Peak #5RMin: 3:H7 AM RR3:55 AM







5RMin Count Period Qeginning At	W Airport S y)NorthboundU				W Airport S y), outhboundU				S S ood1 ard A2e)EastboundU				S S ood1 ard A2e)S estboundU				Total	(ourly Totals
	Left	Thru	Fight	w	Left	Thru	Fight	w	Left	Thru	Fight	w	Left	Thru	Fight	w		
3:77 AM	H	4	7	7	5	9	#4	7	W	H	5	7	#	H	H	7	5H	
3:75 AM	9	3	7	7	W	5	##	7	3	#	W	7	7	4	5	7	H8	
3:#7 AM	7	.	7	7	#	5	#W	7	8	9	9	7	7	3	.	7	54	
3:#5 AM	9	4	7	7	4	5	8	7	##	9	9	7	7	#	5	7	5W	
3:W7 AM	W	#4	7	7	W	.	.	7	.	3	5	7	#	4	3	7	37	
3:W5 AM	7	##	#	7	#	8	5	7	8	H	9	7	#	#	##	7	54	
3:97 AM	7	#7	7	7	H	3	3	7	4	#7	3	7	#	9	8	7	4H	
3:95 AM	7	#7	7	7	H	#5	3	7	#5	#4	#9	7	#	#	3	7	. 8	
3:H7 AM	.	#8	#	7	3	#8	9	7	3	#H	WH	7	7	.	5	7	##5	
3:H5 AM	#W	#9	#	7	9	#4	#H	7	3	#7	97	7	7	.	4	7	#W7	
3:57 AM	#W	#W	#	7	5	#7	.	7	H	4	4	7	7	#W	#H	7	87	
3:55 AM	WW	8	#	7	4	#W	4	7	.	9	W	7	7	#W	#7	7	8#	874
. :77 AM	4	.	#	7	W	#W	.	7	3	9	W	7	7	#3	##	7	33	8W8
. :75 AM	#	H	#	7	3	#7	8	7	3	H	W	7	7	H	#7	#	47	8H7
. :#7 AM	W	##	#	7	5	H	4	7	#W	9	#	7	7	7	H	7	H8	899
. :#5 AM	#	#7	#	7	H	5	#7	7	8	5	7	7	7	9	8	7	53	89.
. :W7 AM	W	#5	7	7	4	.	3	7	#7	W	7	7	7	9	H	7	53	8W5
. :W5 AM	7	##	#	7	H	3	#7	7	4	5	W	7	#	4	W	7	55	8WH
. :97 AM	7	3	7	7	5	9	#7	7	3	W	#	7	7	#	5	7	H#	87#
. :95 AM	W	#W	7	7	3	W	H	7	.	9	#	7	7	9	#7	7	5W	. 4H
. :H7 AM	#	H	7	7	4	4	8	7	#7	W	#	7	7	W	4	7	H3	384
. :H5 AM	#	9	7	7	.	H	.	7	.	H	#	7	7	9	3	7	H3	3W9
. :57 AM	#	3	7	7	4	#	3	7	3	5	9	7	7	9	.	7	H.	4. #
. :55 AM	#	.	7	7	9	H	5	7	4	#	9	7	7	H	.	7	H9	499

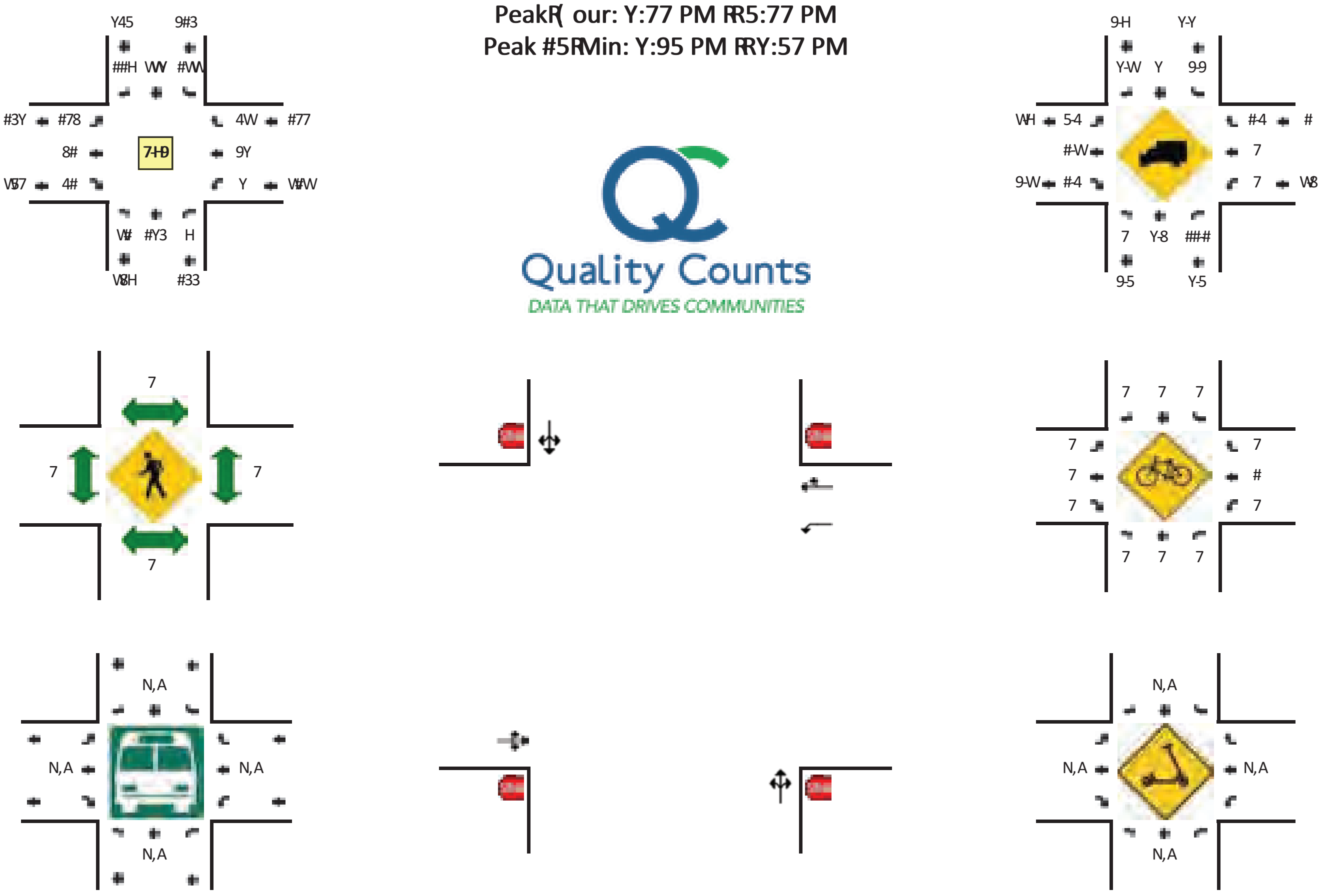
Peak #5RMin vlo1 rates	Northbound				, outhbound				Eastbound				S estbound				Total
	Left	Thru	Fight	w	Left	Thru	Fight	w	Left	Thru	Fight	w	Left	Thru	Fight	w	
All Vehicles	#W	#34	#W	7	47	#. 7	#77	7	3W	#W7	WH7	7	7	##W	#77	7	#977
(ea2y Trucks	7	7	H		H	#W	WH		H	7	H		7	.	.		4.
Quses																	
Pedestrians		H				7				7				7			H
Qicycles	7	7	7		7	7	7		7	H	7		7	7	7		H
, cooters																	

Comments:

LOCATION: W Airport S y RRS S ood1 ard A2e
CIT/, DTATE: Manteca6CA

0 C BOQJ : #5493W7Y
. ATE: S ed6. ec 8 W7W#

PeakR(our: Y:77 PM RR5:77 PM
Peak #5RMin: Y:95 PM RRY:57 PM



5RMin Count Period Qeginning At	W Airport S y)NorthboundU				W Airport S y)DouthboundU				S S ood1 ard A2e)EastboundU				S S ood1 ard A2e)S estboundU				Total	(ourly Totals
	Left	Thru	Fight	w	Left	Thru	Fight	w	Left	Thru	Fight	w	Left	Thru	Fight	w		
Y:77 PM	W	##	#	7	8	#9	3	7	#7	9	4	7	#	9	H	7	3Y	
Y:75 PM	#	#5	W	7	##	WW	8	7	##	8	Y	7	7	#	Y	7	83	
Y:#7 PM	Y	#7	7	7	##	#Y	#9	7	4	4	8	7	#	5	Y	7	8W	
Y:#5 PM	5	##	7	7	3	#8	#W	7	4	3	Y	7	#	W	3	7	87	
Y:W7 PM	W	#4	7	7	#7	#9	#5	7	#3	##	Y	7	7	5	W	7	H5	
Y:W5 PM	#	#W	#	7	3	W9	#9	7	3	5	#	7	7	#	H	7	87	
Y:97 PM	7	#4	7	7	##	WW	##	7	8	5	8	7	7	7	#	7	8W	
Y:95 PM	9	#3	7	7	#7	WY	Y	7	#9	4	4	7	#	9	7	7	83	
Y:Y7 PM	#	#9	W	7	#5	W7	H	7	3	5	5	7	7	W	H	7	88	
Y:Y5 PM	7	#7	#	7	#7	W5	#7	7	#7	#W	H	7	7	W	Y	7	H9	
Y:57 PM	W	8	#	7	#7	#3	3	7	4	4	Y	7	7	3	3	7	35	
Y:55 PM	7	8	#	7	#W	#9	#7	7	3	3	W	7	7	9	4	7	4H	HHW
5:77 PM	W	3	#	7	8	#H	##	7	3	#	#	7	7	9	9	7	49	H8#
5:75 PM	#	4	7	7	4	#W	#7	7	##	3	W	7	#	Y	8	7	48	H4W
5:#7 PM	W	#5	W	7	8	#5	8	7	#4	#W	8	7	7	9	Y	7	H9	H39
5:#5 PM	W	H	7	7	#W	WW	##	7	8	4	4	7	7	5	5	7	84	H3H
5:W7 PM	7	H	7	7	4	#9	8	7	#W	#	W	7	#	4	8	7	44	H57
5:W5 PM	#	##	7	7	##	#Y	3	7	8	Y	3	7	7	#	5	7	4H	H9H
5:97 PM	9	9	#	7	#7	#5	#7	7	3	3	H	7	7	5	3	7	33	H9Y
5:95 PM	#	H	#	7	5	#Y	#W	7	Y	4	W	7	7	4	4	7	44	H#9
5:Y7 PM	#	8	W	7	#5	#5	4	7	4	4	4	7	7	Y	H	7	38	H79
5:Y5 PM	7	#7	7	7	#9	#3	3	7	8	8	7	7	7	9	9	7	4H	83H
5:57 PM	7	4	#	7	H	#5	H	7	#	5	W	7	7	#	3	7	54	847
5:55 PM	7	Y	7	7	3	H	#9	7	W	9	W	7	7	Y	5	7	YH	8Y7

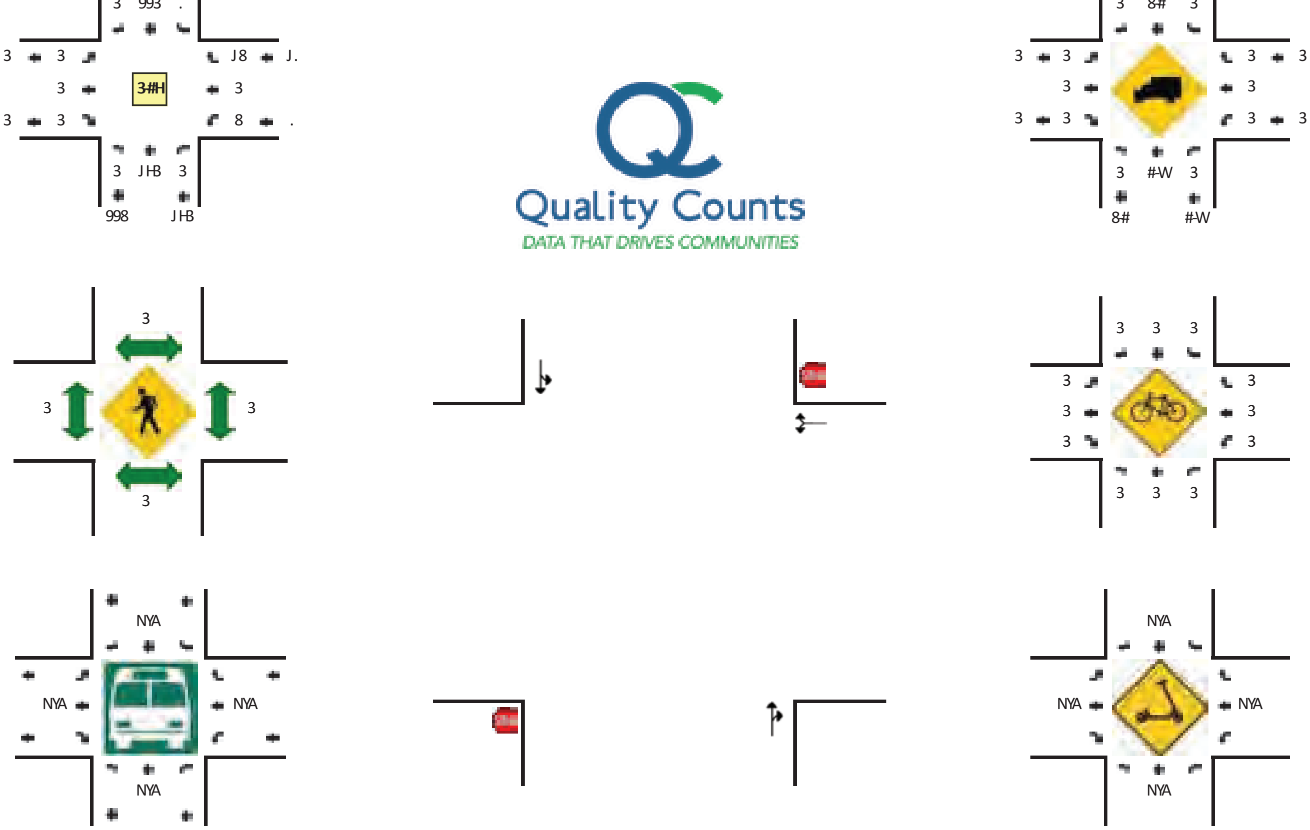
Peak #5RMin vlo1 rates	Northbound				Douthbound				Eastbound				S estbound				Total
	Left	Thru	Fight	w	Left	Thru	Fight	w	Left	Thru	Fight	w	Left	Thru	Fight	w	
All Vehicles	#4	#47	#W	7	#Y7	W34	HW	7	#W7	HW	87	7	Y	W8	5W	7	#73W
(ea2y Trucks	7	#4	Y		Y	8	Y		Y	7	Y		7	7	7		YY
Quses																	
Pedestrians		7				7				7				7			7
Qicycles	7	7	7		7	7	7		7	7	7		7	7	7		7
Dcooters																	

Comments:

Type of peak hour being reported: Intersection Peak | Method for determining peak hour: Total Entering Volume

LOCATION: W Airport S y RRE Peach 1d | **2 C 00B Q:** J #5W493#
CIT7Y/TATE: /an 0oa, uinDCA | **6ATE:** S edD6ec . 939J

PeakR(our: 4:J # AM RR. :J # AM
Peak J #RMin: 4:83 AM RR4:## AM



#RMin Count Period Beginning At	W Airport S y)NorthboundU				W Airport S y)/outhboundU				E Peach 1d)EastboundU				E Peach 1d)S estboundU				Total	(ourly Totals
	Left	Thru	1ight	F	Left	Thru	1ight	F	Left	Thru	1ight	F	Left	Thru	1ight	F		
4:33 AM	3	H	3	3	3	H	3	3	3	3	3	3	3	3	3	3	J .	
4:3# AM	3	4	3	3	3	4	3	3	3	3	3	3	3	3	W	3	J 4	
4:J 3 AM	3	4	3	3	3	.	3	3	3	3	3	3	3	3	J	3	J 5	
4:J # AM	3	J J	3	3	3	4	3	3	3	3	3	3	3	3	J	3	J H	
4:93 AM	3	J 9	3	3	3	J 8	3	3	3	3	3	3	3	3	9	3	9.	
4:9# AM	3	J W	3	3	3	J W	3	3	3	3	3	3	3	3	J	3	94	
4:W3 AM	3	H	3	3	3	J 9	3	3	3	3	3	3	3	3	3	3	9J	
4:W# AM	3	J W	3	3	9	9.	3	3	3	3	3	3	3	3	3	3	8W	
4:83 AM	3	9J	3	3	J	83	3	3	3	3	3	3	J	3	8	3	54	
4:8# AM	3	98	3	3	W	88	3	3	3	3	3	3	J	3	J	3	4W	
4:#3 AM	3	95	3	3	3	J 5	3	3	3	3	3	3	3	3	9	3	88	
4:## AM	3	9H	3	3	J	J 9	3	3	3	3	3	3	J	3	9	3	8#	8J .
. :33 AM	3	J 9	3	3	3	J 4	3	3	3	3	3	3	J	3	3	3	W3	8W3
. :3# AM	3	5	3	3	J	J 3	3	3	3	3	3	3	3	3	J	3	J .	8W
. :J 3 AM	3	J 8	3	3	3	4	3	3	3	3	3	3	3	3	3	3	9J	8W5
. :J # AM	3	J 9	3	3	3	#	3	3	3	3	3	3	3	3	J	3	J .	8W#
. :93 AM	3	J 8	3	3	3	.	3	3	3	3	3	3	J	3	3	3	9W	8W3
. :9# AM	3	J 9	3	3	3	.	3	3	3	3	3	3	3	3	3	3	93	89W
. :W3 AM	3	H	3	3	3	#	3	3	3	3	3	3	3	3	3	3	J 8	8J 5
. :W# AM	3	J 3	J	3	3	W	3	3	3	3	3	3	3	3	3	3	J 8	W 4
. :83 AM	3	4	J	3	3	4	3	3	3	3	3	3	3	3	3	3	J #	WW#
. :8# AM	3	#	3	3	J	8	3	3	3	3	3	3	3	3	3	3	J 3	949
. :#3 AM	3	#	3	3	3	W	3	3	3	3	3	3	3	3	J	3	H	9W4
. :## AM	3	J 3	J	3	J	5	3	3	3	3	3	3	3	3	W	3	9J	9J W

Peak J #RMin wlov rates	Northbound				/outhbound				Eastbound				S estbound				Total
	Left	Thru	1ight	F	Left	Thru	1ight	F	Left	Thru	1ight	F	Left	Thru	1ight	F	
All Vehicles	3	9. 8	3	3	J 5	833	3	3	3	3	3	3	.	3	9.	3	4W5
(eaqy Trucks	3	.	3		3	J 9	3		3	3	3		3	3	3		93
Buses																	
Pedestrians		3				3				3				3			3
Bicycles	3	3	3		3	3	3		3	3	3		3	3	3		3
/cooters																	

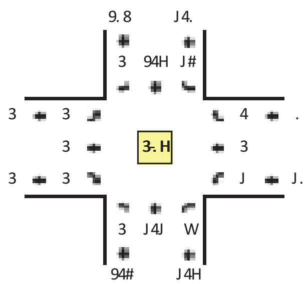
Comments:

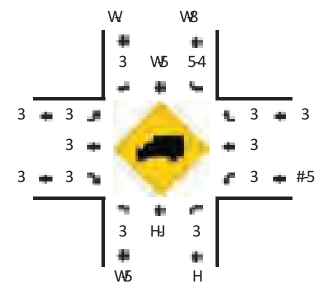
1eport generated on J 9Y93Y939J J 9:88 PM | /OF 1CE: 2 uality CountsDLLC)http:YYv v v -, ualitycounts-netUJ R 44R#. 3R99J 9

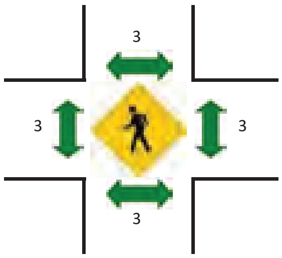
Type of peak hour being reported: Intersection Peak | Method for determining peak hour: Total Entering Volume

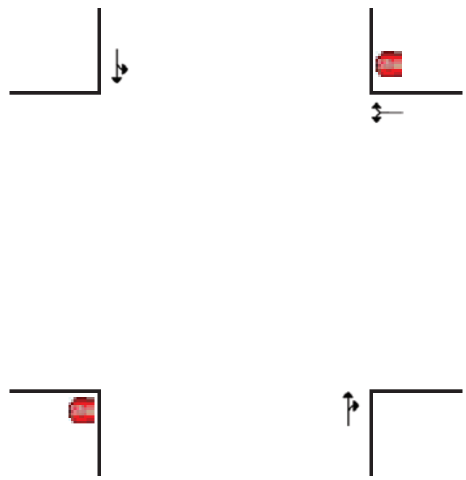
LOCATION: W Airport S y RRE Peach 1d | **2 C 00B Q:** J #5W4935
CIT7Y/TATE: /an 0oa, uinDCA | **6ATE:** S edD6ec . 939J

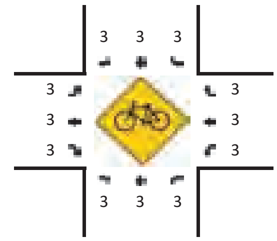
PeakR(our: H:33 PM RR#:33 PM
Peak J #RMin: H:9# PM RRH:H3 PM

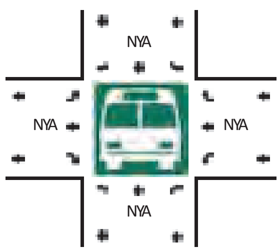


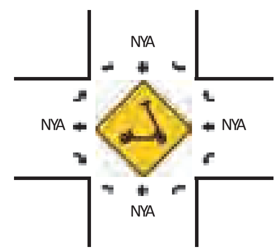












#RMin Count Period Beginning At	W Airport S y)NorthboundU				W Airport S y)/outboundU				E Peach 1d)EastboundU				E Peach 1d)S estboundU				Total	(ourly Totals
	Left	Thru	1ight	F	Left	Thru	1ight	F	Left	Thru	1ight	F	Left	Thru	1ight	F		
H:33 PM	3	J H	3	3	J	9J	3	3	3	3	3	3	3	3	3	3	W5	
H:3# PM	3	J 4	J	3	9	99	3	3	3	3	3	3	3	3	3	3	H9	
H:J 3 PM	3	J #	3	3	J	99	3	3	3	3	3	3	3	3	H	3	H9	
H:J # PM	3	J W	3	3	J	99	3	3	3	3	3	3	3	3	J	3	W4	
H:93 PM	3	J H	J	3	3	J 8	3	3	3	3	3	3	3	3	3	3	WH	
H:9# PM	3	J .	3	3	9	93	3	3	3	3	3	3	3	3	9	3	H9	
H:W3 PM	3	J W	3	3	W	9.	3	3	3	3	3	3	J	3	3	3	H#	
H:W# PM	3	9J	3	3	9	W/	3	3	3	3	3	3	3	3	3	3	#H	
H:H3 PM	3	J #	3	3	3	9H	3	3	3	3	3	3	3	3	3	3	W8	
H:H# PM	3	J 3	J	3	J	W9	3	3	3	3	3	3	3	3	3	3	HH	
H:#3 PM	3	J 9	3	3	3	93	3	3	3	3	3	3	3	3	3	3	W9	
H:## PM	3	8	3	3	9	J W	3	3	3	3	3	3	3	3	3	3	9H	H4J
#:33 PM	3	4	3	3	3	J .	3	3	3	3	3	3	3	3	3	3	9#	H53
#:3# PM	3	8	3	3	9	J H	3	3	3	3	3	3	3	3	3	3	9#	HHW
#:J 3 PM	3	9W	3	3	J	9J	3	3	3	3	3	3	3	3	J	3	H5	HH4
#:J # PM	3	5	3	3	J	9#	3	3	3	3	3	3	3	3	3	3	W9	HH9
#:93 PM	3	5	3	3	J	J .	3	3	3	3	3	3	3	3	3	3	9#	HWW
#:9# PM	3	J #	3	3	3	J .	3	3	3	3	3	3	3	3	3	3	WW	H9H
#:W3 PM	3	4	3	3	3	95	3	3	3	3	3	3	3	3	3	3	WW	HJ 9
#:W# PM	3	4	J	3	3	J #	3	3	3	3	3	3	3	3	9	3	9#	W W
#:H3 PM	3	J W	3	3	J	93	3	3	3	3	3	3	3	3	J	3	W#	W48
#:H# PM	3	5	J	3	W	J H	3	3	3	3	3	3	3	3	3	3	9H	W#8
#:#3 PM	3	4	3	3	3	J 4	3	3	3	3	3	3	3	3	J	3	9#	W#9
#:## PM	3	W	3	3	J	J J	3	3	3	3	3	3	3	3	3	3	J #	WHW

Peak J #RMin wlov rates	Northbound				/outhbound				Eastbound				S estbound				Total
	Left	Thru	1ight	F	Left	Thru	1ight	F	Left	Thru	1ight	F	Left	Thru	1ight	F	
All Vehicles	3	93.	3	3	9.	W 5	3	3	3	3	3	3	H	3	.	3	#5H
(eaqy Trucks	3	J 9	3		3	J 5	3		3	3	3		3	3	3		9.
Buses																	
Pedestrians		3				3				3				3			3
Bicycles	3	3	3		3	3	3		3	3	3		3	3	3		3
/cooters																	

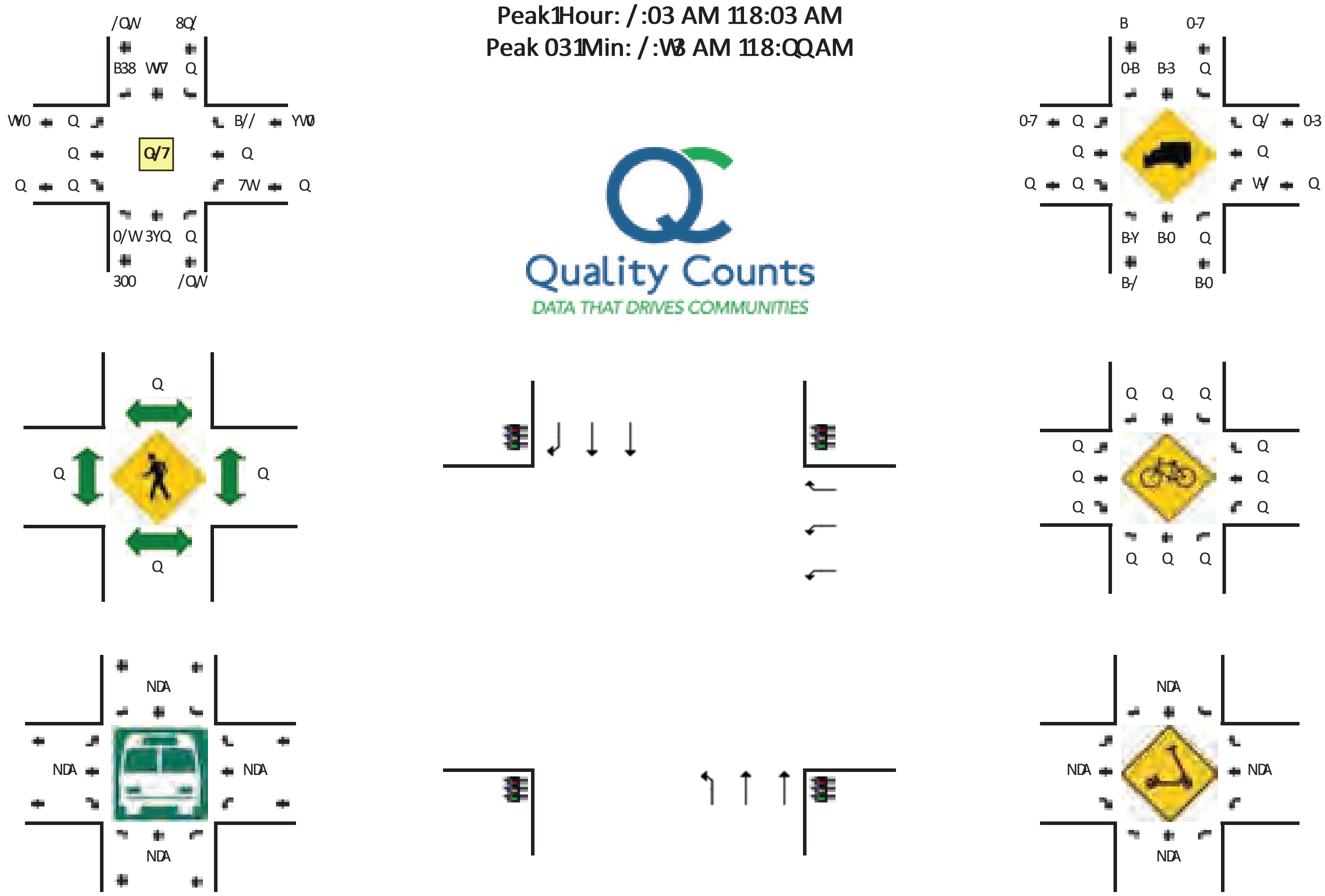
Comments:

1eport generated on J 9Y93Y939J J 9:HH PM | /OF 1CE: 2 uality CountsDLLC)http:YYv v v -, ualitycounts-netUJ R 44R#. 3R99J 9

Type of peak hour being reported: Intersection Peak | Method for determining peak hour: Total Entering Volume

LOCATION: WS nion Rd 112R 0BQJ # Ramps — **5 C 4O# 9:** 037Y/ BQ/
CIT, D2TATE: Manteca6CA — **. ATE:** J ed6. ec 8 BQB0

Peak1Hour: / :03 AM 118:03 AM
Peak 031Min: / :W3 AM 118:QQ AM



31Min Count Period #eginning At	WS nion Rd (Northbound) Left	Thru	Right	S	WS nion Rd (2outhbound) Left	Thru	Right	S	2R 0BQJ # Ramps (Eastbound) Left	Thru	Right	S	2R 0BQJ # Ramps (J estbound) Left	Thru	Right	S	Total	Hourly Totals
/ :QQ AM	0B	08	Q	Q	Q	07	03	Q	Q	Q	Q	Q	07	Q	0W	Q	U0	
/ :Q3 AM	0Y	B0	Q	Q	Q	B3	0/	Q	Q	Q	Q	Q	Y	Q	0B	Q	U0	
/ :0Q AM	U	BW	Q	Q	Q	BB	0U	Q	Q	Q	Q	Q	Y	Q	0/	Q	UW	
/ :03 AM	U	Y0	Q	Q	Q	08	B0	Q	Q	Q	Q	Q	7	Q	00	Q	U7	
/ :BQ AM	U	B7	Q	Q	Q	BU	BQ	Q	Q	Q	Q	Q	/	Q	03	Q	0Q7	
/ :B3 AM	0Q	Y0	Q	0	Q	Y7	B3	Q	Q	Q	Q	Q	B	Q	0Y	Q	008	
/ :YQ AM	0B	WQ	Q	Q	Q	YB	03	Q	Q	Q	Q	Q	Y	Q	0/	Q	00U	
/ :Y3 AM	0Y	WB	Q	Q	Q	WW	BB	Q	Q	Q	Q	Q	W	Q	B3	Q	03Q	
/ :WQ AM	0/	Y/	Q	Q	Q	W/	YY	Q	Q	Q	Q	Q	Y	Q	B/	Q	07W	
/ :W3 AM	0U	80	Q	Q	Q	YU	B7	Q	Q	Q	Q	Q	7	Q	B8	Q	0UU	
/ :3Q AM	B7	7/	Q	Q	Q	Y7	08	Q	Q	Q	Q	Q	/	Q	WB	Q	0U7	
/ :33 AM	B0	7B	Q	Q	Q	WB	B0	Q	Q	Q	Q	Q	Y	Q	Y0	Q	08Q	07QW
8:QQ AM	03	WQ	Q	Q	Q	3W	07	Q	Q	Q	Q	Q	0Q	Q	BW	Q	03U	07/ B
8:Q3 AM	0Y	W3	Q	Q	Q	WQ	BY	Q	Q	Q	Q	Q	/	Q	BW	Q	03B	0/ YY
8:0Q AM	U	B8	Q	Q	Q	BU	08	Q	Q	Q	Q	Q	7	Q	BQ	Q	00Q	0/ WU
8:03 AM	8	B3	Q	Q	Q	B7	00	Q	Q	Q	Q	Q	Y	Q	07	Q	8U	0/ WB
8:BQ AM	U	YQ	Q	Q	Q	BY	08	Q	Q	Q	Q	Q	3	Q	B7	Q	000	0/ W/
8:B3 AM	7	BY	Q	Q	Q	B8	0B	Q	Q	Q	Q	Q	W	Q	0W	Q	8/	0/ 07
8:YQ AM	0B	B3	Q	Q	Q	B8	B7	Q	Q	Q	Q	Q	3	Q	B7	Q	0BB	0/ 0U
8:Y3 AM	U	YW	Q	Q	Q	07	07	Q	Q	Q	Q	Q	3	Q	BW	Q	0QW	07/ Y
8:WQ AM	00	YQ	Q	Q	Q	B7	0Y	Q	Q	Q	Q	Q	U	Q	0U	Q	0Q8	070/
8:W3 AM	/	BU	Q	Q	Q	B0	0W	Q	Q	Q	Q	Q	/	Q	0U	Q	U/	0303
8:3Q AM	7	WQ	Q	Q	Q	BW	BQ	Q	Q	Q	Q	Q	U	Q	0W	Q	00Y	0WYB
8:33 AM	3	B/	Q	Q	Q	BY	0B	Q	Q	Q	Q	Q	0	Q	07	Q	8W	0YY7

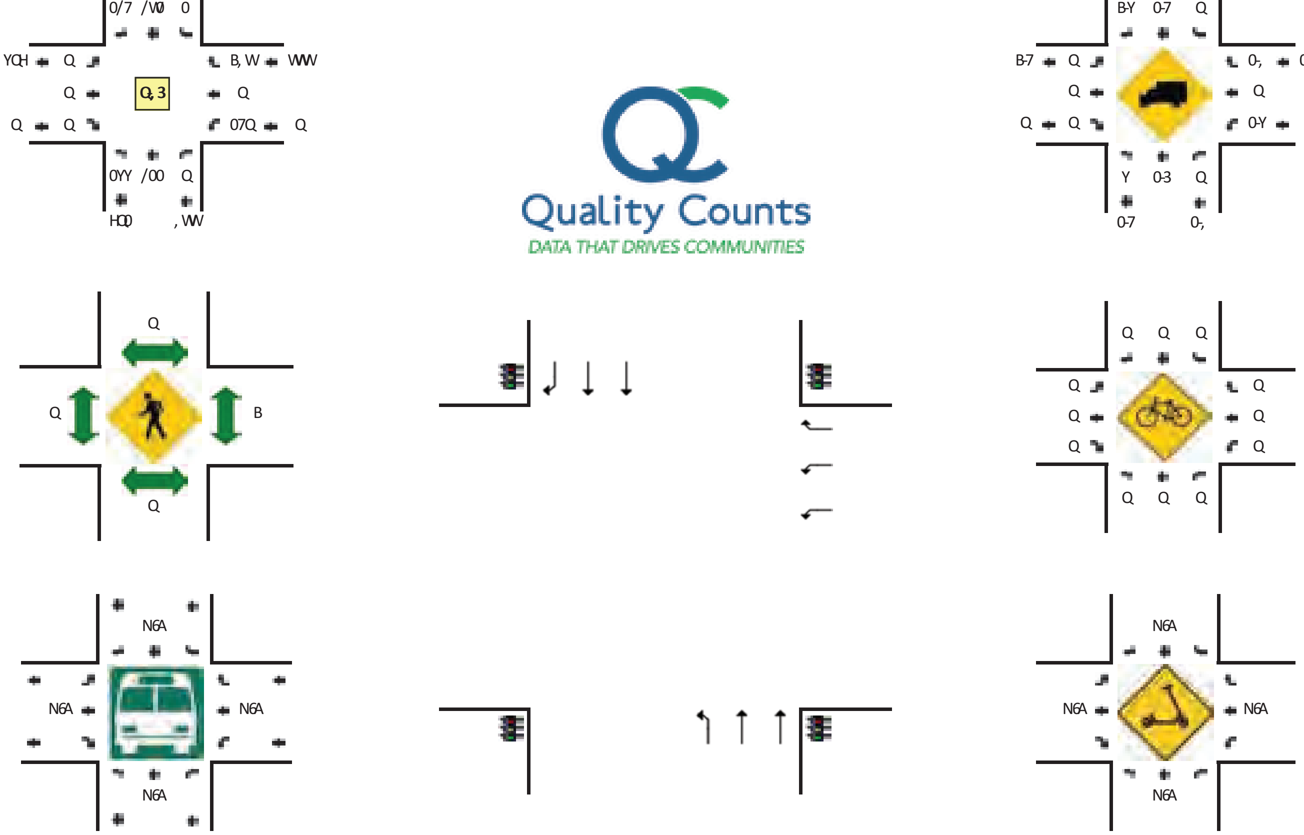
Peak 031Min Flowrates	Northbound Left	Thru	Right	S	2outhbound Left	Thru	Right	S	Eastbound Left	Thru	Right	S	J estbound Left	Thru	Right	S	Total
All Vehicles	B7W	8WQ	Q	Q	Q	W78	B7Q	Q	Q	Q	Q	Q	7W	Q	WQW	Q	BYQQ
Heavy Trucks	W	0B	Q		Q	8	Q		Q	Q	Q		Q	Q	W		B8
#uses																	
Pedestrians		Q				Q				Q				Q			Q
#icycles	Q	Q	Q		Q	Q	Q		Q	Q	Q		Q	Q	Q		Q
2cooters																	

Comments:

Type of peak hour being reported: Intersection Peak | Method for determining peak hour: Total Entering Volume

LOCATION: WS nion Rd 112R 0BQJ # Ramps | **5 C 4O# 9:** 037Y/BQ,
CITD62TATE: Manteca. CA | **8ATE:** J ed. 8ec , BQB0

Peak1(our: WQQ PM 113:QQ PM
Peak 031Min: W0Q PM 11WB3 PM



31Min Count Period #eginning At	WS nion Rd)NorthboundU				WS nion Rd)2outhboundU				2R 0BQJ # Ramps)EastboundU				2R 0BQJ # Ramps)J estboundU				Total	(ourly Totals
	Left	Thru	Right	S	Left	Thru	Right	S	Left	Thru	Right	S	Left	Thru	Right	S		
WQQ PM	0Y	7/	Q	Q	Q	Y3	03	Q	Q	Q	Q	Q	/	Q	YW	Q	0/0	
WQ3 PM	0B	7Y	Q	Q	Q	7H	B0	Q	Q	Q	Q	Q	H	Q	BY	Q	0H/	
W0Q PM	0B	7Y	Q	Q	Q	, H	0Y	Q	Q	Q	Q	Q	0/	Q	B/	Q	BB0	
W03 PM	0Y	7W	Q	Q	Q	, /	0/	Q	Q	Q	Q	Q	07	Q	B/	Q	BBW	
WBQ PM	0Q	73	Q	Q	Q	/H	00	Q	Q	Q	Q	Q	0/	Q	BW	Q	BQ7	
WB3 PM	0B	3W	Q	Q	Q	/Y	0Y	Q	Q	Q	Q	Q	0/	Q	BQ	Q	0, H	
WYQ PM	0Q	3H	Q	Q	Q	7,	00	Q	Q	Q	Q	Q	0Y	Q	0H	Q	0, Q	
WY3 PM	0Q	3Q	Q	Q	Q	70	07	Q	Q	Q	Q	Q	,	Q	BW	Q	07H	
WWQ PM	H	33	Q	Q	Q	3H	03	Q	Q	Q	Q	Q	0/	Q	BB	Q	0//	
WW3 PM	0W	7Q	Q	Q	Q	YQ	H	Q	Q	Q	Q	Q	0H	Q	BQ	Q	03B	
W3Q PM	,	W	Q	Q	Q	W7	0H	Q	Q	Q	Q	Q	,	Q	BY	Q	03B	
W33 PM	0Q	7Y	Q	Q	Q	W3	07	0	Q	Q	Q	Q	0B	Q	B0	Q	07,	BBQ7
3:QQ PM	H	/0	Q	Q	Q	WY	0B	Q	Q	Q	Q	Q	03	Q	07	Q	077	BBQ0
3:Q3 PM	0Y	3H	Q	Q	Q	30	0,	Q	Q	Q	Q	Q	,	Q	BY	Q	0/B	B0/7
3:0Q PM	H	W	Q	Q	Q	77	0W	Q	Q	Q	Q	Q	0H	Q	B/	Q	0, B	B0Y/
3:03 PM	0/	3Y	Q	Q	Q	30	07	Q	Q	Q	Q	Q	0Q	Q	Y,	Q	0, 3	BQH,
3:BQ PM	00	3/	Q	Q	Q	WY	0B	Q	Q	Q	Q	Q	H	Q	BH	Q	070	BQ3Y
3:B3 PM	0Q	7Q	Q	Q	Q	W3	0W	Q	Q	Q	Q	Q	,	Q	0/	Q	030	BQ03
3:YQ PM	0B	WY	Q	Q	Q	3W	B,	Q	Q	Q	Q	Q	0B	Q	B,	Q	0//	BQ0B
3:Y3 PM	0H	3Y	Q	Q	Q	WQ	0,	Q	Q	Q	Q	Q	0H	Q	BW	Q	0/Y	BQ07
3:WQ PM	B0	W7	Q	Q	Q	YH	0B	Q	Q	Q	Q	Q	0Q	Q	B0	Q	0WH	0H, ,
3:W3 PM	0B	W	Q	Q	Q	WY	00	Q	Q	Q	Q	Q	,	Q	BQ	Q	0W0	0H//
3:3Q PM	,	3,	Q	Q	Q	YH	0Q	Q	Q	Q	Q	Q	0Y	Q	0H	Q	0W	0H/B
3:33 PM	00	3Q	Q	Q	Q	WY	03	Q	Q	Q	Q	Q	0W	Q	0Y	Q	0W7	0H3Q

Peak 031Min Flowrates	Northbound				2outhbound				Eastbound				J estbound				Total
	Left	Thru	Right	S	Left	Thru	Right	S	Left	Thru	Right	S	Left	Thru	Right	S	
All Vehicles	0WQ	/7,	Q	Q	Q	0QBQ	07W	Q	Q	Q	Q	Q	BQQ	Q	Y0B	Q	B7QW
(eavy Trucks	,	YB	Q		Q	YB	0B		Q	Q	Q		W	Q	,		H7
#uses																	
Pedestrians		Q				Q				Q				W			W
#icycles	Q	Q	Q		Q	Q	Q		Q	Q	Q		Q	Q	Q		Q
2cooters																	

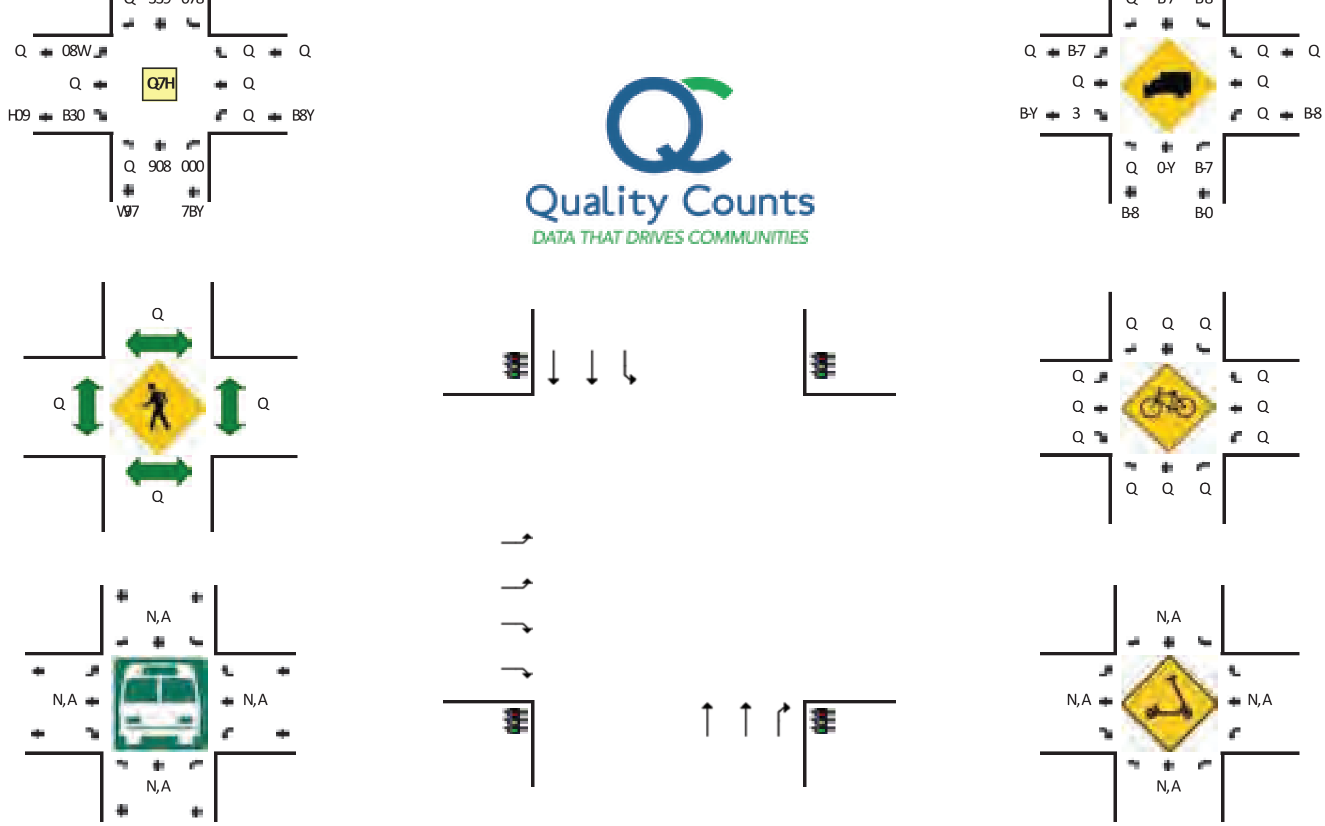
Comments:

Report generated on 0B6BQ6BQB0 0B:WWPM | 2OS RCE: 5 uality Counts. LLC)http:66www-qualitycounts-netU01, //13, Q1BB0B

Type of peak hour being reported: Intersection Peak | Method for determining peak hour: Total Entering Volume

LOCATION: WS nion Rd 112R 0BQEJ Ramps | **# C 5OJ 4:** 0W937BQY
CIT/,2TATE: MantecaDCA | **6ATE:** . edD6ec 8 BQB0

Peak1(our: 7:0WAM 118:0WAM
Peak 0W1Min: 7:HQAM 117:WWAM



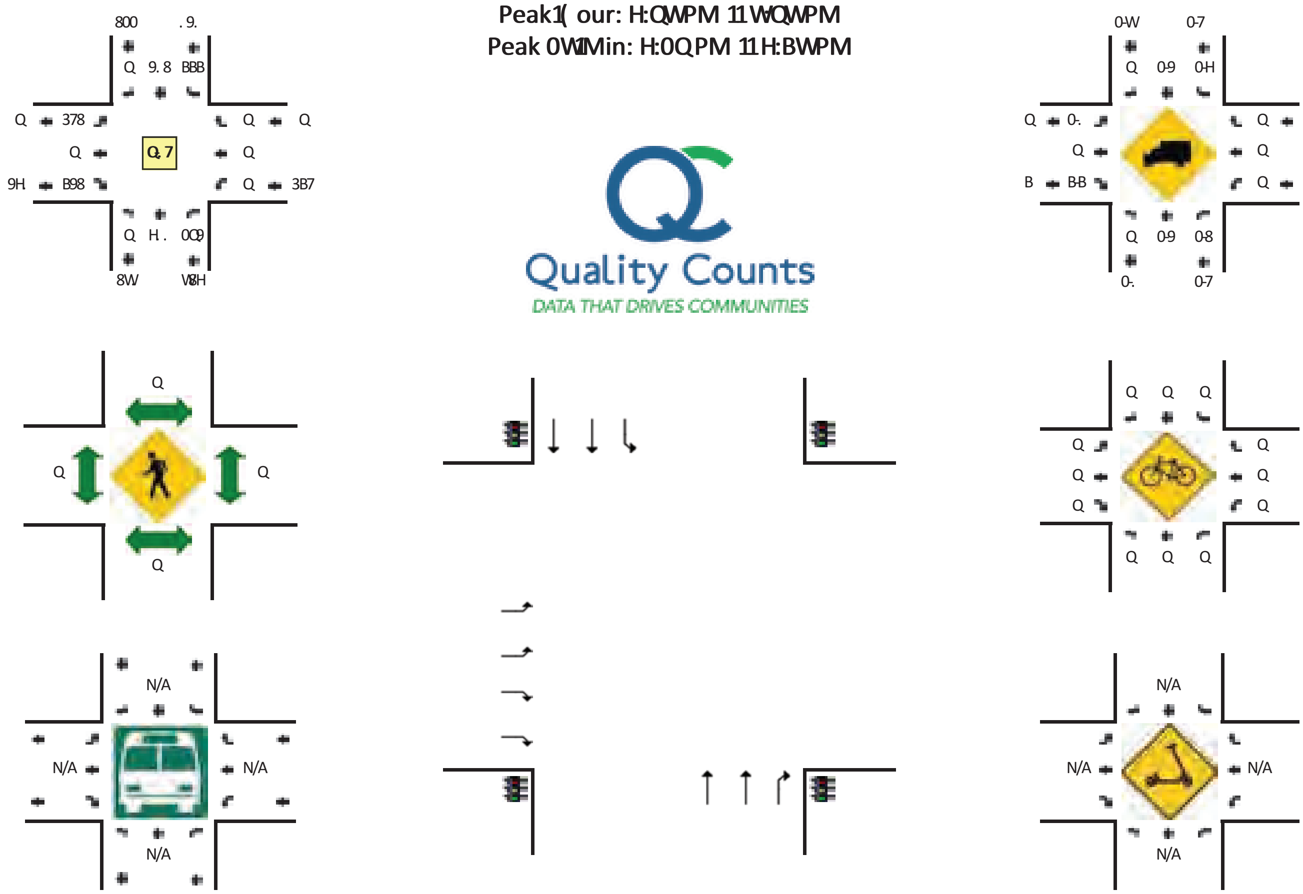
W1Min Count Period J eginning At	WS nion Rd)NorthboundU				WS nion Rd)2outhboundU				2R 0BQEJ Ramps)EastboundU				2R 0BQEJ Ramps). estboundU				Total	(ourly Totals
	Left	Thru	Right	S	Left	Thru	Right	S	Left	Thru	Right	S	Left	Thru	Right	S		
7:QQAM	Q	B8	W	Q	W	BW	Q	Q	8	Q	Y	Q	Q	Q	Q	Q	8Q	
7:QWAM	Q	B7	9	Q	0Q	07	Q	Q	9	Q	3	Q	Q	Q	Q	Q	9Y	
7:0QAM	Q	BB	W	Q	0H	0B	Q	Q	0Y	Q	W	Q	Q	Q	Q	Q	77	
7:0WAM	Q	3B	9	Q	0B	0H	Q	Q	03	Q	Y	Q	Q	Q	Q	Q	89	
7:BQAM	Q	3B	9	Q	0B	BB	Q	Q	Y	Q	0Q	Q	Q	Q	Q	Q	Y0	
7:BWAM	Q	HQ	9	Q	8	3Q	Q	Q	00	Q	BB	Q	Q	Q	Q	Q	007	
7:3QAM	Q	HB	0Q	Q	0B	BB	Q	Q	BB	Q	B3	Q	Q	Q	Q	Q	030	
7:3WAM	Q	3Y	9	Q	07	3B	Q	Q	BH	Q	B3	Q	Q	Q	Q	Q	0H0	
7:HQAM	Q	7H	8	Q	03	38	Q	Q	08	Q	38	Q	Q	Q	Q	Q	08Y	
7:HWAM	Q	73	0W	Q	09	B7	Q	Q	BW	Q	33	Q	Q	Q	Q	Q	08Y	
7:WQAM	Q	79	07	Q	09	33	Q	Q	00	Q	B8	Q	Q	Q	Q	Q	080	
7:WWAM	Q	7Y	0B	Q	09	BW	Q	Q	0Y	Q	0W	Q	Q	Q	Q	Q	099	0W07
8:QQAM	Q	93	0Q	Q	0Y	H3	Q	Q	Y	Q	0H	Q	Q	Q	Q	Q	0W8	0WYW
8:QWAM	Q	HH	8	Q	07	3Q	Q	Q	03	Q	0Q	Q	Q	Q	Q	Q	0BB	09H8
8:0QAM	Q	BH	7	Q	BQ	BQ	Q	Q	00	Q	9	Q	Q	Q	Q	Q	88	09WY
8:0WAM	Q	BH	8	Q	0B	03	Q	Q	09	Q	8	Q	Q	Q	Q	Q	80	09WH
8:BQAM	Q	BH	3	Q	08	0B	Q	Q	03	Q	9	Q	Q	Q	Q	Q	79	093Y
8:BWAM	Q	08	3	Q	0H	07	Q	Q	0W	Q	W	Q	Q	Q	Q	Q	7B	0WYH
8:3QAM	Q	3W	W	Q	0H	09	Q	Q	Y	Q	8	Q	Q	Q	Q	Q	87	0WWQ
8:3WAM	Q	BB	H	Q	03	0Q	Q	Q	0B	Q	W	Q	Q	Q	Q	Q	99	0H7W
8:HQAM	Q	B7	9	Q	08	08	Q	Q	BQ	Q	H	Q	Q	Q	Q	Q	Y3	037Y
8:HWAM	Q	B7	9	Q	07	0B	Q	Q	0W	Q	00	Q	Q	Q	Q	Q	88	0B78
8:WQAM	Q	BH	0Q	Q	0B	B0	Q	Q	09	Q	W	Q	Q	Q	Q	Q	88	008W
8:WWAM	Q	0Y	7	Q	W	0Y	Q	Q	0B	Q	8	Q	Q	Q	Q	Q	7Q	0Q8Y

Peak 0W1Min Flowrates	Northbound				2outhbound				Eastbound				. estbound				Total
	Left	Thru	Right	S	Left	Thru	Right	S	Left	Thru	Right	S	Left	Thru	Right	S	
All Vehicles	Q	8YB	09Q	Q	08Q	3YB	Q	Q	B09	Q	3Y9	Q	Q	Q	Q	Q	BB39
(eavy Trucks	Q	8	H		Q	0B	Q		8	Q	BH		Q	Q	Q		W9
J uses																	
Pedestrians		Q				Q				Q				Q			Q
J icycles	Q	Q	Q		Q	Q	Q		Q	Q	Q		Q	Q	Q		Q
2cooters																	

Comments:

Type of peak hour being reported: Intersection Peak | Method for determining peak hour: Total Entering Volume

LOCATION: WS nion Rd 112R 0BQEJ Ramps | **# C 5OJ 4:** 0W937B0Q
CITY/2TATE: Manteca, CA | **DATE:** 6 ed, Dec . BQB0



W1Min Count Period J eginning At	WS nion Rd)NorthboundU				WS nion Rd)2outhboundU				2R 0BQEJ Ramps)EastboundU				2R 0BQEJ Ramps)6 estboundU				Total	(ourly Totals
	Left	Thru	Right	S	Left	Thru	Right	S	Left	Thru	Right	S	Left	Thru	Right	S		
H:QQPM	Q	W3	7	Q	09	30	Q	Q	BW	Q	B0	Q	Q	Q	Q	Q	0W3	
H:QWPM	Q	WQ	08	Q	0B	7Q	Q	Q	30	Q	08	Q	Q	Q	Q	Q	BQ0	
H:0QPM	Q	3B	9	Q	07	. 3	Q	Q	39	Q	B9	Q	Q	Q	Q	Q	BQQ	
H:0WPM	Q	H.	9	Q	BW	. B	Q	Q	3W	Q	BQ	Q	Q	Q	Q	Q	B09	
H:BQPM	Q	3.	7	Q	B3	7.	Q	Q	3H	Q	BW	Q	Q	Q	Q	Q	BQW	
H:BWPM	Q	H9	0Q	Q	B9	90	Q	Q	BW	Q	BQ	Q	Q	Q	Q	Q	0. .	
H:3QPM	Q	HW	7	Q	0W	W9	Q	Q	3H	Q	B9	Q	Q	Q	Q	Q	0. 3	
H:3WPM	Q	33	9	Q	09	HW	Q	Q	B.	Q	B7	Q	Q	Q	Q	Q	0WW	
H:HQPM	Q	33	0B	Q	BQ	9W	Q	Q	B9	Q	0.	Q	Q	Q	Q	Q	07H	
H:HWPM	Q	37	H	Q	BQ	3.	Q	Q	3W	Q	07	Q	Q	Q	Q	Q	0W0	
H:WQPM	Q	38	03	Q	03	30	Q	0	30	Q	BW	Q	Q	Q	Q	Q	0W3	
H:WWPM	Q	HW	8	Q	0.	H0	Q	Q	3B	Q	B9	Q	Q	Q	Q	Q	070	B0WQ
WQQPM	Q	HB	7	Q	09	38	Q	Q	3B	Q	BQ	Q	Q	Q	Q	Q	0W9	B0W3
WQWPM	Q	39	8	Q	BH	H7	Q	Q	3Q	Q	0B	Q	Q	Q	Q	Q	0W	B00Q
W0QPM	Q	B8	7	Q	09	W3	Q	Q	B.	Q	0.	Q	Q	Q	Q	Q	0WQ	BQ9Q
W0WPM	Q	W3	W	Q	7	WW	Q	Q	B8	Q	07	Q	Q	Q	Q	Q	09W	BQQ8
WBQPM	Q	H3	7	Q	0B	H3	Q	Q	B3	Q	BB	Q	Q	Q	Q	Q	0WQ	08WH
WBWPM	Q	B7	W	Q	07	3Q	Q	Q	HQ	Q	07	Q	Q	Q	Q	Q	039	08QB
W3QPM	Q	30	8	Q	0H	H9	Q	Q	33	Q	3W	Q	Q	Q	Q	Q	09.	0. . 7
W3WPM	Q	W0	9	Q	03	H9	Q	Q	B7	Q	B.	Q	Q	Q	Q	Q	070	08Q3
WHQPM	Q	H0	7	Q	08	38	Q	Q	B9	Q	BQ	Q	Q	Q	Q	Q	0WB	0. . 0
WHWPM	Q	33	W	Q	00	3B	Q	Q	BH	Q	38	Q	Q	Q	Q	Q	0HH	0. 7H
WWQPM	Q	37	00	Q	0B	3.	Q	Q	3Q	Q	BB	Q	Q	Q	Q	Q	0WQ	0. 70
WWWPM	Q	37	8	Q	00	WQ	Q	Q	B8	Q	0W	Q	Q	Q	Q	Q	0W0	0. W0

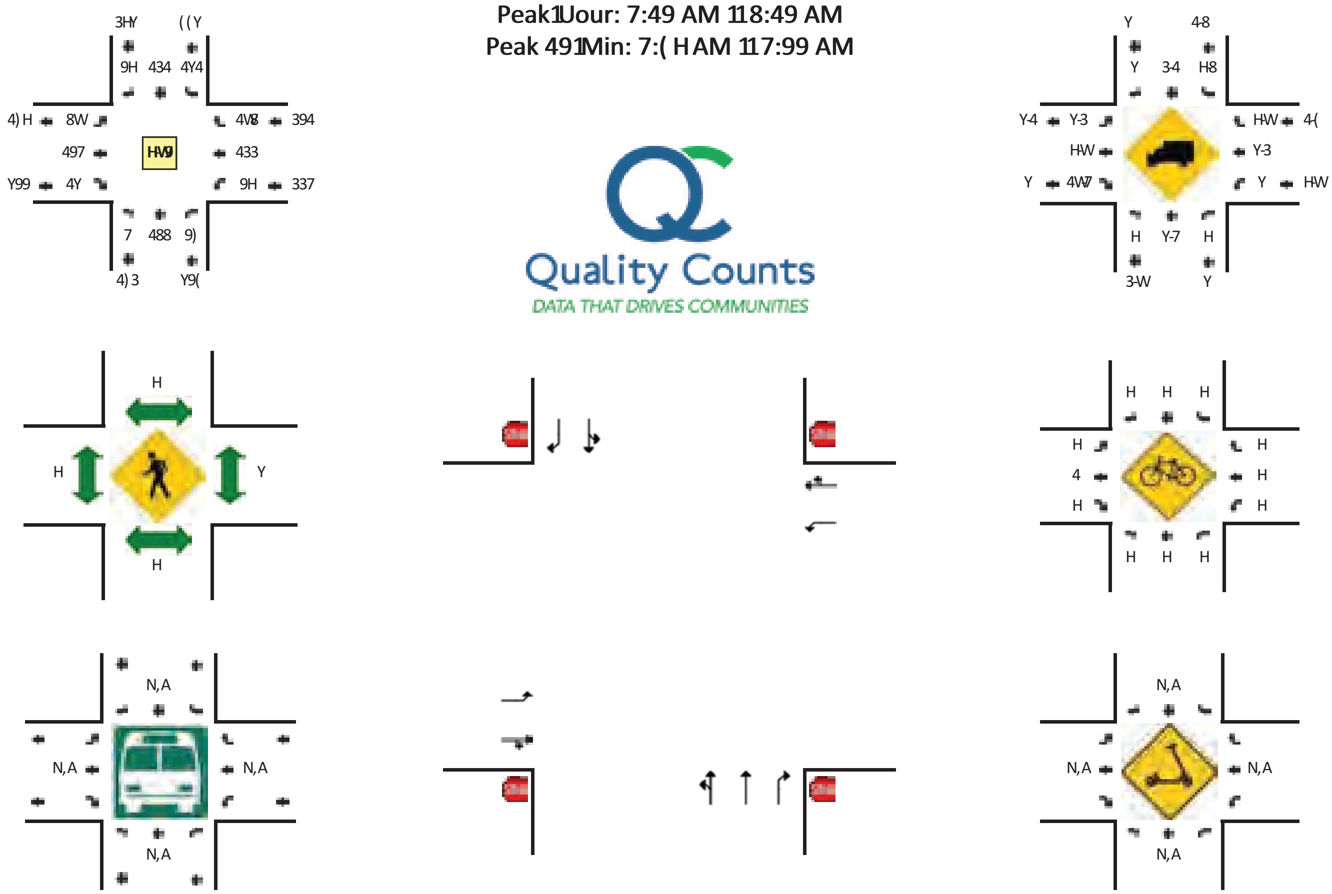
Peak 0W1Min Flowrates	Northbound				2outhbound				Eastbound				6 estbound				Total
	Left	Thru	Right	S	Left	Thru	Right	S	Left	Thru	Right	S	Left	Thru	Right	S	
All Vehicles	Q	H7B	79	Q	B9Q	87B	Q	Q	HBQ	Q	B. H	Q	Q	Q	Q	Q	BH. H
(eavy Trucks	Q	BQ	Q		H	BH	Q		09	Q	H		Q	Q	Q		9.
J uses																	
Pedestrians		Q				Q				Q				Q			Q
J icycles	Q	Q	Q		Q	Q	Q		Q	Q	Q		Q	Q	Q		Q
2cooters																	

Comments:

Type of peak hour being reported: Intersection Peak　　Method for determining peak hour: Total Entering Volume

LOCATION: WS nion Rd 112 ood0 ard ABe　　**QC JO# 5:** 49W37Y44
CIT/, DTATE: Manteca6CA　　**. ATE:** 2 ed6. ec 8 YHY4

Peak1Uour: 7:49 AM 118:49 AM
Peak 491Min: 7:(HAM 117:99 AM



91Min Count Period #eginning At	WS nion Rd FNorthboundw Left	Thru	Right	S	WS nion Rd FDouthboundw Left	Thru	Right	S	2 ood0 ard ABe FEastboundw Left	Thru	Right	S	2 ood0 ard ABe F2 estboundw Left	Thru	Right	S	Total	Uourly Totals
7:HH AM	H	W	H	H	(	W	(	H	3	(	H	H	H	9	W	H	38	
7:H9 AM	H	4Y	3	H	4	)	Y	H	9	3	H	H	(	7	W	H	9Y	
7:4H AM	H	)	(	H	9	3	3	H	W	Y	H	H	Y	W	Y	H	(Y	
7:49 AM	H	)	4	H	4	9	3	H	9	9	H	H	3	9	8	H	(9	
7:YH AM	4	4W	4	H	Y	4H	4	H	9	7	4	H	4	7	43	H	W9	
7:Y9 AM	H	4Y	4	H	4H	44	4	H	7	8	H	H	Y	3	)	H	W(	
7:3H AM	H	4Y	7	H	)	4Y	(	H	9	43	Y	H	3	H	43	H	8H	
7:39 AM	H	4Y	7	H	47	4Y	Y	H	(	Y7	3	H	7	W	4Y	H	4H)	
7:(HAM	H	Y4	44	H	47	4(	7	H	43	Y7	(	H	W	4Y	YH	H	49Y	
7:(9 AM	H	Y7	43	H	4(	43	7	H	4H	Y8	H	H	4H	4)	43	H	49(	
7:9H AM	Y	YY	W	H	4W	4(	W	H	4Y	4)	Y	H	9	YY	4W	H	4(Y	
7:99 AM	Y	4)	W	H	43	4(	W	H	7	44	H	H	7	YW	47	H	4Y8	4H74
8:HH AM	Y	43	3	H	4Y	)	(	H	(	3	H	H	3	Y(	Y8	H	4H9	4438
8:H9 AM	H	4H	H	H	W	4H	7	H	8	7	H	H	3	(	4(	H	WY	4499
8:4H AM	H	49	3	H	(	7	Y	H	W	Y	H	H	H	9	9	H	( )	44WY
8:49 AM	4	)	Y	H	(	7	H	H	9	(	4	H	4	3	8	H	(9	44WY
8:YH AM	H	)	H	H	7	3	3	H	(	4H	H	H	4	9	4	H	(3	44(H
8:Y9 AM	Y	)	4	H	3	8	3	H	(	9	H	H	3	3	3	H	((	44YH
8:3H AM	H	4Y	4	H	7	7	(	H	W	9	4	H	H	(	7	H	9(	4H) (
8:39 AM	H	7	4	H	4	3	Y	H	Y	7	3	H	4	(	8	H	3)	4HY(
8:(HAM	4	7	Y	H	4	7	Y	H	9	3	H	H	4	W	)	H	((	) 4W
8:(9 AM	H	4H	H	H	(	(	3	H	7	(	H	H	H	Y	9	H	3)	8H4
8:9H AM	4	4H	3	H	7	W	Y	H	W	9	H	H	Y	(	9	H	94	74H
8:99 AM	H	)	Y	H	W	)	Y	H	(	9	H	H	H	9	9	H	(7	WY)

Peak 491Min vlo0 rates	Northbound Left	Thru	Right	S	Douthbound Left	Thru	Right	S	Eastbound Left	Thru	Right	S	2 estbound Left	Thru	Right	S	Total
All Vehicles	8	Y8H	4YH	H	488	4W(	8H	H	4(H	Y) W	Y(	H	8(	Y4Y	4) W	H	47) Y
UeaBy Trucks	H	(	H		(	8	H		(	H	H		H	(	H		Y(
#uses																	
Pedestrians		H				H				H				H			H
#icycles	H	H	H		H	H	H		H	(	H		H	H	H		(
Dcooters																	

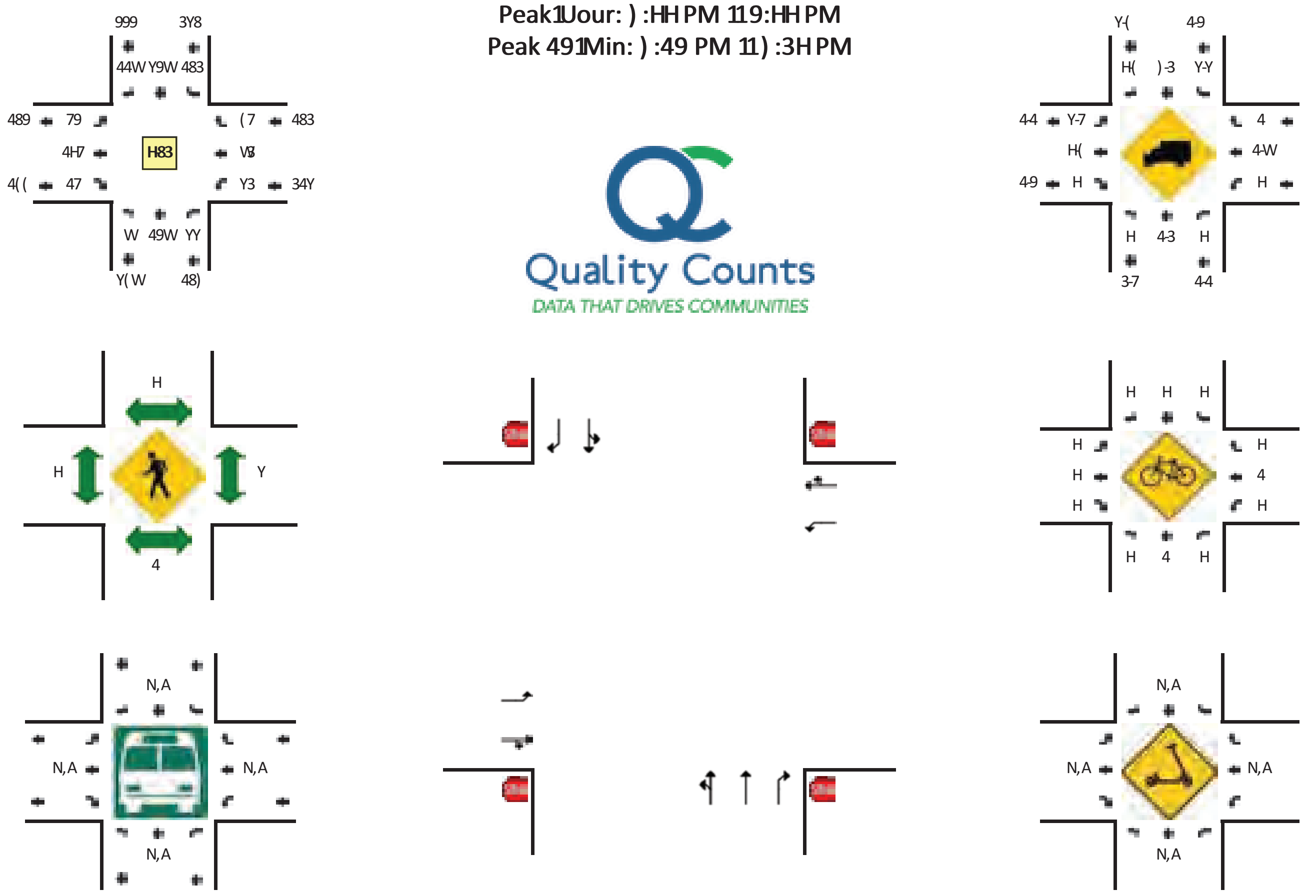
Comments:

Report generated on 4Y, YH, YHY4 4Y:((PM　　DOS RCE: Quality Counts6LLC Fhttp:, , 0 0 0 -qualitycounts-netw41877198H1YY4Y

Type of peak hour being reported: Intersection Peak | Method for determining peak hour: Total Entering Volume

LOCATION: WS nion Rd 112 ood0 ard ABe | **QC JO# 5:** 49W37Y4Y
CIT/, DTATE: Manteca6CA | **. ATE:** 2 ed6. ec 8 YHY4

Peak1Uour:) :HH PM 119:HH PM
Peak 491Min:) :49 PM 11) :3H PM



91Min Count Period #eginning At	WS nion Rd FNorthboundw Left	Thru	Right	S	WS nion Rd FDouthboundw Left	Thru	Right	S	2 ood0 ard ABe FEastboundw Left	Thru	Right	S	2 ood0 ard ABe F2 estboundw Left	Thru	Right	S	Total	Uourly Totals
) :HH PM	H	49	Y	H	47	4)	)	H	9	)	4	H	)	8	4Y	H	8W	
) :H9 PM	4	43	)	H	4)	4)	(	H	7	)	4	H	H	W	4Y	H	89	
) :4H PM	H	4H	3	H	Y3	Y3	43	H	)	43	4	H	H	)	4H	H	4H)	
) :49 PM	H	49	4	H	YH	Y)	4W	H	8	43	3	H	H	3	8	H	444	
) :YH PM	H	4W	4	H	4(	YY	47	H	W	4Y	Y	H	7	W	7	H	449	
) :Y9 PM	H	Y4	4	H	Y4	34	44	H	8	9	)	H	4	)	9	H	44Y	
) :3H PM	4	4(	4	H	YH	Y)	4H	H	3	W	Y	H	4	)	9	H	(W	
) :39 PM	4	4H	4	H	4Y	Y9	7	H	)	8	H	H	Y	9	9	H	8H	
) :) H PM	H	4H	4	H	44	YY	7	H	3	44	H	H	3	(	8	H	89	
) :) 9 PM	4	9	3	H	8	YY	7	H	7	W	H	H	3	Y	4H	H	7)	
) :9H PM	H	8	3	H	4H	49	9	H	44	4)	4	H	H	W	(	H	8Y	
) :99 PM	Y	4)	4	H	8	YH	4H	H	(	44	Y	H	Y	W	W	H	(4	44Y4
9:HH PM	H	9	4	H	(	48	3	H	3	(	H	H	Y	Y	7	H	9(	4H( )
9:H9 PM	H	4W	H	H	4)	Y4	7	H	)	3	4	H	Y	(	7	H	8)	4H(3
9:4H PM	4	43	4	H	4)	4(	3	H	)	4)	Y	H	4	9	(	H	8W	4H79
9:49 PM	H	4H	Y	H	49	Y9	(	H	)	4H	H	H	H	4H	(	H	( )	4H98
9:YH PM	4	44	4	H	4W	48	(	H	3	W	H	H	)	7	9	H	84	4HY)
9:Y9 PM	H	4H	H	H	43	4)	W	H	7	44	4	H	)	7	W	H	7(	((4
9:3H PM	H	44	Y	H	Y4	4(	4H	H	W	W	H	H	Y	9	Y	H	8)	(7(
9:39 PM	H	(	4	H	49	Y8	7	H	W	W	H	H	3	)	W	H	89	(8)
9:) H PM	H	8	4	H	4H	YH	4H	H	8	44	H	H	Y	7	44	H	88	(87
9:) 9 PM	H	43	H	H	44	Y7	)	H	8	3	H	H	4	7	9	H	7(	((Y
9:9H PM	H	(	3	H	44	Y3	)	4	9	4)	4	H	4	7	8	H	87	((7
9:99 PM	H	9	4	H	43	4)	4H	H	8	(	Y	H	4	W	4H	H	7(	(89

Peak 491Min vlo0 rates	Northbound Left	Thru	Right	S	Douthbound Left	Thru	Right	S	Eastbound Left	Thru	Right	S	2 estbound Left	Thru	Right	S	Total
All Vehicles	H	YH8	4Y	H	Y) H	3H8	47W	H	88	4YH	3W	H	3Y	9Y	8H	H	439Y
UeaBy Trucks	H	)	H		)	Y)	H		)	)	H		H	H	H		) H
#uses																	
Pedestrians		H				H				H				H			H
#icycles	H	)	H		H	H	H		H	H	H		H	)	H		8
Dcooters																	

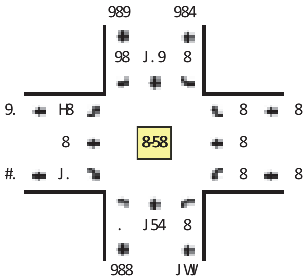
Comments:

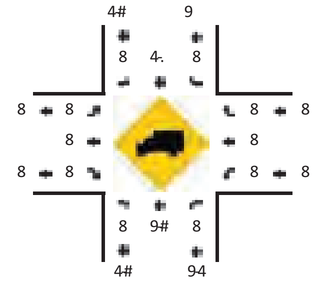
Report generated on 4Y, YH, YHY4 4Y:)) PM | DOS RCE: Quality Counts6LLC Fhttp:, , 0 0 0 -qualitycounts-netw41877198H1YY4Y

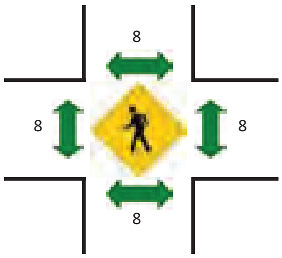
LOCATION: W S nion Rd 11 E Peach Rd
CIT37YTATE: Yan 0ba/ uin, CA

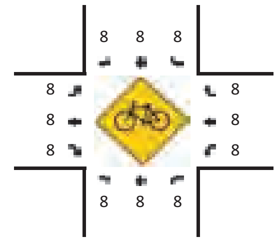
2 C 00B Q: J #54W9J 4
DATE: 6 ed, Dec . 989J

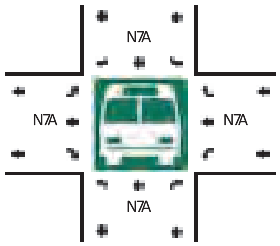
Peak1(our: W98 AM 11 . :98 AM
Peak J #1Min: WH8 AM 11 W## AM

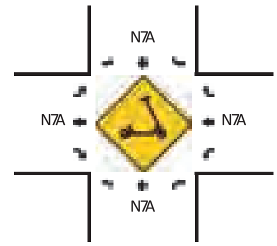












#1Min Count Period Beginning At	W S nion Rd)NorthboundU				W S nion Rd)YouthboundU				E Peach Rd)EastboundU				E Peach Rd)6 estboundU				Total	(ourly Totals
	Left	Thru	Right	S	Left	Thru	Right	S	Left	Thru	Right	S	Left	Thru	Right	S		
W88 AM	8	9	8	8	8	#	8	8	J	8	8	8	8	8	8	8	.	
W8# AM	8	.	8	8	8	J 4	J	8	J	8	8	8	8	8	8	8	94	
WJ 8 AM	8	H	8	8	8	H	8	8	4	8	8	8	8	8	8	8	J J	
WJ # AM	J	W	8	8	8	W	8	8	J	8	J	8	8	8	8	8	J W	
W98 AM	8	4	8	8	8	J 8	8	8	4	8	J	8	8	8	8	8	J W	
W9# AM	8	5	8	8	8	J H	8	8	#	8	8	8	8	8	8	8	9#	
W48 AM	J	J 8	8	8	8	J .	J	8	9	8	9	8	8	8	8	8	4H	
W4# AM	8	F	8	8	8	9#	8	8	J	8	9	8	8	8	8	8	4W	
WH8 AM	9	98	8	8	8	9H	#	8	J J	8	5	8	8	8	8	8	5.	
WH# AM	9	9H	8	8	8	9F	4	8	H	8	H	8	8	8	8	8	55	
W#8 AM	J	9J	8	8	8	J #	H	8	H	8	J	8	8	8	8	8	H5	
W## AM	J	4H	8	8	8	J H	#	8	4	8	J	8	8	8	8	8	#.	HJ 8
. :88 AM	J	J 8	8	8	8	F	J	8	J	8	J	8	8	8	8	8	94	H9#
. :8# AM	8	5	8	8	8	J J	8	8	H	8	8	8	8	8	8	8	9J	H94
. :J 8 AM	8	J J	8	8	8	H	J	8	J	8	8	8	8	8	8	8	J W	H9F
. :J # AM	8	F	8	8	8	F	8	8	J	8	8	8	8	8	8	8	J F	H4J
. :98 AM	8	W	8	8	8	H	J	8	8	8	8	8	8	8	8	8	J 9	H95
. :9# AM	8	5	8	8	8	5	8	8	J	8	8	8	8	8	8	8	J 4	HJ H
. :48 AM	J	J J	8	8	8	.	J	8	J	8	8	8	8	8	8	8	99	H89
. :4# AM	8	#	8	8	8	9	J	8	J	8	J	8	8	8	8	8	J 8	4W#
. :H8 AM	J	5	8	8	8	4	H	8	8	8	8	8	8	8	8	8	J H	49J
. :H# AM	8	#	8	8	8	9	8	8	8	8	J	8	8	8	8	8	.	954
. :#8 AM	8	5	8	8	8	4	9	8	J	8	8	8	8	8	8	8	J 9	99F
. :## AM	8	.	8	8	8	#	8	8	H	8	J	8	8	8	8	8	J .	J . F

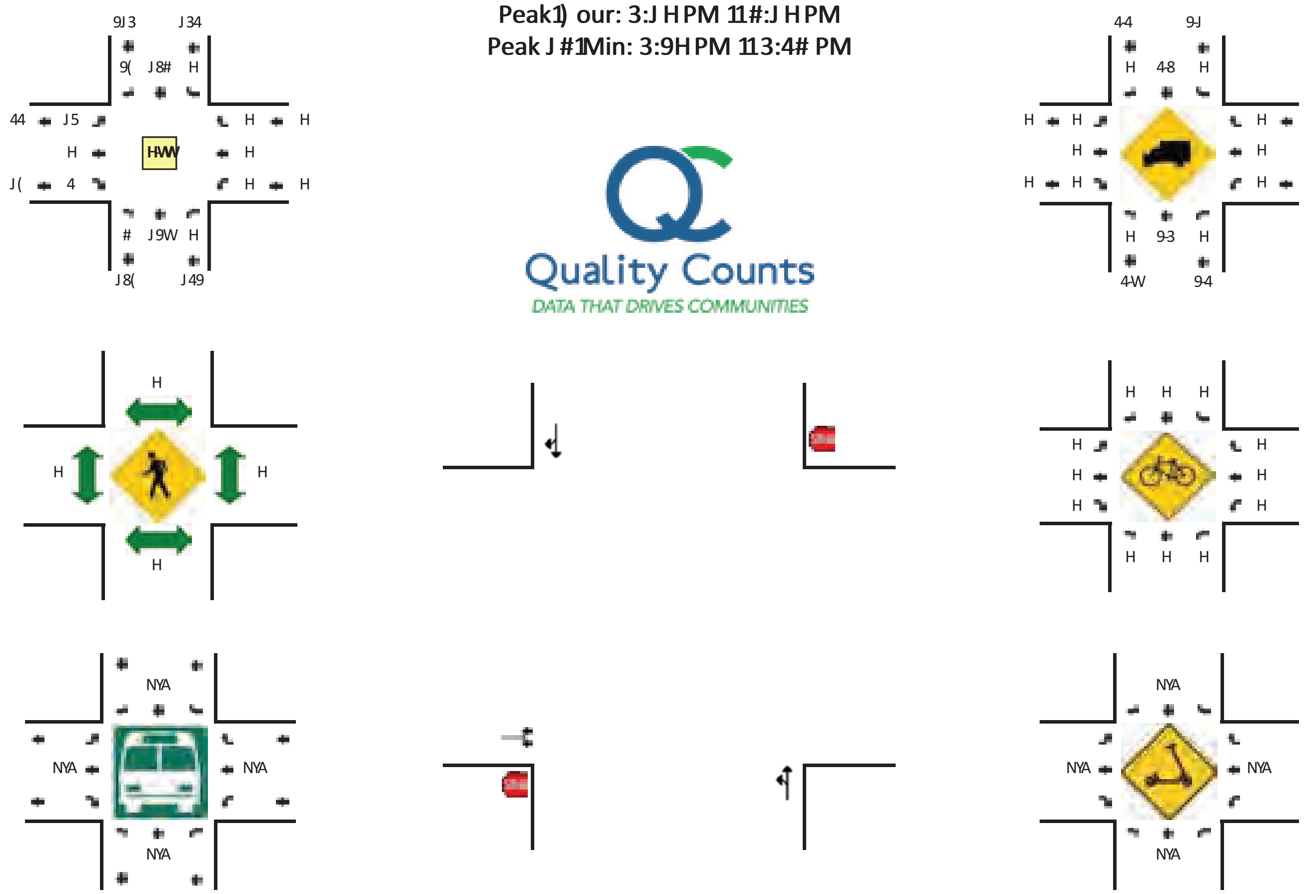
Peak J #1Min wlov rates	Northbound				Youthbound				Eastbound				6 estbound				Total
	Left	Thru	Right	S	Left	Thru	Right	S	Left	Thru	Right	S	Left	Thru	Right	S	
All Vehicles	98	958	8	8	8	9W9	H.	8	W5	8	HH	8	8	8	8	8	W98
(eaqy Trucks	8	8	8		8	.	8		8	8	8		8	8	8		.
Buses																	
Pedestrians		8				8				8				8			8
Bicycles	8	8	8		8	8	8		8	8	8		8	8	8		8
Ycooters																	

Comments:

LOCATION: W S nion Rd 11 E Peach Rd
CIT7Y/TATE: /an 0oa, uinDCA

2 C 00B Q: J #54W9J 3
6 ATE: . edD6 ec 8 9H9J

Peak1) our: 3:J H PM 11#:J H PM
Peak J #1Min: 3:9H PM 113:4# PM



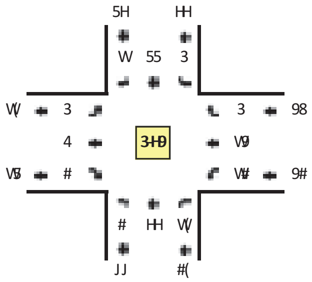
#1Min Count Period Beginning At	W S nion Rd UNorthboundF				W S nion Rd U/outhboundF				E Peach Rd UEastboundF				E Peach Rd U estboundF				Total	) ourly Totals
	Left	Thru	Right	S	Left	Thru	Right	S	Left	Thru	Right	S	Left	Thru	Right	S		
3:HH PM	H	W	H	H	H	W	3	H	J	H	H	H	H	H	H	H	J (	
3:H# PM	H	8	H	H	H	J J	J	H	4	H	H	H	H	H	H	H	94	
3:J H PM	J	J H	H	H	H	J 3	4	H	9	H	H	H	H	H	H	H	4H	
3:J # PM	J	J J	H	H	H	J 5	J	H	H	H	H	H	H	H	H	H	9(	
3:9H PM	H	9H	H	H	H	99	9	H	H	H	H	H	H	H	H	H	33	
3:9# PM	J	J #	H	H	H	9#	J	H	9	H	H	H	H	H	H	H	33	
3:4H PM	H	(	H	H	H	J 5	J	H	9	H	9	H	H	H	H	H	4H	
3:4# PM	H	J 9	H	J	H	J 8	#	H	J	H	H	H	H	H	H	H	4W	
3:3H PM	J	#	H	H	H	J 4	J	H	9	H	H	H	H	H	H	H	99	
3:3# PM	H	8	H	H	H	J #	3	H	J	H	J	H	H	H	H	H	9(	
3:#H PM	H	W	H	H	H	J 4	H	H	J	H	H	H	H	H	H	H	9J	
3:## PM	H	J 9	H	H	H	(	9	H	J	H	H	H	H	H	H	H	93	4#9
#:HH PM	H	W	H	H	H	J H	#	H	J	H	H	H	H	H	H	H	94	4#5
#:H# PM	H	J J	H	H	H	J 3	3	H	4	H	H	H	H	H	H	H	49	45#
#:J H PM	J	5	H	H	H	J 9	9	H	H	H	H	H	H	H	H	H	9J	4#5
#:J # PM	J	J H	H	H	H	J 8	3	H	9	H	J	H	H	H	H	H	45	454
#:9H PM	H	W	H	H	H	J (	J	H	J	H	H	H	H	H	H	H	98	43W
#:9# PM	H	5	H	H	H	J 4	H	H	J	H	H	H	H	H	H	H	9H	494
#:4H PM	J	8	H	H	H	J #	J	H	J	H	H	H	H	H	H	H	95	4J (
#:4# PM	H	3	H	H	H	J W	J	H	J	H	H	H	H	H	H	H	94	4H#
#:3H PM	J	3	H	H	H	9H	H	H	J	H	H	H	H	H	H	H	95	4H(
#:3# PM	H	J 3	H	H	H	J W	4	H	H	H	J	H	H	H	H	H	4#	4J #
#:#H PM	J	9	H	H	H	J 8	H	H	H	H	H	H	H	H	H	H	9J	4J #
#:## PM	H	#	H	H	H	J 4	9	H	J	H	H	H	H	H	H	H	9J	4J 9

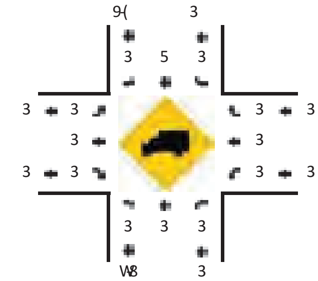
Peak J #1Min wlov rates	Northbound				/outhbound				Eastbound				. estbound				Total
	Left	Thru	Right	S	Left	Thru	Right	S	Left	Thru	Right	S	Left	Thru	Right	S	
All Vehicles	3	J W5	H	H	H	9#9	J 5	H	J 5	H	8	H	H	H	H	H	3W9
) eaqy Trucks	H	H	H		H	J 9	H		H	H	H		H	H	H		J 9
Buses																	
Pedestrians		H				H				H				H			H
Bicycles	H	H	H		H	H	H		H	H	H		H	H	H		H
/cooters																	

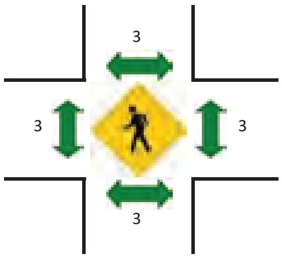
Comments:

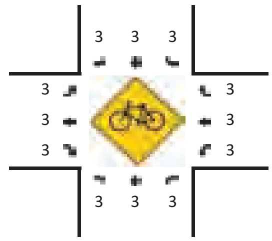
LOCATION: W Oleander ASe RRE Peach 1d | **2 C 00B Q:** W#5493W
CIT7Y/TATE: /an 0oa, uinDCA | **6 ATE:** . edD6 ec 8 939W

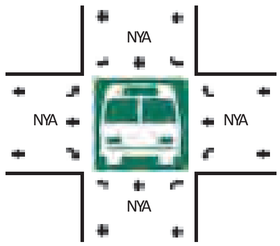
PeakR) our: 4:W AM RR8:W AM
Peak W RMin: 4:H3 AM RR4:J J AM

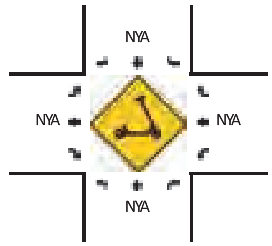












J RMin Count Period Beginning At	W Oleander ASe UNorthboundF				W Oleander ASe V/outhboundF				E Peach 1d UEastboundF				E Peach 1d U estboundF				Total	) ourly Totals
	Left	Thru	1ight	w	Left	Thru	1ight	w	Left	Thru	1ight	w	Left	Thru	1ight	w		
4:33 AM	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	
4:3J AM	3	W	9	3	3	3	3	3	3	3	3	3	3	5	3	3	#	
4:W8 AM	3	W	3	3	3	W	3	3	3	3	3	3	3	3	3	3	9	
4:W AM	3	3	3	3	3	9	3	3	3	3	3	3	3	9	3	3	H	
4:93 AM	3	W	W	3	3	W	W	3	3	3	3	3	3	3	3	3	H	
4:9J AM	3	3	3	3	3	5	3	3	3	9	3	3	W	W	3	3	4	
4:53 AM	3	3	3	3	3	9	3	3	3	W	3	3	5	3	3	3	#	
4:5J AM	3	3	3	3	3	9	3	3	3	3	9	3	W	3	3	3	J	
4:H3 AM	9	WW	#	3	3	4	3	3	3	3	W	3	J	5	3	3	5J	
4:HJ AM	W	8	H	3	3	J	3	3	3	W	5	3	5	9	3	3	94	
4:J3 AM	3	W8	H	3	3	#	3	3	3	W	3	3	W	W	3	3	95	
4:JJ AM	9	W5	9	3	3	W	3	3	3	3	3	3	9	W	3	3	9W	WH3
8:33 AM	3	3	9	3	3	3	3	3	3	3	3	3	3	W	3	3	5	WH5
8:3J AM	W	3	3	3	3	5	3	3	3	9	3	3	3	3	3	3	#	WH5
8:W8 AM	3	W	3	3	3	W	3	3	3	3	3	3	3	W	3	3	5	WHH
8:W AM	3	3	3	3	W	3	3	3	3	3	3	3	3	W	3	3	9	WH9
8:93 AM	3	3	W	3	W	3	3	3	3	3	W	3	W	3	3	3	H	WH9
8:9J AM	3	3	W	3	3	3	3	3	3	3	3	3	3	3	3	3	W	W5#
8:53 AM	3	3	3	3	3	W	3	3	3	3	3	3	3	3	W	3	9	W59
8:5J AM	3	3	3	3	3	3	3	3	3	W	3	3	W	3	3	3	9	W9(
8:H3 AM	3	W	3	3	3	W	3	3	3	9	3	3	3	3	3	3	H	(8
8:HJ AM	3	W	3	3	3	3	3	3	3	3	3	3	W	3	3	3	9	45
8:J3 AM	3	3	3	3	3	3	3	3	3	W	3	3	W	3	3	3	9	J9
8:JJ AM	3	W	3	3	3	W	3	3	3	W	3	3	3	5	3	3	#	54

Peak W RMin vloq rates	Northbound				/outhbound				Eastbound				. estbound				Total
	Left	Thru	1ight	w	Left	Thru	1ight	w	Left	Thru	1ight	w	Left	Thru	1ight	w	
All Vehicles	W9	WW#	J#	3	3	49	3	3	3	8	W#	3	5#	9H	3	3	5H3
) eaSy Trucks	3	3	3		3	3	3		3	3	3		3	3	3		3
Buses																	
Pedestrians		3				3				3				3			3
Bicycles	3	3	3		3	3	3		3	3	3		3	3	3		3
/cooters																	

Comments:

1eport generated on W9Y93Y939WW9:HH PM | /Ow1CE: 2 uality CountsDLLC Uhttp:YYq q q -, ualitycounts-netF W844RJ 83R99W9

LOCATION: W Oleander ASe RRE Peach 1d

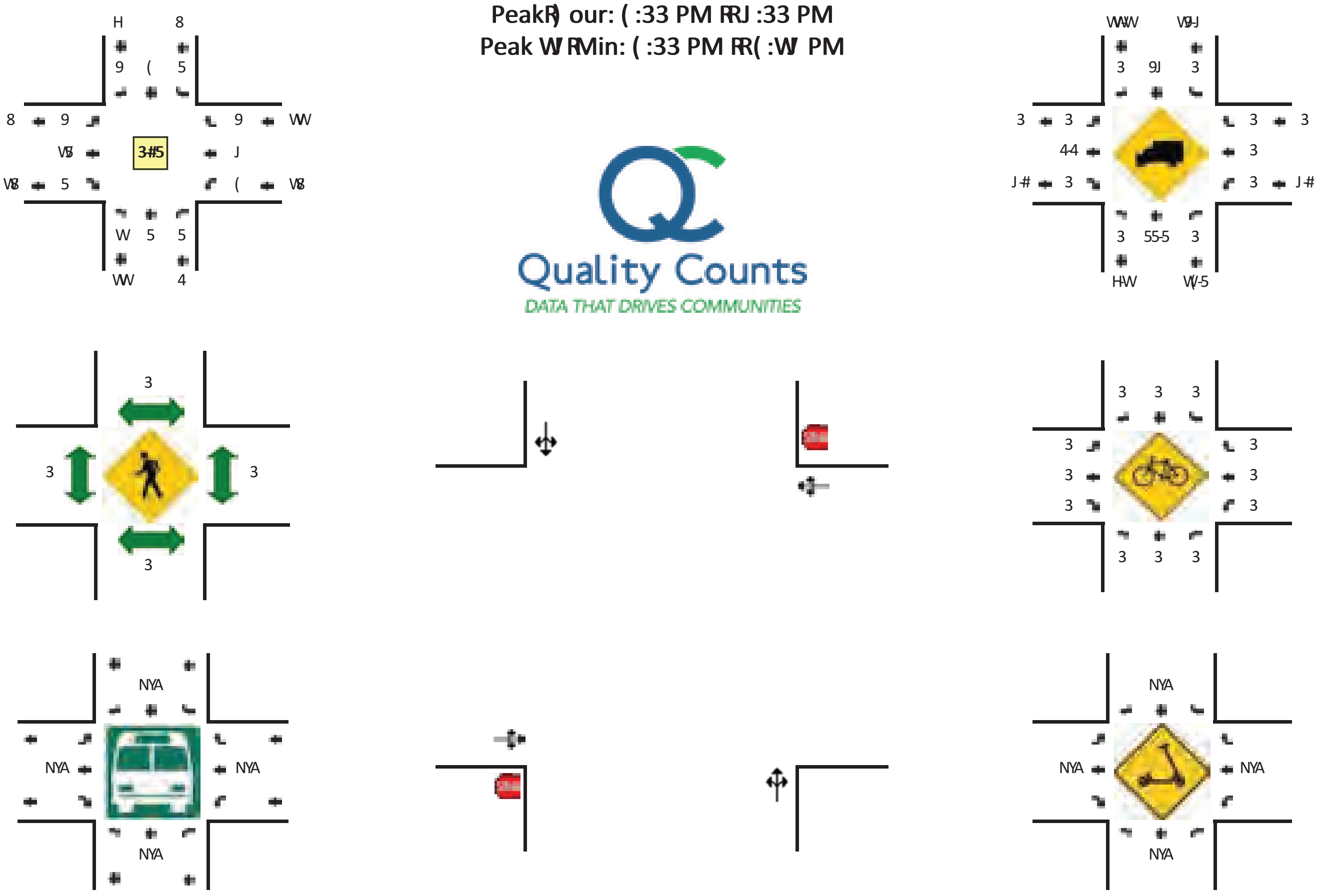
CIT7Y/TATE: /an 0oa, uinDCA

2 C 00B Q: W #54939

6ATE: . edD6ec 8 939W

PeakR) our: (:33 PM RRJ :33 PM

Peak W RMin: (:33 PM RR(:W PM



J RMin Count Period Beginning At	W Oleander ASe UNorthboundF				W Oleander ASe U/outhboundF				E Peach 1d UEastboundF				E Peach 1d U estboundF				Total	) ourly Totals
	Left	Thru	1ight	w	Left	Thru	1ight	w	Left	Thru	1ight	w	Left	Thru	1ight	w		
(:33 PM	3	W	3	3	3	3	3	3	3	W	3	3	9	3	3	3	(	
(:3J PM	3	3	W	3	W	3	3	3	3	(	3	3	W	W	3	3	8	
(:W3 PM	W	3	3	3	3	3	3	3	W	W	W	3	3	9	3	3	#	
(:WJ PM	3	3	3	3	3	3	3	3	3	3	3	3	3	W	3	3	W	
(:93 PM	3	3	3	3	3	3	3	3	W	3	3	3	3	3	3	3	W	
(:9J PM	3	3	3	3	3	5	3	3	3	W	3	3	3	W	W	3	#	
(:53 PM	3	W	W	3	W	W	W	3	3	9	W	3	3	3	3	3	8	
(:5J PM	3	3	W	3	3	3	W	3	3	9	3	3	3	3	3	3	(	
(:(3 PM	3	3	3	3	3	3	3	3	3	3	3	3	W	3	3	3	W	
(:(J PM	3	3	3	3	3	3	3	3	3	W	W	3	3	3	3	3	9	
(:J 3 PM	3	3	3	3	3	3	3	3	3	3	3	3	3	3	W	3	W	
(:J J PM	3	W	3	3	3	3	3	W	3	W	3	3	3	3	3	3	5	(J
J :33 PM	3	9	3	3	3	3	3	3	3	3	3	3	3	3	3	3	9	(5
J :3J PM	3	3	3	3	3	3	3	3	3	W	3	3	3	W	3	3	9	54
J :W3 PM	W	3	3	3	W	3	3	3	3	9	3	3	3	W	3	3	J	5#
J :WJ PM	3	3	3	3	3	W	3	3	3	W	W	3	W	3	3	3	(	5H
J :93 PM	3	W	3	3	W	3	3	3	3	W	3	3	3	W	3	3	(	(9
J :9J PM	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	5#
J :53 PM	W	3	3	3	3	3	3	3	3	3	3	3	W	3	3	3	9	53
J :5J PM	3	W	3	3	3	W	3	3	3	W	3	3	3	W	3	3	(	53
J :(3 PM	3	3	W	3	3	3	W	3	3	W	3	3	3	3	3	3	5	59
J :(J PM	3	3	3	3	3	W	3	3	3	(	W	3	3	W	3	3	4	54
J :J 3 PM	3	3	3	3	3	3	3	3	3	3	3	3	3	W	3	3	W	54
J :J J PM	3	3	3	3	3	3	3	3	3	3	3	3	3	W	3	3	W	5J

Peak W RMin vloq rates	Northbound				/outbound				Eastbound				. estbound				Total
	Left	Thru	1ight	w	Left	Thru	1ight	w	Left	Thru	1ight	w	Left	Thru	1ight	w	
All Vehicles	(	(	(	3	(	3	3	3	(	9(	(	3	W9	W9	3	3	49
) eaSy Trucks	3	3	3		3	3	3		3	(	3		3	3	3		(
Buses																	
Pedestrians		3				3				3				3			3
Bicycles /cooters	3	3	3		3	3	3		3	3	3		3	3	3		3

Comments:

SIGNAL TIMING SHEETS

Location: SJ - 120 - 004.320 EB @ UNION RD
System: 2.21
Master At:

District:
I/C:

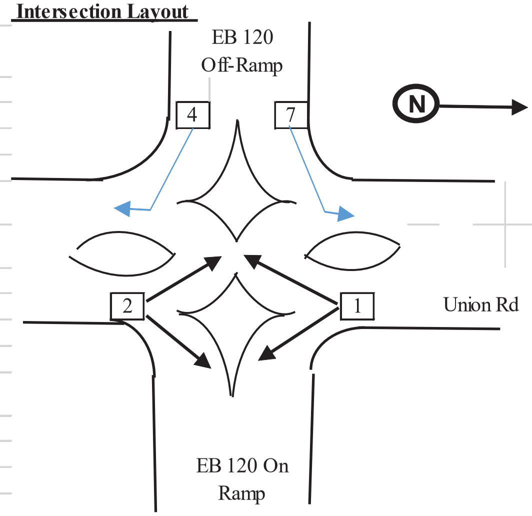
Designed By: JOHN HA
Installed By: JOHN HA
Service Info:

Timing Change: **Date Start:** **Date End:** **Designed:** **Installed:**

PHASE		**FLASH**
1)	SB UNION RD	[ ]
2)	NB UNION RD	[ ]
3)		[ ]
4)	EB 120 OFF-RAMP TO SB UNION RD	[ ]
5)		[ ]
6)		[ ]
7)	EB 120 OFF-RAMP TO NB UNION RD	[ ]
8)		[ ]

OVERLAP | |
---|---|---
A) | Phase 2 and Phase 4 | [ ]
B) | Phase 1 and Phase 7 | [ ]
C) | | [ ]
D) | | [ ]
E) | | [ ]
F) | | [ ]

Intersection Layout



Crosswalks: None

P	=	0
P	=	0
P	=	0
P	=	0

Signal Configuration: Special

Intersection Layout

Input File

1	2	3	4	5	6	7	8	9	10	11	12	13	14
Bike	L2 ADV	L2 INT	L2 S 1234		L1 ADV	L1 INT	L1 S 1234						
2	2	2	2	3	2	2	2	1	2		P	P	FS
1	2	2	2	3	2	2	2	2	4	BAT Flashi	P	P	ST
	L1 ADV	L1 INT	L1 S 1234		L2 ADV	L2 INT	L2 S 1234	L1 S 1234					
Bike	L2 ADV		L2 S 1234	L1 ADV	L1 INT			L1 S 1234					
1	1	6	1	1	1	8	8	1	6		EVA ø2,ø5	EVB ø4,ø7	RR1
5	1	6	1	1	1	8	8	1	8		EVC ø6,ø1	EVD ø8,ø3	RR2
	L1 ADV		L1 S 1234	L2 ADV	L2 INT			L2 S 1234					

Output File

1	2	3	4	5	6
ø1	ø2	ø2P	ø3	ø4	ø4P
ø5	ø6	ø6P	ø7	ø8	ø8P

Comments and Notes:
Detections on Phase 4 to Phase 2 enabling timing extension.
Detections on Phase 7 to Phase 1 enabling timing extension.
Output for Phase 4 and 7 are allocated to 9 and 10, both signal heads are only "green" at the same time during emergency vehicle preemption.

RAM Checksum

Page 2:	223E	Page 8:	EA1E
Page 3:	2837	Page 9:	D2FD
Page 4:	0C23	Page 10:	F7F6
Page 5:	191A	Page 11:	E876
Page 6:	191A	Page 12:	F189
Page 7:	7596	Page 13:	86F7

CONFIGURATION PHASE FLAGS

Cabinet
332
Configuration
CALTRANS

Phases (2-1-1-1)	
Permitted	1 2 . 4 . . 7 .
Restricted	. . . .

Phase Recalls (2-1-1-2)	
Vehicle Min	. . . .
Vehicle Max	. . . .
Pedestrian	. . . .
Bicycle	. . . .

Phase Locks (2-1-1-3)	
Red	. . . .
Yellow	1 2 . . . . . .
Force/Max	. . . .

Phase Features (2-1-1-4)	
Double Entry	. . . .
Rest In Walk	. . . .
Rest In Red	. . . .
Walk 2	. . . .
Max Green 2	. . . .
Max Green 3	. . . .

Startup (2-1-1-5)	
First Green Phases	1 . . . .
Yellow Start Phases	. . . .
Vehicle Calls	1 2 . . . . . .
Pedestrian Calls	. . . .
Yellow Start Overlaps	. . . . . .
Startup All-Red	5.0

Call To Phase (2-1-2-1)		Omit On Green	
1	. . . .	1	. . . .
2	. . . .	2	. . . .
3	. . . .	3	. . . .
4	. . . .	4	. . . .
5	. . . .	5	. . . .
6	. . . .	6	. . . .
7	. . . .	7	. . . .
8	. . . .	8	. . . .

Flashing Colors (2-1-2-2)	
Yellow Flash Phases	. . . .
Yellow Flash Overlap	. . . . . .
Flash In Red Phases	. . . .
Flash In Red Overlaps	. . . . . .

Special Operation (2-1-2-3)	
Single Exit Phase	. . . .
Driveway Signal Phases	. . . .
Driveway Signal Overlaps	. . . . . .
Leading Ped Phases	. . . .

Protected Permissive (2-1-2-4)	
Protected Permissive	. . . .

Pedestrian (2-1-3)	
P1	. . . .
P2	. . . .
P3	. . . .
P4	. . . .
P5	. . . .
P6	. . . .
P7	. . . .
P8	. . . .

Overlap (2-1-4)

Overlap	Parent	Omit	No Start	Not
A	. 2 . 4	. . . .	. . . .	. . . .
B	1 . . . . . 7 .	. . . .	. . . .	. . . .
C	. . . .	. . . .	. . . .	. . . .
D	. . . .	. . . .	. . . .	. . . .
E	. . . .	. . . .	. . . .	. . . .
F	. . . .	. . . .	. . . .	. . . .

PHASE TIMING

Phase (2-2)	-1-	-2-	-3-	-4-	-5-	-6-	-7-	-8-
--- Walk 1 ---	0	0	0	0	0	0	0	0
Flash Don't Walk	0	0	0	0	0	0	0	0
Minimum Green	8	8	0	0	0	0	0	0
Det Limit	10	10	0	0	0	0	0	0
Max Initial	10	10	0	0	0	0	0	0
Max Green 1	40	40	0	0	0	0	0	0
Max Green 2	60	60	0	0	0	0	0	0
Max Green 3	80	80	0	0	0	0	0	0
Extension	2.0	2.0	0.0	0.0	0.0	0.0	0.0	0.0
Maximum Gap	5.0	5.0	0.0	0.0	0.0	0.0	0.0	0.0
Minimum Gap	2.0	2.0	0.0	0.0	0.0	0.0	0.0	0.0
Add Per Vehicle	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Reduce Gap By	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0
Reduce Every	1.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0
Yellow	5.2	5.2	3.0	3.0	3.0	3.0	3.0	3.0
All-Red	4.0	4.0	0.0	0.0	0.0	0.0	0.0	0.0
Ped/Bike (2-3)	-1-	-2-	-3-	-4-	-5-	-6-	-7-	-8-
--- Walk 2 ---	0	0	0	0	0	0	0	0
Delay/Early Walk	0	0	0	0	0	0	0	0
Solid Don't Walk	0	0	0	0	0	0	0	0
Bike Green	0	0	0	0	0	0	0	0
Bike All-Red	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

OVERLAP TIMING

Overlap (2-4)	A	B	C	D	E	F
Green	0.0	0.0	0.0	0.0	0.0	0.0
Yellow	5.2	5.2	5.0	5.0	5.0	5.0
Red	0.0	0.0	0.0	0.0	0.0	0.0

Red Revert

Red Revert (2-5)	
Time	5.0
All-Red Sec/Min (2-6)	
All-Red Sec/Min:	OFF

Max 2 Extension

Max/Gap Out (2-7)	
Max Cnt	0
Gap Cnt	0

Local Plan 1...9 (7-1) TIMING DATA

COORDINATION

[Offsets] Green Factors or Press [F] to Select Force-Off

		Cycle	Multi	Lag Gap	A	B	C	-1-	-2-	-3-	-4-	-5-	-6-	-7-	-8-
Plan 1	Force-Off	50		....					25						
Plan 2	Force-Off	60		....					30						
Plan 3	Force-Off	70		....					35						
Plan 4	Force-Off	50		....				25							
Plan 5	Force-Off	60		....				30							
Plan 6	Force-Off	70		....				35							
Plan 7	Green Factor			....											
Plan 8	Green Factor			....											
Plan 9	Green Factor			....											

Local Plan 1...9 (7-1) PHASE FLAGS

	Lag	Sync	Hold	Omit	Veh Min	Veh Max	Ped	Bike
Plan 1	. 2 . 4 . 6 . 8	1 . . . . 6 . .	....	....	1	....	....	....
Plan 2	. 2 . 4 . 6 . 8	1 . . . . 6 . .	....	....	1	....	....	....
Plan 3	. 2 . 4 . 6 . 8	1 . . . . 6 . .	....	....	1	....	....	....
Plan 4	. 2 . 4 . 6 . 8	. 2 . . 5 . . .	....	....	. 2	....	....	....
Plan 5	. 2 . 4 . 6 . 8	. 2 . . 5 . . .	....	....	. 2	....	....	....
Plan 6	. 2 . 4 . 6 . 8	. 2 . . 5 . . .	....	....	. 2	....	....	....
Plan 7	....	....	....	....	....	....	....	....
Plan 8	....	....	....	....	....	....	....	....
Plan 9	....	....	....	....	....	....	....	....

Master Timer Sync (7-A)	
Enable in Plans	
1-9	....
11-19	....
21-29	....

Master Sub Master	
Input	
Output	

FREE PLAN PHASE FLAGS

(7-E) Free	
Lag	Omit
. 2 . 4 . 6 . 8	....
Veh Min	Veh Max
. 2	....
Ped	Bike
....	....
Cond	Cond Grn
....	10

MANUAL COMMANDS

Manual Plan (4-1)	
Plan	OffSet
	A

Plan: 1-9
15 or 254 = Flash
14 or 255 = Free
Offset A, B, or C

Special Function Override (4-2)			
#	Control	#	Control
1	NORMAL	3	NORMAL
2	NORMAL	4	NORMAL

Detector Reset	(4-3)
Local Manual (4-4)	OFF

Local Plan 11...19 (7-2) TIMING DATA

COORDINATION

[Offsets] Green Factors or Press [F] to Select Force-Off

		Cycle	Multi	Lag Gap	A	B	C	-1-	-2-	-3-	-4-	-5-	-6-	-7-	-8-
Plan 11	Green Factor			....											
Plan 12	Green Factor			....											
Plan 13	Green Factor			....											
Plan 14	Green Factor			....											
Plan 15	Green Factor			....											
Plan 16	Green Factor			....											
Plan 17	Green Factor			....											
Plan 18	Green Factor			....											
Plan 19	Green Factor			....											

Local Plan 11...19 (7-2) PHASE FLAGS

	Lag	Sync	Hold	Omit	Veh Min	Veh Max	Ped	Bike
Plan 11	....	....	....	....	....	....	....	....
Plan 12	....	....	....	....	....	....	....	....
Plan 13	....	....	....	....	....	....	....	....
Plan 14	....	....	....	....	....	....	....	....
Plan 15	....	....	....	....	....	....	....	....
Plan 16	....	....	....	....	....	....	....	....
Plan 17	....	....	....	....	....	....	....	....
Plan 18	....	....	....	....	....	....	....	....
Plan 19	....	....	....	....	....	....	....	....

Local Plan 21...29 (7-3) TIMING DATA

COORDINATION

[Offsets] Green Factors or Press [F] to Select Force-Off

		Cycle	Multi	Lag Gap	A	B	C	-1-	-2-	-3-	-4-	-5-	-6-	-7-	-8-
Plan 21	Green Factor			....											
Plan 22	Green Factor			....											
Plan 23	Green Factor			....											
Plan 24	Green Factor			....											
Plan 25	Green Factor			....											
Plan 26	Green Factor			....											
Plan 27	Green Factor			....											
Plan 28	Green Factor			....											
Plan 29	Green Factor			....											

Local Plan 21...29 (7-3) PHASE FLAGS

	Lag	Sync	Hold	Omit	Veh Min	Veh Max	Ped	Bike
Plan 21	....	....	....	....	....	....	....	....
Plan 22	....	....	....	....	....	....	....	....
Plan 23	....	....	....	....	....	....	....	....
Plan 24	....	....	....	....	....	....	....	....
Plan 25	....	....	....	....	....	....	....	....
Plan 26	....	....	....	....	....	....	....	....
Plan 27	....	....	....	....	....	....	....	....
Plan 28	....	....	....	....	....	....	....	....
Plan 29	....	....	....	....	....	....	....	....

DETECTORS

Detector Attributes (5-1)				Slot	Detector Configuration (5-2)				
Det	Type	Phases	Lock		Det	Delay	Extend	Recall	Port
1	COUNT+CALL+EXTEND	.2......	NO	I1U	1			10	3.2
2	COUNT+CALL+EXTEND	1.......	NO	I1L	2			10	7.2
3	COUNT+CALL+EXTEND	.2......	NO	I2U	3			10	1.1
4	COUNT+CALL+EXTEND	.2......	NO	I2L	4			10	1.5
5	COUNT+CALL+EXTEND	.2......	NO	I3U	5			10	4.5
6	CALL+EXTEND	.2......	NO	I3L	6			10	6.2
7	LIMITED	.2......	NO	I4U	7			10	2.1
8	COUNT+CALL+EXTEND	.2......	NO	I4L	8			10	7.4
9	COUNT+CALL+EXTEND	.2......	NO	I5U	9			10	3.4
10	COUNT+CALL+EXTEND	.2......	NO	I5L	10			10	7.6
11	COUNT+CALL+EXTEND	.2......	NO	I6U	11			10	1.3
12	COUNT+CALL+EXTEND	.2......	NO	I6L	12			10	1.7
13	COUNT+CALL+EXTEND	...4....	NO	I7U	13			10	4.7
14	CALL+EXTEND	...4....	NO	I7L	14			10	6.4
15	COUNT+CALL+EXTEND	...4....	NO	I8U	15			10	2.3
16	COUNT+CALL+EXTEND	...4....	NO	I8L	16			10	7.8
17	COUNT+CALL+EXTEND	.2......	NO	I9U	17			10	3.6
18	COUNT+CALL+EXTEND	.2......	NO	I9L	18			10	3.8
19	COUNT+CALL+EXTEND	.2......	NO	I10U	19			10	4.1
20	COUNT+CALL+EXTEND	...4....	NO	I10L	20			10	4.2
21	COUNT+CALL+EXTEND	1.......	NO	J1U	21			10	3.1
22	COUNT+CALL+EXTEND	....5...	NO	J1L	22			10	7.1
23	COUNT+CALL+EXTEND	1.......	NO	J2U	23			10	1.2
24	COUNT+CALL+EXTEND	1.......	NO	J2L	24			10	1.6
25	COUNT+CALL+EXTEND	.....6..	NO	J3U	25			10	4.6
26	CALL+EXTEND	.....6..	NO	J3L	26			10	6.3
27	COUNT+CALL+EXTEND	1.......	NO	J4U	27			10	2.2
28	COUNT+CALL+EXTEND	1.......	NO	J4L	28			10	7.3
29	COUNT+CALL+EXTEND	......7.	NO	J5U	29			10	3.3
30	COUNT+CALL+EXTEND	......7.	NO	J5L	30			10	7.5
31	COUNT+CALL+EXTEND	1.......	NO	J6U	31			10	1.4
32	COUNT+CALL+EXTEND	1.......	NO	J6L	32			10	1.8
33	COUNT+CALL+EXTEND	8	NO	J7U	33			10	4.8
34	CALL+EXTEND	8	NO	J7L	34			10	6.5
35	LIMITED	8	NO	J8U	35			10	2.4
36	COUNT+CALL+EXTEND	8	NO	J8L	36			10	7.7
37	COUNT+CALL+EXTEND	1.......	NO	J9U	37			10	3.5
38	COUNT+CALL+EXTEND	......7.	NO	J9L	38			10	3.7
39	COUNT+CALL+EXTEND	.....6..	NO	J10U	39			10	4.3
40	COUNT+CALL+EXTEND	8	NO	J10L	40			10	4.4
41	PEDESTRIAN	....	NO	I12U	41			10	5.1
42	PEDESTRIAN	....	NO	I12L	42			10	5.3
43	PEDESTRIAN	....	NO	I13U	43			10	5.2
44	PEDESTRIAN	....	NO	I13L	44			10	5.4

Failure Times(5-3)	Minutes
Maximum On Time	
Fail Reset Time	

Failure Override (5-4)	
Detectors 1-8	....
Detectors 9-16	....
Detectors17-24	....
Detectors 25-32	....
Detectors 33-40	....
Detectors 41-44	....

System Detector Assignment (5-5)								
Sys Det	1	2	3	4	5	6	7	8
Det Num								
Sys Det	9	10	11	12	13	14	15	16
Det Num								

CIC Operation (5-6-1)	
Enable in Plans	....

CIC Values (5-6-2)	Volume	Occupancy	Demand
Smoothing	0.66	0.66	0.66
Multiplier	4.0	0.33	
Exponent	0.50	1.00	

	Detector-to-Phase Assignment (5-6-3)							
Sys Det	1	2	3	4	5	6	7	8
Phase								
Sys Det	9	10	11	12	13	14	15	16
Phase								

Input File Port-Bit Assignments

332 Cabinet - For Reference Only

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
I-	3.2	1.1	4.5	2.1	3.4	1.3	4.7	2.3	3.6	4.1	6.6	5.1	5.2	6.7
	7.2	1.5	6.2	7.4	7.6	1.7	6.4	7.8	3.8	4.2	2.7	5.3	5.4	6.8
J-	3.1	1.2	4.6	2.2	3.3	1.4	4.8	2.4	3.5	4.3	2.8	5.5	5.6	2.5
	7.1	1.6	6.3	7.3	7.5	1.8	6.5	7.7	3.7	4.4	6.1	5.7	5.8	2.6

TOD SCHEDULE

Table 1 (8-2-1)			Table 2 (8-2-2)			Table 3 (8-2-3)			Table 4 (8-2-4)			Table 5 (8-2-5)			Table 6 (8-2-6)		
Time	Plan	OS	Time	Plan	OS	Time	Plan	OS	Time	Plan	OS	Time	Plan	OS	Time	Plan	OS
0600	2	A	0630	2	A			A			A			A			A
0700	3	A	0730	3	A			A			A			A			A
0800	2	A	0830	2	A			A			A			A			A
1130	3	A	1130	3	A			A			A			A			A
1330	2	A	1330	2	A			A			A			A			A
1500	5	A	1500	5	A			A			A			A			A
1630	6	A	1630	6	A			A			A			A			A
1830	5	A	1830	5	A			A			A			A			A
2130	255	A	2130	255	A			A			A			A			A
		A			A			A			A			A			A
		A			A			A			A			A			A
		A			A			A			A			A			A
		A			A			A			A			A			A
		A			A			A			A			A			A
		A			A			A			A			A			A
		A			A			A			A			A			A

WEEKDAY ASSIGNMENT

Weekday Table Assignments (8-2-7)						
Mon	Tue	Wed	Thu	Fri	Sat	Sun
1	1	1	1	1	2	2

HOLIDAY TABLES

Floating Holiday Table (8-2-8)

#	Mnth	Week	DOW	Table
1			....	
2			....	
3			....	
4			....	
5			....	
6			....	
7			....	
8			....	
9			....	
10			....	
11			....	
12			....	
13			....	
14			....	
15			....	
16			....	

Fixed Holiday Table (8-2-9)

#	Mnth	Day	DOW	Table
1			....	
2			....	
3			....	
4			....	
5			....	
6			....	
7			....	
8			....	
9			....	
10			....	
11			....	
12			....	
13			....	
14			....	
15			....	
16			....	

Solar Clock Data (8-4)

North Latitude	34
West Longitude	118
Local Time Zone	8

Sabbatical Clock (8-5)

Hebrew	Ped Recall
Sabbath	....
Holiday	....

Daylight Saving (8-6)

Enabled	YES

TOD FUNCTIONS

TOD Functions (8-3)

#	Start	End	DOW	Action	Phases
1			....		....
2			....		....
3			....		....
4			....		....
5			....		....
6			....		....
7			....		....
8			....		....
9			....		....
10			....		....
11			....		....
12			....		....
13			....		....
14			....		....
15			....		....
16			....		....

Action Codes:
0. None
1. Permitted
2. Restricted
4. Veh Min Recall
5. Veh Max Recall
6. Ped Recall
7. Bike Recall
8. Red Lock
9. Yellow Lock
10. Force/Max Lock
11.Double Entry
12. Y-Coord C
13. Y-Coord D
14. Free
15. Flashing
16. Walk 2
17. Max Green 2
18. Max Green 3
19. Rest in Walk
20. Rest in Red
21. Free Lag Phases
22. Special Functions
23. Truck Preempt
24. Conditional Service
25. Conditional Service
26. Leading Ped
27. Traffic Actuated Max 2
41. Protected Permissive
42. Protected Permissive

Action Code = Phases added to normal setting
100+Action Code = Phases removed
200+Action Code = Phases replaced

COMMUNICATIONS

C2 (6-1-1)	
Address	
Protocol	AB3418
Access Level	0
Baud	1200
Parity	NONE
Data Bits	8
Stop Bits	1
RTS On Time	20
RTS Off Time	20
Handshaking	NORMAL

C20 (6-1-2)	
Address	
Protocol	AB3418
Access Level	0
Baud	1200
Parity	NONE
Data Bits	8
Stop Bits	1
RTS On Time	20
RTS Off Time	20
Handshaking	NORMAL

C21 (6-1-3)	
Address	
Protocol	UTB
Access Level	0
Baud	1200
Parity	NONE
Data Bits	8
Stop Bits	1
RTS On Time	20
RTS Off Time	20
Handshaking	NORMAL

Access Levels:

0-Full Access
1-Status Only
2-Status, Set Pattern, Time
3-Status, Set Pattern, Time, Manual Plan
4-Reserved
5-Full Access with No Set Pattern
6-Full Access with No Set Time
7-Full Access with No Set Pattern, Manual Plan
8-Full Access with No Set Time, Pattern, Manual Plan

SOFT LOGIC

Soft Logic (6-2)							
#	Data	OP	Data	OP	Data	OP	Data
1							
2							
3							
4							
5							
6							
7							
8							
9							
10							
11							
12							
13							
14							
15							
16							

***Refer to User's Manual for Data and OP Codes**

CALLBACK NUMBERS

Callback Numbers (6-3...3)	
Line Out	
Local Toll	
Long Distance	
Delay	10
Area Code	
Phone Number	
Line Out	
Local Toll	
Long Distance	
Delay	10
Area Code	
Phone Number	
Line Out	
Local Toll	
Long Distance	
Delay	10
Area Code	
Phone Number	

NETWORK

Network (6-4)	
Address	
Protocol	AB3418
Port	27000
Type	STATIC
Central Access	0
Field Access	0

IP Address	0 .	0 .	0 .	0
Netmask	255 .	255 .	255 .	0
Broadcast	0 .	0 .	0 .	255
Gateway	0 .	0 .	0 .	254

RAILROAD PREEMPTION

RR 1

(3-1-1)	Timing	Phase Flags (3-1-2)			Pedestrian Flags (3-1-3)			Overlap Flags (3-1-4)		
		Grn Hold	Yel Flash	Red Flash	Walk	Flash DW	Solid DW	Grn Hold	Yel Flash	Red Flash
Delay										
Clear 1	10	. 2 . . 5 . . .	. . . .	. . . .	. . . .	. . . .	. 2 . 4 . 6 . 8	. . . . . .	. . . . . .	. . . . . .
Clear 2		. . . .	. . . .	. . . .	. . . .	. . . .	. . . .	. . . . . .	. . . . . .	. . . . . .
Clear 3		. . . .	. . . .	. . . .	. . . .	. . . .	. . . .	. . . . . .	. . . . . .	. . . . . .
Hold		. . . .	. . . .	1 2 3 4 5 6 7 8	. . . .	. . . .	. . . .	. . . . . .	. . . . . .	A B C D E F
Exit										
Min Grn										
Ped Clr										

Exit Parameters (3-1-5)

Phase Green	Overlap Green	Vehicle Call	Ped Call
. . . .	. . . . . .	1 2 3 4 5 6 7 8	. 2 . 4 . 6 . 8

Configuration (3-1-6)

Primary Port	Secondary Port	Latching	Power-Up
2.5	0.0	YES	FLASHING

RR 2

(3-2-1)	Timing	Phase Flags (3-2-2)			Pedestrian Flags (3-2-3)			Overlap Flags (3-2-4)		
		Grn Hold	Yel Flash	Red Flash	Walk	Flash DW	Solid DW	Grn Hold	Yel Flash	Red Flash
Delay										
Clear 1	10	. . . 4 . . 7 .	. . . .	. . . .	. . . .	. . . .	. 2 . 4 . 6 . 8	. . . . . .	. . . . . .	. . . . . .
Clear 2		. . . .	. . . .	. . . .	. . . .	. . . .	. . . .	. . . . . .	. . . . . .	. . . . . .
Clear 3		. . . .	. . . .	. . . .	. . . .	. . . .	. . . .	. . . . . .	. . . . . .	. . . . . .
Hold		1 2 3 . . 6 . .	. . . .	. . . .	. 2 . . . 6 . .	. . . .	. . . 4 . . . 8	. . . . . .	. . . . . .	. . . . . .
Exit										
Min Grn										
Ped Clr										

Exit Parameters (3-2-5)

Phase Green	Overlap Green	Vehicle Call	Ped Call
. . . .	. . . . . .	. . . 4 . . 7 .	. . . .

Configuration (3-2-6)

Primary Port	Secondary Port	Latching	Power-up
2.6	0.0	YES	DARK

EMERGENCY VEHICLE PREEMPTION

EVA (3-A)

Preempt Timers			Phase Green	Overlap Green
Delay	Clear	Max		
	15	30	. 2	A . . . . .

Port	Latching	Phase Termination
5.5	NO	ADVANCE

EVB (3-B)

Preempt Timers			Phase Green	Overlap Green
Delay	Clear	Max		
	15	30	. . . 4 . . 7 .	A B . . . .

Port	Latching	Phase Termination
5.6	NO	ADVANCE

EVC (3-C)

Preempt Timers			Phase Green	Overlap Green
Delay	Clear	Max		
	15	30	1	. B . . . .

Port	Latching	Phase Termination
5.7	NO	ADVANCE

EVD (3-D)

Preempt Timers			Phase Green	Overlap Green
Delay	Clear	Max		
	30	30	. . 3 8	. . . . . .

Port	Latching	Phase Termination
5.8	NO	ADVANCE

INPUTS

		7 Wire I/C (2-1-5-1)			
		Input	Port	Input	Port
Enable	NO	R1	3.8	Free	3.6
Max ON		R2	3.5	D2	2.8
Max OFF		R3	3.7	D3	6.1

Manual Control (2-1-5-2)	
Input	Port
Manual Advance	
Advance Enable	

Battery Backup (2-1-5-5)	
Port	Operation
2.7	FLASHING

Cabinet Status (2-1-5-3)	
Input	Port
Flash Bus	
Door Ajar	
Flash Sense	6.7
Stop Time	6.8

Special Function (2-1-5-4)	
Input	Port
1	
2	
3	
4	

Y-Coordination (2-1-5-6)	
Port C	Port D
6.1	2.8

OUTPUTS

Loadswitch Assignments (2-1-6)							+
A	1	2	22	3	4	24	9
B	9	10	26	7	8	28	10
X	13	14	0	11	12	0	0

Loadswitch Codes:
0 Unused (no output)
1-8 Vehicle 1-8
9-14 Overlap A-F
21-28 Ped 1-8
41-47 Special Functions
41 Protected Permissive Flashing Phase 1
43 Protected Permissive Flashing Phase 3
45 Protected Permissive Flashing Phase 5
47 Protected Permissive Flashing Phase 7
51-57 Special Functions
71-72 Seven Wire I/C

+ middle output of loadswitches 3 and 6
Channel 9 and 10

TRANSIT PRIORITY

Local Plans (3-E) 1...9 11...19		Early Green	Green Extend	Inhibit Cycles	Phase 1 Minimum	Phase 2 Minimum	Phase 3 Minimum	Phase 4 Minimum	Phase 5 Minimum	Phase 6 Minimum	Phase 7 Minimum	Phase 8 Minimum
Plan 1	Force-Off											
Plan 2	Force-Off											
Plan 3	Force-Off											
Plan 4	Force-Off											
Plan 5	Force-Off											
Plan 6	Force-Off											
Plan 7	Green Factor											
Plan 8	Green Factor											
Plan 9	Green Factor											
Plan 11	Green Factor											
Plan 12	Green Factor											
Plan 13	Green Factor											
Plan 14	Green Factor											
Plan 15	Green Factor											
Plan 16	Green Factor											
Plan 17	Green Factor											
Plan 18	Green Factor											
Plan 19	Green Factor											

Transit Priority Configuration (3-E-A)				Indicator Output	
Enable in Plans		Input	Type	Stop	Go
Plan 1-9	. . . .	0.0	OPT	0	0
Plan 11-19	. . . .	0.0	OPT	0	0

Queue Jump (3-E-B)	
Grn Hold	Hold Phase
	. . . .
	. . . .

Free Plans (3-E-E)	
Max Grn Hold	Hold Phase
	. . . .

Access Utilities (9-5)	
Password	***
Timeout	30

YELLOW YIELD COORDINATION

Y-Coord Plans (7-C,D)	Long Grn	No Grn	Offset	Perm	Force-Offs -1-	-2-	-3-	-4-	-5-	-6-	-7-	-8-	Coord	Lag	Min Recall	Restricted
Plan C													. 2 . . . 6 . .	. 2 . 4 . 6 . 8	. . . .	. . . .
Plan D													. 2 . . . 6 . .	. 2 . 4 . 6 . 8	. . . .	. . . .

TRUCK PRIORITY

Truck Priority (3-F)	Passage	CarryOver	Clearance	Next Priority	Phase Green	Det 2 Port	Det 3 Port	Det 4 Port	Sign Output	Slave Input	Slave Output
					. . . .	0.0	0.0	0.0	0	0.0	0

Location: SJ - 120 - 004.310 @ WB S. Union Rd.
Designed By: JOHN HA

System: 2.21
District: 10
Installed By: JOHN HA

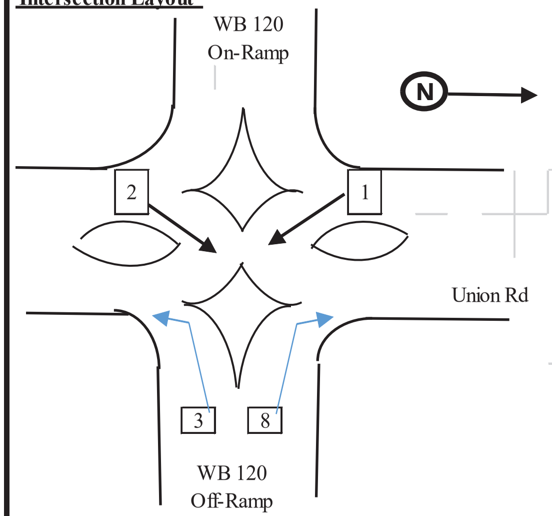
Master At:
I/C:
Service Info:

Timing Change: **Date Start:** **Date End:** **Designed:** **Installed:**

PHASE		FLASH
1)	SB Union Rd	[ ]
2)	NB Union Rd	[ ]
3)	Off Ramp LT to SB Union Rd	[ ]
4)		[ ]
5)		[ ]
6)		[ ]
7)		[ ]
8)	Off Ramp RT to NB Union Rd	[ ]

OVERLAP		
A)	Phase 2 with Phase 3	[ ]
B)	Phase 1 with Phase 8	[ ]
C)		[ ]
D)		[ ]
E)		[ ]
F)		[ ]

Intersection Layout



Crosswalks: None

P = 0
P = 0
P = 0
P = 0

Signal Configuration: Special

Intersection Layout

1	2	3	4	5	6	7	8	9	10	11	12	13	14
Bike	L2 ADV		L2 S 1 2 3 4	L2 ADV	L2 INT			L2 S 1 2 3 4					
2	2	2	2	2	2	4	4	2	2		P	P	FS
1	2	2	2	2	2	4	4	2	4	BAT Flashi	P	P	ST
	L1 ADV		L1 S 1 2 3 4	L1 ADV	L1 INT			L1 S 1 2 3 4					
Bike	L2 ADV	L2 INT	L2 S 1 2 3 4		L1 ADV	L1 INT	L1 S 1 2 3 4						
1	1	1	1	7	1	1	1	5	6		EVA ø2,ø5	EVB ø4,ø7	RR1
5	1	1	1	7	8	8	8	7	8		EVC ø6,ø1	EVD ø8,ø3	RR2
	L1 ADV	L1 INT	L1 S 1 2 3 4										

Input File

1	2	3	4	5	6
ø1	ø2	ø2P	ø3	ø4	ø4P
ø5	ø6	ø6P	ø7	ø8	ø8P

Output File

Comments and Notes:

Detections for Phase 3 have been assigned to Phase 2 to enable timing extension.
Detections for Phase 8 have been assigned to Phase 1 to enable timing extension.
Output for Phase 8 and 3 are allocated to 9 and 10, both signal heads are only "green" at the same time during emergency vehicle preemption.

RAM Checksum

Page 2:	AD59	Page 8:	EA1E
Page 3:	B07B	Page 9:	D2FD
Page 4:	275B	Page 10:	F7F6
Page 5:	191A	Page 11:	770D
Page 6:	191A	Page 12:	F189
Page 7:	43D1	Page 13:	86F7

CONFIGURATION PHASE FLAGS

Cabinet
332
Configuration
CALTRANS

Phases (2-1-1-1)	
Permitted	1 2 3 8
Restricted	. . . .

Phase Recalls (2-1-1-2)	
Vehicle Min	. . . .
Vehicle Max	. . . .
Pedestrian	. . . .
Bicycle	. . . .

Phase Locks (2-1-1-3)	
Red	. . . .
Yellow	1 2 . . . . . .
Force/Max	. . . .

Phase Features (2-1-1-4)	
Double Entry	. . . .
Rest In Walk	. . . .
Rest In Red	. . . .
Walk 2	. . . .
Max Green 2	. . . .
Max Green 3	. . . .

Startup (2-1-1-5)	
First Green Phases	. 2 . . . . . .
Yellow Start Phases	. . . .
Vehicle Calls	1 2 . . . . . .
Pedestrian Calls	. . . .
Yellow Start Overlaps	. . . . . .
Startup All-Red	5.0

Call To Phase (2-1-2-1)		Omit On Green	
1	. . . .	1	. . . .
2	. . . .	2	. . . .
3	. . . .	3	. . . .
4	. . . .	4	. . . .
5	. . . .	5	. . . .
6	. . . .	6	. . . .
7	. . . .	7	. . . .
8	. . . .	8	. . . .

Flashing Colors (2-1-2-2)	
Yellow Flash Phases	. . . .
Yellow Flash Overlap	. . . . . .
Flash In Red Phases	. . . .
Flash In Red Overlaps	. . . . . .

Special Operation (2-1-2-3)	
Single Exit Phase	. . . .
Driveway Signal Phases	. . . .
Driveway Signal Overlaps	. . . . . .
Leading Ped Phases	. . . .

Protected Permissive (2-1-2-4)	
Protected Permissive	. . . .

Pedestrian (2-1-3)	
P1	. . . .
P2	. . . .
P3	. . . .
P4	. . . .
P5	. . . .
P6	. . . .
P7	. . . .
P8	. . . .

Overlap (2-1-4)

Overlap	Parent	Omit	No Start	Not
A	. 2 3	. . . .	. . . .	. . . .
B	1 8	. . . .	. . . .	. . . .
C	. . . .	. . . .	. . . .	. . . .
D	. . . .	. . . .	. . . .	. . . .
E	. . . .	. . . .	. . . .	. . . .
F	. . . .	. . . .	. . . .	. . . .

PHASE TIMING

Phase (2-2)	-1-	-2-	-3-	-4-	-5-	-6-	-7-	-8-
--- Walk 1 ---	0	0	0	0	0	0	0	0
Flash Don't Walk	0	0	0	0	0	0	0	0
Minimum Green	8	8	0	0	0	0	0	0
Det Limit	10	10	0	0	0	0	0	0
Max Initial	10	10	0	0	0	0	0	0
Max Green 1	40	40	0	0	0	0	0	0
Max Green 2	60	60	0	0	0	0	0	0
Max Green 3	80	80	0	0	0	0	0	0
Extension	2.0	2.0	0.0	0.0	0.0	0.0	0.0	0.0
Maximum Gap	5.0	5.0	0.0	0.0	0.0	0.0	0.0	0.0
Minimum Gap	2.0	2.0	0.0	0.0	0.0	0.0	0.0	0.0
Add Per Vehicle	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Reduce Gap By	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0
Reduce Every	1.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0
Yellow	5.2	5.2	3.0	3.0	3.0	3.0	3.0	3.0
All-Red	3.0	3.0	0.0	0.0	0.0	0.0	0.0	0.0

Ped/Bike (2-3)	-1-	-2-	-3-	-4-	-5-	-6-	-7-	-8-
--- Walk 2 ---	0	0	0	0	0	0	0	0
Delay/Early Walk	0	0	0	0	0	0	0	0
Solid Don't Walk	0	0	0	0	0	0	0	0
Bike Green	0	0	0	0	0	0	0	0
Bike All-Red	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

OVERLAP TIMING

Overlap (2-4)	A	B	C	D	E	F
Green	0.0	0.0	0.0	0.0	0.0	0.0
Yellow	5.2	5.2	5.0	5.0	5.0	5.0
Red	0.0	0.0	0.0	0.0	0.0	0.0

Red Revert

Red Revert (2-5)	
Time	5.0
All-Red Sec/Min (2-6)	
All-Red Sec/Min:	OFF

Max 2 Extension

Max/Gap Out (2-7)	
Max Cnt	0
Gap Cnt	0

Local Plan 1...9 (7-1) TIMING DATA

COORDINATION

[Offsets] Green Factors or Press [F] to Select Force-Off

		Cycle	Multi	Lag Gap	A	B	C	-1-	-2-	-3-	-4-	-5-	-6-	-7-	-8-
Plan 1	Force-Off	50		....					25						
Plan 2	Force-Off	60		....					30						
Plan 3	Force-Off	70		....					35						
Plan 4	Force-Off	50		....				25							
Plan 5	Force-Off	60		....				30							
Plan 6	Force-Off	70		....				35							
Plan 7	Green Factor			....											
Plan 8	Green Factor			....											
Plan 9	Green Factor			....											

Local Plan 1...9 (7-1) PHASE FLAGS

	Lag	Sync	Hold	Omit	Veh Min	Veh Max	Ped	Bike
Plan 1	.2.4.6.8	1....6..	....	....	....	....	....	....
Plan 2	.2.4.6.8	1....6..	....	....	....	....	....	....
Plan 3	.2.4.6.8	1....6..	....	....	....	....	....	....
Plan 4	.2.4.6.8	.2..5...	....	....	....	....	....	....
Plan 5	.2.4.6.8	.2..5...	....	....	....	....	....	....
Plan 6	.2.4.6.8	.2..5...	....	....	....	....	....	....
Plan 7	....	....	....	....	....	....	....	....
Plan 8	....	....	....	....	....	....	....	....
Plan 9	....	....	....	....	....	....	....	....

Master Timer Sync (7-A)	
	Enable in Plans
1-9	....
11-19	....
21-29	....

Master Sub Master	
Input	
Output	

FREE PLAN PHASE FLAGS

(7-E) Free	
Lag	Omit
.2.4.6.8	....
Veh Min	Veh Max
.2......	....
Ped	Bike
....	....
Cond	Cond Grn
....	10

MANUAL COMMANDS

Manual Plan (4-1)	
Plan	OffSet
	A

Plan: 1-9
15 or 254 = Flash
14 or 255 = Free
Offset A, B, or C

Special Function Override (4-2)			
#	Control	#	Control
1	NORMAL	3	NORMAL
2	NORMAL	4	NORMAL

Detector Reset	(4-3)
Local Manual (4-4)	OFF

Local Plan 11...19 (7-2) TIMING DATA

COORDINATION

		Cycle	Multi	Lag Gap	[Offsets] A	B	C]	Green Factors or Press [F] to Select Force-Off -1-	-2-	-3-	-4-	-5-	-6-	-7-	-8-
Plan 11	Green Factor			....											
Plan 12	Green Factor			....											
Plan 13	Green Factor			....											
Plan 14	Green Factor			....											
Plan 15	Green Factor			....											
Plan 16	Green Factor			....											
Plan 17	Green Factor			....											
Plan 18	Green Factor			....											
Plan 19	Green Factor			....											

Local Plan 11...19 (7-2) PHASE FLAGS

	Lag	Sync	Hold	Omit	Veh Min	Veh Max	Ped	Bike
Plan 11	....	....	....	....	....	....	....	....
Plan 12	....	....	....	....	....	....	....	....
Plan 13	....	....	....	....	....	....	....	....
Plan 14	....	....	....	....	....	....	....	....
Plan 15	....	....	....	....	....	....	....	....
Plan 16	....	....	....	....	....	....	....	....
Plan 17	....	....	....	....	....	....	....	....
Plan 18	....	....	....	....	....	....	....	....
Plan 19	....	....	....	....	....	....	....	....

Local Plan 21...29 (7-3) TIMING DATA

COORDINATION

[Offsets]   Green Factors or Press [F] to Select Force-Off

		Cycle	Multi	Lag Gap	A	B	C	-1-	-2-	-3-	-4-	-5-	-6-	-7-	-8-
Plan 21	Green Factor			....											
Plan 22	Green Factor			....											
Plan 23	Green Factor			....											
Plan 24	Green Factor			....											
Plan 25	Green Factor			....											
Plan 26	Green Factor			....											
Plan 27	Green Factor			....											
Plan 28	Green Factor			....											
Plan 29	Green Factor			....											

Local Plan 21...29 (7-3) PHASE FLAGS

	Lag	Sync	Hold	Omit	Veh Min	Veh Max	Ped	Bike
Plan 21	....	....	....	....	....	....	....	....
Plan 22	....	....	....	....	....	....	....	....
Plan 23	....	....	....	....	....	....	....	....
Plan 24	....	....	....	....	....	....	....	....
Plan 25	....	....	....	....	....	....	....	....
Plan 26	....	....	....	....	....	....	....	....
Plan 27	....	....	....	....	....	....	....	....
Plan 28	....	....	....	....	....	....	....	....
Plan 29	....	....	....	....	....	....	....	....

DETECTORS

Detector Attributes (5-1)				Slot	Detector Configuration (5-2)				
Det	Type	Phases	Lock		Det	Delay	Extend	Recall	Port
1	COUNT+CALL+EXTEND	.2......	NO	I1U	1			10	3.2
2	COUNT+CALL+EXTEND	1.......	NO	I1L	2			10	7.2
3	COUNT+CALL+EXTEND	.2......	NO	I2U	3			10	1.1
4	COUNT+CALL+EXTEND	.2......	NO	I2L	4			10	1.5
5	COUNT+CALL+EXTEND	.2......	NO	I3U	5			10	4.5
6	COUNT+CALL+EXTEND	.2......	NO	I3L	6			10	6.2
7	COUNT+CALL+EXTEND	.2......	NO	I4U	7			10	2.1
8	COUNT+CALL+EXTEND	.2......	NO	I4L	8			10	7.4
9	COUNT+CALL+EXTEND	.2......	NO	I5U	9			10	3.4
10	COUNT+CALL+EXTEND	.2......	NO	I5L	10			10	7.6
11	COUNT+CALL+EXTEND	.2......	NO	I6U	11			10	1.3
12	COUNT+CALL+EXTEND	.2......	NO	I6L	12			10	1.7
13	COUNT+CALL+EXTEND	...4....	NO	I7U	13			10	4.7
14	CALL+EXTEND	...4....	NO	I7L	14			10	6.4
15	LIMITED	...4....	NO	I8U	15			10	2.3
16	COUNT+CALL+EXTEND	...4....	NO	I8L	16			10	7.8
17	COUNT+CALL+EXTEND	.2......	NO	I9U	17			10	3.6
18	COUNT+CALL+EXTEND	.2......	NO	I9L	18			10	3.8
19	COUNT+CALL+EXTEND	.2......	NO	I10U	19			10	4.1
20	COUNT+CALL+EXTEND	...4....	NO	I10L	20			10	4.2
21	COUNT+CALL+EXTEND	1.......	NO	J1U	21			10	3.1
22	COUNT+CALL+EXTEND	....5...	NO	J1L	22			10	7.1
23	COUNT+CALL+EXTEND	1.......	NO	J2U	23			10	1.2
24	COUNT+CALL+EXTEND	1.......	NO	J2L	24			10	1.6
25	COUNT+CALL+EXTEND	1.......	NO	J3U	25			10	4.6
26	CALL+EXTEND	1.......	NO	J3L	26			10	6.3
27	LIMITED	1.......	NO	J4U	27			10	2.2
28	COUNT+CALL+EXTEND	1.......	NO	J4L	28			10	7.3
29	COUNT+CALL+EXTEND	......7.	NO	J5U	29			10	3.3
30	COUNT+CALL+EXTEND	......7.	NO	J5L	30			10	7.5
31	COUNT+CALL+EXTEND	1.......	NO	J6U	31			10	1.4
32	COUNT+CALL+EXTEND	8	NO	J6L	32			10	1.8
33	COUNT+CALL+EXTEND	1.......	NO	J7U	33			10	4.8
34	CALL+EXTEND	8	NO	J7L	34			10	6.5
35	COUNT+CALL+EXTEND	1.......	NO	J8U	35			10	2.4
36	COUNT+CALL+EXTEND	8	NO	J8L	36			10	7.7
37	COUNT+CALL+EXTEND	....5...	NO	J9U	37			10	3.5
38	COUNT+CALL+EXTEND	......7.	NO	J9L	38			10	3.7
39	COUNT+CALL+EXTEND	.....6..	NO	J10U	39			10	4.3
40	COUNT+CALL+EXTEND	8	NO	J10L	40			10	4.4
41	PEDESTRIAN	....	NO	I12U	41			10	5.1
42	PEDESTRIAN	....	NO	I12L	42			10	5.3
43	PEDESTRIAN	....	NO	I13U	43			10	5.2
44	PEDESTRIAN	....	NO	I13L	44			10	5.4

Failure Times(5-3)	Minutes
Maximum On Time	
Fail Reset Time	

Failure Override (5-4)	
Detectors 1-8	....
Detectors 9-16	....
Detectors17-24	....
Detectors 25-32	....
Detectors 33-40	....
Detectors 41-44	....

System Detector Assignment (5-5)

Sys Det	1	2	3	4	5	6	7	8
Det Num								
Sys Det	9	10	11	12	13	14	15	16
Det Num								

CIC Operation (5-6-1)	
Enable in Plans	....

CIC Values (5-6-2)	Volume	Occupancy	Demand
Smoothing	0.66	0.66	0.66
Multiplier	4.0	0.33	
Exponent	0.50	1.00	

Detector-to-Phase Assignment (5-6-3)

Sys Det	1	2	3	4	5	6	7	8
Phase								
Sys Det	9	10	11	12	13	14	15	16
Phase								

Input File Port-Bit Assignments

332 Cabinet - For Reference Only

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
I-	3.2	1.1	4.5	2.1	3.4	1.3	4.7	2.3	3.6	4.1	6.6	5.1	5.2	6.7
	7.2	1.5	6.2	7.4	7.6	1.7	6.4	7.8	3.8	4.2	2.7	5.3	5.4	6.8
J-	3.1	1.2	4.6	2.2	3.3	1.4	4.8	2.4	3.5	4.3	2.8	5.5	5.6	2.5
	7.1	1.6	6.3	7.3	7.5	1.8	6.5	7.7	3.7	4.4	6.1	5.7	5.8	2.6

TOD SCHEDULE

Table 1 (8-2-1)			Table 2 (8-2-2)			Table 3 (8-2-3)			Table 4 (8-2-4)			Table 5 (8-2-5)			Table 6 (8-2-6)		
Time	Plan	OS	Time	Plan	OS	Time	Plan	OS	Time	Plan	OS	Time	Plan	OS	Time	Plan	OS
0600	2	A	0630	2	A			A			A			A			A
0700	3	A	0730	3	A			A			A			A			A
0800	2	A	0830	2	A			A			A			A			A
1130	3	A	1130	3	A			A			A			A			A
1330	2	A	1330	2	A			A			A			A			A
1500	5	A	1500	5	A			A			A			A			A
1630	6	A	1630	6	A			A			A			A			A
1830	5	A	1830	5	A			A			A			A			A
2130	255	A	2130	255	A			A			A			A			A
		A			A			A			A			A			A
		A			A			A			A			A			A
		A			A			A			A			A			A
		A			A			A			A			A			A
		A			A			A			A			A			A
		A			A			A			A			A			A
		A			A			A			A			A			A

WEEKDAY ASSIGNMENT

Weekday Table Assignments (8-2-7)						
Mon	Tue	Wed	Thu	Fri	Sat	Sun
1	1	1	1	1	2	2

HOLIDAY TABLES

Floating Holiday Table (8-2-8)

#	Mnth	Week	DOW	Table
1			....	
2			....	
3			....	
4			....	
5			....	
6			....	
7			....	
8			....	
9			....	
10			....	
11			....	
12			....	
13			....	
14			....	
15			....	
16			....	

Fixed Holiday Table (8-2-9)

#	Mnth	Day	DOW	Table
1			....	
2			....	
3			....	
4			....	
5			....	
6			....	
7			....	
8			....	
9			....	
10			....	
11			....	
12			....	
13			....	
14			....	
15			....	
16			....	

Solar Clock Data (8-4)

North Latitude	34
West Longitude	118
Local Time Zone	8

Sabbatical Clock (8-5)

Hebrew	Ped Recall
Sabbath	....
Holiday	....

Daylight Saving (8-6)

Enabled	YES

TOD FUNCTIONS

TOD Functions (8-3)

#	Start	End	DOW	Action	Phases
1			....		....
2			....		....
3			....		....
4			....		....
5			....		....
6			....		....
7			....		....
8			....		....
9			....		....
10			....		....
11			....		....
12			....		....
13			....		....
14			....		....
15			....		....
16			....		....

Action Codes:
0. None
1. Permitted
2. Restricted
4. Veh Min Recall
5. Veh Max Recall
6. Ped Recall
7. Bike Recall
8. Red Lock
9. Yellow Lock
10. Force/Max Lock
11.Double Entry
12. Y-Coord C
13. Y-Coord D
14. Free
15. Flashing
16. Walk 2
17. Max Green 2
18. Max Green 3
19. Rest in Walk
20. Rest in Red
21. Free Lag Phases
22. Special Functions
23. Truck Preempt
24. Conditional Service
25. Conditional Service
26. Leading Ped
27. Traffic Actuated Max 2
41. Protected Permissive
42. Protected Permissive

Action Code = Phases added to normal setting
100+Action Code = Phases removed
200+Action Code = Phases replaced

COMMUNICATIONS

C2 (6-1-1)	
Address	
Protocol	AB3418
Access Level	0
Baud	1200
Parity	NONE
Data Bits	8
Stop Bits	1
RTS On Time	20
RTS Off Time	20
Handshaking	NORMAL

C20 (6-1-2)	
Address	
Protocol	AB3418
Access Level	0
Baud	1200
Parity	NONE
Data Bits	8
Stop Bits	1
RTS On Time	20
RTS Off Time	20
Handshaking	NORMAL

C21 (6-1-3)	
Address	
Protocol	UTB
Access Level	0
Baud	1200
Parity	NONE
Data Bits	8
Stop Bits	1
RTS On Time	20
RTS Off Time	20
Handshaking	NORMAL

Access Levels:
0-Full Access
1-Status Only
2-Status, Set Pattern, Time
3-Status, Set Pattern, Time, Manual Plan
4-Reserved
5-Full Access with No Set Pattern
6-Full Access with No Set Time
7-Full Access with No Set Pattern, Manual Plan
8-Full Access with No Set Time, Pattern, Manual Plan

SOFT LOGIC

Soft Logic (6-2)							
#	Data	OP	Data	OP	Data	OP	Data
1							
2							
3							
4							
5							
6							
7							
8							
9							
10							
11							
12							
13							
14							
15							
16							

*Refer to User's Manual for Data and OP Codes

CALLBACK NUMBERS

Callback Numbers (6-3...3)	
Line Out	
Local Toll	
Long Distance	
Delay	10
Area Code	
Phone Number	

Line Out	
Local Toll	
Long Distance	
Delay	10
Area Code	
Phone Number	

Line Out	
Local Toll	
Long Distance	
Delay	10
Area Code	
Phone Number	

NETWORK

Network (6-4)	
Address	
Protocol	AB3418
Port	27000
Type	STATIC
Central Access	0
Field Access	0

IP Address	0 . 0 . 0 . 0
Netmask	255 . 255 . 255 . 0
Broadcast	0 . 0 . 0 . 255
Gateway	0 . 0 . 0 . 254

RAILROAD PREEMPTION

RR 1

(3-1-1)	Timing	Phase Flags (3-1-2)			Pedestrian Flags (3-1-3)			Overlap Flags (3-1-4)		
		Grn Hold	Yel Flash	Red Flash	Walk	Flash DW	Solid DW	Grn Hold	Yel Flash	Red Flash
Delay										
Clear 1	10	. 2 . . 5 . . .	. . . .	. . . .	. . . .	. . . .	. 2 . 4 . 6 . 8	. . . . . .	. . . . . .	. . . . . .
Clear 2		. . . .	. . . .	. . . .	. . . .	. . . .	. . . .	. . . . . .	. . . . . .	. . . . . .
Clear 3		. . . .	. . . .	. . . .	. . . .	. . . .	. . . .	. . . . . .	. . . . . .	. . . . . .
Hold		. . . .	. . . .	1 2 3 4 5 6 7 8	. . . .	. . . .	. . . .	. . . . . .	. . . . . .	A B C D E F
Exit										
Min Grn										
Ped Clr										

Exit Parameters (3-1-5)			
Phase Green	Overlap Green	Vehicle Call	Ped Call
. . . .	. . . . . .	1 2 3 4 5 6 7 8	. 2 . 4 . 6 . 8

Configuration (3-1-6)			
Primary Port	Secondary Port	Latching	Power-Up
2.5	0.0	YES	FLASHING

RR 2

(3-2-1)	Timing	Phase Flags (3-2-2)			Pedestrian Flags (3-2-3)			Overlap Flags (3-2-4)		
		Grn Hold	Yel Flash	Red Flash	Walk	Flash DW	Solid DW	Grn Hold	Yel Flash	Red Flash
Delay										
Clear 1	10	. . . 4 . . 7 .	. . . .	. . . .	. . . .	. . . .	. 2 . 4 . 6 . 8	. . . . . .	. . . . . .	. . . . . .
Clear 2		. . . .	. . . .	. . . .	. . . .	. . . .	. . . .	. . . . . .	. . . . . .	. . . . . .
Clear 3		. . . .	. . . .	. . . .	. . . .	. . . .	. . . .	. . . . . .	. . . . . .	. . . . . .
Hold		1 2 3 . . 6 . .	. . . .	. . . .	. 2 . . . 6 . .	. . . .	. . . 4 . . . 8	. . . . . .	. . . . . .	. . . . . .
Exit										
Min Grn										
Ped Clr										

Exit Parameters (3-2-5)			
Phase Green	Overlap Green	Vehicle Call	Ped Call
. . . .	. . . . . .	. . . 4 . . 7 .	. . . .

Configuration (3-2-6)			
Primary Port	Secondary Port	Latching	Power-up
2.6	0.0	YES	DARK

EMERGENCY VEHICLE PREEMPTION

EVA (3-A)	Preempt Timers			Phase Green	Overlap Green
	Delay	Clear	Max		
		15	30	. 2	A . . . . .

Port	Latching	Phase Termination
5.5	NO	ADVANCE

EVB (3-B)	Preempt Timers			Phase Green	Overlap Green
	Delay	Clear	Max		
		30	30	. . . 4 . . 7 .	. . . . . .

Port	Latching	Phase Termination
5.6	NO	ADVANCE

EVC (3-C)	Preempt Timers			Phase Green	Overlap Green
	Delay	Clear	Max		
		15	30	1	. B . . . .

Port	Latching	Phase Termination
5.7	NO	ADVANCE

EVD (3-D)	Preempt Timers			Phase Green	Overlap Green
	Delay	Clear	Max		
		15	30	. . 3 8	A B . . . .

Port	Latching	Phase Termination
5.8	NO	ADVANCE

INPUTS

7 Wire I/C (2-1-5-1)					
		Input	Port	Input	Port
Enable	NO	R1	3.8	Free	3.6
Max ON		R2	3.5	D2	2.8
Max OFF		R3	3.7	D3	6.1

Manual Control (2-1-5-2)	
Input	Port
Manual Advance	
Advance Enable	

Battery Backup (2-1-5-5)	
Port	Operation
2.7	FLASHING

Cabinet Status (2-1-5-3)	
Input	Port
Flash Bus	
Door Ajar	
Flash Sense	6.7
Stop Time	6.8

Special Function (2-1-5-4)	
Input	Port
1	
2	
3	
4	

Y-Coordination (2-1-5-6)	
Port C	Port D
6.1	2.8

OUTPUTS

Loadswitch Assignments (2-1-6)							+
A	1	2	22	3	4	24	9
B	9	10	26	7	8	28	10
X	13	14	0	11	12	0	0

Loadswitch Codes:
0 Unused (no output)
1-8 Vehicle 1-8
9-14 Overlap A-F
21-28 Ped 1-8
41-47 Special Functions
41 Protected Permissive Flashing Phase 1
43 Protected Permissive Flashing Phase 3
45 Protected Permissive Flashing Phase 5
47 Protected Permissive Flashing Phase 7
51-57 Special Functions
71-72 Seven Wire I/C

+ middle output of loadswitches 3 and 6
Channel 9 and 10

TRANSIT PRIORITY

Local Plans (3-E) 1...9 11...19		Early Green	Green Extend	Inhibit Cycles	Phase 1 Minimum	Phase 2 Minimum	Phase 3 Minimum	Phase 4 Minimum	Phase 5 Minimum	Phase 6 Minimum	Phase 7 Minimum	Phase 8 Minimum
Plan 1	Force-Off											
Plan 2	Force-Off											
Plan 3	Force-Off											
Plan 4	Force-Off											
Plan 5	Force-Off											
Plan 6	Force-Off											
Plan 7	Green Factor											
Plan 8	Green Factor											
Plan 9	Green Factor											
Plan 11	Green Factor											
Plan 12	Green Factor											
Plan 13	Green Factor											
Plan 14	Green Factor											
Plan 15	Green Factor											
Plan 16	Green Factor											
Plan 17	Green Factor											
Plan 18	Green Factor											
Plan 19	Green Factor											

Transit Priority Configuration (3-E-A)				Indicator Output	
Enable in Plans		Input	Type	Stop	Go
Plan 1-9	. . . .	0.0	OPT	0	0
Plan 11-19	. . . .	0.0	OPT	0	0

Queue Jump (3-E-B)	
Grn Hold	Hold Phase
	. . . .
	. . . .

Free Plans (3-E-E)	
Max Grn Hold	Hold Phase
	. . . .

Access Utilities (9-5)	
Password	***
Timeout	30

YELLOW YIELD COORDINATION

Y-Coord Plans (7-C,D)	Long Grn	No Grn	Offset	Perm	Force-Offs -1-	-2-	-3-	-4-	-5-	-6-	-7-	-8-	Coord	Lag	Min Recall	Restricted
Plan C													. 2 . . . 6 . .	. 2 . 4 . 6 . 8	. . . .	. . . .
Plan D													. 2 . . . 6 . .	. 2 . 4 . 6 . 8	. . . .	. . . .

TRUCK PRIORITY

Truck Priority (3-F)	Passage	CarryOver	Clearance	Next Priority	Phase Green	Det 2 Port	Det 3 Port	Det 4 Port	Sign Output	Slave Input	Slave Output
					. . . .	0.0	0.0	0.0	0	0.0	0

Departmer f Transportation, California Caltrans 2070 Controlle iming Chart TSCP 2.16 F GE 1

Location: SJ - 120 - R003.300 EB @ AIPORT WAY
System: 2070 V2.17
Master At: THIS LOCATION

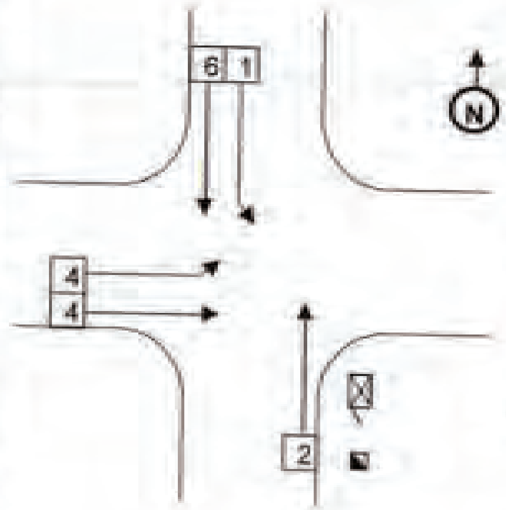
District: 10
I/C:

Designed By:
Installed By:
Service Info:

Timing Change: Date Start: Date End: Designed: Installed:

PHASE		FLASH
1)	LT: SB AIPORT TO EB 120 ONRAMP	
2)	NB AIRPORT WAY	
3)		
4)	EB 120 OFFRAMP	
5)		
6)	SB AIPORT WAY	
7)		
8)		

OVERLAP	FLASH
A)	
B)	
C)	
D)	
E)	
F)	



Intersection Layout

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
	1	2	2	2	3	4	4	4	1			P2	P6	fh
I	1	2	2	2	3	4	4	4	3		BT FL	P4	P8	st
	5	6	6	6	7	8	8	8	5					rr1
J	5	6	6	6	7	8	8	8	7					rr2

Input File

1	2	3	4	5	6
1	2	2P	3	4	4P
5	6	6P	7	8	8P

Output File

Comments and Notes:
TURN ON: 5/29/2009

RAM Checksum

Page 2: A32E	Page 7: 6EEF
Page 3: 8582	Page 8: 6E4B
Page 4: 3C9A	Page 9: 770D
Page 5: 90C0	Page 10: EF20
Page 6: 85AF	Page 11: C381

D5@B

Post Mile: SJ - 120 - R003.300 EB @ AIPORT WAY

Printed: 12/17/2015

CONFIGURATION PHASE FLAGS

Phases (2-1-1-1)	*
Permitted	1 2 . 4 . 6 . .
Restricted	....

Phase Recalls (2-1-1-2)	
Vehicle Min	. 2 . . . 6 . .
Vehicle Max	....
Pedestrian	....
Bicycle	....

Phase Locks (2-1-1-3)	*
Red	1 ....
Yellow	....
Force/Max	....

Phase Features (2-1-1-4)	*
Double Entry	. 2 . . . 6 . .
Rest In Walk	....
Rest In Red	....
Walk 2	....
Max Green 2	....
Max Green 3	....

Startup (2-1-1-5)	*
First Green Phases	. . . 4 . . . .
Yellow Start Phases	. 2 . . . 6 . .
Yellow Start Overlaps	......
Startup All-Red	5.0
Vehicle Calls	1 2 . 4 . 6 . .
Pedestrian Calls	....

Call To Phase (2-1-2-1)		Omit On Green	
1	....	1	....
2	....	2	....
3	....	3	....
4	....	4	....
5	....	5	....
6	....	6	....
7	....	7	....
8	....	8	....

Flashing Colors (2-1-2-2)	
Yellow Flash Phases	....
Yellow Flash Overlap	......
Flash In Red Phases	....
Flash In Red Overlap	......

Special Operation (2-1-2-3)	
Single Exit Phase	....
Driveway Signal Phases	....
Driveway Signal Overlaps	......
Leading Ped Phases	....

Protected Permissive (2-1-2-4)	
Protected Permissive	....

Pedestrian (2-1-3)	
P1	....
P2	. 2 ......
P3	....
P4	. . . 4 . . . .
P5	....
P6	. . . . . 6 . .
P7	....
P8	 8

Overlap (2-1-4)				
Overlap	Parent	Omit	No Start	Not
A	....	....	....	....
B	....	....	....	....
C	....	....	....	....
D	....	....	....	....
E	....	....	....	....
F	....	....	....	....

PHASE TIMING

Phase (2-2)	-1- *	-2- *	-3-	-4- *	-5-	-6- *	-7-	-8-
--- Walk 1 ---	0	10	0	10	0	10	0	10
Flash Don't Walk	0	10	0	10	0	10	0	10
Minimum Green	5	8	10	5	10	8	10	10
Det Limit	10	20	10	10	10	20	10	10
Max Initial	0	20	10	0	10	20	10	10
Max Green 1	30	30	50	20	50	30	50	50
Max Green 2	35	50	50	25	50	50	50	50
Max Green 3	50	50	50	50	50	50	50	50
Extension	2.0	0.2	5.0	1.0	5.0	0.2	5.0	5.0
Maximum Gap	3.0	2.8	5.0	3.6	5.0	2.8	5.0	5.0
Minimum Gap	2.0	0.2	5.0	1.0	5.0	0.2	5.0	5.0
Add Per Vehicle	0.0	0.0	1.0	0.0	1.0	0.0	1.0	1.0
Reduce Gap By	0.1	0.1	0.0	0.1	0.0	0.1	0.0	0.0
Reduce Every	1.0	0.8	1.0	0.4	1.0	0.8	1.0	1.0
Yellow	3.0	4.3	5.0	3.6	5.0	4.3	5.0	5.0
All Red	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0

Ped/Bike (2-3)	-1-	-2-	-3-	-4-	-5-	-6-	-7-	-8-
--- Walk 2 ---	0	0	0	0	0	0	0	0
Delay/Early Walk	0	0	0	0	0	0	0	0
Solid Don't Walk	0	0	0	0	0	0	0	0
Bike Green	0	0	0	0	0	0	0	0
Bike All-Red	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

OVERLAP TIMING

Overlap (2-4)	A	B	C	D	E	F
Green	0.0	0.0	0.0	0.0	0.0	0.0
Yellow	5.0	5.0	5.0	5.0	5.0	5.0
Red	0.0	0.0	0.0	0.0	0.0	0.0

Red Revert

Red Revert (2-5) *	
Time	2.0
Red To Sec (2-6)	
Red To Sec	OFF

COORDINATION

Local Plan (7-1...9) TIMING DATA [Offsets]

Green Factors or Press [F] to Select Force-Off

		Cycle	Multi	Perm	A	B	C	-1-	-2-	-3-	-4-	-5-	-6-	-7-	-8-
Plan 1	Green Factor														
Plan 2	Green Factor														
Plan 3	Green Factor														
Plan 4	Green Factor														
Plan 5	Green Factor														
Plan 6	Green Factor														
Plan 7	Green Factor														
Plan 8	Green Factor														
Plan 9	Green Factor														

Local Plan (7-1...9) PHASE FLAGS

	Lag	Sync	Hold	Omit	Veh Min	Veh Max	Ped	Bike
Plan 1	....	....	....	....	....	....	....	....
Plan 2	....	....	....	....	....	....	....	....
Plan 3	....	....	....	....	....	....	....	....
Plan 4	....	....	....	....	....	....	....	....
Plan 5	....	....	....	....	....	....	....	....
Plan 6	....	....	....	....	....	....	....	....
Plan 7	....	....	....	....	....	....	....	....
Plan 8	....	....	....	....	....	....	....	....
Plan 9	....	....	....	....	....	....	....	....

Master Timer Sync (7-A)
Enable in Plans
....

Master Sub Master	
Input	
Output	

FREE PLAN PHASE FLAGS

(7-E) Free	
Lag	Omit
.2.4.6.8	....
Veh Min	Veh Max
.2...6..	....
Ped	Bike
....	....
Cond	Cond Grn
....	10

MANUAL COMMANDS

Manual Plan (4-1)	
Plan	OffSet
	A

Plan: 1-9
15 or 254 = Flash
14 or 255 = Free
Offset A, B, or C

Special Function Override (4-2)			
#	Control	#	Control
1	NORMAL	3	NORMAL
2	NORMAL	4	NORMAL

Detector Reset	(4-3)
Local Manual (4-4)	OFF

DETECTORS

Detector Attributes (5-1) * / Slot / Detector Configuration (5-2) *

Det	Type	Phases	Lock	Slot	Det	Delay	Extend	Recall	Port
1	CALL+EXTEND	.2......	NO	I2U	1		1.7	10	1.1
2	CALL+EXTEND	......6..	NO	J2U	2		1.7	10	1.2
3	COUNT+CALL+EXTEND	...4....	NO	I6U	3	1	2.0	10	1.3
4	COUNT+CALL+EXTEND	8	NO	J6U	4			10	1.4
5	COUNT+CALL+EXTEND	.2......	NO	I2L	5		2.0	10	1.5
6	COUNT+CALL+EXTEND	......6..	NO	J2L	6		2.0	10	1.6
7	COUNT+CALL+EXTEND	...4....	NO	I6L	7			10	1.7
8	COUNT+CALL+EXTEND	8	NO	J6L	8			10	1.8
9	CALL+EXTEND	.2......	NO	I4	9			10	2.1
10	CALL+EXTEND	......6..	NO	J4	10			10	2.2
11	CALL+EXTEND	...4....	RED	I8	11			10	2.3
12	LIMITED	8	NO	J8	12			10	2.4
13	COUNT+CALL+EXTEND	.....5....	NO	J1	13			10	3.1
14	COUNT+CALL+EXTEND	1.......	NO	I1	14			10	3.2
15	COUNT+CALL+EXTEND	...4.7..	NO	J5	15			10	3.3
16	COUNT+CALL+EXTEND	..3.4...	NO	I5	16			10	3.4
17	COUNT+CALL+EXTEND	.....5...	NO	J9U	17			10	3.5
18	COUNT+CALL+EXTEND	1.......	NO	I9U	18			10	3.6
19	COUNT+CALL+EXTEND	.......7.	NO	J9L	19			10	3.7
20	COUNT+CALL+EXTEND	...3.....	NO	I9L	20			10	3.8
21	CALL+EXTEND	.2......	NO	I3L	21			10	6.2
22	CALL+EXTEND	......6..	NO	J3L	22			10	6.3
23	CALL+EXTEND	...4....	NO	I7L	23	5		10	6.4
24	CALL+EXTEND	8	NO	J7L	24			10	6.5
25	COUNT+CALL+EXTEND	.2......	NO	I3U	25			10	4.5
26	COUNT+CALL+EXTEND	......6..	NO	J3U	26			10	4.6
27	CALL+EXTEND	...4....	NO	I7U	27	5		10	4.7
28	COUNT+CALL+EXTEND	8	NO	J7U	28			10	4.8
29	PEDESTRIAN	.2......	NO	I 12U	29			10	5.1
30	PEDESTRIAN	......6..	NO	I 13U	30			10	5.2
31	PEDESTRIAN	...4....	NO	I 12L	31			10	5.3
32	PEDESTRIAN	8	NO	I 13L	32			10	5.4

Failure Times(5-3)	Minutes
Maximum On Time	
Fail Reset Time	

Failure Override (5-4)	
Detectors 1-8	....
Detectors 9-16	....
Detectors 17-24	....
Detectors 25-32	....

System Detector Assignment (5-5)

Sys Det	1	2	3	4	5	6	7	8
Det Num								
Sys Det	9	10	11	12	13	14	15	16
Det Num								

CIC Operation (5-6-1)	
Enable in Plans	....

CIC Values (5-6-2)	Volume	Occupancy	Demand
Smoothing	0.66	0.66	0.66
Multiplier	4.0	0.33	
Exponent	0.50	1.00	

Detector-to-Phase Assignment (5-6-3)

Sys Det	1	2	3	4	5	6	7	8
Phase								
Sys Det	9	10	11	12	13	14	15	16
Phase								

Input File Port-Bit Assignments

332 Cabinet - For Reference Only

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
I-	3.2	1.1	4.5	2.1	3.4	1.3	4.7	2.3	3.6		6.6	5.1	5.2	6.7
		1.5	6.2			1.7	6.4		3.8		2.7	5.3	5.4	6.8
J-	3.1	1.2	4.6	2.2	3.3	1.4	4.8	2.4	3.5		2.8	5.5	5.6	2.5
		1.6	6.3			1.8	6.5		3.7		6.1	5.7	5.8	2.6

TOD SCHEDULE

Table 1 (8-2-1)			Table 2 (8-2-2)			Table 3 (8-2-3)			Table 4 (8-2-4)			Table 5 (8-2-5)			Table 6 (8-2-6)		
Time	Plan	OS	Time	Plan	OS	Time	Plan	OS	Time	Plan	OS	Time	Plan	OS	Time	Plan	OS
		A			A			A			A			A			A
		A			A			A			A			A			A
		A			A			A			A			A			A
		A			A			A			A			A			A
		A			A			A			A			A			A
		A			A			A			A			A			A
		A			A			A			A			A			A
		A			A			A			A			A			A
		A			A			A			A			A			A
		A			A			A			A			A			A
		A			A			A			A			A			A
		A			A			A			A			A			A
		A			A			A			A			A			A
		A			A			A			A			A			A
		A			A			A			A			A			A
		A			A			A			A			A			A

WEEKDAY ASSIGNMENT

Weekday Table Assignments (8-2-7)						
Mon	Tue	Wed	Thu	Fri	Sat	Sun
1	1	1	1	1	2	2

HOLIDAY TABLES

Floating Holiday Table (8-2-8)

#	Mnth	Week	DOW	Table
1			....	
2			....	
3			....	
4			....	
5			....	
6			....	
7			....	
8			....	
9			....	
10			....	
11			....	
12			....	
13			....	
14			....	
15			....	
16			....	

Fixed Holiday Table (8-2-9)

#	Mnth	Day	DOW	Table
1			....	
2			....	
3			....	
4			....	
5			....	
6			....	
7			....	
8			....	
9			....	
10			....	
11			....	
12			....	
13			....	
14			....	
15			....	
16			....	

Solar Clock Data (8-4)

North Latitude	34
West Longitude	118
Local Time Zone	8

Sabbatical Clock (8-5)

Hebrew	Ped Recall
Sabbath	....
Holiday	....

Daylight Saving (8-6)

Enabled	YES

TOD FUNCTIONS

TOD Functions (8-3) *

#	Start	End	DOW	Action	Phases
1	1500	1800	M T W T F . .	17	1 . . 4 . . . .
2			....		....
3			....		....
4			....		....
5			....		....
6			....		....
7			....		....
8			....		....
9			....		....
10			....		....
11			....		....
12			....		....
13			....		....
14			....		....
15			....		....
16			....		....

Action Codes:
0. None
1. Permitted
2. Restricted
4. Veh Min Recall
5. Veh Max Recall
6. Ped Recall
7. Bike Recall
8. Red Lock
9. Yellow Lock
10. Force/Max Lock
11.Double Entry
12. Y-Coord C
13. Y-Coord D
14. Free
15. Flashing
16. Walk 2
17. Max Green 2
18. Max Green 3
19. Rest in Walk
20. Rest in Red
21. Free Lag Phases
22. Special Functions
23. Truck Preempt
24. Conditional Service
25. Conditional Service
26. Leading Ped
41. Protected Permissive
42. Protected Permissive

Action Code = Phases added to normal setting
100+Action Code = Phases removed
200+Action Code = Phases replaced

COMMUNICATIONS

C2 (6-1-1)	*
Address	I
Protocol	AB3418
Limit Access	
Baud	1200
Parity	NONE
Data Bits	8
Stop Bits	1
RTS On Time	20
RTS Off Time	20
Handshaking	NORMAL

C20 (6-1-2)	
Address	
Protocol	AB3418
Limit Access	
Baud	1200
Parity	NONE
Data Bits	8
Stop Bits	1
RTS On Time	20
RTS Off Time	20
Handshaking	NORMAL

C21 (6-1-3)	
Address	
Protocol	AB3418
Limit Access	
Baud	1200
Parity	NONE
Data Bits	8
Stop Bits	1
RTS On Time	20
RTS Off Time	20
Handshaking	NORMAL

Limit Access:
0-None
1-Status Only
2-Status, Set Pattern, Time
3-Status, Set Pattern, Time, Manual Plan

SOFT LOGIC

Soft Logic (6-2)

#	Data	OP	Data	OP	Data	OP	Data
1							
2							
3							
4							
5							
6							
7							
8							
9							
10							
11							
12							
13							
14							
15							
16							

*Refer to User's Manual for Data and OP Codes

CALLBACK NUMBERS

Callback Numbers (6-3...3)	
Line Out	
Local Toll	
Long Distance	
Delay	10
Area Code	
Phone Number	

Line Out	
Local Toll	
Long Distance	
Delay	10
Area Code	
Phone Number	

Line Out	
Local Toll	
Long Distance	
Delay	10
Area Code	
Phone Number	

RAILROAD PREEMPTION

RR 1 (3-1-1)	Timing	Phase Flags (3-1-2) Grn Hold	Yel Flash	Red Flash	Pedestrian Flags (3-1-3) Walk	Flash DW	Solid DW	Overlap Flags (3-1-4) Grn Hold	Yel Flash	Red Flash
Delay										
Clear1	10	.2..5...	....	....	....	....	.2.4.6.8	......	......	......
Clear 2		....	....	....	....	....	....	......	......	......
Clear 3		....	....	....	....	....	....	......	......	......
Hold		....	....	12345678	....	....	....	......	......	......
Exit	5				....	....	....	......	......	ABCDEF
Min Grn										
Ped Clr										

Exit Parameters (3-1-5)

Phase Green	Overlap Green	Vehicle Recall	Ped Call
....	......	12345678	.2.4.6.8

Configuration (3-1-6)

Port	Latching	Power-Up
2.5	YES	FLASHING

RR 2 (3-2-1)	Timing	Phase Flags (3-2-2) Grn Hold	Yel Flash	Red Flash	Pedestrian Flags (3-2-3) Walk	Flash DW	Solid DW	Overlap Flags (3-2-4) Grn Hold	Yel Flash	Red Flash
Delay										
Clear1	10	...4..7.	....	....	....	....	.2.4.6.8	......	......	......
Clear 2		....	....	....	....	....	....	......	......	......
Clear 3		....	....	....	....	....	....	......	......	......
Hold		123..6..	....	....	.2...6..	....	...4...8	......	......	......
Exit										
Min Grn										
Ped Clr										

Exit Parameters (3-2-5)

Phase Green	Overlap Green	Vehicle Recall	Ped Recall
....	......	...4..7.	....

Configuration (3-2-6)

Port	Latching	Power-up
2.6	YES	DARK

EMERGENCY VEHICLE PREEMPTION

EVA (3-A)	Preempt Timers Delay	Clear	Max	Phase Green	Overlap Green
*		5	90	.2..5...	......

Port	Latching	Phase Termination
5.5	NO	ADVANCE

EVB (3-B)	Preempt Timers Delay	Clear	Max	Phase Green	Overlap Green
*		5	90	...4..7.	......

Port	Latching	Phase Termination
5.6	NO	ADVANCE

EVC (3-C)	Preempt Timers Delay	Clear	Max	Phase Green	Overlap Green
*		5	90	1....6..	......

Port	Latching	Phase Termination
5.7	NO	ADVANCE

EVD (3-D)	Preempt Timers Delay	Clear	Max	Phase Green	Overlap Green
		30	30	..3....8	......

Port	Latching	Phase Termination
5.8	NO	ADVANCE

INPUTS

7 Wire I/C (2-1-5-1)

		Input	Port	Input	Port
Enable	NO	R1	3.8	Free	3.6
Max ON		R2	3.5	D2	2.8
Max OFF		R3	3.7	D3	6.1

Manual Control (2-1-5-2)

Input	Port
Manual Advance	6.6
Advance Enable	6.6

Cabinet Status (2-1-5-3)

Input	Port
Flash Bus	
Door Ajar	
Flash Sense	6.7
Stop Time	6.8

Special Function (2-1-5-4)

Input	Port
1	
2	
3	
4	

Battery Backup (2-1-5-5) *

Port	Operation
2.7	FLASHING

Y-Coordination (2-1-5-6)

Port C	Port D
6.1	2.8

OUTPUTS

Loadswitch Assignments (2-1-6)

							+
A	1	2	22	3	4	24	9
B	5	6	26	7	8	28	10
X	13	14	0	11	12	0	0

Loadswitch Codes:
- 0 Unused (no output)
- 1-8 Vehicle 1-8
- 9-14 Overlap A-F
- 21-28 Ped 1-8
- 41-47 Special Functions
- 41 Protected Permissive Flashing Phase 1
- 43 Protected Permissive Flashing Phase 3
- 45 Protected Permissive Flashing Phase 5
- 47 Protected Permissive Flashing Phase 7
- 51-57 Special Functions
- 71-72 Seven Wire I/C

+ middle output of loadswitches 3 and 6
Channel 9 and 10

YELLOW YIELD COOORDINATION

Y-Coord Plans (7-C,D)	Long Grn	No Grn	Offset	Perm	Force-Offs -1-	-2-	-3-	-4-	-5-	-6-	-7-	-8-	Coord	Lag	Min Recall	Restricted
Plan C													.2...6..	.2.4.6.8	....	....
Plan D													.2...6..	.2.4.6.8	....	....

TRANSIT PRIORITY

Local Plans (3-E1...9)		Early Green	Green Extend	Inhibit Cycles	Phase 1 Minimum	Phase 2 Minimum	Phase 3 Minimum	Phase 4 Minimum	Phase 5 Minimum	Phase 6 Minimum	Phase 7 Minimum	Phase 8 Minimum
Plan 1	Green Factor											
Plan 2	Green Factor											
Plan 3	Green Factor											
Plan 4	Green Factor											
Plan 5	Green Factor											
Plan 6	Green Factor											
Plan 7	Green Factor											
Plan 8	Green Factor											
Plan 9	Green Factor											

Enable Priority (3-E-A)	
Enable in Plan	....

Free Plans (3-E-E)	
Max Green Hold	Hold Phase
	....

Access Utilities (9-5)	
Password	***
Timeout	

TRUCK PREEMPTION

Truck Preemption (3-F)	Passage	CarryOver	Clearance	Next Preempt	Phase Green	Det 2 Port	Det 3 Port	Det 4 Port	Sign Output	Slave Input	Slave Output

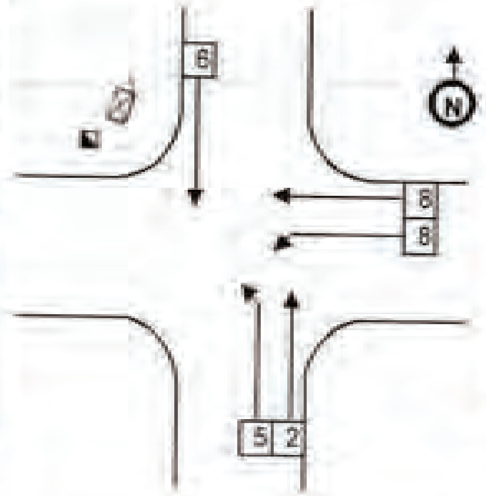
Departme f Transportation, California Caltrans 2070 Controlle ning Chart TSCP 2.16 P. E 1

Location: SJ 120 R3.31 @ Airport Way WB
System: 2070 v2.16
Master At: Hwy 120 EB @ Airport Way
District: 10
I/C:
Designed By: NV
Installed By:
Service Info:

Timing Change: Date Start: Date End: Designed: Installed:

PHASE		FLASH
1)		
2)	NB Airport Way	
3)		
4)		
5)	NB Airport to WB 120	
6)	SB Airport Way	
7)		
8)	WB 120 off ramp	

OVERLAP	FLASH
A)	
B)	
C)	
D)	
E)	
F)	



Intersection Layout

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
I	1	2	2	2	3	4	4	4	1			P2	P6	flh
	1	2	2	2	3	7	4	4	3		BT FL	P4	P8	st
J	5	6	6	6	7	8	8	8	5			[illegible]	[illegible]	rr1
	5	6	6	6	7	8	8	8	7			[illegible]	[illegible]	rr2

Input File

1	2	3	4	5	6
1	2	2P	3	4	4P
5	6	6P	7	8	8P

Output File

Comments and Notes:
Turn on: 5/29/2009

RAM Checksum

Page 2:	7BA4	Page 7:	D2FD
Page 3:	EC6C	Page 8:	A12B
Page 4:	3C9A	Page 9:	8A1D
Page 5:	3855	Page 10:	EF20
Page 6:	85AF	Page 11:	C381

Post Mile: SJ - 120 - R3.31 @ Airport Way WB

Printed: 10/29/2012

CONFIGURATION PHASE FLAGS

Phases (2-1-1-1)	*
Permitted	.2..56.8
Restricted	....

Phase Recalls (2-1-1-2)	
Vehicle Min	.2...6..
Vehicle Max	....
Pedestrian	....
Bicycle	....

Phase Locks (2-1-1-3)	*
Red	....5...
Yellow	....5...
Force/Max	....

Phase Features (2-1-1-4)	*
Double Entry	.2...6..
Rest In Walk	....
Rest In Red	....
Walk 2	....
Max Green 2	....
Max Green 3	....

Startup (2-1-1-5)	*
First Green Phases	8
Yellow Start Phases	.2...6..
Yellow Start Overlaps	......
Startup All-Red	5.0
Vehicle Calls	.2..56.8
Pedestrian Calls	....

Call To Phase (2-1-2-1)		Omit On Green	
1	....	1	....
2	....	2	....
3	....	3	....
4	....	4	....
5	....	5	....
6	....	6	....
7	....	7	....
8	....	8	....

Flashing Colors (2-1-2-2)	
Yellow Flash Phases	....
Yellow Flash Overlap	......
Flash In Red Phases	....
Flash In Red Overlap	......

Special Operation (2-1-2-3)	
Single Exit Phase	....
Driveway Signal Phases	....
Driveway Signal Overlaps	......
Leading Ped Phases	....

Protected Permissive (2-1-2-4)	
Protected Permissive	....

Pedestrian (2-1-3)	
P1	....
P2	.2......
P3	....
P4	...4....
P5	....
P6	.....6..
P7	....
P8	8

Overlap (2-1-4)

Overlap	Parent	Omit	No Start	Not
A	....	....	....	....
B	....	....	....	....
C	....	....	....	....
D	....	....	....	....
E	....	....	....	....
F	....	....	....	....

PHASE TIMING

Phase (2-2)	-1-	-2- *	-3-	-4-	-5- *	-6- *	-7-	-8- *
--- Walk 1 ---	0	10	0	10	0	10	0	10
Flash Don't Walk	0	10	0	10	0	10	0	10
Minimum Green	10	8	10	10	5	8	10	5
Det Limit	10	20	10	10	10	20	10	10
Max Initial	10	20	10	10	0	20	10	0
Max Green 1	50	30	50	50	15	30	50	15
Max Green 2	50	50	50	50	50	50	50	50
Max Green 3	50	50	50	50	50	50	50	50
Extension	5.0	0.2	5.0	5.0	3.0	1.0	5.0	1.0
Maximum Gap	5.0	3.5	5.0	5.0	3.0	3.5	5.0	3.6
Minimum Gap	5.0	0.2	5.0	5.0	3.0	1.0	5.0	1.0
Add Per Vehicle	1.0	0.0	1.0	1.0	0.0	0.0	1.0	0.0
Reduce Gap By	0.0	0.1	0.0	0.0	0.1	0.1	0.0	0.1
Reduce Every	1.0	0.6	1.0	1.0	1.0	0.8	1.0	0.5
Yellow	5.0	4.3	5.0	5.0	3.0	4.3	5.0	3.6
All-Red	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0

Ped/Bike (2-3)	-1-	-2-	-3-	-4-	-5-	-6-	-7-	-8-
--- Walk 2 ---	0	0	0	0	0	0	0	0
Delay/Early Walk	0	0	0	0	0	0	0	0
Solid Don't Walk	0	0	0	0	0	0	0	0
Bike Green	0	0	0	0	0	0	0	0
Bike All-Red	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

OVERLAP TIMING

Overlap (2-4)	A	B	C	D	E	F
Green	0.0	0.0	0.0	0.0	0.0	0.0
Yellow	5.0	5.0	5.0	5.0	5.0	5.0
Red	0.0	0.0	0.0	0.0	0.0	0.0

Red Revert

Red Revert (2-5) *	
Time	2.0
Red To Sec (2-6)	
Red To Sec	OFF

COORDINATION

Local Plan (7-1...9) TIMING DATA [Offsets]

Green Factors or Press [F] to Select Force-Off

		Cycle	Multi	Perm	A	B	C	-1-	-2-	-3-	-4-	-5-	-6-	-7-	-8-
Plan 1	Green Factor														
Plan 2	Green Factor														
Plan 3	Green Factor														
Plan 4	Green Factor														
Plan 5	Green Factor														
Plan 6	Green Factor														
Plan 7	Green Factor														
Plan 8	Green Factor														
Plan 9	Green Factor														

Local Plan (7-1...9) PHASE FLAGS

	Lag	Sync	Hold	Omit	Veh Min	Veh Max	Ped	Bike
Plan 1	....	....	....	....	....	....	....	....
Plan 2	....	....	....	....	....	....	....	....
Plan 3	....	....	....	....	....	....	....	....
Plan 4	....	....	....	....	....	....	....	....
Plan 5	....	....	....	....	....	....	....	....
Plan 6	....	....	....	....	....	....	....	....
Plan 7	....	....	....	....	....	....	....	....
Plan 8	....	....	....	....	....	....	....	....
Plan 9	....	....	....	....	....	....	....	....

Master Timer Sync (7-A)
Enable in Plans
....

Master Sub Master	
Input	
Output	

FREE PLAN PHASE FLAGS

(7-E) Free	
Lag	Omit
.2.4.6.8	....
Veh Min	Veh Max
.2...6..	....
Ped	Bike
....	....
Cond	Cond Grn
....	10

MANUAL COMMANDS

Manual Plan (4-1)	
Plan	OffSet
	A

Plan: 1-9
15 or 254 = Flash
14 or 255 = Free
Offset A, B, or C

Special Function Override (4-2)			
#	Control	#	Control
1	NORMAL	3	NORMAL
2	NORMAL	4	NORMAL

Detector Reset	(4-3)
Local Manual (4-4)	OFF

DETECTORS

Detector Attributes (5-1)			*	Slot	Detector Configuration (5-2)				*
Det	Type	Phases	Lock		Det	Delay	Extend	Recall	Port
1	COUNT+CALL+EXTEND	.2......	NO	I2U	1		2.0	10	1.1
2	COUNT+CALL+EXTEND	.....6..	NO	J2U	2		2.0	10	1.2
3	COUNT+CALL+EXTEND	...4....	NO	I6U	3			10	1.3
4	COUNT+CALL+EXTEND	8	NO	J6U	4	1	2.0	10	1.4
5	CALL+EXTEND	.2......	NO	I2L	5		2.0	10	1.5
6	COUNT+CALL+EXTEND	.....6..	NO	J2L	6		2.0	10	1.6
7	COUNT+CALL+EXTEND	...4....	NO	I6L	7			10	1.7
8	COUNT+CALL+EXTEND	8	NO	J6L	8			10	1.8
9	CALL+EXTEND	.2......	NO	I4	9			10	2.1
10	CALL+EXTEND	.....6..	NO	J4	10			10	2.2
11	LIMITED	...4....	NO	I8	11			10	2.3
12	CALL+EXTEND	8	NO	J8	12	5		10	2.4
13	COUNT+CALL+EXTEND	....5...	NO	J1	13			10	3.1
14	COUNT+CALL+EXTEND	1.......	NO	I1	14			10	3.2
15	COUNT+CALL+EXTEND	......7.	NO	J5	15			10	3.3
16	COUNT+CALL+EXTEND	..3.....	NO	I5	16			10	3.4
17	COUNT+CALL+EXTEND	....5...	NO	J9U	17			10	3.5
18	COUNT+CALL+EXTEND	1.......	NO	I9U	18			10	3.6
19	COUNT+CALL+EXTEND	......7.	NO	J9L	19			10	3.7
20	COUNT+CALL+EXTEND	..3.....	NO	I9L	20			10	3.8
21	CALL+EXTEND	.2......	NO	I3L	21			10	6.2
22	CALL+EXTEND	.....6..	NO	J3L	22			10	6.3
23	CALL+EXTEND	...4....	NO	I7L	23			10	6.4
24	CALL+EXTEND	8	NO	J7L	24			10	6.5
25	COUNT+CALL+EXTEND	.2......	NO	I3U	25			10	4.5
26	CALL+EXTEND	.....6..	NO	J3U	26			10	4.6
27	COUNT+CALL+EXTEND	...4....	NO	I7U	27			10	4.7
28	CALL+EXTEND	8	NO	J7U	28			10	4.8
29	PEDESTRIAN	.2......	NO	I 12U	29			10	5.1
30	PEDESTRIAN	.....6..	NO	I 13U	30			10	5.2
31	PEDESTRIAN	...4....	NO	I 12L	31			10	5.3
32	PEDESTRIAN	8	NO	I 13L	32			10	5.4

Failure Times(5-3)	Minutes
Maximum On Time	
Fail Reset Time	

Failure Override (5-4)	
Detectors 1-8	....
Detectors 9-16	....
Detectors 17-24	....
Detectors 25-32	....

System Detector Assignment (5-5)

Sys Det	1	2	3	4	5	6	7	8
Det Num								
Sys Det	9	10	11	12	13	14	15	16
Det Num								

CIC Operation (5-6-1)	
Enable in Plans	....

CIC Values (5-6-2)	Volume	Occupancy	Demand
Smoothing	0.66	0.66	0.66
Multiplier	4.0	0.33	
Exponent	0.50	1.00	

Detector-to-Phase Assignment (5-6-3)

Sys Det	1	2	3	4	5	6	7	8
Phase								
Sys Det	9	10	11	12	13	14	15	16
Phase								

Input File Port-Bit Assignments

332 Cabinet - For Reference Only

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
I-	3.2	1.1	4.5	2.1	3.4	1.3	4.7	2.3	3.6		6.6	5.1	5.2	6.7
		1.5	6.2			1.7	6.4		3.8		2.7	5.3	5.4	6.8
J-	3.1	1.2	4.6	2.2	3.3	1.4	4.8	2.4	3.5		2.8	5.5	5.6	2.5
		1.6	6.3			1.8	6.5		3.7		6.1	5.7	5.8	2.6

TOD SCHEDULE

Table 1 (8-2-1)

Time	Plan	OS
		A
		A
		A
		A
		A
		A
		A
		A
		A
		A
		A
		A
		A
		A
		A
		A

Table 2 (8-2-2)

Time	Plan	OS
		A
		A
		A
		A
		A
		A
		A
		A
		A
		A
		A
		A
		A
		A
		A
		A

Table 3 (8-2-3)

Time	Plan	OS
		A
		A
		A
		A
		A
		A
		A
		A
		A
		A
		A
		A
		A
		A
		A
		A

Table 4 (8-2-4)

Time	Plan	OS
		A
		A
		A
		A
		A
		A
		A
		A
		A
		A
		A
		A
		A
		A
		A
		A

Table 5 (8-2-5)

Time	Plan	OS
		A
		A
		A
		A
		A
		A
		A
		A
		A
		A
		A
		A
		A
		A
		A
		A

Table 6 (8-2-6)

Time	Plan	OS
		A
		A
		A
		A
		A
		A
		A
		A
		A
		A
		A
		A
		A
		A
		A
		A

WEEKDAY ASSIGNMENT

Weekday Table Assignments (8-2-7)

Mon	Tue	Wed	Thu	Fri	Sat	Sun
1	1	1	1	1	2	2

HOLIDAY TABLES

Floating Holiday Table (8-2-8)

#	Mnth	Week	DOW	Table
1			....	
2			....	
3			....	
4			....	
5			....	
6			....	
7			....	
8			....	
9			....	
10			....	
11			....	
12			....	
13			....	
14			....	
15			....	
16			....	

Fixed Holiday Table (8-2-9)

#	Mnth	Day	DOW	Table
1			....	
2			....	
3			....	
4			....	
5			....	
6			....	
7			....	
8			....	
9			....	
10			....	
11			....	
12			....	
13			....	
14			....	
15			....	
16			....	

Solar Clock Data (8-4)

North Latitude	34
West Longitude	118
Local Time Zone	8

Sabbatical Clock (8-5)

Hebrew	Ped Recall
Sabbath	....
Holiday	....

Daylight Saving (8-6)

Enabled	YES

TOD FUNCTIONS

TOD Functions (8-3)

#	Start	End	DOW	Action	Phases
1			....		....
2			....		....
3			....		....
4			....		....
5			....		....
6			....		....
7			....		....
8			....		....
9			....		....
10			....		....
11			....		....
12			....		....
13			....		....
14			....		....
15			....		....
16			....		....

Action Codes:
0. None
1. Permitted
2. Restricted
4. Veh Min Recall
5. Veh Max Recall
6. Ped Recall
7. Bike Recall
8. Red Lock
9. Yellow Lock
10. Force/Max Lock
11.Double Entry
12. Y-Coord C
13. Y-Coord D
14. Free
15. Flashing
16. Walk 2
17. Max Green 2
18. Max Green 3
19. Rest in Walk
20. Rest in Red
21. Free Lag Phases
22. Special Functions
23. Truck Preempt
24. Conditional Service
25. Conditional Service
26. Leading Ped
41. Protected Permissive
42. Protected Permissive

Action Code = Phases added to normal setting
100+Action Code = Phases removed
200+Action Code = Phases replaced

COMMUNICATIONS

C2 (6-1-1)	*
Address	2
Protocol	AB3418
Limit Access	
Baud	1200
Parity	NONE
Data Bits	8
Stop Bits	1
RTS On Time	20
RTS Off Time	20
Handshaking	NORMAL

C20 (6-1-2)	
Address	
Protocol	AB3418
Limit Access	
Baud	1200
Parity	NONE
Data Bits	8
Stop Bits	1
RTS On Time	20
RTS Off Time	20
Handshaking	NORMAL

C21 (6-1-3)	
Address	
Protocol	AB3418
Limit Access	
Baud	1200
Parity	NONE
Data Bits	8
Stop Bits	1
RTS On Time	20
RTS Off Time	20
Handshaking	NORMAL

Limit Access:
0-None
1-Status Only
2-Status, Set Pattern, Time
3-Status, Set Pattern, Time, Manual Plan

SOFT LOGIC

Soft Logic (6-2)

#	Data	OP	Data	OP	Data	OP	Data
1							
2							
3							
4							
5							
6							
7							
8							
9							
10							
11							
12							
13							
14							
15							
16							

*Refer to User's Manual for Data and OP Codes

CALLBACK NUMBERS

Callback Numbers (6-3...3)

Line Out	
Local Toll	
Long Distance	
Delay	10
Area Code	
Phone Number	

Line Out	
Local Toll	
Long Distance	
Delay	10
Area Code	
Phone Number	

Line Out	
Local Toll	
Long Distance	
Delay	10
Area Code	
Phone Number	

RAILROAD PREEMPTION

RR 1

(3-1-1)	Timing	Phase Flags (3-1-2)			Pedestrian Flags (3-1-3)			Overlap Flags (3-1-4)		
		Grn Hold	Yel Flash	Red Flash	Walk	Flash DW	Solid DW	Grn Hold	Yel Flash	Red Flash
Delay										
Clear1	10	.2..5...	....	....	....	....	.2.4.6.8	......	......	......
Clear 2		....	....	....	....	....	....	......	......	......
Clear 3		....	....	....	....	....	....	......	......	......
Hold		....	....	12345678	....	....	....	......	......	ABCDEF
Exit	5									
Min Grn										
Ped Clr										

Exit Parameters (3-1-5)

Phase Green	Overlap Green	Vehicle Recall	Ped Call
....	......	12345678	.2.4.6.8

Configuration (3-1-6)

Port	Latching	Power-Up
2.5	YES	FLASHING

RR 2

(3-2-1)	Timing	Phase Flags (3-2-2)			Pedestrian Flags (3-2-3)			Overlap Flags (3-2-4)		
		Grn Hold	Yel Flash	Red Flash	Walk	Flash DW	Solid DW	Grn Hold	Yel Flash	Red Flash
Delay										
Clear1	10	...4..7.	....	....	....	....	.2.4.6.8	......	......	......
Clear 2		....	....	....	....	....	....	......	......	......
Clear 3		....	....	....	....	....	....	......	......	......
Hold		123..6..	....	....	.2...6..	....	...4...8	......	......	......
Exit										
Min Grn										
Ped Clr										

Exit Parameters (3-2-5)

Phase Green	Overlap Green	Vehicle Recall	Ped Recall
....	......	...4..7.	....

Configuration (3-2-6)

Port	Latching	Power-up
2.6	YES	DARK

EMERGENCY VEHICLE PREEMPTION

EVA (3-A)	Preempt Timers			Phase Green	Overlap Green
	Delay	Clear	Max		
*		5	90	.2..5...	......

Port	Latching	Phase Termination
5.5	NO	ADVANCE

EVB (3-B)	Preempt Timers			Phase Green	Overlap Green
	Delay	Clear	Max		
		30	30	...4..7.	......

Port	Latching	Phase Termination
5.6	NO	ADVANCE

EVC (3-C)	Preempt Timers			Phase Green	Overlap Green
	Delay	Clear	Max		
*		5	90	1....6..	......

Port	Latching	Phase Termination
5.7	NO	ADVANCE

EVD (3-D)	Preempt Timers			Phase Green	Overlap Green
	Delay	Clear	Max		
*		5	90	..3....8	......

Port	Latching	Phase Termination
5.8	NO	ADVANCE

INPUTS

		7 Wire I/C (2-1-5-1)			
		Input	Port	Input	Port
Enable	NO	R1	3.8	Free	3.6
Max ON		R2	3.5	D2	2.8
Max OFF		R3	3.7	D3	6.1

Manual Control (2-1-5-2)	
Input	Port
Manual Advance	6.6
Advance Enable	6.6

Cabinet Status (2-1-5-3)	
Input	Port
Flash Bus	
Door Ajar	
Flash Sense	6.7
Stop Time	6.8

Special Function (2-1-5-4)	
Input	Port
1	
2	
3	
4	

Battery Backup (2-1-5-5)	*
Port	Operation
2.7	FLASHING

Y-Coordination (2-1-5-6)	
Port C	Port D
6.1	2.8

OUTPUTS

Loadswitch Assignments (2-1-6)							+
A	1	2	22	3	4	24	9
B	5	6	26	7	8	28	10
X	13	14	0	11	12	0	0

Loadswitch Codes:
- 0 Unused (no output)
- 1-8 Vehicle 1-8
- 9-14 Overlap A-F
- 21-28 Ped 1-8
- 41-47 Special Functions
- 41 Protected Permissive Flashing Phase 1
- 43 Protected Permissive Flashing Phase 3
- 45 Protected Permissive Flashing Phase 5
- 47 Protected Permissive Flashing Phase 7
- 51-57 Special Functions
- 71-72 Seven Wire I/C

+ middle output of loadswitches 3 and 6 Channel 9 and 10

YELLOW YIELD COOORDINATION

Y-Coord Plans (7-C,D)	Long Grn	No Grn	Offset	Perm	Force-Offs -1-	-2-	-3-	-4-	-5-	-6-	-7-	-8-	Coord	Lag	Min Recall	Restricted
Plan C													.2...6..	.2.4.6.8	....	....
Plan D													.2...6..	.2.4.6.8	....	....

TRANSIT PRIORITY

Local Plans (3-E1...9)		Early Green	Green Extend	Inhibit Cycles	Phase 1 Minimum	Phase 2 Minimum	Phase 3 Minimum	Phase 4 Minimum	Phase 5 Minimum	Phase 6 Minimum	Phase 7 Minimum	Phase 8 Minimum
Plan 1	Green Factor											
Plan 2	Green Factor											
Plan 3	Green Factor											
Plan 4	Green Factor											
Plan 5	Green Factor											
Plan 6	Green Factor											
Plan 7	Green Factor											
Plan 8	Green Factor											
Plan 9	Green Factor											

Enable Priority (3-E-A)	
Enable in Plan	....

Free Plans (3-E-E)	
Max Green Hold	Hold Phase
	....

Access Utilities (9-5)	
Password	***
Timeout	

TRUCK PREEMPTION

Truck Preemption (3-F)	Passage	CarryOver	Clearance	Next Preempt	Phase Green	Det 2 Port	Det 3 Port	Det 4 Port	Sign Output	Slave Input	Slave Output

INPUT FILE - 332 CABINET

11/4/2011

1	2	3	4	5	6	7	8	9	10	11	12	13	14
1I1U EX,CT TB2 1,2 F-C1/56 D E	2I2U EX,CT ADV TB2 5,6 F-C1/39 D E	2I3U EX,CT TB2 9,10 F-C1/63 D E	2I4U CL,T3 STPBR TB4 1,2 F-C1/47 D E	3I5U EX,CT TB4 5,6 F-C1/58 D E	4I6U EX,CT TB4 9,10 F-C1/41 D E	4I7U EX,CT TB6 1,2 F-C1/65 D E	4I8U CL,T3 TB6 5,6 F-C1/49 D E	1I9U EX,CT TB6 9,10 F-C1/60 D E	F D E	MANUAL TB8 1,3 F-C1/80 D E	2-PPB TB8 4,6 F-C1-67 D E	6-PPB TB8 7,9 F-C1/68 D E	FLASH SENSE TB8 10,12 F-C1/81 D E
1I1L EX,CT TB2 3,4 W-C1/56 J K	2I2L EX,CT INT TB2 7,8 W-C1/43 J K	2I3L EX TB2 11,12 W-C1/76 J K	2I4L CL,T3 LP 2-4 TB4 3,4 W-C1/47 J K	3I5L EX,CT TB4 7,8 W-C1/58 J K	4I6L EX,CT TB4 11,12 W-C1/45 J K	4I7L EX TB6 3,4 W-C1/78 J K	4I8L CL,T3 TB6 7,8 W-C1/49 J K	3I9L EX,CT TB6 11,12 W-C1/62 J K	W J K	BATT BAK 1 TB8 2,3 W-C1/53 J K	4-PPB TB8 5,6 W-C1/69 J K	8-PPB TB8 8,9 W-C1/70 J K	STOP TIME TB8 11,12 W-C1/82 J K
5J1U EX,CT STPBR TB3 1,2 F-C1/55 D E	6J2U EX,CT LN 1 ADV TB3 5,6 F-C1/40 D E	6J3U EX,CT STPBR 2 TB3 9,10 F-C1/64 D E	6J4U CL,T3 STPBR 1 TB5 1,2 F-C1/48 D E	7J5U EX,CT TB5 5,6 F-C1/57 D E	8J6U EX,CT ADV TB5 9,10 F-C1/42 D E	8J7U EX,CT STPBR TB7 1,2 F-C1/66 D E	8J8U CL,T3 RT STPBR TB7 5,6 F-C1/50 D E	5J9U EX,CT LP 2-4 TB7 9,10 F-C1/59 D E	F D E	SPARE 2 TB9 1,3 F-C1/54 D E	EVA PREMT ϕ2 & ϕ5 TB9 4,2,6 D-Yellow E-Orange K-Blu+Shl	EVB PREMT ϕ4 & ϕ7 TB9 7,3,9 D-Yellow E-Orange K-Blu+Shl	RR1 PREMT ϕ2 & ϕ5 TB9 10,12 F-C1/51 D E
5J1L EX,CT TB3 3,4 W-C1/55 J K	6J2L EX,CT LN 2 ADV TB3 7,8 W-C1/44 J K	6J3L EX LN 2 LP 2-4 TB3 11,12 W-C1/77 J K	6J4L CL,T3 LN 1 LP 2-4 TB5 3,4 W-C1/48 J K	7J5L EX,CT TB5 7,8 W-C1/57 J K	8J6L EX,CT TB5 11,12 W-C1/46 J K	8J7L EX Lp 2,3,4 TB7 3,4 W-C1/79 J K	8J8L CL,T3 LP 2-4 TB7 7,8 W-C1/50 J K	7J9L EX,CT TB7 11,12 W-C1/61 J K	W J K	SPARE 3 TB9 2,3 W-C1/75 J K	EVC PREMT ϕ6 & ϕ1 TB9 5,2,6 J-Yellow E-Orange K-Blu+Shl	EVD PREMT ϕ8 & ϕ3 TB9 8,3,9 J-Yellow E-Orange K-Blu+Shl	RR2 PREMT ϕ4 & ϕ7 TB9 11,12 W-C1/52 J K

OUTPUT FILE

ϕ 1 R-125 C1/16 Y-126 C1/17 G-127 C1/18	ϕ 2 R-128 C1/12 Y-129 C1/13 G-130 C1/15	ϕ 2P R-113 C1/10 Y-114 C1/35 G-115 C1/11	ϕ 3 R-116 C1/7 Y-117 C1/8 G-118 C1/9	ϕ 4 R-101 C1/4 Y-102 C1/5 G-103 C1/6	ϕ 4P R-104 C1/2 Y-105 C1/37 G-106 C1/3
ϕ 5 R-131 C1/32 Y-132 C1/33 G-133 C1/34	ϕ 6 R-134 C1/29 Y-135 C1/30 G-136 C1/31	ϕ 6P R-119 C1/27 Y-120 C1/36 G-121 C1/28	ϕ 7 R-122 C1/24 Y-123 C1/25 G-124 C1/26	ϕ 8 R-107 C1/21 Y-108 C1/22 G-109 C1/23	ϕ 8P R-110 C1/19 Y-111 C1/38 G-112 C1/20

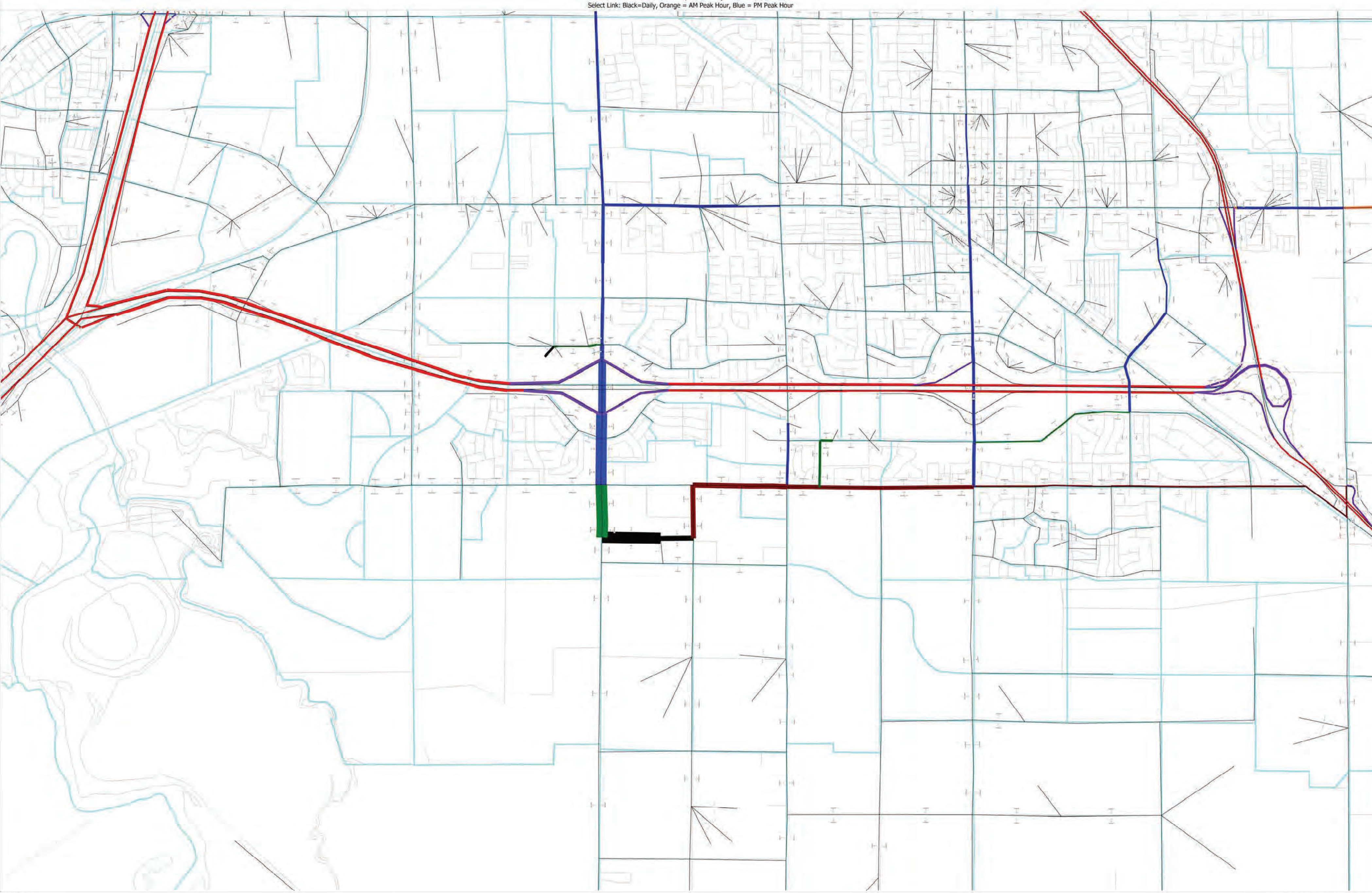
AUXILIARY

A1 (OVL-C) R-A121 C1/97 C5/14 Y-A122 C1/98 C5/15 G-A123 C1/99 C5/16	A2 (OVL-D) R-A124 C1/94 C5/11 Y-A125 C1/95 C5/12 G-A126 C1/96 C5/13	A3 R-A111 C1/91 C5/9 OS1 Y-A112 C1/101 C5/18 D-2 G-A113 C1/93 C5/10 D-3
A4 (OVL-A) R-A114 C1/88 C5/6 Y-A115 C1/89 C5/7 G-A116 C1/90 C5/8	A5 (OVL-B) R-A101 C1/85 C5/3 Y-A102 C1/86 C5/4 G-A103 C1/87 C5/5	A6 R-A104 C1/84 C5/2 OS-2 Y-A105 C1/100 C5/17 Flash G-A106 C1/83 C5/1 OS-3

SJ	120	R 3.31	AIRPORT WAY WB On-Off		MANTECA
County	Route	PM	Location	File	City

MODEL PLOTS

MANTECA TRAVEL MODEL
2019 with Kiper DutraProject
Select Link: Black=Daily, Orange = AM Peak Hour, Blue = PM Peak Hour



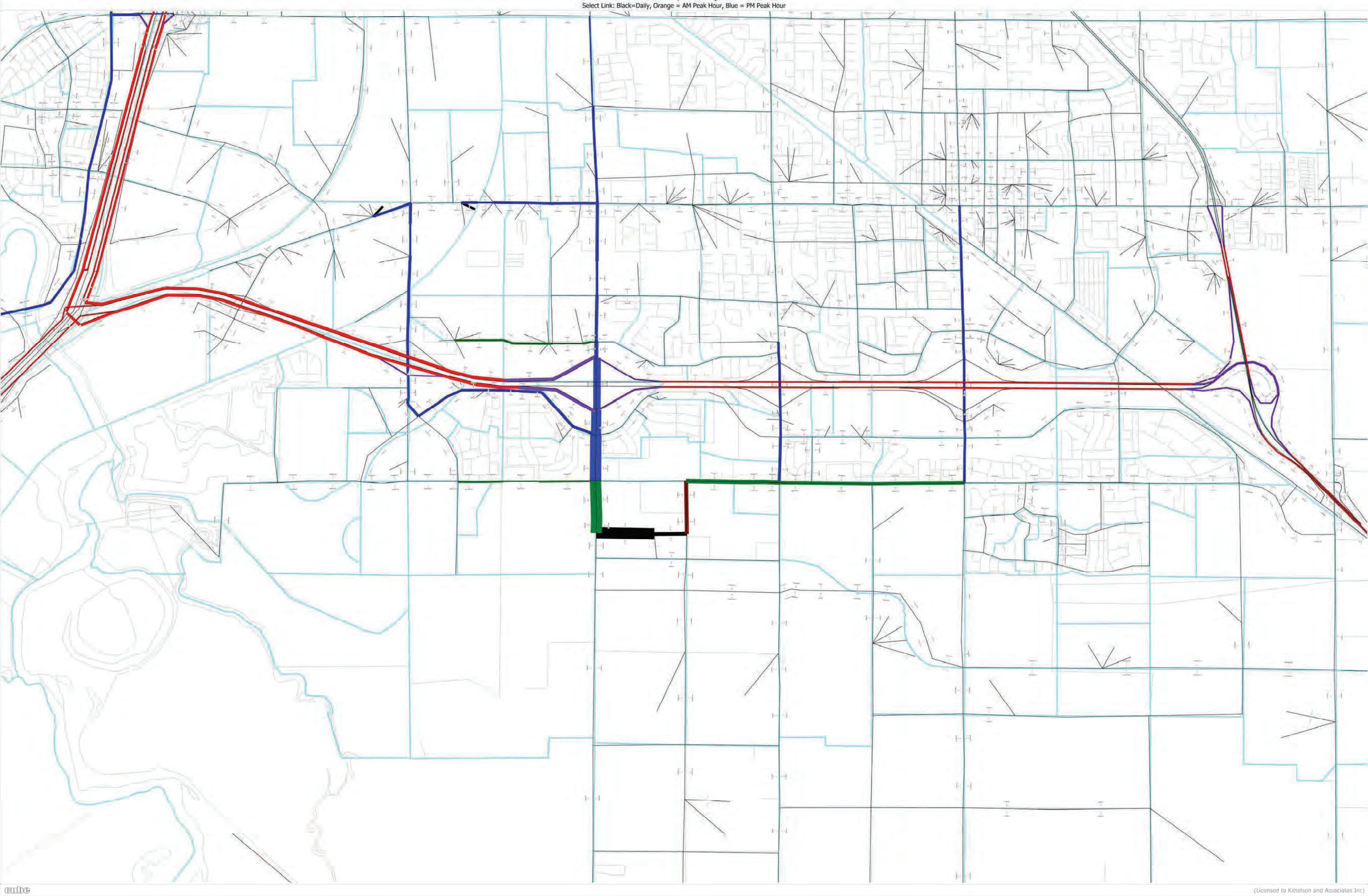
cube

(Licensed to Kittelson and Associates Inc)

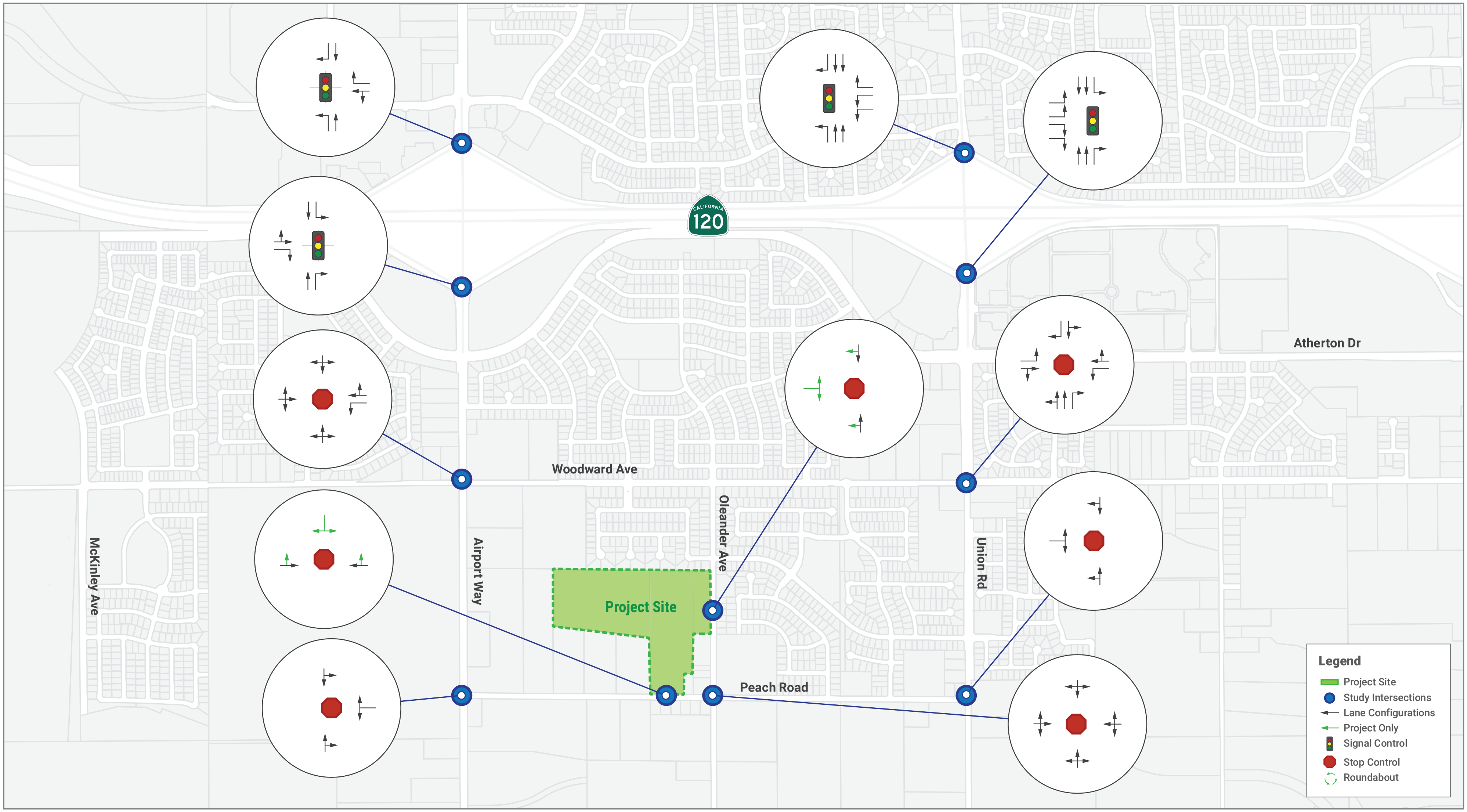
MANTECA TRAVEL MODEL

2040 with Kiper Dutra Project

Select Link: Black=Daily, Orange = AM Peak Hour, Blue = PM Peak Hour



EXISTING LANE CONFIGURATIONS



KITTELSON & ASSOCIATES

Manteca, CA. Dutra Property | Traffic Impact Analysis

Existing Lane Configurations

EXISTING CONDITIONS ANALYSIS

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	85	3	353	183	664	0	0	378	328
Future Volume (veh/h)	0	0	0	85	3	353	183	664	0	0	378	328
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)				1.00		0.98	1.00		1.00	1.00		0.97
Parking Bus, Adj				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach					No			No			No	
Adj Sat Flow, veh/h/ln				1796	1796	1796	1811	1811	0	0	1796	1796
Adj Flow Rate, veh/h				93	3	388	201	730	0	0	415	360
Peak Hour Factor				0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Percent Heavy Veh, %				7	7	7	6	6	0	0	7	7
Cap, veh/h				480	15	432	256	935	0	0	519	428
Arrive On Green				0.29	0.29	0.29	0.15	0.52	0.00	0.00	0.29	0.29
Sat Flow, veh/h				1660	54	1494	1725	1811	0	0	1796	1481
Grp Volume(v), veh/h				96	0	388	201	730	0	0	415	360
Grp Sat Flow(s),veh/h/ln				1713	0	1494	1725	1811	0	0	1796	1481
Q Serve(g_s), s				2.1	0.0	12.7	5.7	16.6	0.0	0.0	10.9	11.6
Cycle Q Clear(g_c), s				2.1	0.0	12.7	5.7	16.6	0.0	0.0	10.9	11.6
Prop In Lane				0.97		1.00	1.00		0.00	0.00		1.00
Lane Grp Cap(c), veh/h				495	0	432	256	935	0	0	519	428
V/C Ratio(X)				0.19	0.00	0.90	0.78	0.78	0.00	0.00	0.80	0.84
Avail Cap(c_a), veh/h				506	0	441	509	1069	0	0	1061	874
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	1.00	1.00	1.00	0.00	0.00	1.00	1.00
Uniform Delay (d), s/veh				13.6	0.0	17.3	20.8	10.0	0.0	0.0	16.7	17.0
Incr Delay (d2), s/veh				0.1	0.0	20.0	5.2	2.8	0.0	0.0	1.1	1.7
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				0.7	0.0	6.1	2.4	5.5	0.0	0.0	4.0	3.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh				13.7	0.0	37.3	26.1	12.7	0.0	0.0	17.8	18.7
LnGrp LOS				B	A	D	C	B	A	A	B	B
Approach Vol, veh/h					484			931			775	
Approach Delay, s/veh					32.6			15.6			18.2	
Approach LOS					C			B			B	
Timer - Assigned Phs		2			5	6		8				
Phs Duration (G+Y+Rc), s		31.5			11.6	20.0		19.3				
Change Period (Y+Rc), s		5.3			4.0	5.3		4.6				
Max Green Setting (Gmax), s		30.0			15.0	30.0		15.0				
Max Q Clear Time (g_c+I1), s		18.6			7.7	13.6		14.7				
Green Ext Time (p_c), s		0.8			0.3	1.1		0.0				
Intersection Summary												
HCM 6th Ctrl Delay			20.3									
HCM 6th LOS			C									

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	270	3	117	0	0	0	0	577	132	131	332	0
Future Volume (veh/h)	270	3	117	0	0	0	0	577	132	131	332	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	1781	1781	1781				0	1811	1811	1781	1781	0
Adj Flow Rate, veh/h	290	3	126				0	620	142	141	357	0
Peak Hour Factor	0.93	0.93	0.93				0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	8	8	8				0	6	6	8	8	0
Cap, veh/h	365	4	327				0	687	580	182	1018	0
Arrive On Green	0.22	0.22	0.22				0.00	0.38	0.38	0.11	0.57	0.00
Sat Flow, veh/h	1680	17	1506				0	1811	1529	1697	1781	0
Grp Volume(v), veh/h	293	0	126				0	620	142	141	357	0
Grp Sat Flow(s),veh/h/ln	1697	0	1506				0	1811	1529	1697	1781	0
Q Serve(g_s), s	7.7	0.0	3.4				0.0	15.2	3.0	3.8	5.0	0.0
Cycle Q Clear(g_c), s	7.7	0.0	3.4				0.0	15.2	3.0	3.8	5.0	0.0
Prop In Lane	0.99		1.00				0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	369	0	327				0	687	580	182	1018	0
V/C Ratio(X)	0.79	0.00	0.39				0.00	0.90	0.24	0.78	0.35	0.00
Avail Cap(c_a), veh/h	724	0	642				0	1158	978	1085	1139	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	1.00				0.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	17.4	0.0	15.7				0.0	13.7	10.0	20.4	5.4	0.0
Incr Delay (d2), s/veh	1.5	0.0	0.3				0.0	3.3	0.1	2.7	0.1	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.7	0.0	1.0				0.0	5.5	0.8	1.5	1.2	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	18.9	0.0	16.0				0.0	17.0	10.0	23.1	5.5	0.0
LnGrp LOS	B	A	B				A	B	B	C	A	A
Approach Vol, veh/h		419						762			498	
Approach Delay, s/veh		18.0						15.7			10.4	
Approach LOS		B						B			B	

Timer - Assigned Phs	1	2		4		6
Phs Duration (G+Y+Rc), s	9.0	23.1		14.8		32.1
Change Period (Y+Rc), s	4.0	5.3		4.6		5.3
Max Green Setting (Gmax), s	30.0	30.0		20.0		30.0
Max Q Clear Time (g_c+I1), s	5.8	17.2		9.7		7.0
Green Ext Time (p_c), s	0.2	0.6		0.6		0.4

Intersection Summary	
HCM 6th Ctrl Delay	14.7
HCM 6th LOS	B

Intersection	
Intersection Delay, s/veh	26.7
Intersection LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	98	83	100	5	80	103	66	126	7	48	128	96
Future Vol, veh/h	98	83	100	5	80	103	66	126	7	48	128	96
Peak Hour Factor	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.70
Heavy Vehicles, %	4	4	4	5	5	5	4	4	4	12	12	12
Mvmt Flow	136	115	139	7	111	143	92	175	10	67	178	137
Number of Lanes	0	1	0	1	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	2	1
HCM Control Delay	32	19.2	21.2	30.5
HCM LOS	D	C	C	D

Lane	NBLn1	EBLn1	WBLn1	WBLn2	SBLn1
Vol Left, %	33%	35%	100%	0%	18%
Vol Thru, %	63%	30%	0%	44%	47%
Vol Right, %	4%	36%	0%	56%	35%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	199	281	5	183	272
LT Vol	66	98	5	0	48
Through Vol	126	83	0	80	128
RT Vol	7	100	0	103	96
Lane Flow Rate	276	390	7	254	382
Geometry Grp	2	5	7	7	2
Degree of Util (X)	0.587	0.784	0.017	0.544	0.767
Departure Headway (Hd)	7.647	7.228	8.633	7.71	7.237
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	470	500	413	465	496
Service Time	5.74	5.309	6.422	5.498	5.319
HCM Lane V/C Ratio	0.587	0.78	0.017	0.546	0.77
HCM Control Delay	21.2	32	11.6	19.4	30.5
HCM Lane LOS	C	D	B	C	D
HCM 95th-tile Q	3.7	7.1	0.1	3.2	6.7

Intersection	
Int Delay, s/veh	0.6

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	4	14	190	0	8	220
Future Vol, veh/h	4	14	190	0	8	220
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	59	59	59	59	59	59
Heavy Vehicles, %	2	2	5	5	4	4
Mvmt Flow	7	24	322	0	14	373

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	723	322	0	0	322	0
Stage 1	322	-	-	-	-	-
Stage 2	401	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.14	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.236	-
Pot Cap-1 Maneuver	393	719	-	-	1227	-
Stage 1	735	-	-	-	-	-
Stage 2	676	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	387	719	-	-	1227	-
Mov Cap-2 Maneuver	387	-	-	-	-	-
Stage 1	735	-	-	-	-	-
Stage 2	667	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	11.3	0	0.3
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	604	1227	-
HCM Lane V/C Ratio	-	-	0.051	0.011	-
HCM Control Delay (s)	-	-	11.3	8	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	0.2	0	-

Movement	NBT	NBR	SBL	SBT	SWL	SWR
Lane Configurations						
Traffic Volume (vph)	629	0	0	0	0	277
Future Volume (vph)	629	0	0	0	0	277
Ideal Flow (vphpl)	1950	1950	1950	1950	1950	1950
Total Lost time (s)	8.2					8.2
Lane Util. Factor	0.95					1.00
Frt	1.00					0.86
Flt Protected	1.00					1.00
Satd. Flow (prot)	3632					1654
Flt Permitted	1.00					1.00
Satd. Flow (perm)	3632					1654
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	629	0	0	0	0	277
RTOR Reduction (vph)	0	0	0	0	0	35
Lane Group Flow (vph)	629	0	0	0	0	242
Turn Type	NA					Prot
Protected Phases	2					1
Permitted Phases						
Actuated Green, G (s)	24.2					29.4
Effective Green, g (s)	24.2					29.4
Actuated g/C Ratio	0.35					0.42
Clearance Time (s)	8.2					8.2
Vehicle Extension (s)	2.0					2.0
Lane Grp Cap (vph)	1255					694
v/s Ratio Prot	c0.17					c0.15
v/s Ratio Perm						
v/c Ratio	0.50					0.35
Uniform Delay, d1	18.1					13.8
Progression Factor	0.20					1.00
Incremental Delay, d2	0.1					1.4
Delay (s)	3.8					15.2
Level of Service	A					B
Approach Delay (s)	3.8			0.0	15.2	
Approach LOS	A			A	B	

Intersection Summary			
HCM 2000 Control Delay	7.2	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.42		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	16.4
Intersection Capacity Utilization	47.3%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	NBL	NBT	NBR	SBL	SBT	SBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (vph)	0	0	0	0	450	0	0	629	0	0	0	0
Future Volume (vph)	0	0	0	0	450	0	0	629	0	0	0	0
Ideal Flow (vphpl)	1950	1950	1950	1950	1950	1950	1950	1950	1950	1950	1950	1950
Total Lost time (s)					8.2			8.2				
Lane Util. Factor					0.95			0.95				
Frt					1.00			1.00				
Flt Protected					1.00			1.00				
Satd. Flow (prot)					3632			3632				
Flt Permitted					1.00			1.00				
Satd. Flow (perm)					3632			3632				
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	0.75	1.00	0.75	0.75	0.75	1.00	1.00	1.00
Adj. Flow (vph)	0	0	0	0	600	0	0	839	0	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	600	0	0	839	0	0	0	0
Turn Type					NA			NA				
Protected Phases					1			2				
Permitted Phases												
Actuated Green, G (s)					29.4			24.2				
Effective Green, g (s)					29.4			24.2				
Actuated g/C Ratio					0.42			0.35				
Clearance Time (s)					8.2			8.2				
Vehicle Extension (s)					2.0			2.0				
Lane Grp Cap (vph)					1525			1255				
v/s Ratio Prot					c0.17			c0.23				
v/s Ratio Perm												
v/c Ratio					0.39			0.67				
Uniform Delay, d1					14.1			19.5				
Progression Factor					1.00			0.64				
Incremental Delay, d2					0.8			1.0				
Delay (s)					14.9			13.5				
Level of Service					B			B				
Approach Delay (s)		0.0			14.9			13.5			0.0	
Approach LOS		A			B			B			A	

Intersection Summary			
HCM 2000 Control Delay	14.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.52		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	16.4
Intersection Capacity Utilization	47.3%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	NBT	NBR	SBL	SBT	SWL	SWR
Lane Configurations						
Traffic Volume (vph)	0	0	0	450	64	0
Future Volume (vph)	0	0	0	450	64	0
Ideal Flow (vphpl)	1950	1950	1950	1950	1950	1950
Total Lost time (s)				8.2	8.2	
Lane Util. Factor				0.95	0.97	
Frt				1.00	1.00	
Flt Protected				1.00	0.95	
Satd. Flow (prot)				3632	3523	
Flt Permitted				1.00	0.95	
Satd. Flow (perm)				3632	3523	
Peak-hour factor, PHF	1.00	1.00	1.00	0.75	0.75	1.00
Adj. Flow (vph)	0	0	0	600	85	0
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	600	85	0
Turn Type				NA	Prot	
Protected Phases				1	2	
Permitted Phases						
Actuated Green, G (s)				29.4	24.2	
Effective Green, g (s)				29.4	24.2	
Actuated g/C Ratio				0.42	0.35	
Clearance Time (s)				8.2	8.2	
Vehicle Extension (s)				2.0	2.0	
Lane Grp Cap (vph)				1525	1217	
v/s Ratio Prot				c0.17	c0.02	
v/s Ratio Perm						
v/c Ratio				0.39	0.07	
Uniform Delay, d1				14.1	15.4	
Progression Factor				0.17	1.00	
Incremental Delay, d2				0.7	0.0	
Delay (s)				3.2	15.4	
Level of Service				A	B	
Approach Delay (s)	0.0			3.2	15.4	
Approach LOS	A			A	B	

Intersection Summary			
HCM 2000 Control Delay	4.7	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.25		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	16.4
Intersection Capacity Utilization	32.5%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	NBL	NBT	SBT	SBR	NEL	NER
Lane Configurations						
Traffic Volume (vph)	0	618	0	0	185	0
Future Volume (vph)	0	618	0	0	185	0
Ideal Flow (vphpl)	1950	1950	1950	1950	1950	1950
Total Lost time (s)		9.2			9.2	
Lane Util. Factor		0.95			0.97	
Frt		1.00			1.00	
Flt Protected		1.00			0.95	
Satd. Flow (prot)		3632			3523	
Flt Permitted		1.00			0.95	
Satd. Flow (perm)		3632			3523	
Peak-hour factor, PHF	0.75	0.75	0.75	0.75	0.75	0.75
Adj. Flow (vph)	0	824	0	0	247	0
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	0	824	0	0	247	0
Turn Type		NA			Prot	
Protected Phases		2			1	
Permitted Phases						
Actuated Green, G (s)		28.3			23.3	
Effective Green, g (s)		28.3			23.3	
Actuated g/C Ratio		0.40			0.33	
Clearance Time (s)		9.2			9.2	
Vehicle Extension (s)		2.0			2.0	
Lane Grp Cap (vph)		1468			1172	
v/s Ratio Prot		c0.23			c0.07	
v/s Ratio Perm						
v/c Ratio		0.56			0.21	
Uniform Delay, d1		16.1			16.8	
Progression Factor		0.23			1.00	
Incremental Delay, d2		0.3			0.4	
Delay (s)		3.9			17.2	
Level of Service		A			B	
Approach Delay (s)		3.9	0.0		17.2	
Approach LOS		A	A		B	

Intersection Summary			
HCM 2000 Control Delay	6.9	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.40		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	18.4
Intersection Capacity Utilization	38.6%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	NBL	NBT	NBR	SBL	SBT	SBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations		↑↑									↑↑	
Traffic Volume (vph)	0	618	0	0	0	0	0	0	0	0	336	0
Future Volume (vph)	0	618	0	0	0	0	0	0	0	0	336	0
Ideal Flow (vphpl)	1950	1950	1950	1950	1950	1950	1950	1950	1950	1950	1950	1950
Total Lost time (s)		9.2									9.2	
Lane Util. Factor		0.95									0.95	
Frt		1.00									1.00	
Flt Protected		1.00									1.00	
Satd. Flow (prot)		3632									3632	
Flt Permitted		1.00									1.00	
Satd. Flow (perm)		3632									3632	
Peak-hour factor, PHF	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75
Adj. Flow (vph)	0	824	0	0	0	0	0	0	0	0	448	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	824	0	0	0	0	0	0	0	0	448	0
Turn Type		NA									NA	
Protected Phases		2									1	
Permitted Phases												
Actuated Green, G (s)		28.3									23.3	
Effective Green, g (s)		28.3									23.3	
Actuated g/C Ratio		0.40									0.33	
Clearance Time (s)		9.2									9.2	
Vehicle Extension (s)		2.0									2.0	
Lane Grp Cap (vph)		1468									1208	
v/s Ratio Prot		c0.23									c0.12	
v/s Ratio Perm												
v/c Ratio		0.56									0.37	
Uniform Delay, d1		16.1									17.8	
Progression Factor		1.00									1.34	
Incremental Delay, d2		0.3									0.8	
Delay (s)		16.4									24.6	
Level of Service		B									C	
Approach Delay (s)		16.4			0.0			0.0			24.6	
Approach LOS		B			A			A			C	

Intersection Summary			
HCM 2000 Control Delay	19.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.48		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	18.4
Intersection Capacity Utilization	41.0%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	NBT	NBR	SBL	SBT	SWL	SWR
Lane Configurations						
Traffic Volume (vph)	0	0	0	231	336	0
Future Volume (vph)	0	0	0	231	336	0
Ideal Flow (vphpl)	1950	1950	1950	1950	1950	1950
Total Lost time (s)				9.2	9.2	
Lane Util. Factor				0.95	0.97	
Frt				1.00	1.00	
Flt Protected				1.00	0.95	
Satd. Flow (prot)				3632	3523	
Flt Permitted				1.00	0.95	
Satd. Flow (perm)				3632	3523	
Peak-hour factor, PHF	0.75	0.75	0.75	0.75	0.75	0.75
Adj. Flow (vph)	0	0	0	308	448	0
RTOR Reduction (vph)	0	0	0	0	299	0
Lane Group Flow (vph)	0	0	0	308	149	0
Turn Type				NA	Prot	
Protected Phases				2	1	
Permitted Phases						
Actuated Green, G (s)				28.3	23.3	
Effective Green, g (s)				28.3	23.3	
Actuated g/C Ratio				0.40	0.33	
Clearance Time (s)				9.2	9.2	
Vehicle Extension (s)				2.0	2.0	
Lane Grp Cap (vph)				1468	1172	
v/s Ratio Prot				c0.08	c0.04	
v/s Ratio Perm						
v/c Ratio				0.21	0.13	
Uniform Delay, d1				13.6	16.3	
Progression Factor				1.00	1.00	
Incremental Delay, d2				0.0	0.2	
Delay (s)				13.6	16.5	
Level of Service				B	B	
Approach Delay (s)	0.0			13.6	16.5	
Approach LOS	A			B	B	

Intersection Summary			
HCM 2000 Control Delay	15.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.17		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	18.4
Intersection Capacity Utilization	41.0%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Intersection	
Intersection Delay, s/veh	75.3
Intersection LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	86	157	12	50	133	168	7	188	59	121	131	50
Future Vol, veh/h	86	157	12	50	133	168	7	188	59	121	131	50
Peak Hour Factor	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	132	242	18	77	205	258	11	289	91	186	202	77
Number of Lanes	1	1	0	1	1	0	0	2	1	0	1	1

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	2	2	3
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	3	2	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	3	2	2	2
HCM Control Delay	32.5	129.8	22.2	92.9
HCM LOS	D	F	C	F

Lane	NBLn1	NBLn2	NBLn3	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1	SBLn2
Vol Left, %	10%	0%	0%	100%	0%	100%	0%	48%	0%
Vol Thru, %	90%	100%	0%	0%	93%	0%	44%	52%	0%
Vol Right, %	0%	0%	100%	0%	7%	0%	56%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	70	125	59	86	169	50	301	252	50
LT Vol	7	0	0	86	0	50	0	121	0
Through Vol	63	125	0	0	157	0	133	131	0
RT Vol	0	0	59	0	12	0	168	0	50
Lane Flow Rate	107	193	91	132	260	77	463	388	77
Geometry Grp	8	8	8	8	8	8	8	8	8
Degree of Util (X)	0.308	0.551	0.242	0.391	0.729	0.221	1.214	1.086	0.196
Departure Headway (Hd)	11.222	11.169	10.429	11.496	10.918	10.812	9.883	10.861	9.868
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	323	326	347	315	333	334	370	337	366
Service Time	8.922	8.869	8.129	9.196	8.618	8.512	7.583	8.561	7.568
HCM Lane V/C Ratio	0.331	0.592	0.262	0.419	0.781	0.231	1.251	1.151	0.21
HCM Control Delay	18.8	26.8	16.4	21.4	38.1	16.6	148.6	108.3	15
HCM Lane LOS	C	D	C	C	E	C	F	F	B
HCM 95th-tile Q	1.3	3.1	0.9	1.8	5.4	0.8	18.6	13.5	0.7

Intersection	
Int Delay, s/veh	2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	40	18	8	163	182	20
Future Vol, veh/h	40	18	8	163	182	20
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	60	60	60	60	60	60
Heavy Vehicles, %	2	2	2	2	4	4
Mvmt Flow	67	30	13	272	303	33

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	618	320	336	0	-	0
Stage 1	320	-	-	-	-	-
Stage 2	298	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	453	721	1223	-	-	-
Stage 1	736	-	-	-	-	-
Stage 2	753	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	447	721	1223	-	-	-
Mov Cap-2 Maneuver	447	-	-	-	-	-
Stage 1	726	-	-	-	-	-
Stage 2	753	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	13.8	0.4	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1223	-	507	-	-
HCM Lane V/C Ratio	0.011	-	0.191	-	-
HCM Control Delay (s)	8	0	13.8	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0.7	-	-

Intersection	
Int Delay, s/veh	3.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	7	6	16	12	0	6	44	19	0	33	1
Future Vol, veh/h	0	7	6	16	12	0	6	44	19	0	33	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	42	42	42	42	42	42	42	42	42	42	42	42
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	17	14	38	29	0	14	105	45	0	79	2

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	250	258	80	252	237	128	81	0	0	150	0	0
Stage 1	80	80	-	156	156	-	-	-	-	-	-	-
Stage 2	170	178	-	96	81	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	703	646	980	701	664	922	1517	-	-	1431	-	-
Stage 1	929	828	-	846	769	-	-	-	-	-	-	-
Stage 2	832	752	-	911	828	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	674	640	980	672	657	922	1517	-	-	1431	-	-
Mov Cap-2 Maneuver	674	640	-	672	657	-	-	-	-	-	-	-
Stage 1	920	828	-	838	761	-	-	-	-	-	-	-
Stage 2	793	744	-	880	828	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	9.9	11	0.6	0
HCM LOS	A	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1517	-	-	762	665	1431	-	-
HCM Lane V/C Ratio	0.009	-	-	0.041	0.1	-	-	-
HCM Control Delay (s)	7.4	0	-	9.9	11	0	-	-
HCM Lane LOS	A	A	-	A	B	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.1	0.3	0	-	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	148	1	346	96	703	0	0	725	281
Future Volume (veh/h)	0	0	0	148	1	346	96	703	0	0	725	281
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		0.97
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	1841	1841	1841	0	0	1870	1870
Adj Flow Rate, veh/h				153	1	357	99	725	0	0	747	290
Peak Hour Factor				0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %				2	4	4	4	4	0	0	2	2
Cap, veh/h				445	3	398	129	1059	0	0	811	670
Arrive On Green				0.26	0.26	0.26	0.07	0.58	0.00	0.00	0.43	0.43
Sat Flow, veh/h				1742	11	1556	1753	1841	0	0	1870	1545
Grp Volume(v), veh/h				154	0	357	99	725	0	0	747	290
Grp Sat Flow(s),veh/h/ln				1754	0	1556	1753	1841	0	0	1870	1545
Q Serve(g_s), s				4.2	0.0	13.0	3.3	16.2	0.0	0.0	22.1	7.7
Cycle Q Clear(g_c), s				4.2	0.0	13.0	3.3	16.2	0.0	0.0	22.1	7.7
Prop In Lane				0.99		1.00	1.00		0.00	0.00		1.00
Lane Grp Cap(c), veh/h				448	0	398	129	1059	0	0	811	670
V/C Ratio(X)				0.34	0.00	0.90	0.77	0.68	0.00	0.00	0.92	0.43
Avail Cap(c_a), veh/h				449	0	398	448	1059	0	0	957	790
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	1.00	1.00	1.00	0.00	0.00	1.00	1.00
Uniform Delay (d), s/veh				17.8	0.0	21.1	26.7	8.7	0.0	0.0	15.7	11.6
Incr Delay (d2), s/veh				0.2	0.0	21.8	9.1	1.5	0.0	0.0	11.6	0.2
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				1.6	0.0	6.7	1.6	5.3	0.0	0.0	10.5	2.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh				18.0	0.0	42.9	35.8	10.2	0.0	0.0	27.3	11.7
LnGrp LOS				B	A	D	D	B	A	A	C	B
Approach Vol, veh/h					511			824			1037	
Approach Delay, s/veh					35.4			13.3			22.9	
Approach LOS					D			B			C	

Timer - Assigned Phs		2			5	6		8				
Phs Duration (G+Y+Rc), s		39.0			8.3	30.7		19.6				
Change Period (Y+Rc), s		5.3			4.0	5.3		4.6				
Max Green Setting (Gmax), s		30.0			15.0	30.0		15.0				
Max Q Clear Time (g_c+I1), s		18.2			5.3	24.1		15.0				
Green Ext Time (p_c), s		0.8			0.1	1.3		0.0				

Intersection Summary			
HCM 6th Ctrl Delay			22.3
HCM 6th LOS			C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	376	0	278	0	0	0	0	423	106	241	632	0
Future Volume (veh/h)	376	0	278	0	0	0	0	423	106	241	632	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	1856	1856	1856				0	1811	1811	1856	1856	0
Adj Flow Rate, veh/h	400	0	296				0	450	113	256	672	0
Peak Hour Factor	0.94	0.94	0.94				0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	3	3	3				0	6	6	3	3	0
Cap, veh/h	473	0	420				0	514	434	318	1004	0
Arrive On Green	0.27	0.00	0.27				0.00	0.28	0.28	0.18	0.54	0.00
Sat Flow, veh/h	1767	0	1570				0	1811	1529	1767	1856	0
Grp Volume(v), veh/h	400	0	296				0	450	113	256	672	0
Grp Sat Flow(s),veh/h/ln	1767	0	1570				0	1811	1529	1767	1856	0
Q Serve(g_s), s	11.1	0.0	8.8				0.0	12.3	3.0	7.2	13.5	0.0
Cycle Q Clear(g_c), s	11.1	0.0	8.8				0.0	12.3	3.0	7.2	13.5	0.0
Prop In Lane	1.00		1.00				0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	473	0	420				0	514	434	318	1004	0
V/C Ratio(X)	0.85	0.00	0.70				0.00	0.88	0.26	0.81	0.67	0.00
Avail Cap(c_a), veh/h	683	0	607				0	1050	887	1024	1076	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	1.00				0.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	17.9	0.0	17.1				0.0	17.7	14.3	20.4	8.6	0.0
Incr Delay (d2), s/veh	4.6	0.0	0.8				0.0	1.9	0.1	1.9	1.1	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.6	0.0	2.9				0.0	4.7	0.9	2.8	4.2	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	22.6	0.0	17.9				0.0	19.6	14.4	22.2	9.7	0.0
LnGrp LOS	C	A	B				A	B	B	C	A	A
Approach Vol, veh/h		696						563			928	
Approach Delay, s/veh		20.6						18.5			13.1	
Approach LOS		C						B			B	

Timer - Assigned Phs	1	2		4		6
Phs Duration (G+Y+Rc), s	13.3	20.0		18.5		33.3
Change Period (Y+Rc), s	4.0	5.3		4.6		5.3
Max Green Setting (Gmax), s	30.0	30.0		20.0		30.0
Max Q Clear Time (g_c+I1), s	9.2	14.3		13.1		15.5
Green Ext Time (p_c), s	0.3	0.4		0.8		0.7

Intersection Summary	
HCM 6th Ctrl Delay	16.9
HCM 6th LOS	B

Intersection	
Intersection Delay, s/veh	17.6
Intersection LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	108	81	61	4	34	62	21	147	9	122	224	119
Future Vol, veh/h	108	81	61	4	34	62	21	147	9	122	224	119
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
Heavy Vehicles, %	3	3	3	2	2	2	5	5	5	4	4	4
Mvmt Flow	116	87	66	4	37	67	23	158	10	131	241	128
Number of Lanes	0	1	0	1	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	2	1
HCM Control Delay	14.4	10.9	11.9	22.9
HCM LOS	B	B	B	C

Lane	NBLn1	EBLn1	WBLn1	WBLn2	SBLn1
Vol Left, %	12%	43%	100%	0%	26%
Vol Thru, %	83%	32%	0%	35%	48%
Vol Right, %	5%	24%	0%	65%	26%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	177	250	4	96	465
LT Vol	21	108	4	0	122
Through Vol	147	81	0	34	224
RT Vol	9	61	0	62	119
Lane Flow Rate	190	269	4	103	500
Geometry Grp	2	5	7	7	2
Degree of Util (X)	0.318	0.459	0.009	0.19	0.749
Departure Headway (Hd)	6.006	6.146	7.611	6.635	5.393
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	592	581	473	544	665
Service Time	4.104	4.234	5.311	4.335	3.465
HCM Lane V/C Ratio	0.321	0.463	0.008	0.189	0.752
HCM Control Delay	11.9	14.4	10.4	10.9	22.9
HCM Lane LOS	B	B	B	B	C
HCM 95th-tile Q	1.4	2.4	0	0.7	6.7

Intersection	
Int Delay, s/veh	0.4

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	1	7	171	3	15	274
Future Vol, veh/h	1	7	171	3	15	274
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	84	84	84	84	84	84
Heavy Vehicles, %	2	2	4	4	4	4
Mvmt Flow	1	8	204	4	18	326

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	568	206	0	0	208	0
Stage 1	206	-	-	-	-	-
Stage 2	362	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.14	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.236	-
Pot Cap-1 Maneuver	484	835	-	-	1351	-
Stage 1	829	-	-	-	-	-
Stage 2	704	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	476	835	-	-	1351	-
Mov Cap-2 Maneuver	476	-	-	-	-	-
Stage 1	829	-	-	-	-	-
Stage 2	693	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	9.8	0	0.4
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	763	1351	-
HCM Lane V/C Ratio	-	-	0.012	0.013	-
HCM Control Delay (s)	-	-	9.8	7.7	0
HCM Lane LOS	-	-	A	A	A
HCM 95th %tile Q(veh)	-	-	0	0	-

Movement	NBT	NBR	SBL	SBT	SWL	SWR
Lane Configurations						
Traffic Volume (vph)	734	0	0	0	0	284
Future Volume (vph)	734	0	0	0	0	284
Ideal Flow (vphpl)	1950	1950	1950	1950	1950	1950
Total Lost time (s)	8.2					8.2
Lane Util. Factor	0.95					1.00
Frt	1.00					0.86
Flt Protected	1.00					1.00
Satd. Flow (prot)	3632					1654
Flt Permitted	1.00					1.00
Satd. Flow (perm)	3632					1654
Peak-hour factor, PHF	0.86	1.00	1.00	1.00	1.00	0.86
Adj. Flow (vph)	853	0	0	0	0	330
RTOR Reduction (vph)	0	0	0	0	0	38
Lane Group Flow (vph)	853	0	0	0	0	292
Turn Type	NA					Prot
Protected Phases	2					1
Permitted Phases						
Actuated Green, G (s)	28.2					25.4
Effective Green, g (s)	28.2					25.4
Actuated g/C Ratio	0.40					0.36
Clearance Time (s)	8.2					8.2
Vehicle Extension (s)	2.0					2.0
Lane Grp Cap (vph)	1463					600
v/s Ratio Prot	c0.23					c0.18
v/s Ratio Perm						
v/c Ratio	0.58					0.49
Uniform Delay, d1	16.3					17.3
Progression Factor	0.13					1.00
Incremental Delay, d2	1.4					0.2
Delay (s)	3.5					17.5
Level of Service	A					B
Approach Delay (s)	3.5			0.0	17.5	
Approach LOS	A			A	B	

Intersection Summary			
HCM 2000 Control Delay	7.4	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.54		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	16.4
Intersection Capacity Utilization	53.6%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	NBL	NBT	NBR	SBL	SBT	SBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (vph)	0	0	0	0	748	0	0	734	0	0	0	0
Future Volume (vph)	0	0	0	0	748	0	0	734	0	0	0	0
Ideal Flow (vphpl)	1950	1950	1950	1950	1950	1950	1950	1950	1950	1950	1950	1950
Total Lost time (s)					8.2			8.2				
Lane Util. Factor					0.95			0.95				
Frt					1.00			1.00				
Flt Protected					1.00			1.00				
Satd. Flow (prot)					3632			3632				
Flt Permitted					1.00			1.00				
Satd. Flow (perm)					3632			3632				
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	0.86	1.00	1.00	0.86	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	0	0	0	870	0	0	853	0	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	870	0	0	853	0	0	0	0
Turn Type					NA			NA				
Protected Phases					1			2				
Permitted Phases												
Actuated Green, G (s)					25.4			28.2				
Effective Green, g (s)					25.4			28.2				
Actuated g/C Ratio					0.36			0.40				
Clearance Time (s)					8.2			8.2				
Vehicle Extension (s)					2.0			2.0				
Lane Grp Cap (vph)					1317			1463				
v/s Ratio Prot					c0.24			c0.23				
v/s Ratio Perm												
v/c Ratio					0.66			0.58				
Uniform Delay, d1					18.7			16.3				
Progression Factor					1.00			0.85				
Incremental Delay, d2					1.0			1.7				
Delay (s)					19.7			15.5				
Level of Service					B			B				
Approach Delay (s)		0.0			19.7			15.5			0.0	
Approach LOS		A			B			B			A	

Intersection Summary			
HCM 2000 Control Delay	17.6	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	16.4
Intersection Capacity Utilization	53.6%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	NBT	NBR	SBL	SBT	SWL	SWR
Lane Configurations						
Traffic Volume (vph)	0	0	0	748	163	0
Future Volume (vph)	0	0	0	748	163	0
Ideal Flow (vphpl)	1950	1950	1950	1950	1950	1950
Total Lost time (s)				8.2	8.2	
Lane Util. Factor				0.95	0.97	
Frt				1.00	1.00	
Flt Protected				1.00	0.95	
Satd. Flow (prot)				3632	3523	
Flt Permitted				1.00	0.95	
Satd. Flow (perm)				3632	3523	
Peak-hour factor, PHF	1.00	1.00	1.00	0.86	0.86	1.00
Adj. Flow (vph)	0	0	0	870	190	0
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	870	190	0
Turn Type				NA	Prot	
Protected Phases				1	2	
Permitted Phases						
Actuated Green, G (s)				25.4	28.2	
Effective Green, g (s)				25.4	28.2	
Actuated g/C Ratio				0.36	0.40	
Clearance Time (s)				8.2	8.2	
Vehicle Extension (s)				2.0	2.0	
Lane Grp Cap (vph)				1317	1419	
v/s Ratio Prot				c0.24	c0.05	
v/s Ratio Perm						
v/c Ratio				0.66	0.13	
Uniform Delay, d1				18.7	13.2	
Progression Factor				0.15	1.00	
Incremental Delay, d2				0.8	0.2	
Delay (s)				3.6	13.4	
Level of Service				A	B	
Approach Delay (s)	0.0			3.6	13.4	
Approach LOS	A			A	B	

Intersection Summary			
HCM 2000 Control Delay	5.3	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.38		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	16.4
Intersection Capacity Utilization	40.5%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	NBL	NBT	SBT	SBR	NEL	NER
Lane Configurations						
Traffic Volume (vph)	0	488	0	0	379	0
Future Volume (vph)	0	488	0	0	379	0
Ideal Flow (vphpl)	1950	1950	1950	1950	1950	1950
Total Lost time (s)		9.2			9.2	
Lane Util. Factor		0.95			0.97	
Frt		1.00			1.00	
Flt Protected		1.00			0.95	
Satd. Flow (prot)		3632			3523	
Flt Permitted		1.00			0.95	
Satd. Flow (perm)		3632			3523	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	488	0	0	379	0
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	0	488	0	0	379	0
Turn Type		NA			Prot	
Protected Phases		2			1	
Permitted Phases						
Actuated Green, G (s)		29.6			22.0	
Effective Green, g (s)		29.6			22.0	
Actuated g/C Ratio		0.42			0.31	
Clearance Time (s)		9.2			9.2	
Vehicle Extension (s)		2.0			2.0	
Lane Grp Cap (vph)		1535			1107	
v/s Ratio Prot		c0.13			c0.11	
v/s Ratio Perm						
v/c Ratio		0.32			0.34	
Uniform Delay, d1		13.5			18.4	
Progression Factor		0.24			1.00	
Incremental Delay, d2		0.5			0.1	
Delay (s)		3.8			18.5	
Level of Service		A			B	
Approach Delay (s)		3.8	0.0		18.5	
Approach LOS		A	A		B	

Intersection Summary			
HCM 2000 Control Delay	10.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.33		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	18.4
Intersection Capacity Utilization	39.0%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	NBL	NBT	NBR	SBL	SBT	SBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (vph)	0	488	0	0	0	0	0	0	0	0	689	0
Future Volume (vph)	0	488	0	0	0	0	0	0	0	0	689	0
Ideal Flow (vphpl)	1950	1950	1950	1950	1950	1950	1950	1950	1950	1950	1950	1950
Total Lost time (s)		9.2									9.2	
Lane Util. Factor		0.95									0.95	
Frt		1.00									1.00	
Flt Protected		1.00									1.00	
Satd. Flow (prot)		3632									3632	
Flt Permitted		1.00									1.00	
Satd. Flow (perm)		3632									3632	
Peak-hour factor, PHF	0.86	0.86	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.86	1.00
Adj. Flow (vph)	0	567	0	0	0	0	0	0	0	0	801	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	567	0	0	0	0	0	0	0	0	801	0
Turn Type		NA									NA	
Protected Phases		2									1	
Permitted Phases												
Actuated Green, G (s)		29.6									22.0	
Effective Green, g (s)		29.6									22.0	
Actuated g/C Ratio		0.42									0.31	
Clearance Time (s)		9.2									9.2	
Vehicle Extension (s)		2.0									2.0	
Lane Grp Cap (vph)		1535									1141	
v/s Ratio Prot		c0.16									c0.22	
v/s Ratio Perm												
v/c Ratio		0.37									0.70	
Uniform Delay, d1		13.8									21.1	
Progression Factor		1.00									1.61	
Incremental Delay, d2		0.7									1.3	
Delay (s)		14.5									35.2	
Level of Service		B									D	
Approach Delay (s)		14.5			0.0			0.0			35.2	
Approach LOS		B			A			A			D	

Intersection Summary			
HCM 2000 Control Delay	26.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.51		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	18.4
Intersection Capacity Utilization	47.0%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	NBT	NBR	SBL	SBT	SWL	SWR
Lane Configurations						
Traffic Volume (vph)	0	0	0	269	689	0
Future Volume (vph)	0	0	0	269	689	0
Ideal Flow (vphpl)	1950	1950	1950	1950	1950	1950
Total Lost time (s)				9.2	9.2	
Lane Util. Factor				0.95	0.97	
Frt				1.00	1.00	
Flt Protected				1.00	0.95	
Satd. Flow (prot)				3632	3523	
Flt Permitted				1.00	0.95	
Satd. Flow (perm)				3632	3523	
Peak-hour factor, PHF	1.00	1.00	1.00	0.86	0.86	1.00
Adj. Flow (vph)	0	0	0	313	801	0
RTOR Reduction (vph)	0	0	0	0	483	0
Lane Group Flow (vph)	0	0	0	313	318	0
Turn Type				NA	Prot	
Protected Phases				2	1	
Permitted Phases						
Actuated Green, G (s)				29.6	22.0	
Effective Green, g (s)				29.6	22.0	
Actuated g/C Ratio				0.42	0.31	
Clearance Time (s)				9.2	9.2	
Vehicle Extension (s)				2.0	2.0	
Lane Grp Cap (vph)				1535	1107	
v/s Ratio Prot				c0.09	c0.09	
v/s Ratio Perm						
v/c Ratio				0.20	0.29	
Uniform Delay, d1				12.8	18.1	
Progression Factor				1.00	0.25	
Incremental Delay, d2				0.3	0.0	
Delay (s)				13.1	4.5	
Level of Service				B	A	
Approach Delay (s)	0.0			13.1	4.5	
Approach LOS	A			B	A	

Intersection Summary			
HCM 2000 Control Delay	6.9	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.24		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	18.4
Intersection Capacity Utilization	47.0%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Intersection	
Intersection Delay, s/veh	46.5
Intersection LOS	E

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	75	107	17	23	63	97	6	156	22	183	256	116
Future Vol, veh/h	75	107	17	23	63	97	6	156	22	183	256	116
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	90	129	20	28	76	117	7	188	27	220	308	140
Number of Lanes	1	1	0	1	1	0	0	2	1	0	1	1

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	2	2	3
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	3	2	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	3	2	2	2
HCM Control Delay	15	16.2	13.6	78.6
HCM LOS	B	C	B	F

Lane	NBLn1	NBLn2	NBLn3	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1	SBLn2
Vol Left, %	10%	0%	0%	100%	0%	100%	0%	42%	0%
Vol Thru, %	90%	100%	0%	0%	86%	0%	39%	58%	0%
Vol Right, %	0%	0%	100%	0%	14%	0%	61%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	58	104	22	75	124	23	160	439	116
LT Vol	6	0	0	75	0	23	0	183	0
Through Vol	52	104	0	0	107	0	63	256	0
RT Vol	0	0	22	0	17	0	97	0	116
Lane Flow Rate	70	125	27	90	149	28	193	529	140
Geometry Grp	8	8	8	8	8	8	8	8	8
Degree of Util (X)	0.16	0.286	0.055	0.219	0.338	0.068	0.423	1.096	0.254
Departure Headway (Hd)	8.565	8.511	7.79	9.045	8.434	9.118	8.17	7.46	6.531
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	421	425	463	399	429	395	443	487	551
Service Time	6.265	6.211	5.49	6.745	6.134	6.818	5.87	5.193	4.264
HCM Lane V/C Ratio	0.166	0.294	0.058	0.226	0.347	0.071	0.436	1.086	0.254
HCM Control Delay	12.9	14.6	10.9	14.3	15.4	12.5	16.7	96.3	11.5
HCM Lane LOS	B	B	B	B	C	B	C	F	B
HCM 95th-tile Q	0.6	1.2	0.2	0.8	1.5	0.2	2.1	17.2	1

Intersection						
Int Delay, s/veh	0.7					

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	16	3	5	127	185	29
Future Vol, veh/h	16	3	5	127	185	29
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	77	77	77	77	77	77
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	21	4	6	165	240	38

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	436	259	278	0	-	0
Stage 1	259	-	-	-	-	-
Stage 2	177	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	578	780	1285	-	-	-
Stage 1	784	-	-	-	-	-
Stage 2	854	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	575	780	1285	-	-	-
Mov Cap-2 Maneuver	575	-	-	-	-	-
Stage 1	780	-	-	-	-	-
Stage 2	854	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	11.3	0.3	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1285	-	600	-	-
HCM Lane V/C Ratio	0.005	-	0.041	-	-
HCM Control Delay (s)	7.8	0	11.3	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0.1	-	-

Intersection	
Int Delay, s/veh	6.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	2	13	3	4	5	2	1	3	3	3	4	2
Future Vol, veh/h	2	13	3	4	5	2	1	3	3	3	4	2
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	63	63	63	63	63	63	63	63	63	63	63	63
Heavy Vehicles, %	6	6	6	2	2	2	14	14	14	11	11	11
Mvmt Flow	3	21	5	6	8	3	2	5	5	5	6	3

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	35	32	8	43	31	8	9	0	0	10	0	0
Stage 1	18	18	-	12	12	-	-	-	-	-	-	-
Stage 2	17	14	-	31	19	-	-	-	-	-	-	-
Critical Hdwy	7.16	6.56	6.26	7.12	6.52	6.22	4.24	-	-	4.21	-	-
Critical Hdwy Stg 1	6.16	5.56	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.16	5.56	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.554	4.054	3.354	3.518	4.018	3.318	2.326	-	-	2.299	-	-
Pot Cap-1 Maneuver	961	853	1062	960	862	1074	1536	-	-	1553	-	-
Stage 1	991	872	-	1009	886	-	-	-	-	-	-	-
Stage 2	992	876	-	986	880	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	949	850	1062	935	859	1074	1536	-	-	1553	-	-
Mov Cap-2 Maneuver	949	850	-	935	859	-	-	-	-	-	-	-
Stage 1	990	869	-	1008	885	-	-	-	-	-	-	-
Stage 2	979	875	-	955	877	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	9.2	9	1	2.4
HCM LOS	A	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1536	-	-	890	920	1553	-	-
HCM Lane V/C Ratio	0.001	-	-	0.032	0.019	0.003	-	-
HCM Control Delay (s)	7.3	0	-	9.2	9	7.3	0	-
HCM Lane LOS	A	A	-	A	A	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.1	0.1	0	-	-

EXISTING PLUS PROJECT ANALYSIS

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	88	3	353	218	685	0	0	386	328
Future Volume (veh/h)	0	0	0	88	3	353	218	685	0	0	386	328
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)				1.00		0.98	1.00		1.00	1.00		0.97
Parking Bus, Adj				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach					No			No			No	
Adj Sat Flow, veh/h/ln				1796	1796	1796	1811	1811	0	0	1796	1796
Adj Flow Rate, veh/h				97	3	388	240	753	0	0	424	360
Peak Hour Factor				0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Percent Heavy Veh, %				7	7	7	6	6	0	0	7	7
Cap, veh/h				466	14	419	298	968	0	0	515	425
Arrive On Green				0.28	0.28	0.28	0.17	0.53	0.00	0.00	0.29	0.29
Sat Flow, veh/h				1662	51	1494	1725	1811	0	0	1796	1481
Grp Volume(v), veh/h				100	0	388	240	753	0	0	424	360
Grp Sat Flow(s),veh/h/ln				1713	0	1494	1725	1811	0	0	1796	1481
Q Serve(g_s), s				2.4	0.0	13.5	7.1	17.7	0.0	0.0	11.8	12.2
Cycle Q Clear(g_c), s				2.4	0.0	13.5	7.1	17.7	0.0	0.0	11.8	12.2
Prop In Lane				0.97		1.00	1.00		0.00	0.00		1.00
Lane Grp Cap(c), veh/h				481	0	419	298	968	0	0	515	425
V/C Ratio(X)				0.21	0.00	0.93	0.81	0.78	0.00	0.00	0.82	0.85
Avail Cap(c_a), veh/h				481	0	419	484	1016	0	0	1008	831
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	1.00	1.00	1.00	0.00	0.00	1.00	1.00
Uniform Delay (d), s/veh				14.7	0.0	18.7	21.3	9.9	0.0	0.0	17.8	18.0
Incr Delay (d2), s/veh				0.1	0.0	26.0	5.1	3.3	0.0	0.0	1.3	1.8
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				0.8	0.0	7.1	3.0	6.1	0.0	0.0	4.5	3.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh				14.8	0.0	44.6	26.4	13.2	0.0	0.0	19.1	19.8
LnGrp LOS				B	A	D	C	B	A	A	B	B
Approach Vol, veh/h					488			993			784	
Approach Delay, s/veh					38.5			16.4			19.4	
Approach LOS					D			B			B	

Timer - Assigned Phs		2			5	6		8				
Phs Duration (G+Y+Rc), s		33.9			13.2	20.6		19.6				
Change Period (Y+Rc), s		5.3			4.0	5.3		4.6				
Max Green Setting (Gmax), s		30.0			15.0	30.0		15.0				
Max Q Clear Time (g_c+I1), s		19.7			9.1	14.2		15.5				
Green Ext Time (p_c), s		0.8			0.3	1.1		0.0				

Intersection Summary			
HCM 6th Ctrl Delay			22.2
HCM 6th LOS			C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	270	3	130	0	0	0	0	633	142	131	343	0
Future Volume (veh/h)	270	3	130	0	0	0	0	633	142	131	343	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	1781	1781	1781				0	1811	1811	1781	1781	0
Adj Flow Rate, veh/h	290	3	140				0	681	153	141	369	0
Peak Hour Factor	0.93	0.93	0.93				0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	8	8	8				0	6	6	8	8	0
Cap, veh/h	359	4	322				0	740	625	181	1057	0
Arrive On Green	0.21	0.21	0.21				0.00	0.41	0.41	0.11	0.59	0.00
Sat Flow, veh/h	1680	17	1506				0	1811	1529	1697	1781	0
Grp Volume(v), veh/h	293	0	140				0	681	153	141	369	0
Grp Sat Flow(s),veh/h/ln	1697	0	1506				0	1811	1529	1697	1781	0
Q Serve(g_s), s	8.4	0.0	4.1				0.0	18.3	3.4	4.2	5.5	0.0
Cycle Q Clear(g_c), s	8.4	0.0	4.1				0.0	18.3	3.4	4.2	5.5	0.0
Prop In Lane	0.99		1.00				0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	363	0	322				0	740	625	181	1057	0
V/C Ratio(X)	0.81	0.00	0.44				0.00	0.92	0.24	0.78	0.35	0.00
Avail Cap(c_a), veh/h	662	0	587				0	1059	894	992	1057	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	1.00				0.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	19.2	0.0	17.5				0.0	14.4	10.0	22.3	5.3	0.0
Incr Delay (d2), s/veh	1.6	0.0	0.3				0.0	7.9	0.1	2.7	0.1	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.1	0.0	1.3				0.0	7.7	1.0	1.7	1.4	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	20.8	0.0	17.8				0.0	22.3	10.0	25.0	5.4	0.0
LnGrp LOS	C	A	B				A	C	B	C	A	A
Approach Vol, veh/h		433						834			510	
Approach Delay, s/veh		19.9						20.0			10.8	
Approach LOS		B						C			B	

Timer - Assigned Phs	1	2	4	6
Phs Duration (G+Y+Rc), s	9.5	26.3	15.6	35.8
Change Period (Y+Rc), s	4.0	5.3	4.6	5.3
Max Green Setting (Gmax), s	30.0	30.0	20.0	30.0
Max Q Clear Time (g_c+I1), s	6.2	20.3	10.4	7.5
Green Ext Time (p_c), s	0.2	0.7	0.6	0.4

Intersection Summary	
HCM 6th Ctrl Delay	17.4
HCM 6th LOS	B

Intersection	
Intersection Delay, s/veh	50
Intersection LOS	E

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	98	83	100	5	81	149	66	146	7	64	136	96
Future Vol, veh/h	98	83	100	5	81	149	66	146	7	64	136	96
Peak Hour Factor	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.70
Heavy Vehicles, %	4	4	4	5	5	5	4	4	4	12	12	12
Mvmt Flow	136	115	139	7	113	207	92	203	10	89	189	137
Number of Lanes	0	1	0	1	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	2	1
HCM Control Delay	56.7	35.1	35.2	66.1
HCM LOS	F	E	E	F

Lane	NBLn1	EBLn1	WBLn1	WBLn2	SBLn1
Vol Left, %	30%	35%	100%	0%	22%
Vol Thru, %	67%	30%	0%	35%	46%
Vol Right, %	3%	36%	0%	65%	32%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	219	281	5	230	296
LT Vol	66	98	5	0	64
Through Vol	146	83	0	81	136
RT Vol	7	100	0	149	96
Lane Flow Rate	304	390	7	319	415
Geometry Grp	2	5	7	7	2
Degree of Util (X)	0.756	0.924	0.019	0.772	0.97
Departure Headway (Hd)	8.953	8.519	9.698	8.705	8.418
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	402	425	368	415	432
Service Time	7.052	6.605	7.483	6.49	6.506
HCM Lane V/C Ratio	0.756	0.918	0.019	0.769	0.961
HCM Control Delay	35.2	56.7	12.7	35.6	66.1
HCM Lane LOS	E	F	B	E	F
HCM 95th-tile Q	6.2	10.2	0.1	6.5	11.6

Intersection	
Int Delay, s/veh	1.2

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	4	34	190	0	16	220
Future Vol, veh/h	4	34	190	0	16	220
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	59	59	59	59	59	59
Heavy Vehicles, %	2	2	5	5	4	4
Mvmt Flow	7	58	322	0	27	373

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	749	322	0	0	322	0
Stage 1	322	-	-	-	-	-
Stage 2	427	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.14	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.236	-
Pot Cap-1 Maneuver	379	719	-	-	1227	-
Stage 1	735	-	-	-	-	-
Stage 2	658	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	368	719	-	-	1227	-
Mov Cap-2 Maneuver	368	-	-	-	-	-
Stage 1	735	-	-	-	-	-
Stage 2	640	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	11.1	0	0.5
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	653	1227	-
HCM Lane V/C Ratio	-	-	0.099	0.022	-
HCM Control Delay (s)	-	-	11.1	8	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	0.3	0.1	-

Movement	NBT	NBR	SBL	SBT	SWL	SWR
Lane Configurations	↑↑					↱
Traffic Volume (vph)	633	0	0	0	0	277
Future Volume (vph)	633	0	0	0	0	277
Ideal Flow (vphpl)	1950	1950	1950	1950	1950	1950
Total Lost time (s)	8.2					8.2
Lane Util. Factor	0.95					1.00
Frt	1.00					0.86
Flt Protected	1.00					1.00
Satd. Flow (prot)	3632					1654
Flt Permitted	1.00					1.00
Satd. Flow (perm)	3632					1654
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	633	0	0	0	0	277
RTOR Reduction (vph)	0	0	0	0	0	35
Lane Group Flow (vph)	633	0	0	0	0	242
Turn Type	NA					Prot
Protected Phases	2					1
Permitted Phases						
Actuated Green, G (s)	24.4					29.2
Effective Green, g (s)	24.4					29.2
Actuated g/C Ratio	0.35					0.42
Clearance Time (s)	8.2					8.2
Vehicle Extension (s)	2.0					2.0
Lane Grp Cap (vph)	1266					689
v/s Ratio Prot	c0.17					c0.15
v/s Ratio Perm						
v/c Ratio	0.50					0.35
Uniform Delay, d1	18.0					13.9
Progression Factor	0.21					1.00
Incremental Delay, d2	0.1					1.4
Delay (s)	3.8					15.3
Level of Service	A					B
Approach Delay (s)	3.8			0.0	15.3	
Approach LOS	A			A	B	

Intersection Summary			
HCM 2000 Control Delay	7.3	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.42		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	16.4
Intersection Capacity Utilization	47.4%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	NBL	NBT	NBR	SBL	SBT	SBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (vph)	0	0	0	0	451	0	0	633	0	0	0	0
Future Volume (vph)	0	0	0	0	451	0	0	633	0	0	0	0
Ideal Flow (vphpl)	1950	1950	1950	1950	1950	1950	1950	1950	1950	1950	1950	1950
Total Lost time (s)					8.2			8.2				
Lane Util. Factor					0.95			0.95				
Frt					1.00			1.00				
Flt Protected					1.00			1.00				
Satd. Flow (prot)					3632			3632				
Flt Permitted					1.00			1.00				
Satd. Flow (perm)					3632			3632				
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	0.75	1.00	0.75	0.75	0.75	1.00	1.00	1.00
Adj. Flow (vph)	0	0	0	0	601	0	0	844	0	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	601	0	0	844	0	0	0	0
Turn Type					NA			NA				
Protected Phases					1			2				
Permitted Phases												
Actuated Green, G (s)					29.2			24.4				
Effective Green, g (s)					29.2			24.4				
Actuated g/C Ratio					0.42			0.35				
Clearance Time (s)					8.2			8.2				
Vehicle Extension (s)					2.0			2.0				
Lane Grp Cap (vph)					1515			1266				
v/s Ratio Prot					c0.17			c0.23				
v/s Ratio Perm												
v/c Ratio					0.40			0.67				
Uniform Delay, d1					14.2			19.3				
Progression Factor					1.00			0.64				
Incremental Delay, d2					0.8			0.9				
Delay (s)					15.0			13.3				
Level of Service					B			B				
Approach Delay (s)		0.0			15.0			13.3			0.0	
Approach LOS		A			B			B			A	

Intersection Summary			
HCM 2000 Control Delay	14.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.52		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	16.4
Intersection Capacity Utilization	47.4%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	NBT	NBR	SBL	SBT	SWL	SWR
Lane Configurations				↑↑	↰↰	
Traffic Volume (vph)	0	0	0	451	68	0
Future Volume (vph)	0	0	0	451	68	0
Ideal Flow (vphpl)	1950	1950	1950	1950	1950	1950
Total Lost time (s)				8.2	8.2	
Lane Util. Factor				0.95	0.97	
Frt				1.00	1.00	
Flt Protected				1.00	0.95	
Satd. Flow (prot)				3632	3523	
Flt Permitted				1.00	0.95	
Satd. Flow (perm)				3632	3523	
Peak-hour factor, PHF	1.00	1.00	1.00	0.75	0.75	1.00
Adj. Flow (vph)	0	0	0	601	91	0
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	601	91	0
Turn Type				NA	Prot	
Protected Phases				1	2	
Permitted Phases						
Actuated Green, G (s)				29.2	24.4	
Effective Green, g (s)				29.2	24.4	
Actuated g/C Ratio				0.42	0.35	
Clearance Time (s)				8.2	8.2	
Vehicle Extension (s)				2.0	2.0	
Lane Grp Cap (vph)				1515	1228	
v/s Ratio Prot				c0.17	c0.03	
v/s Ratio Perm						
v/c Ratio				0.40	0.07	
Uniform Delay, d1				14.2	15.2	
Progression Factor				0.17	1.00	
Incremental Delay, d2				0.7	0.0	
Delay (s)				3.2	15.3	
Level of Service				A	B	
Approach Delay (s)	0.0			3.2	15.3	
Approach LOS	A			A	B	

Intersection Summary			
HCM 2000 Control Delay	4.8	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.25		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	16.4
Intersection Capacity Utilization	32.5%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	NBL	NBT	SBT	SBR	NEL	NER
Lane Configurations						
Traffic Volume (vph)	0	622	0	0	185	0
Future Volume (vph)	0	622	0	0	185	0
Ideal Flow (vphpl)	1950	1950	1950	1950	1950	1950
Total Lost time (s)		9.2			9.2	
Lane Util. Factor		0.95			0.97	
Frt		1.00			1.00	
Flt Protected		1.00			0.95	
Satd. Flow (prot)		3632			3523	
Flt Permitted		1.00			0.95	
Satd. Flow (perm)		3632			3523	
Peak-hour factor, PHF	0.75	0.75	0.75	0.75	0.75	0.75
Adj. Flow (vph)	0	829	0	0	247	0
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	0	829	0	0	247	0
Turn Type		NA			Prot	
Protected Phases		2			1	
Permitted Phases						
Actuated Green, G (s)		28.5			23.1	
Effective Green, g (s)		28.5			23.1	
Actuated g/C Ratio		0.41			0.33	
Clearance Time (s)		9.2			9.2	
Vehicle Extension (s)		2.0			2.0	
Lane Grp Cap (vph)		1478			1162	
v/s Ratio Prot		c0.23			c0.07	
v/s Ratio Perm						
v/c Ratio		0.56			0.21	
Uniform Delay, d1		15.9			16.9	
Progression Factor		0.23			1.00	
Incremental Delay, d2		0.2			0.4	
Delay (s)		3.9			17.3	
Level of Service		A			B	
Approach Delay (s)		3.9	0.0		17.3	
Approach LOS		A	A		B	

Intersection Summary			
HCM 2000 Control Delay	7.0	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.40		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	18.4
Intersection Capacity Utilization	38.8%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	NBL	NBT	NBR	SBL	SBT	SBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (vph)	0	622	0	0	0	0	0	0	0	0	341	0
Future Volume (vph)	0	622	0	0	0	0	0	0	0	0	341	0
Ideal Flow (vphpl)	1950	1950	1950	1950	1950	1950	1950	1950	1950	1950	1950	1950
Total Lost time (s)		9.2									9.2	
Lane Util. Factor		0.95									0.95	
Frt		1.00									1.00	
Flt Protected		1.00									1.00	
Satd. Flow (prot)		3632									3632	
Flt Permitted		1.00									1.00	
Satd. Flow (perm)		3632									3632	
Peak-hour factor, PHF	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75
Adj. Flow (vph)	0	829	0	0	0	0	0	0	0	0	455	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	829	0	0	0	0	0	0	0	0	455	0
Turn Type		NA									NA	
Protected Phases		2									1	
Permitted Phases												
Actuated Green, G (s)		28.5									23.1	
Effective Green, g (s)		28.5									23.1	
Actuated g/C Ratio		0.41									0.33	
Clearance Time (s)		9.2									9.2	
Vehicle Extension (s)		2.0									2.0	
Lane Grp Cap (vph)		1478									1198	
v/s Ratio Prot		c0.23									c0.13	
v/s Ratio Perm												
v/c Ratio		0.56									0.38	
Uniform Delay, d1		15.9									18.0	
Progression Factor		1.00									1.34	
Incremental Delay, d2		0.3									0.9	
Delay (s)		16.2									25.0	
Level of Service		B									C	
Approach Delay (s)		16.2			0.0			0.0			25.0	
Approach LOS		B			A			A			C	

Intersection Summary			
HCM 2000 Control Delay	19.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.48		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	18.4
Intersection Capacity Utilization	41.3%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	NBT	NBR	SBL	SBT	SWL	SWR
Lane Configurations						
Traffic Volume (vph)	0	0	0	231	341	0
Future Volume (vph)	0	0	0	231	341	0
Ideal Flow (vphpl)	1950	1950	1950	1950	1950	1950
Total Lost time (s)				9.2	9.2	
Lane Util. Factor				0.95	0.97	
Frt				1.00	1.00	
Flt Protected				1.00	0.95	
Satd. Flow (prot)				3632	3523	
Flt Permitted				1.00	0.95	
Satd. Flow (perm)				3632	3523	
Peak-hour factor, PHF	0.75	0.75	0.75	0.75	0.75	0.75
Adj. Flow (vph)	0	0	0	308	455	0
RTOR Reduction (vph)	0	0	0	0	305	0
Lane Group Flow (vph)	0	0	0	308	150	0
Turn Type				NA	Prot	
Protected Phases				2	1	
Permitted Phases						
Actuated Green, G (s)				28.5	23.1	
Effective Green, g (s)				28.5	23.1	
Actuated g/C Ratio				0.41	0.33	
Clearance Time (s)				9.2	9.2	
Vehicle Extension (s)				2.0	2.0	
Lane Grp Cap (vph)				1478	1162	
v/s Ratio Prot				c0.08	c0.04	
v/s Ratio Perm						
v/c Ratio				0.21	0.13	
Uniform Delay, d1				13.4	16.4	
Progression Factor				1.00	1.00	
Incremental Delay, d2				0.0	0.2	
Delay (s)				13.5	16.6	
Level of Service				B	B	
Approach Delay (s)	0.0			13.5	16.6	
Approach LOS	A			B	B	

Intersection Summary			
HCM 2000 Control Delay	15.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.17		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	18.4
Intersection Capacity Utilization	41.3%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Intersection	
Intersection Delay, s/veh	83.6
Intersection LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	96	169	12	52	137	168	7	194	64	121	133	53
Future Vol, veh/h	96	169	12	52	137	168	7	194	64	121	133	53
Peak Hour Factor	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	148	260	18	80	211	258	11	298	98	186	205	82
Number of Lanes	1	1	0	1	1	0	0	2	1	0	1	1

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	2	2	3
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	3	2	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	3	2	2	2
HCM Control Delay	37.8	146.8	23.6	103.1
HCM LOS	E	F	C	F

Lane	NBLn1	NBLn2	NBLn3	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1	SBLn2
Vol Left, %	10%	0%	0%	100%	0%	100%	0%	48%	0%
Vol Thru, %	90%	100%	0%	0%	93%	0%	45%	52%	0%
Vol Right, %	0%	0%	100%	0%	7%	0%	55%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	72	129	64	96	181	52	305	254	53
LT Vol	7	0	0	96	0	52	0	121	0
Through Vol	65	129	0	0	169	0	137	133	0
RT Vol	0	0	64	0	12	0	168	0	53
Lane Flow Rate	110	199	98	148	278	80	469	391	82
Geometry Grp	8	8	8	8	8	8	8	8	8
Degree of Util (X)	0.322	0.579	0.267	0.441	0.79	0.235	1.264	1.122	0.213
Departure Headway (Hd)	11.572	11.52	10.778	11.775	11.198	11.135	10.209	11.201	10.207
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	313	316	336	309	326	325	361	328	354
Service Time	9.272	9.22	8.478	9.475	8.898	8.835	7.909	8.901	7.907
HCM Lane V/C Ratio	0.351	0.63	0.292	0.479	0.853	0.246	1.299	1.192	0.232
HCM Control Delay	19.7	28.9	17.4	23.4	45.5	17.2	168.9	121.4	15.6
HCM Lane LOS	C	D	C	C	E	C	F	F	C
HCM 95th-tile Q	1.4	3.4	1.1	2.2	6.4	0.9	20	14.3	0.8

Intersection						
Int Delay, s/veh	2.4					

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	51	19	8	163	182	24
Future Vol, veh/h	51	19	8	163	182	24
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	60	60	60	60	60	60
Heavy Vehicles, %	2	2	2	2	4	4
Mvmt Flow	85	32	13	272	303	40

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	621	323	343	0	-	0
Stage 1	323	-	-	-	-	-
Stage 2	298	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	451	718	1216	-	-	-
Stage 1	734	-	-	-	-	-
Stage 2	753	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	445	718	1216	-	-	-
Mov Cap-2 Maneuver	445	-	-	-	-	-
Stage 1	724	-	-	-	-	-
Stage 2	753	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	14.5	0.4	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1216	-	496	-	-
HCM Lane V/C Ratio	0.011	-	0.235	-	-
HCM Control Delay (s)	8	0	14.5	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0.9	-	-

Intersection	
Int Delay, s/veh	4.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	18	6	16	16	0	7	44	19	1	34	1
Future Vol, veh/h	0	18	6	16	16	0	7	44	19	1	34	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	42	42	42	42	42	42	42	42	42	42	42	42
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	43	14	38	38	0	17	105	45	2	81	2

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	267	270	82	277	249	128	83	0	0	150	0	0
Stage 1	86	86	-	162	162	-	-	-	-	-	-	-
Stage 2	181	184	-	115	87	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	686	636	978	675	654	922	1514	-	-	1431	-	-
Stage 1	922	824	-	840	764	-	-	-	-	-	-	-
Stage 2	821	747	-	890	823	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	648	628	978	624	645	922	1514	-	-	1431	-	-
Mov Cap-2 Maneuver	648	628	-	624	645	-	-	-	-	-	-	-
Stage 1	911	823	-	830	755	-	-	-	-	-	-	-
Stage 2	770	738	-	830	822	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	10.7	11.5	0.7	0.2
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1514	-	-	690	634	1431	-	-
HCM Lane V/C Ratio	0.011	-	-	0.083	0.12	0.002	-	-
HCM Control Delay (s)	7.4	0	-	10.7	11.5	7.5	0	-
HCM Lane LOS	A	A	-	B	B	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.3	0.4	0	-	-

Intersection						
Int Delay, s/veh	3.9					

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	69	2	0	44	34	23
Future Vol, veh/h	69	2	0	44	34	23
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	75	2	0	48	37	25

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	98	50	62	0	-	0
Stage 1	50	-	-	-	-	-
Stage 2	48	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	901	1018	1541	-	-	-
Stage 1	972	-	-	-	-	-
Stage 2	974	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	901	1018	1541	-	-	-
Mov Cap-2 Maneuver	901	-	-	-	-	-
Stage 1	972	-	-	-	-	-
Stage 2	974	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	9.4	0	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1541	-	904	-	-
HCM Lane V/C Ratio	-	-	0.085	-	-
HCM Control Delay (s)	0	-	9.4	-	-
HCM Lane LOS	A	-	A	-	-
HCM 95th %tile Q(veh)	0	-	0.3	-	-

Intersection	
Int Delay, s/veh	4.5

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	8	13	19	5	11	23
Future Vol, veh/h	8	13	19	5	11	23
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	9	14	21	5	12	25

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	26	0	-	0	56	24
Stage 1	-	-	-	-	24	-
Stage 2	-	-	-	-	32	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1588	-	-	-	952	1052
Stage 1	-	-	-	-	999	-
Stage 2	-	-	-	-	991	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1588	-	-	-	946	1052
Mov Cap-2 Maneuver	-	-	-	-	946	-
Stage 1	-	-	-	-	993	-
Stage 2	-	-	-	-	991	-

Approach	EB	WB	SB
HCM Control Delay, s	2.8	0	8.7
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1588	-	-	-	1015
HCM Lane V/C Ratio	0.005	-	-	-	0.036
HCM Control Delay (s)	7.3	0	-	-	8.7
HCM Lane LOS	A	A	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	0.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	159	1	346	119	718	0	0	750	281
Future Volume (veh/h)	0	0	0	159	1	346	119	718	0	0	750	281
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		0.97
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	1841	1841	1841	0	0	1870	1870
Adj Flow Rate, veh/h				164	1	357	123	740	0	0	773	290
Peak Hour Factor				0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %				2	4	4	4	4	0	0	2	2
Cap, veh/h				422	3	377	160	1101	0	0	827	683
Arrive On Green				0.24	0.24	0.24	0.09	0.60	0.00	0.00	0.44	0.44
Sat Flow, veh/h				1743	11	1556	1753	1841	0	0	1870	1545
Grp Volume(v), veh/h				165	0	357	123	740	0	0	773	290
Grp Sat Flow(s),veh/h/ln				1754	0	1556	1753	1841	0	0	1870	1545
Q Serve(g_s), s				4.9	0.0	14.0	4.2	16.7	0.0	0.0	24.3	8.0
Cycle Q Clear(g_c), s				4.9	0.0	14.0	4.2	16.7	0.0	0.0	24.3	8.0
Prop In Lane				0.99		1.00	1.00		0.00	0.00		1.00
Lane Grp Cap(c), veh/h				425	0	377	160	1101	0	0	827	683
V/C Ratio(X)				0.39	0.00	0.95	0.77	0.67	0.00	0.00	0.93	0.42
Avail Cap(c_a), veh/h				425	0	377	425	1101	0	0	906	748
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	1.00	1.00	1.00	0.00	0.00	1.00	1.00
Uniform Delay (d), s/veh				19.6	0.0	23.1	27.5	8.4	0.0	0.0	16.4	11.9
Incr Delay (d2), s/veh				0.2	0.0	32.6	7.5	1.3	0.0	0.0	15.1	0.2
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				1.9	0.0	8.1	2.0	5.4	0.0	0.0	12.3	2.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh				19.8	0.0	55.7	35.0	9.7	0.0	0.0	31.5	12.0
LnGrp LOS				B	A	E	D	A	A	A	C	B
Approach Vol, veh/h					522			863			1063	
Approach Delay, s/veh					44.3			13.3			26.2	
Approach LOS					D			B			C	

Timer - Assigned Phs		2			5	6		8				
Phs Duration (G+Y+Rc), s		42.3			9.7	32.7		19.6				
Change Period (Y+Rc), s		5.3			4.0	5.3		4.6				
Max Green Setting (Gmax), s		30.0			15.0	30.0		15.0				
Max Q Clear Time (g_c+I1), s		18.7			6.2	26.3		16.0				
Green Ext Time (p_c), s		0.8			0.2	1.0		0.0				

Intersection Summary			
HCM 6th Ctrl Delay			25.5
HCM 6th LOS			C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	376	0	317	0	0	0	0	461	112	241	668	0
Future Volume (veh/h)	376	0	317	0	0	0	0	461	112	241	668	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	1856	1856	1856				0	1811	1811	1856	1856	0
Adj Flow Rate, veh/h	400	0	337				0	490	119	256	711	0
Peak Hour Factor	0.94	0.94	0.94				0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	3	3	3				0	6	6	3	3	0
Cap, veh/h	469	0	416				0	550	464	315	1029	0
Arrive On Green	0.27	0.00	0.27				0.00	0.30	0.30	0.18	0.55	0.00
Sat Flow, veh/h	1767	0	1570				0	1811	1530	1767	1856	0
Grp Volume(v), veh/h	400	0	337				0	490	119	256	711	0
Grp Sat Flow(s),veh/h/ln	1767	0	1570				0	1811	1530	1767	1856	0
Q Serve(g_s), s	11.8	0.0	11.0				0.0	14.2	3.2	7.6	15.2	0.0
Cycle Q Clear(g_c), s	11.8	0.0	11.0				0.0	14.2	3.2	7.6	15.2	0.0
Prop In Lane	1.00		1.00				0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	469	0	416				0	550	464	315	1029	0
V/C Ratio(X)	0.85	0.00	0.81				0.00	0.89	0.26	0.81	0.69	0.00
Avail Cap(c_a), veh/h	643	0	571				0	989	835	965	1029	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	1.00				0.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	19.2	0.0	18.9				0.0	18.3	14.5	21.7	8.8	0.0
Incr Delay (d2), s/veh	6.2	0.0	4.3				0.0	2.1	0.1	1.9	1.7	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	5.1	0.0	4.1				0.0	5.5	1.0	3.1	5.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	25.4	0.0	23.2				0.0	20.3	14.6	23.6	10.5	0.0
LnGrp LOS	C	A	C				A	C	B	C	B	A
Approach Vol, veh/h		737						609			967	
Approach Delay, s/veh		24.4						19.2			14.0	
Approach LOS		C						B			B	

Timer - Assigned Phs	1	2		4		6
Phs Duration (G+Y+Rc), s	13.8	22.0		19.2		35.8
Change Period (Y+Rc), s	4.0	5.3		4.6		5.3
Max Green Setting (Gmax), s	30.0	30.0		20.0		30.0
Max Q Clear Time (g_c+I1), s	9.6	16.2		13.8		17.2
Green Ext Time (p_c), s	0.3	0.5		0.8		0.8

Intersection Summary		
HCM 6th Ctrl Delay		18.7
HCM 6th LOS		B

Intersection	
Intersection Delay, s/veh	29.3
Intersection LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	108	81	62	4	35	92	21	161	9	170	251	119
Future Vol, veh/h	108	81	62	4	35	92	21	161	9	170	251	119
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
Heavy Vehicles, %	3	3	3	2	2	2	5	5	5	4	4	4
Mvmt Flow	116	87	67	4	38	99	23	173	10	183	270	128
Number of Lanes	0	1	0	1	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	2	1
HCM Control Delay	16.6	12.4	13.6	44.9
HCM LOS	C	B	B	E

Lane	NBLn1	EBLn1	WBLn1	WBLn2	SBLn1
Vol Left, %	11%	43%	100%	0%	31%
Vol Thru, %	84%	32%	0%	28%	46%
Vol Right, %	5%	25%	0%	72%	22%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	191	251	4	127	540
LT Vol	21	108	4	0	170
Through Vol	161	81	0	35	251
RT Vol	9	62	0	92	119
Lane Flow Rate	205	270	4	137	581
Geometry Grp	2	5	7	7	2
Degree of Util (X)	0.375	0.506	0.01	0.268	0.93
Departure Headway (Hd)	6.567	6.745	8.1	7.064	5.769
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	546	534	441	507	627
Service Time	4.631	4.802	5.867	4.831	3.816
HCM Lane V/C Ratio	0.375	0.506	0.009	0.27	0.927
HCM Control Delay	13.6	16.6	10.9	12.4	44.9
HCM Lane LOS	B	C	B	B	E
HCM 95th-tile Q	1.7	2.8	0	1.1	12.2

Intersection						
Int Delay, s/veh	1.1					

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	2	21	171	4	43	274
Future Vol, veh/h	2	21	171	4	43	274
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	84	84	84	84	84	84
Heavy Vehicles, %	2	2	4	4	4	4
Mvmt Flow	2	25	204	5	51	326

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	635	207	0	0	209	0
Stage 1	207	-	-	-	-	-
Stage 2	428	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.14	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.236	-
Pot Cap-1 Maneuver	443	833	-	-	1350	-
Stage 1	828	-	-	-	-	-
Stage 2	657	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	423	833	-	-	1350	-
Mov Cap-2 Maneuver	423	-	-	-	-	-
Stage 1	828	-	-	-	-	-
Stage 2	627	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	9.9	0	1.1
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	768	1350	-
HCM Lane V/C Ratio	-	-	0.036	0.038	-
HCM Control Delay (s)	-	-	9.9	7.8	0
HCM Lane LOS	-	-	A	A	A
HCM 95th %tile Q(veh)	-	-	0.1	0.1	-

Movement	NBT	NBR	SBL	SBT	SWL	SWR
Lane Configurations						
Traffic Volume (vph)	737	0	0	0	0	284
Future Volume (vph)	737	0	0	0	0	284
Ideal Flow (vphpl)	1950	1950	1950	1950	1950	1950
Total Lost time (s)	8.2					8.2
Lane Util. Factor	0.95					1.00
Frt	1.00					0.86
Flt Protected	1.00					1.00
Satd. Flow (prot)	3632					1654
Flt Permitted	1.00					1.00
Satd. Flow (perm)	3632					1654
Peak-hour factor, PHF	0.86	1.00	1.00	1.00	1.00	0.86
Adj. Flow (vph)	857	0	0	0	0	330
RTOR Reduction (vph)	0	0	0	0	0	37
Lane Group Flow (vph)	857	0	0	0	0	293
Turn Type	NA					Prot
Protected Phases	2					1
Permitted Phases						
Actuated Green, G (s)	27.2					26.4
Effective Green, g (s)	27.2					26.4
Actuated g/C Ratio	0.39					0.38
Clearance Time (s)	8.2					8.2
Vehicle Extension (s)	3.0					3.0
Lane Grp Cap (vph)	1411					623
v/s Ratio Prot	c0.24					c0.18
v/s Ratio Perm						
v/c Ratio	0.61					0.47
Uniform Delay, d1	17.1					16.5
Progression Factor	0.12					1.00
Incremental Delay, d2	1.6					0.6
Delay (s)	3.6					17.1
Level of Service	A					B
Approach Delay (s)	3.6			0.0	17.1	
Approach LOS	A			A	B	

Intersection Summary			
HCM 2000 Control Delay	7.3	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.54		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	16.4
Intersection Capacity Utilization	53.8%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	NBL	NBT	NBR	SBL	SBT	SBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (vph)	0	0	0	0	754	0	0	737	0	0	0	0
Future Volume (vph)	0	0	0	0	754	0	0	737	0	0	0	0
Ideal Flow (vphpl)	1950	1950	1950	1950	1950	1950	1950	1950	1950	1950	1950	1950
Total Lost time (s)					8.2			8.2				
Lane Util. Factor					0.95			0.95				
Frt					1.00			1.00				
Flt Protected					1.00			1.00				
Satd. Flow (prot)					3632			3632				
Flt Permitted					1.00			1.00				
Satd. Flow (perm)					3632			3632				
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	0.86	1.00	1.00	0.86	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	0	0	0	877	0	0	857	0	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	877	0	0	857	0	0	0	0
Turn Type					NA			NA				
Protected Phases					1			2				
Permitted Phases												
Actuated Green, G (s)					26.4			27.2				
Effective Green, g (s)					26.4			27.2				
Actuated g/C Ratio					0.38			0.39				
Clearance Time (s)					8.2			8.2				
Vehicle Extension (s)					3.0			3.0				
Lane Grp Cap (vph)					1369			1411				
v/s Ratio Prot					c0.24			c0.24				
v/s Ratio Perm												
v/c Ratio					0.64			0.61				
Uniform Delay, d1					17.9			17.1				
Progression Factor					1.00			0.89				
Incremental Delay, d2					1.0			1.9				
Delay (s)					18.9			17.1				
Level of Service					B			B				
Approach Delay (s)		0.0			18.9			17.1			0.0	
Approach LOS		A			B			B			A	

Intersection Summary			
HCM 2000 Control Delay	18.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	16.4
Intersection Capacity Utilization	53.8%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	NBT	NBR	SBL	SBT	SWL	SWR
Lane Configurations						
Traffic Volume (vph)	0	0	0	754	175	0
Future Volume (vph)	0	0	0	754	175	0
Ideal Flow (vphpl)	1950	1950	1950	1950	1950	1950
Total Lost time (s)				8.2	8.2	
Lane Util. Factor				0.95	0.97	
Frt				1.00	1.00	
Flt Protected				1.00	0.95	
Satd. Flow (prot)				3632	3523	
Flt Permitted				1.00	0.95	
Satd. Flow (perm)				3632	3523	
Peak-hour factor, PHF	1.00	1.00	1.00	0.86	0.86	1.00
Adj. Flow (vph)	0	0	0	877	203	0
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	877	203	0
Turn Type				NA	Prot	
Protected Phases				1	2	
Permitted Phases						
Actuated Green, G (s)				26.4	27.2	
Effective Green, g (s)				26.4	27.2	
Actuated g/C Ratio				0.38	0.39	
Clearance Time (s)				8.2	8.2	
Vehicle Extension (s)				3.0	3.0	
Lane Grp Cap (vph)				1369	1368	
v/s Ratio Prot				c0.24	c0.06	
v/s Ratio Perm						
v/c Ratio				0.64	0.15	
Uniform Delay, d1				17.9	13.9	
Progression Factor				0.15	1.00	
Incremental Delay, d2				0.8	0.2	
Delay (s)				3.5	14.1	
Level of Service				A	B	
Approach Delay (s)	0.0			3.5	14.1	
Approach LOS	A			A	B	

Intersection Summary			
HCM 2000 Control Delay	5.5	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.39		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	16.4
Intersection Capacity Utilization	40.6%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	NBL	NBT	SBT	SBR	NEL	NER
Lane Configurations						
Traffic Volume (vph)	0	491	0	0	379	0
Future Volume (vph)	0	491	0	0	379	0
Ideal Flow (vphpl)	1950	1950	1950	1950	1950	1950
Total Lost time (s)		9.2			9.2	
Lane Util. Factor		0.95			0.97	
Frt		1.00			1.00	
Flt Protected		1.00			0.95	
Satd. Flow (prot)		3632			3523	
Flt Permitted		1.00			0.95	
Satd. Flow (perm)		3632			3523	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	491	0	0	379	0
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	0	491	0	0	379	0
Turn Type		NA			Prot	
Protected Phases		2			1	
Permitted Phases						
Actuated Green, G (s)		29.0			22.6	
Effective Green, g (s)		29.0			22.6	
Actuated g/C Ratio		0.41			0.32	
Clearance Time (s)		9.2			9.2	
Vehicle Extension (s)		2.0			2.0	
Lane Grp Cap (vph)		1504			1137	
v/s Ratio Prot		c0.14			c0.11	
v/s Ratio Perm						
v/c Ratio		0.33			0.33	
Uniform Delay, d1		13.9			18.0	
Progression Factor		0.24			1.00	
Incremental Delay, d2		0.5			0.1	
Delay (s)		3.9			18.0	
Level of Service		A			B	
Approach Delay (s)		3.9	0.0		18.0	
Approach LOS		A	A		B	

Intersection Summary			
HCM 2000 Control Delay	10.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.33		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	18.4
Intersection Capacity Utilization	39.1%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	NBL	NBT	NBR	SBL	SBT	SBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations		↑↑									↑↑	
Traffic Volume (vph)	0	491	0	0	0	0	0	0	0	0	707	0
Future Volume (vph)	0	491	0	0	0	0	0	0	0	0	707	0
Ideal Flow (vphpl)	1950	1950	1950	1950	1950	1950	1950	1950	1950	1950	1950	1950
Total Lost time (s)		9.2									9.2	
Lane Util. Factor		0.95									0.95	
Frt		1.00									1.00	
Flt Protected		1.00									1.00	
Satd. Flow (prot)		3632									3632	
Flt Permitted		1.00									1.00	
Satd. Flow (perm)		3632									3632	
Peak-hour factor, PHF	0.86	0.86	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.86	1.00
Adj. Flow (vph)	0	571	0	0	0	0	0	0	0	0	822	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	571	0	0	0	0	0	0	0	0	822	0
Turn Type		NA									NA	
Protected Phases		2									1	
Permitted Phases												
Actuated Green, G (s)		29.0									22.6	
Effective Green, g (s)		29.0									22.6	
Actuated g/C Ratio		0.41									0.32	
Clearance Time (s)		9.2									9.2	
Vehicle Extension (s)		2.0									2.0	
Lane Grp Cap (vph)		1504									1172	
v/s Ratio Prot		c0.16									c0.23	
v/s Ratio Perm												
v/c Ratio		0.38									0.70	
Uniform Delay, d1		14.2									20.7	
Progression Factor		1.00									1.54	
Incremental Delay, d2		0.7									1.2	
Delay (s)		15.0									33.2	
Level of Service		B									C	
Approach Delay (s)		15.0			0.0			0.0			33.2	
Approach LOS		B			A			A			C	

Intersection Summary			
HCM 2000 Control Delay	25.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.52		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	18.4
Intersection Capacity Utilization	47.6%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	NBT	NBR	SBL	SBT	SWL	SWR
Lane Configurations						
Traffic Volume (vph)	0	0	0	269	707	0
Future Volume (vph)	0	0	0	269	707	0
Ideal Flow (vphpl)	1950	1950	1950	1950	1950	1950
Total Lost time (s)				9.2	9.2	
Lane Util. Factor				0.95	0.97	
Frt				1.00	1.00	
Flt Protected				1.00	0.95	
Satd. Flow (prot)				3632	3523	
Flt Permitted				1.00	0.95	
Satd. Flow (perm)				3632	3523	
Peak-hour factor, PHF	1.00	1.00	1.00	0.86	0.86	1.00
Adj. Flow (vph)	0	0	0	313	822	0
RTOR Reduction (vph)	0	0	0	0	477	0
Lane Group Flow (vph)	0	0	0	313	345	0
Turn Type				NA	Prot	
Protected Phases				2	1	
Permitted Phases						
Actuated Green, G (s)				29.0	22.6	
Effective Green, g (s)				29.0	22.6	
Actuated g/C Ratio				0.41	0.32	
Clearance Time (s)				9.2	9.2	
Vehicle Extension (s)				2.0	2.0	
Lane Grp Cap (vph)				1504	1137	
v/s Ratio Prot				c0.09	c0.10	
v/s Ratio Perm						
v/c Ratio				0.21	0.30	
Uniform Delay, d1				13.1	17.8	
Progression Factor				1.00	0.22	
Incremental Delay, d2				0.3	0.0	
Delay (s)				13.5	4.0	
Level of Service				B	A	
Approach Delay (s)	0.0			13.5	4.0	
Approach LOS	A			B	A	

Intersection Summary			
HCM 2000 Control Delay	6.6	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.25		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	18.4
Intersection Capacity Utilization	47.6%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Intersection	
Intersection Delay, s/veh	53.8
Intersection LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	82	115	17	29	77	97	6	160	25	183	264	126
Future Vol, veh/h	82	115	17	29	77	97	6	160	25	183	264	126
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	99	139	20	35	93	117	7	193	30	220	318	152
Number of Lanes	1	1	0	1	1	0	0	2	1	0	1	1

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	2	2	3
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	3	2	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	3	2	2	2
HCM Control Delay	15.9	17.6	14.2	94
HCM LOS	C	C	B	F

Lane	NBLn1	NBLn2	NBLn3	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1	SBLn2
Vol Left, %	10%	0%	0%	100%	0%	100%	0%	41%	0%
Vol Thru, %	90%	100%	0%	0%	87%	0%	44%	59%	0%
Vol Right, %	0%	0%	100%	0%	13%	0%	56%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	59	107	25	82	132	29	174	447	126
LT Vol	6	0	0	82	0	29	0	183	0
Through Vol	53	107	0	0	115	0	77	264	0
RT Vol	0	0	25	0	17	0	97	0	126
Lane Flow Rate	71	129	30	99	159	35	210	539	152
Geometry Grp	8	8	8	8	8	8	8	8	8
Degree of Util (X)	0.169	0.302	0.065	0.244	0.367	0.087	0.469	1.153	0.286
Departure Headway (Hd)	8.889	8.837	8.113	9.32	8.713	9.369	8.454	7.706	6.779
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	406	409	444	387	415	385	430	474	531
Service Time	6.589	6.537	5.813	7.02	6.413	7.069	6.154	5.441	4.514
HCM Lane V/C Ratio	0.175	0.315	0.068	0.256	0.383	0.091	0.488	1.137	0.286
HCM Control Delay	13.4	15.3	11.4	15	16.4	13	18.4	117	12.2
HCM Lane LOS	B	C	B	B	C	B	C	F	B
HCM 95th-tile Q	0.6	1.3	0.2	0.9	1.7	0.3	2.4	19.3	1.2

Intersection	
Int Delay, s/veh	0.9

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	23	4	6	127	185	43
Future Vol, veh/h	23	4	6	127	185	43
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	77	77	77	77	77	77
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	30	5	8	165	240	56

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	449	268	296	0	-	0
Stage 1	268	-	-	-	-	-
Stage 2	181	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	568	771	1265	-	-	-
Stage 1	777	-	-	-	-	-
Stage 2	850	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	564	771	1265	-	-	-
Mov Cap-2 Maneuver	564	-	-	-	-	-
Stage 1	772	-	-	-	-	-
Stage 2	850	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	11.5	0.4	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1265	-	587	-	-
HCM Lane V/C Ratio	0.006	-	0.06	-	-
HCM Control Delay (s)	7.9	0	11.5	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0.2	-	-

Intersection	
Int Delay, s/veh	7.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	2	20	4	4	20	2	2	4	3	4	4	2
Future Vol, veh/h	2	20	4	4	20	2	2	4	3	4	4	2
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	63	63	63	63	63	63	63	63	63	63	63	63
Heavy Vehicles, %	6	6	6	2	2	2	14	14	14	11	11	11
Mvmt Flow	3	32	6	6	32	3	3	6	5	6	6	3

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	52	37	8	54	36	9	9	0	0	11	0	0
Stage 1	20	20	-	15	15	-	-	-	-	-	-	-
Stage 2	32	17	-	39	21	-	-	-	-	-	-	-
Critical Hdwy	7.16	6.56	6.26	7.12	6.52	6.22	4.24	-	-	4.21	-	-
Critical Hdwy Stg 1	6.16	5.56	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.16	5.56	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.554	4.054	3.354	3.518	4.018	3.318	2.326	-	-	2.299	-	-
Pot Cap-1 Maneuver	937	848	1062	944	856	1073	1536	-	-	1551	-	-
Stage 1	989	871	-	1005	883	-	-	-	-	-	-	-
Stage 2	974	873	-	976	878	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	903	843	1062	907	851	1073	1536	-	-	1551	-	-
Mov Cap-2 Maneuver	903	843	-	907	851	-	-	-	-	-	-	-
Stage 1	987	868	-	1003	881	-	-	-	-	-	-	-
Stage 2	934	871	-	931	874	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	9.3	9.3	1.6	2.9
HCM LOS	A	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1536	-	-	875	873	1551	-	-
HCM Lane V/C Ratio	0.002	-	-	0.047	0.047	0.004	-	-
HCM Control Delay (s)	7.3	0	-	9.3	9.3	7.3	0	-
HCM Lane LOS	A	A	-	A	A	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.1	0.1	0	-	-

Intersection						
Int Delay, s/veh	3.2					

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	46	1	1	7	9	72
Future Vol, veh/h	46	1	1	7	9	72
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	50	1	1	8	10	78

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	59	49	88	0	-	0
Stage 1	49	-	-	-	-	-
Stage 2	10	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	948	1020	1508	-	-	-
Stage 1	973	-	-	-	-	-
Stage 2	1013	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	947	1020	1508	-	-	-
Mov Cap-2 Maneuver	947	-	-	-	-	-
Stage 1	972	-	-	-	-	-
Stage 2	1013	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	9	0.9	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1508	-	948	-	-
HCM Lane V/C Ratio	0.001	-	0.054	-	-
HCM Control Delay (s)	7.4	0	9	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	0.2	-	-

Intersection						
Int Delay, s/veh	4.4					

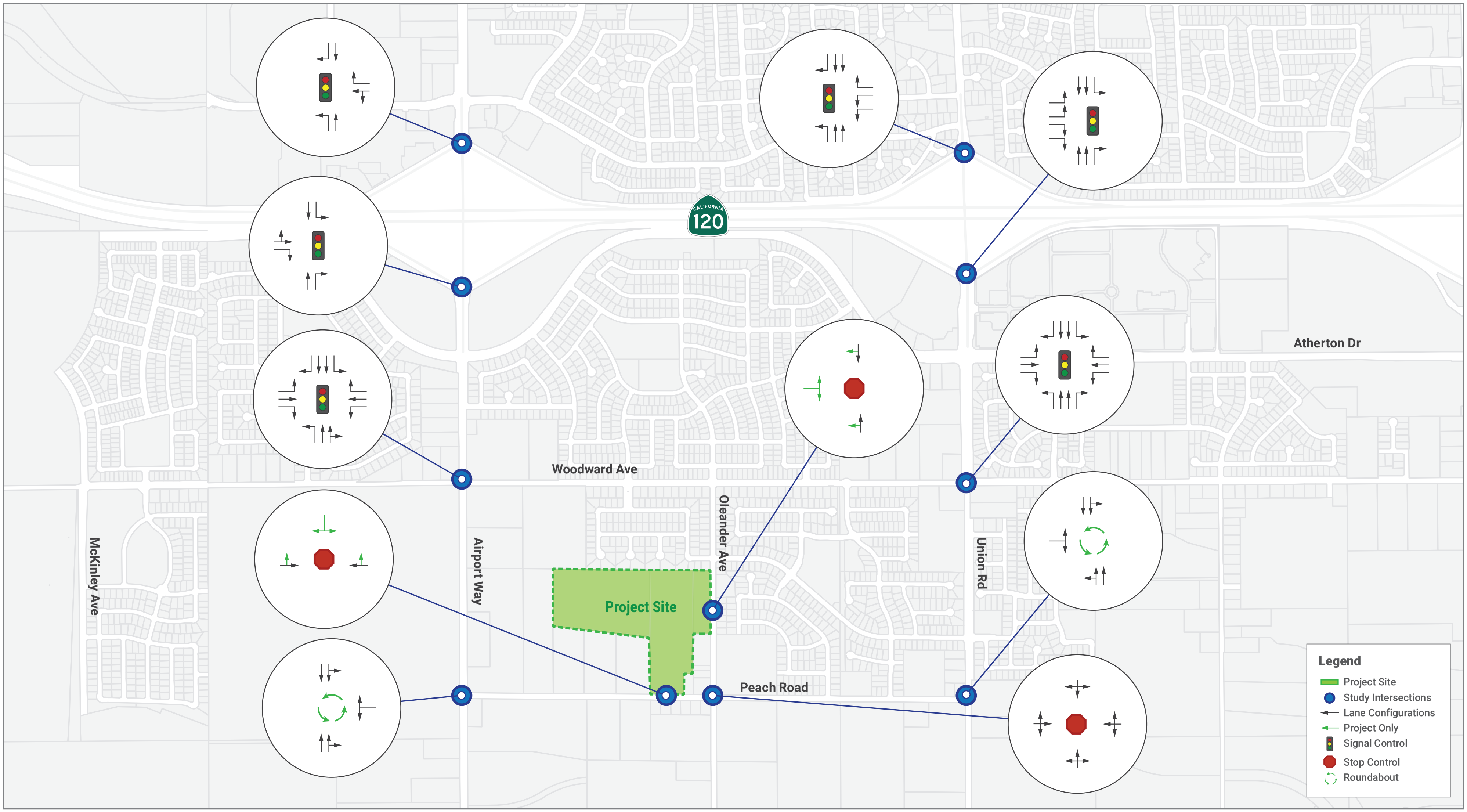
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	29	18	8	16	8	15
Future Vol, veh/h	29	18	8	16	8	15
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	32	20	9	17	9	16

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	26	0	-	0	102	18
Stage 1	-	-	-	-	18	-
Stage 2	-	-	-	-	84	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1588	-	-	-	896	1061
Stage 1	-	-	-	-	1005	-
Stage 2	-	-	-	-	939	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1588	-	-	-	878	1061
Mov Cap-2 Maneuver	-	-	-	-	878	-
Stage 1	-	-	-	-	985	-
Stage 2	-	-	-	-	939	-

Approach	EB	WB	SB
HCM Control Delay, s	4.5	0	8.7
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1588	-	-	-	989
HCM Lane V/C Ratio	0.02	-	-	-	0.025
HCM Control Delay (s)	7.3	0	-	-	8.7
HCM Lane LOS	A	A	-	-	A
HCM 95th %tile Q(veh)	0.1	-	-	-	0.1

CUMULATIVE LANE CONFIGURATIONS


Woodward Ave
Atherton Dr
McKinley Ave
Airport Way
Oleander Ave
Union Rd
Peach Road
Project Site
120
Legend
Project Site
Study Intersections
Lane Configurations
Project Only
Signal Control
Stop Control
Roundabout
Scale in Feet
0
1,200
North

CUMULATIVE CONDITIONS ANALYSIS

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	180	3	591	421	1495	0	0	953	500
Future Volume (veh/h)	0	0	0	180	3	591	421	1495	0	0	953	500
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)				1.00		0.98	1.00		1.00	1.00		0.97
Parking Bus, Adj				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach					No			No			No	
Adj Sat Flow, veh/h/ln				1796	1796	1796	1811	1811	0	0	1796	1796
Adj Flow Rate, veh/h				196	3	642	458	1625	0	0	1036	543
Peak Hour Factor				0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %				7	7	7	6	6	0	0	7	7
Cap, veh/h				342	5	302	350	1201	0	0	729	602
Arrive On Green				0.20	0.20	0.20	0.20	0.66	0.00	0.00	0.41	0.41
Sat Flow, veh/h				1686	26	1490	1725	1811	0	0	1796	1484
Grp Volume(v), veh/h				199	0	642	458	1625	0	0	1036	543
Grp Sat Flow(s),veh/h/ln				1712	0	1490	1725	1811	0	0	1796	1484
Q Serve(g_s), s				7.7	0.0	15.0	15.0	49.0	0.0	0.0	30.0	25.3
Cycle Q Clear(g_c), s				7.7	0.0	15.0	15.0	49.0	0.0	0.0	30.0	25.3
Prop In Lane				0.98		1.00	1.00		0.00	0.00		1.00
Lane Grp Cap(c), veh/h				347	0	302	350	1201	0	0	729	602
V/C Ratio(X)				0.57	0.00	2.12	1.31	1.35	0.00	0.00	1.42	0.90
Avail Cap(c_a), veh/h				347	0	302	350	1201	0	0	729	602
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	1.00	1.00	1.00	0.00	0.00	1.00	1.00
Uniform Delay (d), s/veh				26.6	0.0	29.5	29.5	12.5	0.0	0.0	21.9	20.6
Incr Delay (d2), s/veh				1.5	0.0	516.1	157.9	164.5	0.0	0.0	197.3	16.3
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				3.2	0.0	48.5	21.3	69.3	0.0	0.0	51.4	10.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh				28.0	0.0	545.6	187.3	176.9	0.0	0.0	219.3	36.9
LnGrp LOS				C	A	F	F	F	A	A	F	D
Approach Vol, veh/h					841			2083			1579	
Approach Delay, s/veh					423.1			179.2			156.6	
Approach LOS					F			F			F	

Timer - Assigned Phs		2			5	6		8				
Phs Duration (G+Y+Rc), s		54.3			19.0	35.3		19.6				
Change Period (Y+Rc), s		5.3			4.0	5.3		4.6				
Max Green Setting (Gmax), s		30.0			15.0	30.0		15.0				
Max Q Clear Time (g_c+I1), s		51.0			17.0	32.0		17.0				
Green Ext Time (p_c), s		0.0			0.0	0.0		0.0				

Intersection Summary			
HCM 6th Ctrl Delay			216.8
HCM 6th LOS			F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	311	3	424	0	0	0	0	1605	151	221	912	0
Future Volume (veh/h)	311	3	424	0	0	0	0	1605	151	221	912	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	1781	1781	1781				0	1811	1811	1781	1781	0
Adj Flow Rate, veh/h	338	3	461				0	1745	164	240	991	0
Peak Hour Factor	0.92	0.92	0.92				0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	8	8	8				0	6	6	8	8	0
Cap, veh/h	439	4	393				0	709	598	283	1087	0
Arrive On Green	0.26	0.26	0.26				0.00	0.39	0.39	0.17	0.61	0.00
Sat Flow, veh/h	1682	15	1508				0	1811	1529	1697	1781	0
Grp Volume(v), veh/h	341	0	461				0	1745	164	240	991	0
Grp Sat Flow(s),veh/h/ln	1697	0	1508				0	1811	1529	1697	1781	0
Q Serve(g_s), s	14.2	0.0	20.0				0.0	30.0	5.6	10.5	37.5	0.0
Cycle Q Clear(g_c), s	14.2	0.0	20.0				0.0	30.0	5.6	10.5	37.5	0.0
Prop In Lane	0.99		1.00				0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	443	0	393				0	709	598	283	1087	0
V/C Ratio(X)	0.77	0.00	1.17				0.00	2.46	0.27	0.85	0.91	0.00
Avail Cap(c_a), veh/h	443	0	393				0	709	598	664	1087	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	1.00				0.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	26.2	0.0	28.3				0.0	23.3	15.9	31.0	13.1	0.0
Incr Delay (d2), s/veh	7.3	0.0	101.2				0.0	662.3	0.1	2.8	11.2	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	6.4	0.0	17.9				0.0	142.1	1.9	4.4	15.5	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	33.5	0.0	129.5				0.0	685.6	16.0	33.8	24.3	0.0
LnGrp LOS	C	A	F				A	F	B	C	C	A
Approach Vol, veh/h		802						1909			1231	
Approach Delay, s/veh		88.7						628.1			26.2	
Approach LOS		F						F			C	

Timer - Assigned Phs	1	2		4		6
Phs Duration (G+Y+Rc), s	16.8	35.3		24.6		52.1
Change Period (Y+Rc), s	4.0	5.3		4.6		5.3
Max Green Setting (Gmax), s	30.0	30.0		20.0		30.0
Max Q Clear Time (g_c+I1), s	12.5	32.0		22.0		39.5
Green Ext Time (p_c), s	0.3	0.0		0.0		0.0

Intersection Summary	
HCM 6th Ctrl Delay	330.4
HCM 6th LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	181	83	218	23	115	144	318	1112	11	108	723	173
Future Volume (veh/h)	181	83	218	23	115	144	318	1112	11	108	723	173
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		0.98	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	1841	1841	1841	1826	1826	1826	1841	1841	1841	1722	1722	1722
Adj Flow Rate, veh/h	197	90	237	25	125	157	346	1209	12	117	786	188
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	4	4	4	5	5	5	4	4	4	12	12	12
Cap, veh/h	243	423	358	48	216	183	393	1372	14	146	824	368
Arrive On Green	0.14	0.23	0.23	0.03	0.12	0.12	0.22	0.39	0.39	0.09	0.25	0.25
Sat Flow, veh/h	1753	1841	1558	1739	1826	1543	1753	3547	35	1640	3272	1459
Grp Volume(v), veh/h	197	90	237	25	125	157	346	596	625	117	786	188
Grp Sat Flow(s),veh/h/ln	1753	1841	1558	1739	1826	1543	1753	1749	1833	1640	1636	1459
Q Serve(g_s), s	7.4	2.7	9.3	1.0	4.4	6.7	12.9	21.4	21.4	4.7	16.0	7.5
Cycle Q Clear(g_c), s	7.4	2.7	9.3	1.0	4.4	6.7	12.9	21.4	21.4	4.7	16.0	7.5
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.02	1.00		1.00
Lane Grp Cap(c), veh/h	243	423	358	48	216	183	393	677	709	146	824	368
V/C Ratio(X)	0.81	0.21	0.66	0.52	0.58	0.86	0.88	0.88	0.88	0.80	0.95	0.51
Avail Cap(c_a), veh/h	390	464	392	155	216	183	442	677	709	194	824	368
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	28.2	21.0	23.6	32.4	28.1	29.2	25.3	19.2	19.2	30.2	24.9	21.7
Incr Delay (d2), s/veh	6.5	0.2	3.6	8.4	3.8	31.1	17.1	12.9	12.4	15.9	20.8	1.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.4	1.1	3.6	0.5	2.1	4.0	6.9	10.2	10.6	2.4	8.1	2.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	34.7	21.3	27.3	40.7	31.9	60.3	42.4	32.1	31.7	46.1	45.7	22.9
LnGrp LOS	C	C	C	D	C	E	D	C	C	D	D	C
Approach Vol, veh/h		524			307			1567			1091	
Approach Delay, s/veh		29.0			47.1			34.2			41.8	
Approach LOS		C			D			C			D	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	10.0	31.1	5.9	20.5	19.1	22.0	13.4	13.0				
Change Period (Y+Rc), s	4.0	5.0	4.0	5.0	4.0	5.0	4.0	5.0				
Max Green Setting (Gmax), s	8.0	26.0	6.0	17.0	17.0	17.0	15.0	8.0				
Max Q Clear Time (g_c+I1), s	6.7	23.4	3.0	11.3	14.9	18.0	9.4	8.7				
Green Ext Time (p_c), s	0.0	1.8	0.0	0.6	0.3	0.0	0.3	0.0				
Intersection Summary												
HCM 6th Ctrl Delay			36.9									
HCM 6th LOS			D									

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	129	170	14	50	187	373	10	437	59	487	317	89
Future Volume (veh/h)	129	170	14	50	187	373	10	437	59	487	317	89
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		1.00	1.00		0.99	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	140	185	15	54	203	405	11	475	64	529	345	97
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	178	355	297	85	258	731	25	579	257	577	1680	748
Arrive On Green	0.10	0.19	0.19	0.05	0.14	0.14	0.01	0.16	0.16	0.32	0.47	0.47
Sat Flow, veh/h	1781	1870	1564	1781	1870	1578	1781	3554	1575	1781	3554	1582
Grp Volume(v), veh/h	140	185	15	54	203	405	11	475	64	529	345	97
Grp Sat Flow(s),veh/h/ln	1781	1870	1564	1781	1870	1578	1781	1777	1575	1781	1777	1582
Q Serve(g_s), s	5.0	5.8	0.5	1.9	6.9	9.0	0.4	8.4	2.3	18.7	3.7	2.2
Cycle Q Clear(g_c), s	5.0	5.8	0.5	1.9	6.9	9.0	0.4	8.4	2.3	18.7	3.7	2.2
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	178	355	297	85	258	731	25	579	257	577	1680	748
V/C Ratio(X)	0.79	0.52	0.05	0.63	0.79	0.55	0.45	0.82	0.25	0.92	0.21	0.13
Avail Cap(c_a), veh/h	245	355	297	164	258	731	136	599	265	627	1680	748
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	28.7	23.8	21.6	30.5	27.2	12.7	32.0	26.4	23.8	21.2	10.0	9.7
Incr Delay (d2), s/veh	11.0	1.4	0.1	7.6	14.9	0.9	12.1	8.7	0.5	17.7	0.1	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.6	2.6	0.2	1.0	4.0	3.9	0.2	4.1	0.9	9.9	1.3	0.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	39.7	25.2	21.7	38.1	42.2	13.6	44.0	35.1	24.4	38.9	10.1	9.7
LnGrp LOS	D	C	C	D	D	B	D	D	C	D	B	A
Approach Vol, veh/h		340			662			550			971	
Approach Delay, s/veh		31.0			24.4			34.0			25.8	
Approach LOS		C			C			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	25.1	15.6	7.1	17.4	4.9	35.9	10.5	14.0
Change Period (Y+Rc), s	4.0	5.0	4.0	5.0	4.0	5.0	4.0	5.0
Max Green Setting (Gmax), s	23.0	11.0	6.0	12.0	5.0	29.0	9.0	9.0
Max Q Clear Time (g_c+I1), s	20.7	10.4	3.9	7.8	2.4	5.7	7.0	11.0
Green Ext Time (p_c), s	0.5	0.2	0.0	0.4	0.0	2.6	0.1	0.0

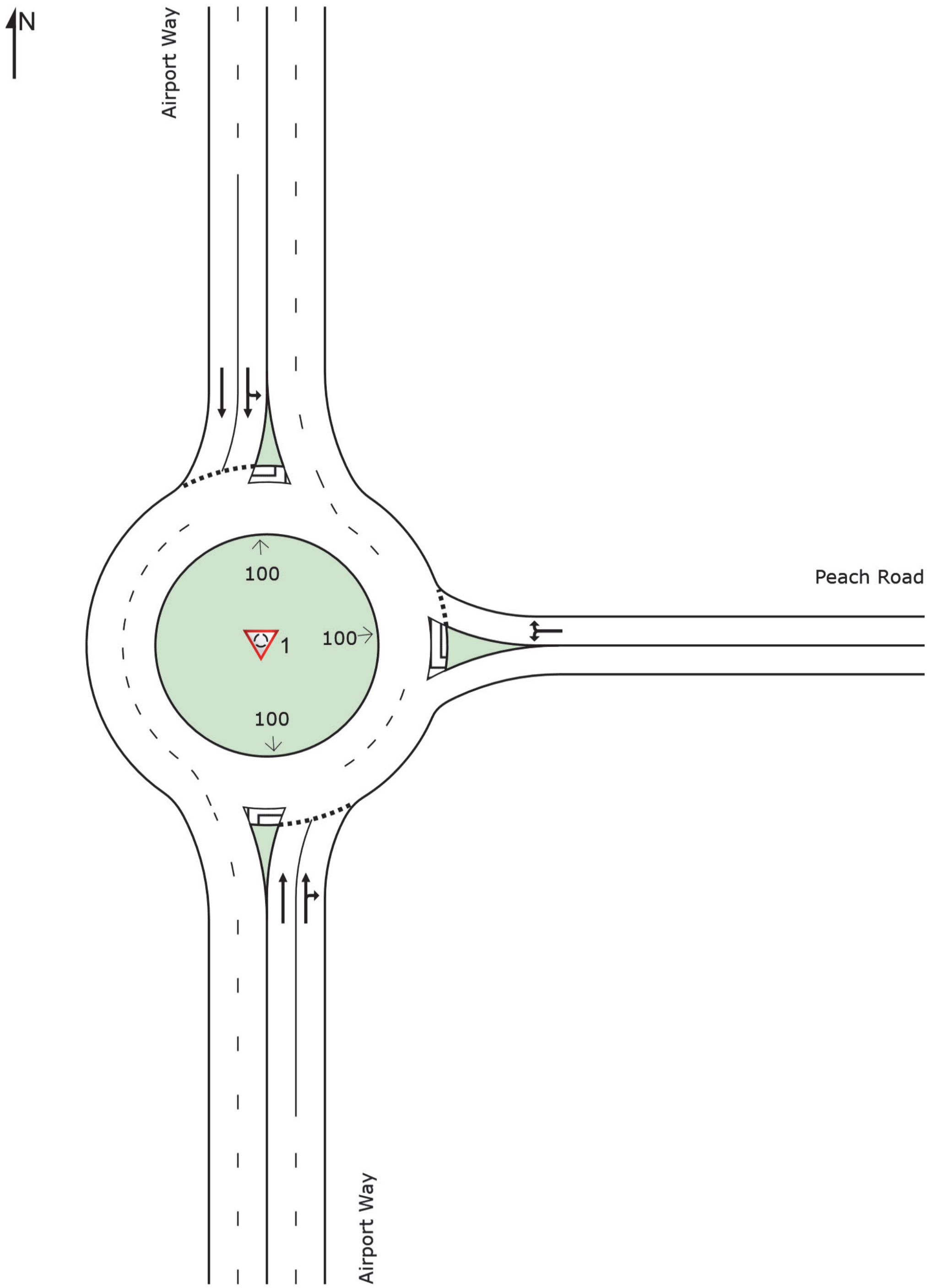
Intersection Summary	
HCM 6th Ctrl Delay	27.9
HCM 6th LOS	C

SITE LAYOUT

Site: 1 [Airport Way & Peach Road (Site Folder: General)]

New Site
Site Category: (None)
Roundabout

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



MOVEMENT SUMMARY

Site: 1 [Airport Way & Peach Road (Site Folder: General)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance															
Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] ft	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed mph
South: Airport Way														
8	T1	1008	3.0	1096	3.0	0.401	6.4	LOS A	2.4	62.5	0.08	0.02	0.08	34.5
18	R2	1	3.0	1	3.0	0.401	6.4	LOS A	2.4	62.5	0.08	0.02	0.08	33.4
Approach		1009	3.0	1097	3.0	0.401	6.4	LOS A	2.4	62.5	0.08	0.02	0.08	34.5
East: Peach Road														
1	L2	4	3.0	4	3.0	0.046	9.1	LOS A	0.2	4.1	0.69	0.69	0.69	32.5
16	R2	14	3.0	15	3.0	0.046	9.1	LOS A	0.2	4.1	0.69	0.69	0.69	31.5
Approach		18	3.0	20	3.0	0.046	9.1	LOS A	0.2	4.1	0.69	0.69	0.69	31.7
North: Airport Way														
7	L2	8	3.0	9	3.0	0.314	5.4	LOS A	1.7	43.1	0.05	0.01	0.05	35.0
4	T1	785	3.0	853	3.0	0.314	5.4	LOS A	1.7	43.1	0.05	0.01	0.05	35.0
Approach		793	3.0	862	3.0	0.314	5.4	LOS A	1.7	43.1	0.05	0.01	0.05	35.0
All Vehicles		1820	3.0	1978	3.0	0.401	6.0	LOS A	2.4	62.5	0.07	0.02	0.07	34.7

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
Delay Model: HCM Delay Formula (Geometric Delay is not included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement	NBT	NBR	SBL	SBT	SWL	SWR
Lane Configurations						
Traffic Volume (vph)	1060	0	0	0	0	297
Future Volume (vph)	1060	0	0	0	0	297
Ideal Flow (vphpl)	1950	1950	1950	1950	1950	1950
Total Lost time (s)	8.2					8.2
Lane Util. Factor	0.95					1.00
Frt	1.00					0.86
Flt Protected	1.00					1.00
Satd. Flow (prot)	3632					1654
Flt Permitted	1.00					1.00
Satd. Flow (perm)	3632					1654
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1152	0	0	0	0	323
RTOR Reduction (vph)	0	0	0	0	0	39
Lane Group Flow (vph)	1152	0	0	0	0	284
Turn Type	NA					Prot
Protected Phases	2					1
Permitted Phases						
Actuated Green, G (s)	29.3					24.3
Effective Green, g (s)	29.3					24.3
Actuated g/C Ratio	0.42					0.35
Clearance Time (s)	8.2					8.2
Vehicle Extension (s)	2.0					2.0
Lane Grp Cap (vph)	1520					574
v/s Ratio Prot	c0.32					c0.17
v/s Ratio Perm						
v/c Ratio	0.76					0.49
Uniform Delay, d1	17.3					18.0
Progression Factor	0.14					1.00
Incremental Delay, d2	1.3					3.0
Delay (s)	3.7					21.0
Level of Service	A					C
Approach Delay (s)	3.7			0.0	21.0	
Approach LOS	A			A	C	

Intersection Summary			
HCM 2000 Control Delay	7.5	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	16.4
Intersection Capacity Utilization	63.5%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	NBL	NBT	NBR	SBL	SBT	SBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations					↑↑			↑↑				
Traffic Volume (vph)	0	0	0	0	791	0	0	1060	0	0	0	0
Future Volume (vph)	0	0	0	0	791	0	0	1060	0	0	0	0
Ideal Flow (vphpl)	1950	1950	1950	1950	1950	1950	1950	1950	1950	1950	1950	1950
Total Lost time (s)					8.2			8.2				
Lane Util. Factor					0.95			0.95				
Frt					1.00			1.00				
Flt Protected					1.00			1.00				
Satd. Flow (prot)					3632			3632				
Flt Permitted					1.00			1.00				
Satd. Flow (perm)					3632			3632				
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	0	860	0	0	1152	0	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	860	0	0	1152	0	0	0	0
Turn Type					NA			NA				
Protected Phases					1			2				
Permitted Phases												
Actuated Green, G (s)					24.3			29.3				
Effective Green, g (s)					24.3			29.3				
Actuated g/C Ratio					0.35			0.42				
Clearance Time (s)					8.2			8.2				
Vehicle Extension (s)					2.0			2.0				
Lane Grp Cap (vph)					1260			1520				
v/s Ratio Prot					c0.24			c0.32				
v/s Ratio Perm												
v/c Ratio					0.68			0.76				
Uniform Delay, d1					19.5			17.3				
Progression Factor					1.00			0.76				
Incremental Delay, d2					3.0			1.5				
Delay (s)					22.6			14.7				
Level of Service					C			B				
Approach Delay (s)		0.0			22.6			14.7			0.0	
Approach LOS		A			C			B			A	

Intersection Summary			
HCM 2000 Control Delay	18.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	16.4
Intersection Capacity Utilization	63.5%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	NBT	NBR	SBL	SBT	SWL	SWR
Lane Configurations				↑↑	↰↰	
Traffic Volume (vph)	0	0	0	791	104	0
Future Volume (vph)	0	0	0	791	104	0
Ideal Flow (vphpl)	1950	1950	1950	1950	1950	1950
Total Lost time (s)				8.2	8.2	
Lane Util. Factor				0.95	0.97	
Frt				1.00	1.00	
Flt Protected				1.00	0.95	
Satd. Flow (prot)				3632	3523	
Flt Permitted				1.00	0.95	
Satd. Flow (perm)				3632	3523	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	860	113	0
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	860	113	0
Turn Type				NA	Prot	
Protected Phases				1	2	
Permitted Phases						
Actuated Green, G (s)				24.3	29.3	
Effective Green, g (s)				24.3	29.3	
Actuated g/C Ratio				0.35	0.42	
Clearance Time (s)				8.2	8.2	
Vehicle Extension (s)				2.0	2.0	
Lane Grp Cap (vph)				1260	1474	
v/s Ratio Prot				c0.24	c0.03	
v/s Ratio Perm						
v/c Ratio				0.68	0.08	
Uniform Delay, d1				19.5	12.2	
Progression Factor				0.18	1.00	
Incremental Delay, d2				2.2	0.0	
Delay (s)				5.7	12.2	
Level of Service				A	B	
Approach Delay (s)	0.0			5.7	12.2	
Approach LOS	A			A	B	

Intersection Summary			
HCM 2000 Control Delay	6.4	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.35		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	16.4
Intersection Capacity Utilization	41.6%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	NBL	NBT	SBT	SBR	NEL	NER
Lane Configurations						
Traffic Volume (vph)	0	1094	0	0	419	0
Future Volume (vph)	0	1094	0	0	419	0
Ideal Flow (vphpl)	1950	1950	1950	1950	1950	1950
Total Lost time (s)		9.2			9.2	
Lane Util. Factor		0.95			0.97	
Frt		1.00			1.00	
Flt Protected		1.00			0.95	
Satd. Flow (prot)		3632			3523	
Flt Permitted		1.00			0.95	
Satd. Flow (perm)		3632			3523	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	1189	0	0	455	0
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	0	1189	0	0	455	0
Turn Type		NA			Prot	
Protected Phases		2			1	
Permitted Phases						
Actuated Green, G (s)		31.1			20.5	
Effective Green, g (s)		31.1			20.5	
Actuated g/C Ratio		0.44			0.29	
Clearance Time (s)		9.2			9.2	
Vehicle Extension (s)		2.0			2.0	
Lane Grp Cap (vph)		1613			1031	
v/s Ratio Prot		c0.33			c0.13	
v/s Ratio Perm						
v/c Ratio		0.74			0.44	
Uniform Delay, d1		16.1			20.1	
Progression Factor		0.27			1.00	
Incremental Delay, d2		1.0			1.4	
Delay (s)		5.3			21.5	
Level of Service		A			C	
Approach Delay (s)		5.3	0.0		21.5	
Approach LOS		A	A		C	

Intersection Summary			
HCM 2000 Control Delay	9.8	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	18.4
Intersection Capacity Utilization	56.4%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	NBL	NBT	NBR	SBL	SBT	SBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations		↑↑									↑↑	
Traffic Volume (vph)	0	1094	0	0	0	0	0	0	0	0	707	0
Future Volume (vph)	0	1094	0	0	0	0	0	0	0	0	707	0
Ideal Flow (vphpl)	1950	1950	1950	1950	1950	1950	1950	1950	1950	1950	1950	1950
Total Lost time (s)		9.2									9.2	
Lane Util. Factor		0.95									0.95	
Frt		1.00									1.00	
Flt Protected		1.00									1.00	
Satd. Flow (prot)		3632									3632	
Flt Permitted		1.00									1.00	
Satd. Flow (perm)		3632									3632	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	1189	0	0	0	0	0	0	0	0	768	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	1189	0	0	0	0	0	0	0	0	768	0
Turn Type		NA									NA	
Protected Phases		2									1	
Permitted Phases												
Actuated Green, G (s)		31.1									20.5	
Effective Green, g (s)		31.1									20.5	
Actuated g/C Ratio		0.44									0.29	
Clearance Time (s)		9.2									9.2	
Vehicle Extension (s)		2.0									2.0	
Lane Grp Cap (vph)		1613									1063	
v/s Ratio Prot		c0.33									c0.21	
v/s Ratio Perm												
v/c Ratio		0.74									0.72	
Uniform Delay, d1		16.1									22.2	
Progression Factor		1.00									1.17	
Incremental Delay, d2		1.5									3.1	
Delay (s)		17.6									29.1	
Level of Service		B									C	
Approach Delay (s)		17.6			0.0			0.0			29.1	
Approach LOS		B			A			A			C	

Intersection Summary			
HCM 2000 Control Delay	22.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	18.4
Intersection Capacity Utilization	63.8%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	NBT	NBR	SBL	SBT	SWL	SWR
Lane Configurations						
Traffic Volume (vph)	0	0	0	598	707	0
Future Volume (vph)	0	0	0	598	707	0
Ideal Flow (vphpl)	1950	1950	1950	1950	1950	1950
Total Lost time (s)				9.2	9.2	
Lane Util. Factor				0.95	0.97	
Frt				1.00	1.00	
Flt Protected				1.00	0.95	
Satd. Flow (prot)				3632	3523	
Flt Permitted				1.00	0.95	
Satd. Flow (perm)				3632	3523	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	650	768	0
RTOR Reduction (vph)	0	0	0	0	200	0
Lane Group Flow (vph)	0	0	0	650	568	0
Turn Type				NA	Prot	
Protected Phases				2	1	
Permitted Phases						
Actuated Green, G (s)				31.1	20.5	
Effective Green, g (s)				31.1	20.5	
Actuated g/C Ratio				0.44	0.29	
Clearance Time (s)				9.2	9.2	
Vehicle Extension (s)				2.0	2.0	
Lane Grp Cap (vph)				1613	1031	
v/s Ratio Prot				c0.18	c0.16	
v/s Ratio Perm						
v/c Ratio				0.40	0.55	
Uniform Delay, d1				13.2	20.9	
Progression Factor				1.00	0.32	
Incremental Delay, d2				0.1	1.5	
Delay (s)				13.2	8.1	
Level of Service				B	A	
Approach Delay (s)	0.0			13.2	8.1	
Approach LOS	A			B	A	

Intersection Summary			
HCM 2000 Control Delay	10.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.46		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	18.4
Intersection Capacity Utilization	63.8%	ICU Level of Service	B
Analysis Period (min)	15		

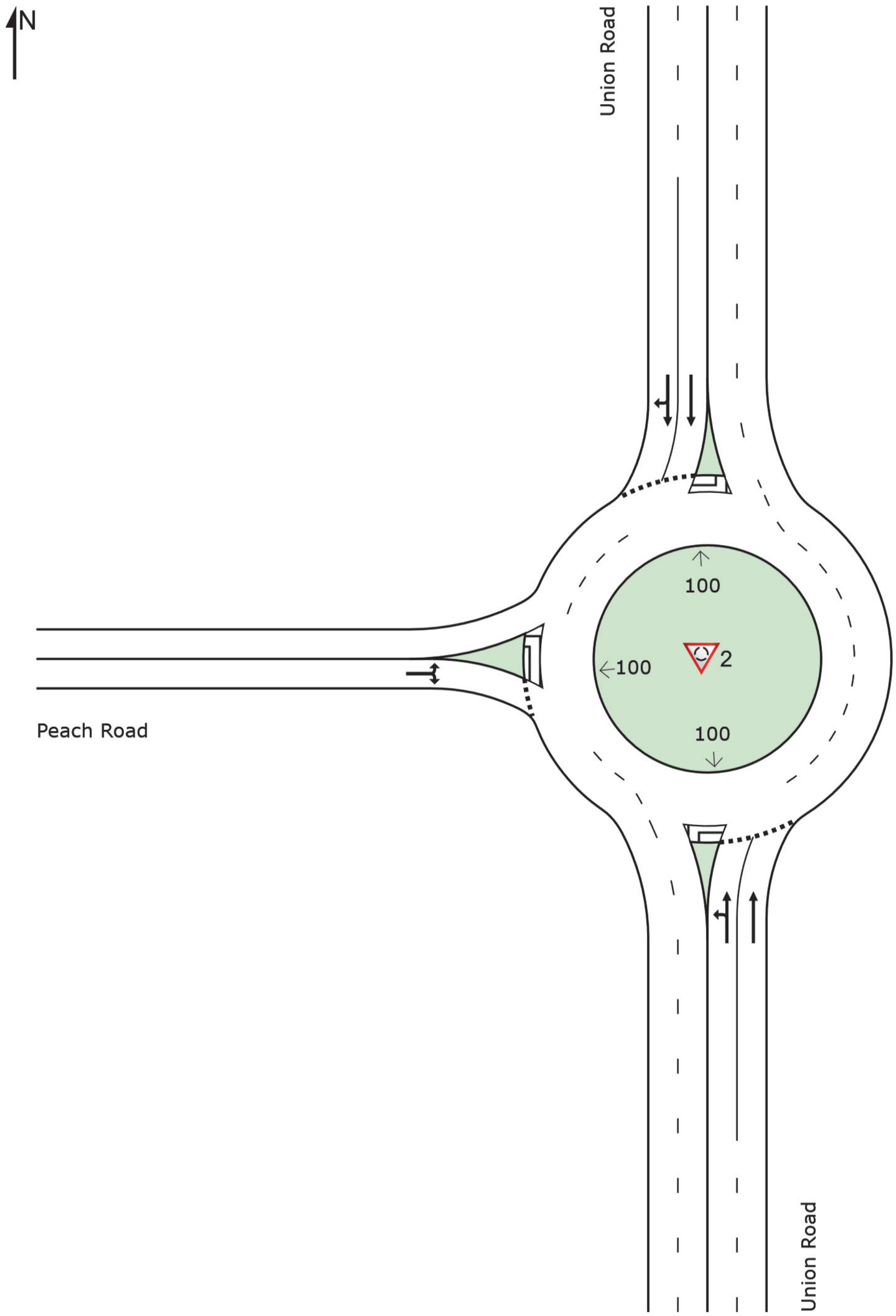
c Critical Lane Group

SITE LAYOUT

Site: 2 [Union Road & Peach Road (Site Folder: General)]

New Site
Site Category: (None)
Roundabout

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



MOVEMENT SUMMARY

Site: 2 [Union Road & Peach Road (Site Folder: General)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] ft	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed mph
South: Union Road														
3	L2	8	3.0	9	3.0	0.168	4.1	LOS A	0.7	18.9	0.15	0.05	0.15	35.7
8	T1	400	3.0	435	3.0	0.168	4.1	LOS A	0.7	18.9	0.15	0.05	0.15	35.7
Approach		408	3.0	443	3.0	0.168	4.1	LOS A	0.7	18.9	0.15	0.05	0.15	35.7
North: Union Road														
4	T1	371	3.0	403	3.0	0.155	3.9	LOS A	0.7	17.5	0.06	0.01	0.06	35.9
14	R2	20	3.0	22	3.0	0.155	3.9	LOS A	0.7	17.5	0.06	0.01	0.06	34.7
Approach		391	3.0	425	3.0	0.155	3.9	LOS A	0.7	17.5	0.06	0.01	0.06	35.8
West: Peach Road														
5	L2	40	3.0	43	3.0	0.072	4.8	LOS A	0.3	7.4	0.48	0.37	0.48	33.4
12	R2	18	3.0	20	3.0	0.072	4.8	LOS A	0.3	7.4	0.48	0.37	0.48	32.4
Approach		58	3.0	63	3.0	0.072	4.8	LOS A	0.3	7.4	0.48	0.37	0.48	33.1
All Vehicles		857	3.0	932	3.0	0.168	4.1	LOS A	0.7	18.9	0.13	0.06	0.13	35.5

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
Delay Model: HCM Delay Formula (Geometric Delay is not included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Intersection	
Int Delay, s/veh	2.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	7	6	16	12	0	6	51	19	0	42	1
Future Vol, veh/h	0	7	6	16	12	0	6	51	19	0	42	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	8	7	17	13	0	7	55	21	0	46	1

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	133	137	47	134	127	66	47	0	0	76	0	0
Stage 1	47	47	-	80	80	-	-	-	-	-	-	-
Stage 2	86	90	-	54	47	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	839	754	1022	838	764	998	1560	-	-	1523	-	-
Stage 1	967	856	-	929	828	-	-	-	-	-	-	-
Stage 2	922	820	-	958	856	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	825	750	1022	823	760	998	1560	-	-	1523	-	-
Mov Cap-2 Maneuver	825	750	-	823	760	-	-	-	-	-	-	-
Stage 1	962	856	-	924	824	-	-	-	-	-	-	-
Stage 2	903	816	-	943	856	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	9.3	9.7	0.6	0
HCM LOS	A	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1560	-	-	855	795	1523	-	-
HCM Lane V/C Ratio	0.004	-	-	0.017	0.038	-	-	-
HCM Control Delay (s)	7.3	0	-	9.3	9.7	0	-	-
HCM Lane LOS	A	A	-	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.1	0.1	0	-	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	148	1	577	305	1323	0	0	1635	508
Future Volume (veh/h)	0	0	0	148	1	577	305	1323	0	0	1635	508
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		0.97
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	1841	1841	1841	0	0	1870	1870
Adj Flow Rate, veh/h				161	1	627	332	1438	0	0	1777	552
Peak Hour Factor				0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %				2	4	4	4	4	0	0	2	2
Cap, veh/h				354	2	316	356	1221	0	0	759	627
Arrive On Green				0.20	0.20	0.20	0.20	0.66	0.00	0.00	0.41	0.41
Sat Flow, veh/h				1743	11	1555	1753	1841	0	0	1870	1544
Grp Volume(v), veh/h				162	0	627	332	1438	0	0	1777	552
Grp Sat Flow(s),veh/h/ln				1754	0	1555	1753	1841	0	0	1870	1544
Q Serve(g_s), s				6.0	0.0	15.0	13.8	49.0	0.0	0.0	30.0	24.4
Cycle Q Clear(g_c), s				6.0	0.0	15.0	13.8	49.0	0.0	0.0	30.0	24.4
Prop In Lane				0.99		1.00	1.00		0.00	0.00		1.00
Lane Grp Cap(c), veh/h				356	0	316	356	1221	0	0	759	627
V/C Ratio(X)				0.46	0.00	1.99	0.93	1.18	0.00	0.00	2.34	0.88
Avail Cap(c_a), veh/h				356	0	316	356	1221	0	0	759	627
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	1.00	1.00	1.00	0.00	0.00	1.00	1.00
Uniform Delay (d), s/veh				25.9	0.0	29.5	29.0	12.5	0.0	0.0	22.0	20.3
Incr Delay (d2), s/veh				0.3	0.0	454.9	31.1	89.0	0.0	0.0	607.3	13.2
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				2.4	0.0	45.2	8.6	44.8	0.0	0.0	140.0	10.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh				26.2	0.0	484.4	60.0	101.4	0.0	0.0	629.2	33.5
LnGrp LOS				C	A	F	E	F	A	A	F	C
Approach Vol, veh/h					789			1770			2329	
Approach Delay, s/veh					390.3			93.7			488.0	
Approach LOS					F			F			F	

Timer - Assigned Phs		2			5	6		8				
Phs Duration (G+Y+Rc), s		54.3			19.0	35.3		19.6				
Change Period (Y+Rc), s		5.3			4.0	5.3		4.6				
Max Green Setting (Gmax), s		30.0			15.0	30.0		15.0				
Max Q Clear Time (g_c+I1), s		51.0			15.8	32.0		17.0				
Green Ext Time (p_c), s		0.0			0.0	0.0		0.0				

Intersection Summary		
HCM 6th Ctrl Delay		329.5
HCM 6th LOS		F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	432	0	502	0	0	0	0	1196	106	348	1435	0
Future Volume (veh/h)	432	0	502	0	0	0	0	1196	106	348	1435	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	1856	1856	1856				0	1811	1811	1856	1856	0
Adj Flow Rate, veh/h	470	0	546				0	1300	115	378	1560	0
Peak Hour Factor	0.92	0.92	0.92				0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	3	3	3				0	6	6	3	3	0
Cap, veh/h	422	0	375				0	649	548	419	1193	0
Arrive On Green	0.24	0.00	0.24				0.00	0.36	0.36	0.24	0.64	0.00
Sat Flow, veh/h	1767	0	1571				0	1811	1531	1767	1856	0
Grp Volume(v), veh/h	470	0	546				0	1300	115	378	1560	0
Grp Sat Flow(s),veh/h/ln	1767	0	1571				0	1811	1531	1767	1856	0
Q Serve(g_s), s	20.0	0.0	20.0				0.0	30.0	4.4	17.4	53.8	0.0
Cycle Q Clear(g_c), s	20.0	0.0	20.0				0.0	30.0	4.4	17.4	53.8	0.0
Prop In Lane	1.00		1.00				0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	422	0	375				0	649	548	419	1193	0
V/C Ratio(X)	1.11	0.00	1.46				0.00	2.00	0.21	0.90	1.31	0.00
Avail Cap(c_a), veh/h	422	0	375				0	649	548	633	1193	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	1.00				0.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	31.9	0.0	31.9				0.0	26.9	18.6	31.0	14.9	0.0
Incr Delay (d2), s/veh	78.4	0.0	219.4				0.0	457.2	0.1	8.6	144.5	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	17.4	0.0	30.2				0.0	94.6	1.5	8.2	66.1	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	110.3	0.0	251.3				0.0	484.1	18.7	39.6	159.5	0.0
LnGrp LOS	F	A	F				A	F	B	D	F	A
Approach Vol, veh/h		1016						1415			1938	
Approach Delay, s/veh		186.1						446.2			136.1	
Approach LOS		F						F			F	
Timer - Assigned Phs	1	2		4		6						
Phs Duration (G+Y+Rc), s	23.8	35.3		24.6		59.1						
Change Period (Y+Rc), s	4.0	5.3		4.6		5.3						
Max Green Setting (Gmax), s	30.0	30.0		20.0		30.0						
Max Q Clear Time (g_c+I1), s	19.4	32.0		22.0		55.8						
Green Ext Time (p_c), s	0.5	0.0		0.0		0.0						
Intersection Summary												
HCM 6th Ctrl Delay			248.2									
HCM 6th LOS			F									

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	108	150	434	21	54	66	87	966	23	144	1143	135
Future Volume (veh/h)	108	150	434	21	54	66	87	966	23	144	1143	135
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		0.99	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	1856	1856	1856	1870	1870	1870	1826	1826	1826	1841	1841	1841
Adj Flow Rate, veh/h	117	163	472	23	59	72	95	1050	25	157	1242	147
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	3	3	3	2	2	2	5	5	5	4	4	4
Cap, veh/h	149	482	520	47	377	316	123	1148	27	188	1286	574
Arrive On Green	0.08	0.26	0.26	0.03	0.20	0.20	0.07	0.33	0.33	0.11	0.37	0.37
Sat Flow, veh/h	1767	1856	1572	1781	1870	1564	1739	3463	82	1753	3497	1560
Grp Volume(v), veh/h	117	163	472	23	59	72	95	526	549	157	1242	147
Grp Sat Flow(s),veh/h/ln	1767	1856	1572	1781	1870	1564	1739	1735	1811	1753	1749	1560
Q Serve(g_s), s	4.2	4.7	17.0	0.8	1.7	2.5	3.5	19.0	19.0	5.7	22.8	4.3
Cycle Q Clear(g_c), s	4.2	4.7	17.0	0.8	1.7	2.5	3.5	19.0	19.0	5.7	22.8	4.3
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.05	1.00		1.00
Lane Grp Cap(c), veh/h	149	482	520	47	377	316	123	575	600	188	1286	574
V/C Ratio(X)	0.78	0.34	0.91	0.49	0.16	0.23	0.77	0.91	0.91	0.84	0.97	0.26
Avail Cap(c_a), veh/h	189	482	520	163	458	383	372	584	609	188	1286	574
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	29.4	19.6	20.9	31.4	21.5	21.8	29.9	21.0	21.0	28.6	20.3	14.4
Incr Delay (d2), s/veh	15.3	0.4	19.7	7.9	0.2	0.4	9.8	19.0	18.4	26.8	17.5	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.4	1.9	9.1	0.4	0.7	0.9	1.7	10.0	10.4	3.7	11.4	1.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	44.6	20.0	40.6	39.3	21.7	22.2	39.6	39.9	39.3	55.4	37.7	14.7
LnGrp LOS	D	C	D	D	C	C	D	D	D	E	D	B
Approach Vol, veh/h		752			154			1170			1546	
Approach Delay, s/veh		36.8			24.6			39.6			37.3	
Approach LOS		D			C			D			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	11.0	26.7	5.7	22.0	8.6	29.0	9.5	18.2
Change Period (Y+Rc), s	4.0	5.0	4.0	5.0	4.0	5.0	4.0	5.0
Max Green Setting (Gmax), s	7.0	22.0	6.0	17.0	14.0	15.0	7.0	16.0
Max Q Clear Time (g_c+I1), s	7.7	21.0	2.8	19.0	5.5	24.8	6.2	4.5
Green Ext Time (p_c), s	0.0	0.7	0.0	0.0	0.1	0.0	0.0	0.3

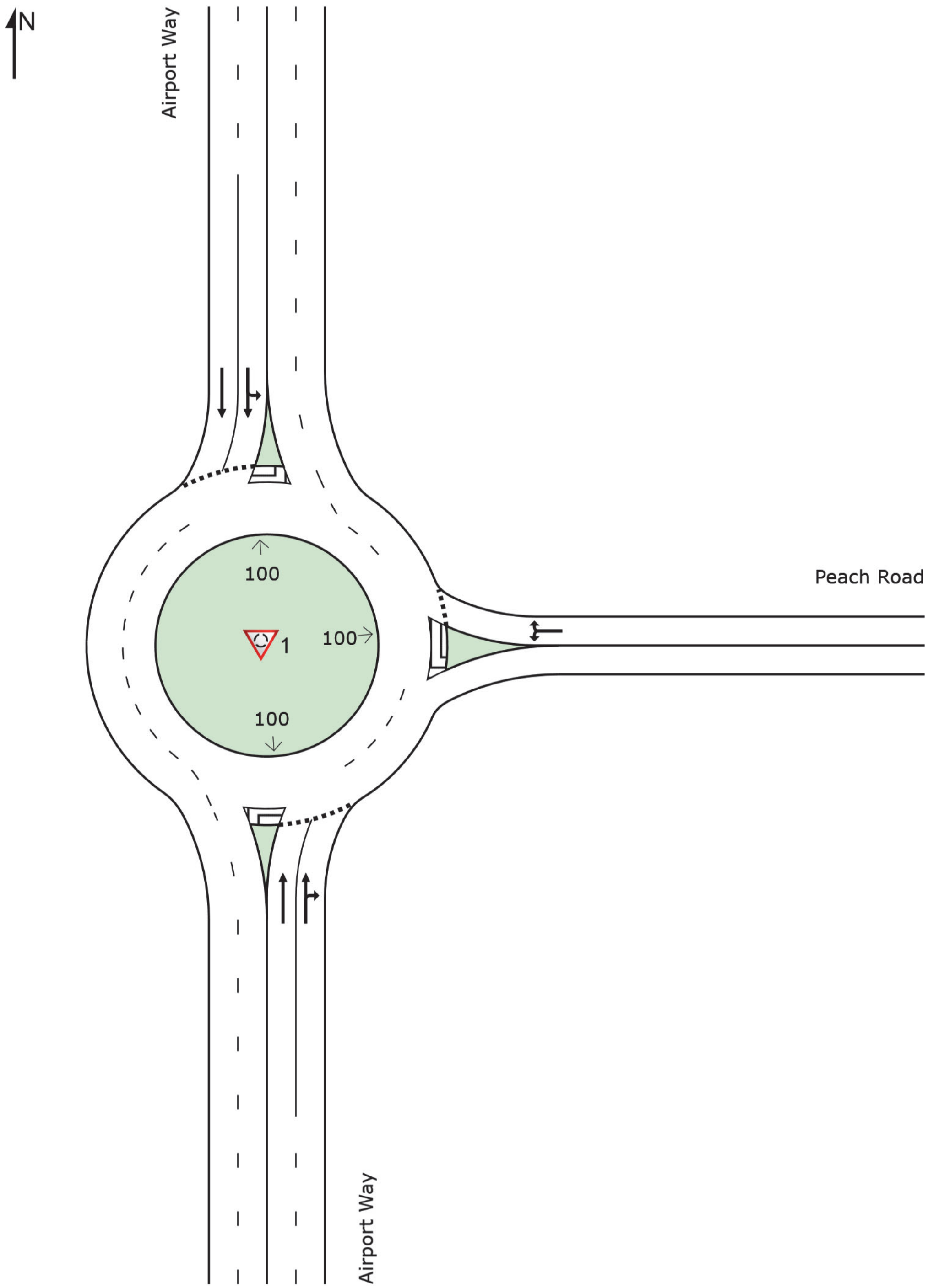
Intersection Summary	
HCM 6th Ctrl Delay	37.4
HCM 6th LOS	D

SITE LAYOUT

Site: 1 [Airport Way & Peach Road (Site Folder: General)]

New Site
Site Category: (None)
Roundabout

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



MOVEMENT SUMMARY

Site: 1 [Airport Way & Peach Road (Site Folder: General)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] ft	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed mph
South: Airport Way														
8	T1	838	3.0	911	3.0	0.337	5.7	LOS A	1.9	47.5	0.10	0.03	0.10	34.9
18	R2	3	3.0	3	3.0	0.337	5.7	LOS A	1.9	47.5	0.10	0.03	0.10	33.8
Approach		841	3.0	914	3.0	0.337	5.7	LOS A	1.9	47.5	0.10	0.03	0.10	34.9
East: Peach Road														
1	L2	1	3.0	1	3.0	0.017	7.2	LOS A	0.1	1.5	0.63	0.55	0.63	33.7
16	R2	7	3.0	8	3.0	0.017	7.2	LOS A	0.1	1.5	0.63	0.55	0.63	32.6
Approach		8	3.0	9	3.0	0.017	7.2	LOS A	0.1	1.5	0.63	0.55	0.63	32.8
North: Airport Way														
7	L2	15	3.0	16	3.0	0.465	7.2	LOS A	3.2	81.2	0.03	0.00	0.03	34.1
4	T1	1164	3.0	1265	3.0	0.465	7.2	LOS A	3.2	81.2	0.03	0.00	0.03	34.1
Approach		1179	3.0	1282	3.0	0.465	7.2	LOS A	3.2	81.2	0.03	0.00	0.03	34.1
All Vehicles		2028	3.0	2204	3.0	0.465	6.6	LOS A	3.2	81.2	0.06	0.01	0.06	34.4

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
Delay Model: HCM Delay Formula (Geometric Delay is not included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement	NBT	NBR	SBL	SBT	SWL	SWR
Lane Configurations						
Traffic Volume (vph)	1103	0	0	0	0	284
Future Volume (vph)	1103	0	0	0	0	284
Ideal Flow (vphpl)	1950	1950	1950	1950	1950	1950
Total Lost time (s)	8.2					8.2
Lane Util. Factor	0.95					1.00
Frt	1.00					0.86
Flt Protected	1.00					1.00
Satd. Flow (prot)	3632					1654
Flt Permitted	1.00					1.00
Satd. Flow (perm)	3632					1654
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1199	0	0	0	0	309
RTOR Reduction (vph)	0	0	0	0	0	39
Lane Group Flow (vph)	1199	0	0	0	0	270
Turn Type	NA					Prot
Protected Phases	2					1
Permitted Phases						
Actuated Green, G (s)	28.9					24.7
Effective Green, g (s)	28.9					24.7
Actuated g/C Ratio	0.41					0.35
Clearance Time (s)	8.2					8.2
Vehicle Extension (s)	2.0					2.0
Lane Grp Cap (vph)	1499					583
v/s Ratio Prot	c0.33					c0.16
v/s Ratio Perm						
v/c Ratio	0.80					0.46
Uniform Delay, d1	18.0					17.5
Progression Factor	0.15					1.00
Incremental Delay, d2	2.7					0.2
Delay (s)	5.3					17.7
Level of Service	A					B
Approach Delay (s)	5.3			0.0	17.7	
Approach LOS	A			A	B	

Intersection Summary			
HCM 2000 Control Delay	7.8	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	16.4
Intersection Capacity Utilization	68.1%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	NBL	NBT	NBR	SBL	SBT	SBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (vph)	0	0	0	0	917	0	0	1103	0	0	0	0
Future Volume (vph)	0	0	0	0	917	0	0	1103	0	0	0	0
Ideal Flow (vphpl)	1950	1950	1950	1950	1950	1950	1950	1950	1950	1950	1950	1950
Total Lost time (s)					8.2			8.2				
Lane Util. Factor					0.95			0.95				
Frt					1.00			1.00				
Flt Protected					1.00			1.00				
Satd. Flow (prot)					3632			3632				
Flt Permitted					1.00			1.00				
Satd. Flow (perm)					3632			3632				
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	0	997	0	0	1199	0	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	997	0	0	1199	0	0	0	0
Turn Type					NA			NA				
Protected Phases					1			2				
Permitted Phases												
Actuated Green, G (s)					24.7			28.9				
Effective Green, g (s)					24.7			28.9				
Actuated g/C Ratio					0.35			0.41				
Clearance Time (s)					8.2			8.2				
Vehicle Extension (s)					2.0			2.0				
Lane Grp Cap (vph)					1281			1499				
v/s Ratio Prot					c0.27			c0.33				
v/s Ratio Perm												
v/c Ratio					0.78			0.80				
Uniform Delay, d1					20.2			18.0				
Progression Factor					1.00			0.84				
Incremental Delay, d2					2.8			3.9				
Delay (s)					23.0			19.0				
Level of Service					C			B				
Approach Delay (s)		0.0			23.0			19.0			0.0	
Approach LOS		A			C			B			A	

Intersection Summary			
HCM 2000 Control Delay	20.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	16.4
Intersection Capacity Utilization	68.1%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	NBT	NBR	SBL	SBT	SWL	SWR
Lane Configurations						
Traffic Volume (vph)	0	0	0	917	202	0
Future Volume (vph)	0	0	0	917	202	0
Ideal Flow (vphpl)	1950	1950	1950	1950	1950	1950
Total Lost time (s)				8.2	8.2	
Lane Util. Factor				0.95	0.97	
Frt				1.00	1.00	
Flt Protected				1.00	0.95	
Satd. Flow (prot)				3632	3523	
Flt Permitted				1.00	0.95	
Satd. Flow (perm)				3632	3523	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	997	220	0
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	997	220	0
Turn Type				NA	Prot	
Protected Phases				1	2	
Permitted Phases						
Actuated Green, G (s)				24.7	28.9	
Effective Green, g (s)				24.7	28.9	
Actuated g/C Ratio				0.35	0.41	
Clearance Time (s)				8.2	8.2	
Vehicle Extension (s)				2.0	2.0	
Lane Grp Cap (vph)				1281	1454	
v/s Ratio Prot				c0.27	c0.06	
v/s Ratio Perm						
v/c Ratio				0.78	0.15	
Uniform Delay, d1				20.2	12.9	
Progression Factor				0.21	1.00	
Incremental Delay, d2				1.7	0.2	
Delay (s)				5.9	13.1	
Level of Service				A	B	
Approach Delay (s)	0.0			5.9	13.1	
Approach LOS	A			A	B	

Intersection Summary			
HCM 2000 Control Delay	7.2	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.44		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	16.4
Intersection Capacity Utilization	45.0%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	NBL	NBT	SBT	SBR	NEL	NER
Lane Configurations						
Traffic Volume (vph)	0	757	0	0	599	0
Future Volume (vph)	0	757	0	0	599	0
Ideal Flow (vphpl)	1950	1950	1950	1950	1950	1950
Total Lost time (s)		9.2			9.2	
Lane Util. Factor		0.95			0.97	
Frt		1.00			1.00	
Flt Protected		1.00			0.95	
Satd. Flow (prot)		3632			3523	
Flt Permitted		1.00			0.95	
Satd. Flow (perm)		3632			3523	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	823	0	0	651	0
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	0	823	0	0	651	0
Turn Type		NA			Prot	
Protected Phases		2			1	
Permitted Phases						
Actuated Green, G (s)		26.0			25.6	
Effective Green, g (s)		26.0			25.6	
Actuated g/C Ratio		0.37			0.37	
Clearance Time (s)		9.2			9.2	
Vehicle Extension (s)		2.0			2.0	
Lane Grp Cap (vph)		1349			1288	
v/s Ratio Prot		c0.23			c0.18	
v/s Ratio Perm						
v/c Ratio		0.61			0.51	
Uniform Delay, d1		17.9			17.3	
Progression Factor		0.26			1.00	
Incremental Delay, d2		1.6			0.1	
Delay (s)		6.2			17.4	
Level of Service		A			B	
Approach Delay (s)		6.2	0.0		17.4	
Approach LOS		A	A		B	

Intersection Summary			
HCM 2000 Control Delay	11.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	18.4
Intersection Capacity Utilization	52.4%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	NBL	NBT	NBR	SBL	SBT	SBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (vph)	0	757	0	0	0	0	0	0	0	0	892	0
Future Volume (vph)	0	757	0	0	0	0	0	0	0	0	892	0
Ideal Flow (vphpl)	1950	1950	1950	1950	1950	1950	1950	1950	1950	1950	1950	1950
Total Lost time (s)		9.2									9.2	
Lane Util. Factor		0.95									0.95	
Frt		1.00									1.00	
Flt Protected		1.00									1.00	
Satd. Flow (prot)		3632									3632	
Flt Permitted		1.00									1.00	
Satd. Flow (perm)		3632									3632	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	823	0	0	0	0	0	0	0	0	970	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	823	0	0	0	0	0	0	0	0	970	0
Turn Type		NA									NA	
Protected Phases		2									1	
Permitted Phases												
Actuated Green, G (s)		26.0									25.6	
Effective Green, g (s)		26.0									25.6	
Actuated g/C Ratio		0.37									0.37	
Clearance Time (s)		9.2									9.2	
Vehicle Extension (s)		2.0									2.0	
Lane Grp Cap (vph)		1349									1328	
v/s Ratio Prot		c0.23									c0.27	
v/s Ratio Perm												
v/c Ratio		0.61									0.73	
Uniform Delay, d1		17.9									19.2	
Progression Factor		1.00									1.33	
Incremental Delay, d2		2.1									1.1	
Delay (s)		19.9									26.6	
Level of Service		B									C	
Approach Delay (s)		19.9			0.0			0.0			26.6	
Approach LOS		B			A			A			C	

Intersection Summary			
HCM 2000 Control Delay	23.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	18.4
Intersection Capacity Utilization	59.7%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	NBT	NBR	SBL	SBT	SWL	SWR
Lane Configurations						
Traffic Volume (vph)	0	0	0	384	892	0
Future Volume (vph)	0	0	0	384	892	0
Ideal Flow (vphpl)	1950	1950	1950	1950	1950	1950
Total Lost time (s)				9.2	9.2	
Lane Util. Factor				0.95	0.97	
Frt				1.00	1.00	
Flt Protected				1.00	0.95	
Satd. Flow (prot)				3632	3523	
Flt Permitted				1.00	0.95	
Satd. Flow (perm)				3632	3523	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	417	970	0
RTOR Reduction (vph)	0	0	0	0	270	0
Lane Group Flow (vph)	0	0	0	417	700	0
Turn Type				NA	Prot	
Protected Phases				2	1	
Permitted Phases						
Actuated Green, G (s)				26.0	25.6	
Effective Green, g (s)				26.0	25.6	
Actuated g/C Ratio				0.37	0.37	
Clearance Time (s)				9.2	9.2	
Vehicle Extension (s)				2.0	2.0	
Lane Grp Cap (vph)				1349	1288	
v/s Ratio Prot				c0.11	c0.20	
v/s Ratio Perm						
v/c Ratio				0.31	0.54	
Uniform Delay, d1				15.6	17.6	
Progression Factor				1.00	0.20	
Incremental Delay, d2				0.6	0.2	
Delay (s)				16.2	3.7	
Level of Service				B	A	
Approach Delay (s)	0.0			16.2	3.7	
Approach LOS	A			B	A	

Intersection Summary			
HCM 2000 Control Delay	7.5	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.43		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	18.4
Intersection Capacity Utilization	59.7%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	84	140	20	23	83	336	6	210	22	445	573	128
Future Volume (veh/h)	84	140	20	23	83	336	6	210	22	445	573	128
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		0.98	1.00		0.96	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	91	152	22	25	90	365	7	228	24	484	623	139
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	123	388	328	52	313	765	16	393	169	568	1492	664
Arrive On Green	0.07	0.21	0.21	0.03	0.17	0.17	0.01	0.11	0.11	0.32	0.42	0.42
Sat Flow, veh/h	1781	1870	1583	1781	1870	1556	1781	3554	1527	1781	3554	1581
Grp Volume(v), veh/h	91	152	22	25	90	365	7	228	24	484	623	139
Grp Sat Flow(s),veh/h/ln	1781	1870	1583	1781	1870	1556	1781	1777	1527	1781	1777	1581
Q Serve(g_s), s	2.7	3.8	0.6	0.7	2.3	8.5	0.2	3.3	0.8	13.7	6.6	3.0
Cycle Q Clear(g_c), s	2.7	3.8	0.6	0.7	2.3	8.5	0.2	3.3	0.8	13.7	6.6	3.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	123	388	328	52	313	765	16	393	169	568	1492	664
V/C Ratio(X)	0.74	0.39	0.07	0.48	0.29	0.48	0.43	0.58	0.14	0.85	0.42	0.21
Avail Cap(c_a), veh/h	298	452	382	166	313	765	166	726	312	1092	2576	1146
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	24.6	18.4	17.1	25.7	19.6	9.3	26.5	22.7	21.6	17.2	11.0	9.9
Incr Delay (d2), s/veh	8.4	0.6	0.1	6.9	0.5	0.5	16.5	1.4	0.4	3.8	0.2	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.3	1.6	0.2	0.4	0.9	0.1	0.2	1.3	0.3	5.4	2.2	0.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	32.9	19.0	17.2	32.6	20.1	9.8	43.0	24.1	22.0	20.9	11.2	10.1
LnGrp LOS	C	B	B	C	C	A	D	C	C	C	B	B
Approach Vol, veh/h		265			480			259			1246	
Approach Delay, s/veh		23.7			12.9			24.4			14.8	
Approach LOS		C			B			C			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	21.1	10.9	5.6	16.2	4.5	27.6	7.7	14.0
Change Period (Y+Rc), s	4.0	5.0	4.0	5.0	4.0	5.0	4.0	5.0
Max Green Setting (Gmax), s	33.0	11.0	5.0	13.0	5.0	39.0	9.0	9.0
Max Q Clear Time (g_c+I1), s	15.7	5.3	2.7	5.8	2.2	8.6	4.7	10.5
Green Ext Time (p_c), s	1.5	0.7	0.0	0.4	0.0	5.2	0.1	0.0

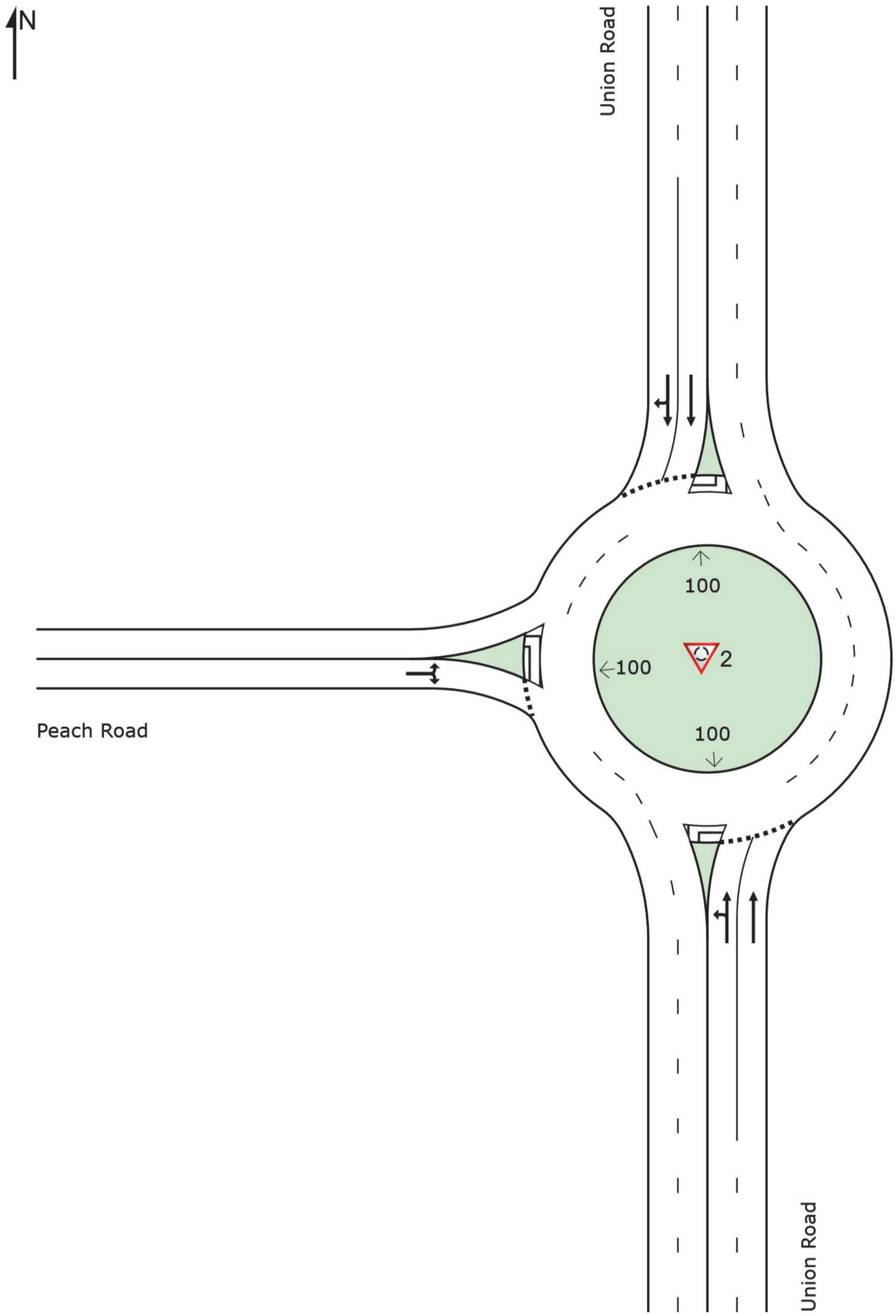
Intersection Summary	
HCM 6th Ctrl Delay	16.6
HCM 6th LOS	B

SITE LAYOUT

Site: 2 [Union Road & Peach Road (Site Folder: General)]

New Site
Site Category: (None)
Roundabout

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



MOVEMENT SUMMARY

Site: 2 [Union Road & Peach Road (Site Folder: General)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance															
Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] ft	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed mph
South: Union Road														
3	L2	5	3.0	5	3.0	0.073	3.2	LOS A	0.3	7.5	0.08	0.02	0.08	36.1
8	T1	177	3.0	192	3.0	0.073	3.2	LOS A	0.3	7.5	0.08	0.02	0.08	36.2
Approach		182	3.0	198	3.0	0.073	3.2	LOS A	0.3	7.5	0.08	0.02	0.08	36.2
North: Union Road														
4	T1	483	3.0	525	3.0	0.203	4.3	LOS A	0.9	24.2	0.05	0.01	0.05	35.6
14	R2	29	3.0	32	3.0	0.203	4.3	LOS A	0.9	24.2	0.05	0.01	0.05	34.5
Approach		512	3.0	557	3.0	0.203	4.3	LOS A	0.9	24.2	0.05	0.01	0.05	35.6
West: Peach Road														
5	L2	16	3.0	17	3.0	0.027	4.9	LOS A	0.1	2.6	0.52	0.40	0.52	32.9
12	R2	3	3.0	3	3.0	0.027	4.9	LOS A	0.1	2.6	0.52	0.40	0.52	32.0
Approach		19	3.0	21	3.0	0.027	4.9	LOS A	0.1	2.6	0.52	0.40	0.52	32.8
All Vehicles		713	3.0	775	3.0	0.203	4.0	LOS A	0.9	24.2	0.07	0.02	0.07	35.6

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
Delay Model: HCM Delay Formula (Geometric Delay is not included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Intersection												
Int Delay, s/veh	6.5											

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	2	13	3	4	5	2	1	3	3	3	4	2
Future Vol, veh/h	2	13	3	4	5	2	1	3	3	3	4	2
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	6	6	6	2	2	2	14	14	14	11	11	11
Mvmt Flow	2	14	3	4	5	2	1	3	3	3	4	2

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	21	19	5	27	19	5	6	0	0	6	0	0
Stage 1	11	11	-	7	7	-	-	-	-	-	-	-
Stage 2	10	8	-	20	12	-	-	-	-	-	-	-
Critical Hdwy	7.16	6.56	6.26	7.12	6.52	6.22	4.24	-	-	4.21	-	-
Critical Hdwy Stg 1	6.16	5.56	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.16	5.56	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.554	4.054	3.354	3.518	4.018	3.318	2.326	-	-	2.299	-	-
Pot Cap-1 Maneuver	982	867	1067	983	875	1078	1540	-	-	1558	-	-
Stage 1	999	878	-	1015	890	-	-	-	-	-	-	-
Stage 2	1001	881	-	999	886	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	973	864	1067	965	872	1078	1540	-	-	1558	-	-
Mov Cap-2 Maneuver	973	864	-	965	872	-	-	-	-	-	-	-
Stage 1	998	876	-	1014	889	-	-	-	-	-	-	-
Stage 2	992	880	-	978	884	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	9.1	8.9	1	2.4
HCM LOS	A	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1540	-	-	904	937	1558	-	-
HCM Lane V/C Ratio	0.001	-	-	0.022	0.013	0.002	-	-
HCM Control Delay (s)	7.3	0	-	9.1	8.9	7.3	0	-
HCM Lane LOS	A	A	-	A	A	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.1	0	0	-	-

CUMULATIVE PLUS PROJECT ANALYSIS

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	183	3	591	456	1516	0	0	961	500
Future Volume (veh/h)	0	0	0	183	3	591	456	1516	0	0	961	500
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)				1.00		0.98	1.00		1.00	1.00		0.97
Parking Bus, Adj				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach					No			No			No	
Adj Sat Flow, veh/h/ln				1796	1796	1796	1811	1811	0	0	1796	1796
Adj Flow Rate, veh/h				199	3	642	496	1648	0	0	1045	543
Peak Hour Factor				0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %				7	7	7	6	6	0	0	7	7
Cap, veh/h				342	5	302	350	1201	0	0	729	602
Arrive On Green				0.20	0.20	0.20	0.20	0.66	0.00	0.00	0.41	0.41
Sat Flow, veh/h				1687	25	1490	1725	1811	0	0	1796	1484
Grp Volume(v), veh/h				202	0	642	496	1648	0	0	1045	543
Grp Sat Flow(s),veh/h/ln				1712	0	1490	1725	1811	0	0	1796	1484
Q Serve(g_s), s				7.9	0.0	15.0	15.0	49.0	0.0	0.0	30.0	25.3
Cycle Q Clear(g_c), s				7.9	0.0	15.0	15.0	49.0	0.0	0.0	30.0	25.3
Prop In Lane				0.99		1.00	1.00		0.00	0.00		1.00
Lane Grp Cap(c), veh/h				347	0	302	350	1201	0	0	729	602
V/C Ratio(X)				0.58	0.00	2.12	1.42	1.37	0.00	0.00	1.43	0.90
Avail Cap(c_a), veh/h				347	0	302	350	1201	0	0	729	602
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	1.00	1.00	1.00	0.00	0.00	1.00	1.00
Uniform Delay (d), s/veh				26.6	0.0	29.5	29.5	12.5	0.0	0.0	21.9	20.6
Incr Delay (d2), s/veh				1.6	0.0	516.1	203.6	172.9	0.0	0.0	202.7	16.3
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				3.2	0.0	48.5	25.7	72.1	0.0	0.0	52.5	10.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh				28.2	0.0	545.6	233.1	185.4	0.0	0.0	224.7	36.9
LnGrp LOS				C	A	F	F	F	A	A	F	D
Approach Vol, veh/h					844			2144			1588	
Approach Delay, s/veh					421.8			196.4			160.5	
Approach LOS					F			F			F	
Timer - Assigned Phs		2			5	6		8				
Phs Duration (G+Y+Rc), s		54.3			19.0	35.3		19.6				
Change Period (Y+Rc), s		5.3			4.0	5.3		4.6				
Max Green Setting (Gmax), s		30.0			15.0	30.0		15.0				
Max Q Clear Time (g_c+I1), s		51.0			17.0	32.0		17.0				
Green Ext Time (p_c), s		0.0			0.0	0.0		0.0				
Intersection Summary												
HCM 6th Ctrl Delay			225.5									
HCM 6th LOS			F									

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	311	3	437	0	0	0	0	1661	161	221	923	0
Future Volume (veh/h)	311	3	437	0	0	0	0	1661	161	221	923	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	1781	1781	1781				0	1811	1811	1781	1781	0
Adj Flow Rate, veh/h	338	3	475				0	1805	175	240	1003	0
Peak Hour Factor	0.92	0.92	0.92				0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	8	8	8				0	6	6	8	8	0
Cap, veh/h	439	4	393				0	709	598	283	1087	0
Arrive On Green	0.26	0.26	0.26				0.00	0.39	0.39	0.17	0.61	0.00
Sat Flow, veh/h	1682	15	1508				0	1811	1529	1697	1781	0
Grp Volume(v), veh/h	341	0	475				0	1805	175	240	1003	0
Grp Sat Flow(s),veh/h/ln	1697	0	1508				0	1811	1529	1697	1781	0
Q Serve(g_s), s	14.2	0.0	20.0				0.0	30.0	6.0	10.5	38.5	0.0
Cycle Q Clear(g_c), s	14.2	0.0	20.0				0.0	30.0	6.0	10.5	38.5	0.0
Prop In Lane	0.99		1.00				0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	443	0	393				0	709	598	283	1087	0
V/C Ratio(X)	0.77	0.00	1.21				0.00	2.55	0.29	0.85	0.92	0.00
Avail Cap(c_a), veh/h	443	0	393				0	709	598	664	1087	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	1.00				0.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	26.2	0.0	28.3				0.0	23.3	16.0	31.0	13.3	0.0
Incr Delay (d2), s/veh	7.3	0.0	115.0				0.0	700.3	0.1	2.8	12.5	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	6.4	0.0	19.4				0.0	149.6	2.0	4.4	16.3	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	33.5	0.0	143.3				0.0	723.6	16.1	33.8	25.9	0.0
LnGrp LOS	C	A	F				A	F	B	C	C	A
Approach Vol, veh/h		816						1980			1243	
Approach Delay, s/veh		97.4						661.1			27.4	
Approach LOS		F						F			C	

Timer - Assigned Phs	1	2		4		6
Phs Duration (G+Y+Rc), s	16.8	35.3		24.6		52.1
Change Period (Y+Rc), s	4.0	5.3		4.6		5.3
Max Green Setting (Gmax), s	30.0	30.0		20.0		30.0
Max Q Clear Time (g_c+I1), s	12.5	32.0		22.0		40.5
Green Ext Time (p_c), s	0.3	0.0		0.0		0.0

Intersection Summary		
HCM 6th Ctrl Delay		352.2
HCM 6th LOS		F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	181	83	218	23	116	190	318	1132	11	124	731	173
Future Volume (veh/h)	181	83	218	23	116	190	318	1132	11	124	731	173
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		0.98	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	1841	1841	1841	1826	1826	1826	1841	1841	1841	1722	1722	1722
Adj Flow Rate, veh/h	197	90	237	25	126	207	346	1230	12	135	795	188
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	4	4	4	5	5	5	4	4	4	12	12	12
Cap, veh/h	243	421	357	48	215	182	392	1337	13	167	833	372
Arrive On Green	0.14	0.23	0.23	0.03	0.12	0.12	0.22	0.38	0.38	0.10	0.25	0.25
Sat Flow, veh/h	1753	1841	1558	1739	1826	1543	1753	3548	35	1640	3272	1459
Grp Volume(v), veh/h	197	90	237	25	126	207	346	606	636	135	795	188
Grp Sat Flow(s),veh/h/ln	1753	1841	1558	1739	1826	1543	1753	1749	1834	1640	1636	1459
Q Serve(g_s), s	7.4	2.7	9.4	1.0	4.4	8.0	13.0	22.5	22.5	5.5	16.2	7.5
Cycle Q Clear(g_c), s	7.4	2.7	9.4	1.0	4.4	8.0	13.0	22.5	22.5	5.5	16.2	7.5
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.02	1.00		1.00
Lane Grp Cap(c), veh/h	243	421	357	48	215	182	392	659	691	167	833	372
V/C Ratio(X)	0.81	0.21	0.66	0.52	0.59	1.14	0.88	0.92	0.92	0.81	0.95	0.51
Avail Cap(c_a), veh/h	387	461	390	154	215	182	439	670	702	193	833	372
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	28.4	21.2	23.8	32.6	28.4	30.0	25.5	20.2	20.2	29.9	24.9	21.6
Incr Delay (d2), s/veh	6.7	0.3	3.8	8.4	4.1	108.9	17.3	17.9	17.3	19.7	20.7	1.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.4	1.1	3.6	0.5	2.1	8.3	7.0	11.5	12.0	3.0	8.3	2.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	35.1	21.5	27.6	41.0	32.4	138.8	42.8	38.1	37.5	49.6	45.6	22.8
LnGrp LOS	D	C	C	D	C	F	D	D	D	D	D	C
Approach Vol, veh/h		524			358			1588			1118	
Approach Delay, s/veh		29.3			94.6			38.9			42.3	
Approach LOS		C			F			D			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	10.9	30.6	5.9	20.5	19.2	22.3	13.4	13.0
Change Period (Y+Rc), s	4.0	5.0	4.0	5.0	4.0	5.0	4.0	5.0
Max Green Setting (Gmax), s	8.0	26.0	6.0	17.0	17.0	17.0	15.0	8.0
Max Q Clear Time (g_c+I1), s	7.5	24.5	3.0	11.4	15.0	18.2	9.4	10.0
Green Ext Time (p_c), s	0.0	1.1	0.0	0.6	0.2	0.0	0.3	0.0

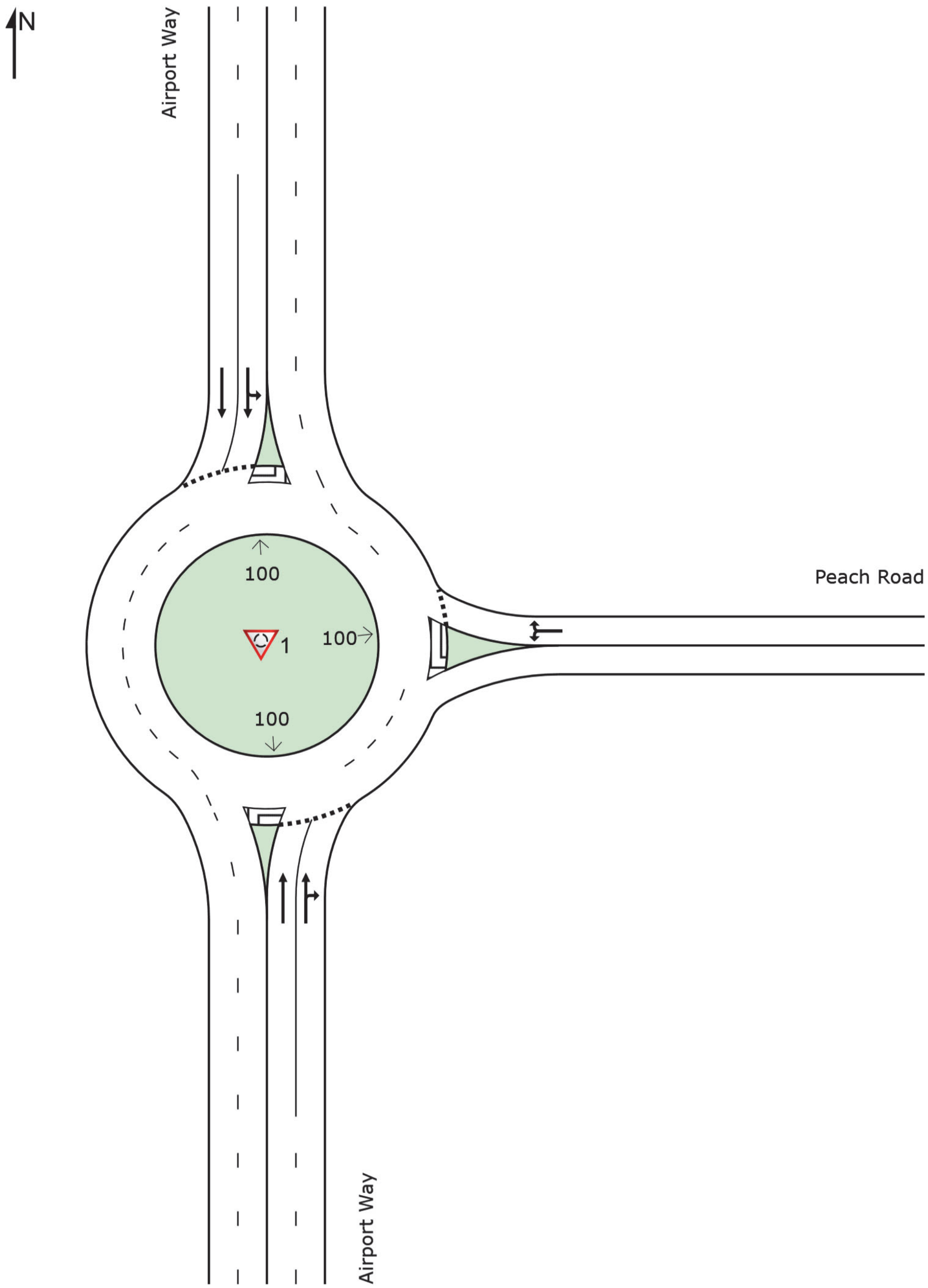
Intersection Summary	
HCM 6th Ctrl Delay	44.1
HCM 6th LOS	D

SITE LAYOUT

Site: 1 [Airport Way & Peach Road (Site Folder: General)]

New Site
Site Category: (None)
Roundabout

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



MOVEMENT SUMMARY

Site: 1 [Airport Way & Peach Road (Site Folder: General)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance															
Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] ft	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed mph
South: Airport Way														
8	T1	1008	3.0	1096	3.0	0.404	6.5	LOS A	2.5	63.0	0.12	0.03	0.12	34.5
18	R2	1	3.0	1	3.0	0.404	6.5	LOS A	2.5	63.0	0.12	0.03	0.12	33.4
Approach		1009	3.0	1097	3.0	0.404	6.5	LOS A	2.5	63.0	0.12	0.03	0.12	34.5
East: Peach Road														
1	L2	4	3.0	4	3.0	0.097	9.9	LOS A	0.3	8.8	0.70	0.70	0.70	32.4
16	R2	34	3.0	37	3.0	0.097	9.9	LOS A	0.3	8.8	0.70	0.70	0.70	31.4
Approach		38	3.0	41	3.0	0.097	9.9	LOS A	0.3	8.8	0.70	0.70	0.70	31.5
North: Airport Way														
7	L2	16	3.0	17	3.0	0.317	5.4	LOS A	1.7	43.8	0.05	0.01	0.05	35.0
4	T1	785	3.0	853	3.0	0.317	5.4	LOS A	1.7	43.8	0.05	0.01	0.05	35.0
Approach		801	3.0	871	3.0	0.317	5.4	LOS A	1.7	43.8	0.05	0.01	0.05	35.0
All Vehicles		1848	3.0	2009	3.0	0.404	6.1	LOS A	2.5	63.0	0.10	0.04	0.10	34.6

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
Delay Model: HCM Delay Formula (Geometric Delay is not included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement	NBT	NBR	SBL	SBT	SWL	SWR
Lane Configurations						
Traffic Volume (vph)	1064	0	0	0	0	297
Future Volume (vph)	1064	0	0	0	0	297
Ideal Flow (vphpl)	1950	1950	1950	1950	1950	1950
Total Lost time (s)	8.2					8.2
Lane Util. Factor	0.95					1.00
Frt	1.00					0.86
Flt Protected	1.00					1.00
Satd. Flow (prot)	3632					1654
Flt Permitted	1.00					1.00
Satd. Flow (perm)	3632					1654
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1157	0	0	0	0	323
RTOR Reduction (vph)	0	0	0	0	0	39
Lane Group Flow (vph)	1157	0	0	0	0	284
Turn Type	NA					Prot
Protected Phases	2					1
Permitted Phases						
Actuated Green, G (s)	29.3					24.3
Effective Green, g (s)	29.3					24.3
Actuated g/C Ratio	0.42					0.35
Clearance Time (s)	8.2					8.2
Vehicle Extension (s)	2.0					2.0
Lane Grp Cap (vph)	1520					574
v/s Ratio Prot	c0.32					c0.17
v/s Ratio Perm						
v/c Ratio	0.76					0.49
Uniform Delay, d1	17.4					18.0
Progression Factor	0.14					1.00
Incremental Delay, d2	1.3					3.0
Delay (s)	3.8					21.0
Level of Service	A					C
Approach Delay (s)	3.8			0.0	21.0	
Approach LOS	A			A	C	

Intersection Summary			
HCM 2000 Control Delay	7.6	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	16.4
Intersection Capacity Utilization	63.7%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	NBL	NBT	NBR	SBL	SBT	SBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (vph)	0	0	0	0	792	0	0	1064	0	0	0	0
Future Volume (vph)	0	0	0	0	792	0	0	1064	0	0	0	0
Ideal Flow (vphpl)	1950	1950	1950	1950	1950	1950	1950	1950	1950	1950	1950	1950
Total Lost time (s)					8.2			8.2				
Lane Util. Factor					0.95			0.95				
Frt					1.00			1.00				
Flt Protected					1.00			1.00				
Satd. Flow (prot)					3632			3632				
Flt Permitted					1.00			1.00				
Satd. Flow (perm)					3632			3632				
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	0	861	0	0	1157	0	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	861	0	0	1157	0	0	0	0
Turn Type					NA			NA				
Protected Phases					1			2				
Permitted Phases												
Actuated Green, G (s)					24.3			29.3				
Effective Green, g (s)					24.3			29.3				
Actuated g/C Ratio					0.35			0.42				
Clearance Time (s)					8.2			8.2				
Vehicle Extension (s)					2.0			2.0				
Lane Grp Cap (vph)					1260			1520				
v/s Ratio Prot					c0.24			c0.32				
v/s Ratio Perm												
v/c Ratio					0.68			0.76				
Uniform Delay, d1					19.6			17.4				
Progression Factor					1.00			0.76				
Incremental Delay, d2					3.0			1.6				
Delay (s)					22.6			14.8				
Level of Service					C			B				
Approach Delay (s)		0.0			22.6			14.8			0.0	
Approach LOS		A			C			B			A	

Intersection Summary			
HCM 2000 Control Delay	18.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	16.4
Intersection Capacity Utilization	63.7%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	NBT	NBR	SBL	SBT	SWL	SWR
Lane Configurations						
Traffic Volume (vph)	0	0	0	792	108	0
Future Volume (vph)	0	0	0	792	108	0
Ideal Flow (vphpl)	1950	1950	1950	1950	1950	1950
Total Lost time (s)				8.2	8.2	
Lane Util. Factor				0.95	0.97	
Frt				1.00	1.00	
Flt Protected				1.00	0.95	
Satd. Flow (prot)				3632	3523	
Flt Permitted				1.00	0.95	
Satd. Flow (perm)				3632	3523	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	861	117	0
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	861	117	0
Turn Type				NA	Prot	
Protected Phases				1	2	
Permitted Phases						
Actuated Green, G (s)				24.3	29.3	
Effective Green, g (s)				24.3	29.3	
Actuated g/C Ratio				0.35	0.42	
Clearance Time (s)				8.2	8.2	
Vehicle Extension (s)				2.0	2.0	
Lane Grp Cap (vph)				1260	1474	
v/s Ratio Prot				c0.24	c0.03	
v/s Ratio Perm						
v/c Ratio				0.68	0.08	
Uniform Delay, d1				19.6	12.2	
Progression Factor				0.18	1.00	
Incremental Delay, d2				2.2	0.0	
Delay (s)				5.7	12.2	
Level of Service				A	B	
Approach Delay (s)	0.0			5.7	12.2	
Approach LOS	A			A	B	

Intersection Summary			
HCM 2000 Control Delay	6.5	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.35		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	16.4
Intersection Capacity Utilization	41.7%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	NBL	NBT	SBT	SBR	NEL	NER
Lane Configurations						
Traffic Volume (vph)	0	1098	0	0	419	0
Future Volume (vph)	0	1098	0	0	419	0
Ideal Flow (vphpl)	1950	1950	1950	1950	1950	1950
Total Lost time (s)		9.2			9.2	
Lane Util. Factor		0.95			0.97	
Frt		1.00			1.00	
Flt Protected		1.00			0.95	
Satd. Flow (prot)		3632			3523	
Flt Permitted		1.00			0.95	
Satd. Flow (perm)		3632			3523	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	1193	0	0	455	0
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	0	1193	0	0	455	0
Turn Type		NA			Prot	
Protected Phases		2			1	
Permitted Phases						
Actuated Green, G (s)		31.1			20.5	
Effective Green, g (s)		31.1			20.5	
Actuated g/C Ratio		0.44			0.29	
Clearance Time (s)		9.2			9.2	
Vehicle Extension (s)		2.0			2.0	
Lane Grp Cap (vph)		1613			1031	
v/s Ratio Prot		c0.33			c0.13	
v/s Ratio Perm						
v/c Ratio		0.74			0.44	
Uniform Delay, d1		16.1			20.1	
Progression Factor		0.27			1.00	
Incremental Delay, d2		1.0			1.4	
Delay (s)		5.4			21.5	
Level of Service		A			C	
Approach Delay (s)		5.4	0.0		21.5	
Approach LOS		A	A		C	

Intersection Summary			
HCM 2000 Control Delay	9.8	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	18.4
Intersection Capacity Utilization	56.6%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	NBL	NBT	NBR	SBL	SBT	SBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (vph)	0	1098	0	0	0	0	0	0	0	0	712	0
Future Volume (vph)	0	1098	0	0	0	0	0	0	0	0	712	0
Ideal Flow (vphpl)	1950	1950	1950	1950	1950	1950	1950	1950	1950	1950	1950	1950
Total Lost time (s)		9.2									9.2	
Lane Util. Factor		0.95									0.95	
Frt		1.00									1.00	
Flt Protected		1.00									1.00	
Satd. Flow (prot)		3632									3632	
Flt Permitted		1.00									1.00	
Satd. Flow (perm)		3632									3632	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	1193	0	0	0	0	0	0	0	0	774	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	1193	0	0	0	0	0	0	0	0	774	0
Turn Type		NA									NA	
Protected Phases		2									1	
Permitted Phases												
Actuated Green, G (s)		31.1									20.5	
Effective Green, g (s)		31.1									20.5	
Actuated g/C Ratio		0.44									0.29	
Clearance Time (s)		9.2									9.2	
Vehicle Extension (s)		2.0									2.0	
Lane Grp Cap (vph)		1613									1063	
v/s Ratio Prot		c0.33									c0.21	
v/s Ratio Perm												
v/c Ratio		0.74									0.73	
Uniform Delay, d1		16.1									22.2	
Progression Factor		1.00									1.17	
Incremental Delay, d2		1.6									3.2	
Delay (s)		17.7									29.2	
Level of Service		B									C	
Approach Delay (s)		17.7			0.0			0.0			29.2	
Approach LOS		B			A			A			C	

Intersection Summary			
HCM 2000 Control Delay	22.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	18.4
Intersection Capacity Utilization	64.1%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	NBT	NBR	SBL	SBT	SWL	SWR
Lane Configurations				↑↑	↰↰	
Traffic Volume (vph)	0	0	0	598	712	0
Future Volume (vph)	0	0	0	598	712	0
Ideal Flow (vphpl)	1950	1950	1950	1950	1950	1950
Total Lost time (s)				9.2	9.2	
Lane Util. Factor				0.95	0.97	
Frt				1.00	1.00	
Flt Protected				1.00	0.95	
Satd. Flow (prot)				3632	3523	
Flt Permitted				1.00	0.95	
Satd. Flow (perm)				3632	3523	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	650	774	0
RTOR Reduction (vph)	0	0	0	0	200	0
Lane Group Flow (vph)	0	0	0	650	574	0
Turn Type				NA	Prot	
Protected Phases				2	1	
Permitted Phases						
Actuated Green, G (s)				31.1	20.5	
Effective Green, g (s)				31.1	20.5	
Actuated g/C Ratio				0.44	0.29	
Clearance Time (s)				9.2	9.2	
Vehicle Extension (s)				2.0	2.0	
Lane Grp Cap (vph)				1613	1031	
v/s Ratio Prot				c0.18	c0.16	
v/s Ratio Perm						
v/c Ratio				0.40	0.56	
Uniform Delay, d1				13.2	20.9	
Progression Factor				1.00	0.32	
Incremental Delay, d2				0.1	1.6	
Delay (s)				13.2	8.2	
Level of Service				B	A	
Approach Delay (s)	0.0			13.2	8.2	
Approach LOS	A			B	A	

Intersection Summary			
HCM 2000 Control Delay	10.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.46		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	18.4
Intersection Capacity Utilization	64.1%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	139	182	14	52	191	373	10	443	64	487	319	92
Future Volume (veh/h)	139	182	14	52	191	373	10	443	64	487	319	92
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		1.00	1.00		0.99	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	151	198	15	57	208	405	11	482	70	529	347	100
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	190	362	303	87	254	726	25	580	257	575	1678	747
Arrive On Green	0.11	0.19	0.19	0.05	0.14	0.14	0.01	0.16	0.16	0.32	0.47	0.47
Sat Flow, veh/h	1781	1870	1564	1781	1870	1578	1781	3554	1575	1781	3554	1582
Grp Volume(v), veh/h	151	198	15	57	208	405	11	482	70	529	347	100
Grp Sat Flow(s),veh/h/ln	1781	1870	1564	1781	1870	1578	1781	1777	1575	1781	1777	1582
Q Serve(g_s), s	5.5	6.3	0.5	2.1	7.2	9.0	0.4	8.7	2.6	19.0	3.8	2.4
Cycle Q Clear(g_c), s	5.5	6.3	0.5	2.1	7.2	9.0	0.4	8.7	2.6	19.0	3.8	2.4
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	190	362	303	87	254	726	25	580	257	575	1678	747
V/C Ratio(X)	0.79	0.55	0.05	0.65	0.82	0.56	0.45	0.83	0.27	0.92	0.21	0.13
Avail Cap(c_a), veh/h	242	362	303	161	254	726	134	590	261	618	1678	747
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	28.9	24.1	21.8	31.0	27.9	13.1	32.4	26.9	24.3	21.6	10.2	9.9
Incr Delay (d2), s/veh	13.2	1.7	0.1	8.0	18.7	1.0	12.1	9.7	0.6	18.4	0.1	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.9	2.8	0.2	1.1	4.4	4.1	0.3	4.3	1.0	10.1	1.3	0.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	42.1	25.8	21.8	38.9	46.5	14.0	44.6	36.5	24.9	40.0	10.3	9.9
LnGrp LOS	D	C	C	D	D	B	D	D	C	D	B	A
Approach Vol, veh/h		364			670			563			976	
Approach Delay, s/veh		32.4			26.2			35.2			26.4	
Approach LOS		C			C			D			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	25.4	15.8	7.2	17.8	4.9	36.3	11.1	14.0
Change Period (Y+Rc), s	4.0	5.0	4.0	5.0	4.0	5.0	4.0	5.0
Max Green Setting (Gmax), s	23.0	11.0	6.0	12.0	5.0	29.0	9.0	9.0
Max Q Clear Time (g_c+I1), s	21.0	10.7	4.1	8.3	2.4	5.8	7.5	11.0
Green Ext Time (p_c), s	0.4	0.1	0.0	0.3	0.0	2.6	0.1	0.0

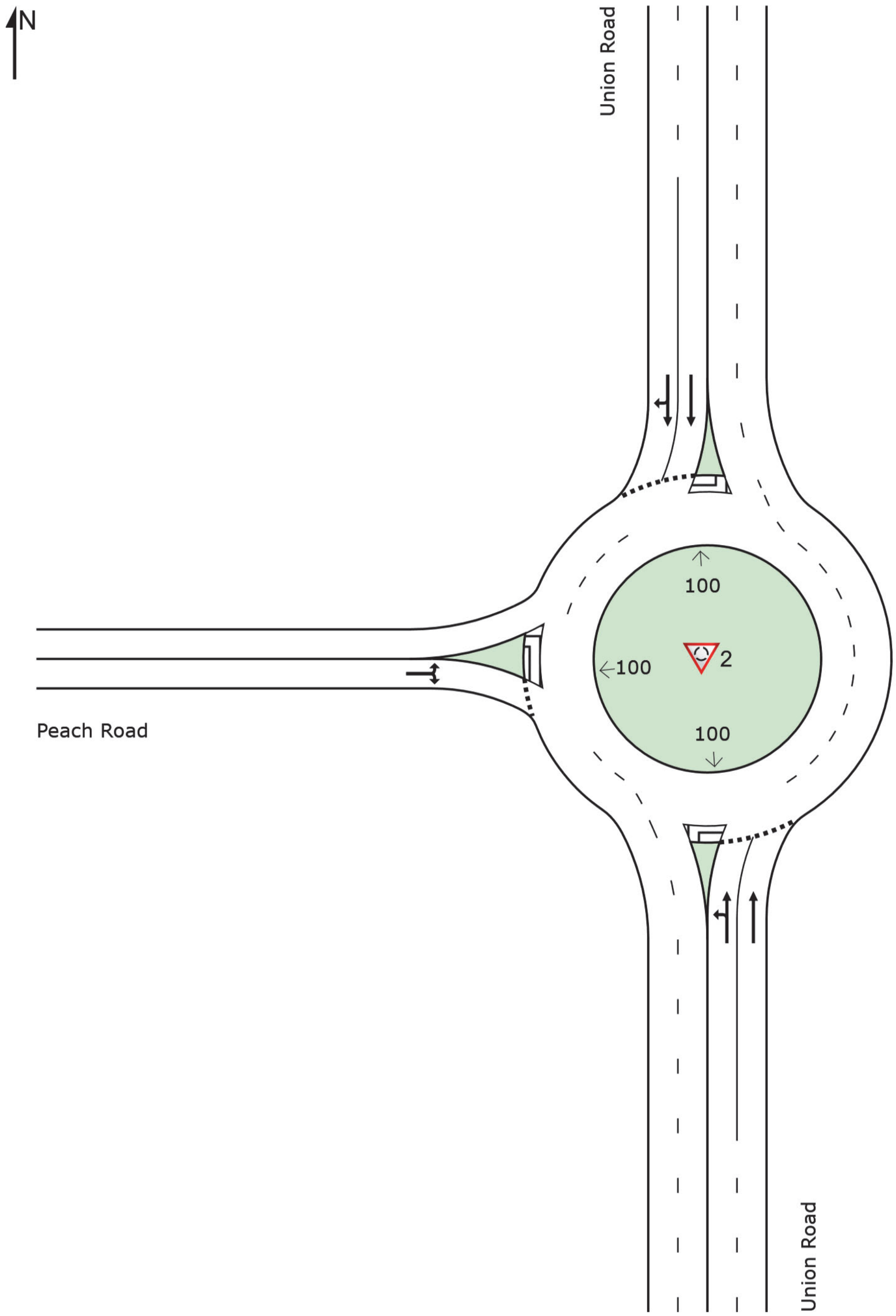
Intersection Summary	
HCM 6th Ctrl Delay	29.1
HCM 6th LOS	C

SITE LAYOUT

Site: 2 [Union Road & Peach Road (Site Folder: General)]

New Site
Site Category: (None)
Roundabout

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



MOVEMENT SUMMARY

Site: 2 [Union Road & Peach Road (Site Folder: General)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance															
Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] ft	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed mph
South: Union Road														
3	L2	8	3.0	9	3.0	0.169	4.2	LOS A	0.7	19.1	0.17	0.07	0.17	35.7
8	T1	400	3.0	435	3.0	0.169	4.2	LOS A	0.7	19.1	0.17	0.07	0.17	35.7
Approach		408	3.0	443	3.0	0.169	4.2	LOS A	0.7	19.1	0.17	0.07	0.17	35.7
North: Union Road														
4	T1	371	3.0	403	3.0	0.157	3.9	LOS A	0.7	17.7	0.06	0.01	0.06	35.9
14	R2	24	3.0	26	3.0	0.157	3.9	LOS A	0.7	17.7	0.06	0.01	0.06	34.7
Approach		395	3.0	429	3.0	0.157	3.9	LOS A	0.7	17.7	0.06	0.01	0.06	35.8
West: Peach Road														
5	L2	51	3.0	55	3.0	0.087	4.9	LOS A	0.4	9.0	0.49	0.38	0.49	33.2
12	R2	19	3.0	21	3.0	0.087	4.9	LOS A	0.4	9.0	0.49	0.38	0.49	32.2
Approach		70	3.0	76	3.0	0.087	4.9	LOS A	0.4	9.0	0.49	0.38	0.49	32.9
All Vehicles		873	3.0	949	3.0	0.169	4.1	LOS A	0.7	19.1	0.14	0.07	0.14	35.5

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
Delay Model: HCM Delay Formula (Geometric Delay is not included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Intersection	
Int Delay, s/veh	3.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	18	6	16	16	0	7	51	19	1	43	1
Future Vol, veh/h	0	18	6	16	16	0	7	51	19	1	43	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	20	7	17	17	0	8	55	21	1	47	1

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	140	142	48	145	132	66	48	0	0	76	0	0
Stage 1	50	50	-	82	82	-	-	-	-	-	-	-
Stage 2	90	92	-	63	50	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	830	749	1021	824	759	998	1559	-	-	1523	-	-
Stage 1	963	853	-	926	827	-	-	-	-	-	-	-
Stage 2	917	819	-	948	853	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	812	745	1021	798	754	998	1559	-	-	1523	-	-
Mov Cap-2 Maneuver	812	745	-	798	754	-	-	-	-	-	-	-
Stage 1	958	852	-	921	823	-	-	-	-	-	-	-
Stage 2	893	815	-	919	852	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	9.7	9.9	0.7	0.2
HCM LOS	A	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1559	-	-	799	775	1523	-	-
HCM Lane V/C Ratio	0.005	-	-	0.033	0.045	0.001	-	-
HCM Control Delay (s)	7.3	0	-	9.7	9.9	7.4	0	-
HCM Lane LOS	A	A	-	A	A	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.1	0.1	0	-	-

Intersection	
Int Delay, s/veh	3.6

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	69	2	0	51	43	23
Future Vol, veh/h	69	2	0	51	43	23
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	75	2	0	55	47	25

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	115	60	72	0	-	0
Stage 1	60	-	-	-	-	-
Stage 2	55	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	881	1005	1528	-	-	-
Stage 1	963	-	-	-	-	-
Stage 2	968	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	881	1005	1528	-	-	-
Mov Cap-2 Maneuver	881	-	-	-	-	-
Stage 1	963	-	-	-	-	-
Stage 2	968	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	9.5	0	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1528	-	884	-	-
HCM Lane V/C Ratio	-	-	0.087	-	-
HCM Control Delay (s)	0	-	9.5	-	-
HCM Lane LOS	A	-	A	-	-
HCM 95th %tile Q(veh)	0	-	0.3	-	-

Intersection						
Int Delay, s/veh	4.5					

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	8	13	19	5	11	23
Future Vol, veh/h	8	13	19	5	11	23
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	9	14	21	5	12	25

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	26	0	-	0	56	24
Stage 1	-	-	-	-	24	-
Stage 2	-	-	-	-	32	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1588	-	-	-	952	1052
Stage 1	-	-	-	-	999	-
Stage 2	-	-	-	-	991	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1588	-	-	-	946	1052
Mov Cap-2 Maneuver	-	-	-	-	946	-
Stage 1	-	-	-	-	993	-
Stage 2	-	-	-	-	991	-

Approach	EB	WB	SB
HCM Control Delay, s	2.8	0	8.7
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1588	-	-	-	1015
HCM Lane V/C Ratio	0.005	-	-	-	0.036
HCM Control Delay (s)	7.3	0	-	-	8.7
HCM Lane LOS	A	A	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	0.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	159	1	577	328	1338	0	0	1660	508
Future Volume (veh/h)	0	0	0	159	1	577	328	1338	0	0	1660	508
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		0.97
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	1841	1841	1841	0	0	1870	1870
Adj Flow Rate, veh/h				173	1	627	357	1454	0	0	1804	552
Peak Hour Factor				0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %				2	4	4	4	4	0	0	2	2
Cap, veh/h				354	2	316	356	1221	0	0	759	627
Arrive On Green				0.20	0.20	0.20	0.20	0.66	0.00	0.00	0.41	0.41
Sat Flow, veh/h				1743	10	1555	1753	1841	0	0	1870	1544
Grp Volume(v), veh/h				174	0	627	357	1454	0	0	1804	552
Grp Sat Flow(s),veh/h/ln				1754	0	1555	1753	1841	0	0	1870	1544
Q Serve(g_s), s				6.5	0.0	15.0	15.0	49.0	0.0	0.0	30.0	24.4
Cycle Q Clear(g_c), s				6.5	0.0	15.0	15.0	49.0	0.0	0.0	30.0	24.4
Prop In Lane				0.99		1.00	1.00		0.00	0.00		1.00
Lane Grp Cap(c), veh/h				356	0	316	356	1221	0	0	759	627
V/C Ratio(X)				0.49	0.00	1.99	1.00	1.19	0.00	0.00	2.38	0.88
Avail Cap(c_a), veh/h				356	0	316	356	1221	0	0	759	627
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	1.00	1.00	1.00	0.00	0.00	1.00	1.00
Uniform Delay (d), s/veh				26.1	0.0	29.5	29.5	12.5	0.0	0.0	22.0	20.3
Incr Delay (d2), s/veh				0.4	0.0	454.9	48.5	94.5	0.0	0.0	623.2	13.2
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				2.6	0.0	45.2	10.8	46.7	0.0	0.0	143.3	10.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh				26.4	0.0	484.4	78.0	106.9	0.0	0.0	645.2	33.5
LnGrp LOS				C	A	F	F	F	A	A	F	C
Approach Vol, veh/h					801			1811			2356	
Approach Delay, s/veh					384.9			101.2			501.9	
Approach LOS					F			F			F	

Timer - Assigned Phs		2			5	6		8				
Phs Duration (G+Y+Rc), s		54.3			19.0	35.3		19.6				
Change Period (Y+Rc), s		5.3			4.0	5.3		4.6				
Max Green Setting (Gmax), s		30.0			15.0	30.0		15.0				
Max Q Clear Time (g_c+I1), s		51.0			17.0	32.0		17.0				
Green Ext Time (p_c), s		0.0			0.0	0.0		0.0				

Intersection Summary	
HCM 6th Ctrl Delay	337.0
HCM 6th LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	432	0	541	0	0	0	0	1234	112	348	1471	0
Future Volume (veh/h)	432	0	541	0	0	0	0	1234	112	348	1471	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	1856	1856	1856				0	1811	1811	1856	1856	0
Adj Flow Rate, veh/h	470	0	588				0	1341	122	378	1599	0
Peak Hour Factor	0.92	0.92	0.92				0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	3	3	3				0	6	6	3	3	0
Cap, veh/h	422	0	375				0	649	548	419	1193	0
Arrive On Green	0.24	0.00	0.24				0.00	0.36	0.36	0.24	0.64	0.00
Sat Flow, veh/h	1767	0	1571				0	1811	1531	1767	1856	0
Grp Volume(v), veh/h	470	0	588				0	1341	122	378	1599	0
Grp Sat Flow(s),veh/h/ln	1767	0	1571				0	1811	1531	1767	1856	0
Q Serve(g_s), s	20.0	0.0	20.0				0.0	30.0	4.7	17.4	53.8	0.0
Cycle Q Clear(g_c), s	20.0	0.0	20.0				0.0	30.0	4.7	17.4	53.8	0.0
Prop In Lane	1.00		1.00				0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	422	0	375				0	649	548	419	1193	0
V/C Ratio(X)	1.11	0.00	1.57				0.00	2.07	0.22	0.90	1.34	0.00
Avail Cap(c_a), veh/h	422	0	375				0	649	548	633	1193	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	1.00				0.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	31.9	0.0	31.9				0.0	26.9	18.7	31.0	14.9	0.0
Incr Delay (d2), s/veh	78.4	0.0	268.1				0.0	485.5	0.1	8.6	158.8	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	17.4	0.0	35.2				0.0	99.7	1.6	8.2	70.8	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	110.3	0.0	300.0				0.0	512.4	18.8	39.6	173.8	0.0
LnGrp LOS	F	A	F				A	F	B	D	F	A
Approach Vol, veh/h		1058						1463			1977	
Approach Delay, s/veh		215.7						471.2			148.1	
Approach LOS		F						F			F	

Timer - Assigned Phs	1	2	4	6
Phs Duration (G+Y+Rc), s	23.8	35.3	24.6	59.1
Change Period (Y+Rc), s	4.0	5.3	4.6	5.3
Max Green Setting (Gmax), s	30.0	30.0	20.0	30.0
Max Q Clear Time (g_c+I1), s	19.4	32.0	22.0	55.8
Green Ext Time (p_c), s	0.5	0.0	0.0	0.0

Intersection Summary	
HCM 6th Ctrl Delay	269.1
HCM 6th LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	108	150	435	21	55	96	87	980	23	192	1170	135
Future Volume (veh/h)	108	150	435	21	55	96	87	980	23	192	1170	135
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		0.99	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	1856	1856	1856	1870	1870	1870	1826	1826	1826	1841	1841	1841
Adj Flow Rate, veh/h	117	163	473	23	60	104	95	1065	25	209	1272	147
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	3	3	3	2	2	2	5	5	5	4	4	4
Cap, veh/h	149	481	519	46	376	315	123	1153	27	187	1290	576
Arrive On Green	0.08	0.26	0.26	0.03	0.20	0.20	0.07	0.33	0.33	0.11	0.37	0.37
Sat Flow, veh/h	1767	1856	1572	1781	1870	1564	1739	3465	81	1753	3497	1560
Grp Volume(v), veh/h	117	163	473	23	60	104	95	533	557	209	1272	147
Grp Sat Flow(s),veh/h/ln	1767	1856	1572	1781	1870	1564	1739	1735	1811	1753	1749	1560
Q Serve(g_s), s	4.3	4.7	17.0	0.8	1.7	3.7	3.5	19.4	19.4	7.0	23.6	4.3
Cycle Q Clear(g_c), s	4.3	4.7	17.0	0.8	1.7	3.7	3.5	19.4	19.4	7.0	23.6	4.3
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.04	1.00		1.00
Lane Grp Cap(c), veh/h	149	481	519	46	376	315	123	577	603	187	1290	576
V/C Ratio(X)	0.78	0.34	0.91	0.49	0.16	0.33	0.77	0.92	0.92	1.12	0.99	0.26
Avail Cap(c_a), veh/h	189	481	519	163	457	382	372	582	608	187	1290	576
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	29.4	19.7	21.0	31.5	21.6	22.4	29.9	21.1	21.1	29.3	20.5	14.4
Incr Delay (d2), s/veh	15.4	0.4	20.2	7.9	0.2	0.6	9.8	20.5	19.8	100.3	21.6	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.4	1.9	9.2	0.4	0.7	1.3	1.7	10.4	10.8	8.0	12.5	1.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	44.8	20.1	41.3	39.4	21.8	23.0	39.7	41.5	40.9	129.6	42.1	14.6
LnGrp LOS	D	C	D	D	C	C	D	D	D	F	D	B
Approach Vol, veh/h		753			187			1185			1628	
Approach Delay, s/veh		37.2			24.6			41.1			50.9	
Approach LOS		D			C			D			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	11.0	26.8	5.7	22.0	8.6	29.2	9.5	18.2
Change Period (Y+Rc), s	4.0	5.0	4.0	5.0	4.0	5.0	4.0	5.0
Max Green Setting (Gmax), s	7.0	22.0	6.0	17.0	14.0	15.0	7.0	16.0
Max Q Clear Time (g_c+I1), s	19.0	21.4	2.8	19.0	5.5	25.6	6.3	5.7
Green Ext Time (p_c), s	0.0	0.4	0.0	0.0	0.1	0.0	0.0	0.4

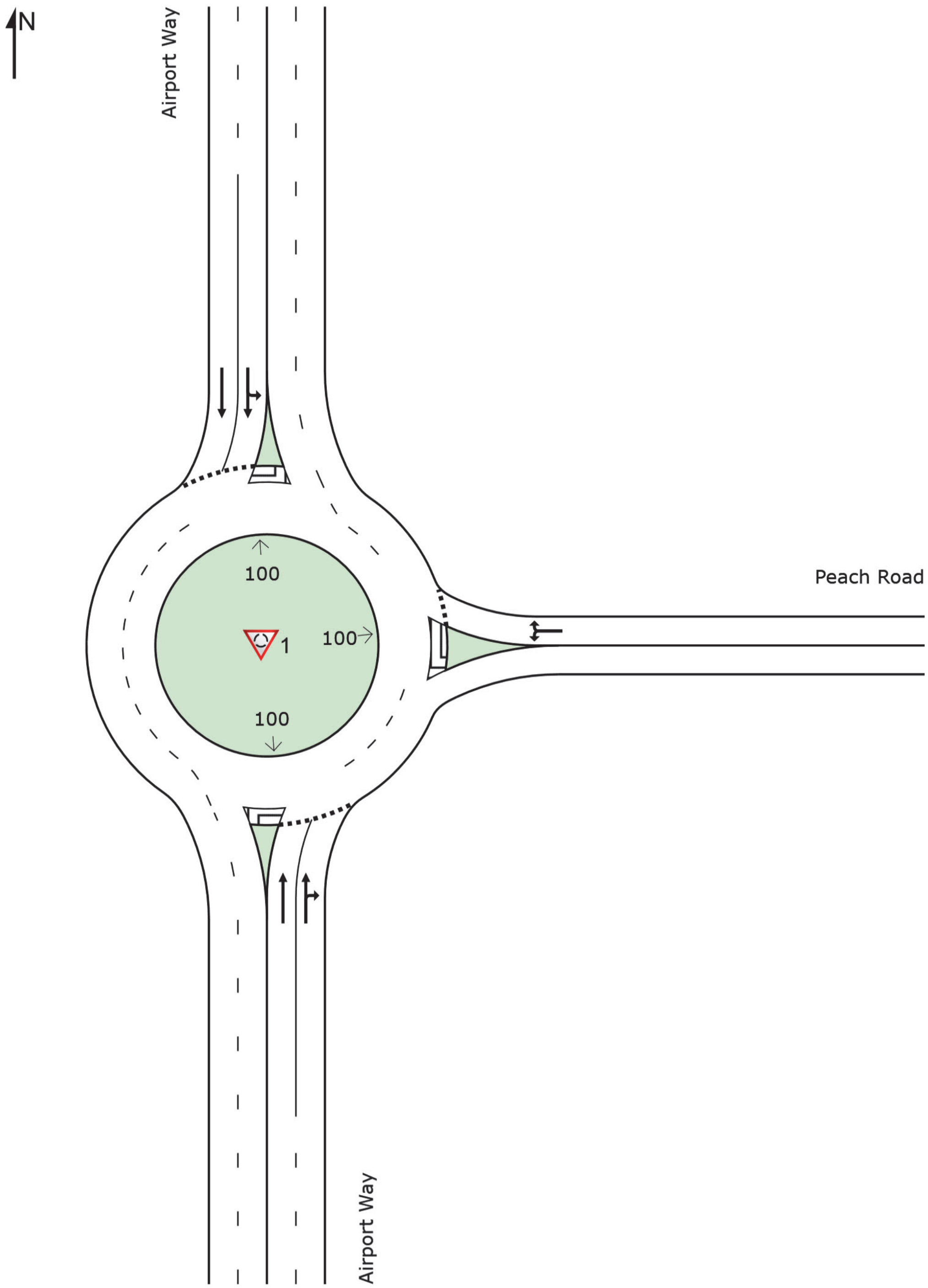
Intersection Summary	
HCM 6th Ctrl Delay	43.7
HCM 6th LOS	D

SITE LAYOUT

Site: 1 [Airport Way & Peach Road (Site Folder: General)]

New Site
Site Category: (None)
Roundabout

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



MOVEMENT SUMMARY

Site: 1 [Airport Way & Peach Road (Site Folder: General)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] ft	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed mph
South: Airport Way														
8	T1	838	3.0	911	3.0	0.347	5.9	LOS A	1.9	48.8	0.19	0.08	0.19	34.8
18	R2	4	3.0	4	3.0	0.347	5.9	LOS A	1.9	48.8	0.19	0.08	0.19	33.7
Approach		842	3.0	915	3.0	0.347	5.9	LOS A	1.9	48.8	0.19	0.08	0.19	34.8
East: Peach Road														
1	L2	2	3.0	2	3.0	0.049	7.6	LOS A	0.2	4.5	0.64	0.62	0.64	33.6
16	R2	21	3.0	23	3.0	0.049	7.6	LOS A	0.2	4.5	0.64	0.62	0.64	32.5
Approach		23	3.0	25	3.0	0.049	7.6	LOS A	0.2	4.5	0.64	0.62	0.64	32.6
North: Airport Way														
7	L2	43	3.0	47	3.0	0.477	7.4	LOS A	3.3	84.9	0.04	0.00	0.04	33.9
4	T1	1164	3.0	1265	3.0	0.477	7.4	LOS A	3.3	84.9	0.04	0.00	0.04	33.9
Approach		1207	3.0	1312	3.0	0.477	7.4	LOS A	3.3	84.9	0.04	0.00	0.04	33.9
All Vehicles		2072	3.0	2252	3.0	0.477	6.8	LOS A	3.3	84.9	0.11	0.04	0.11	34.2

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
Delay Model: HCM Delay Formula (Geometric Delay is not included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement	NBT	NBR	SBL	SBT	SWL	SWR
Lane Configurations						
Traffic Volume (vph)	1106	0	0	0	0	284
Future Volume (vph)	1106	0	0	0	0	284
Ideal Flow (vphpl)	1950	1950	1950	1950	1950	1950
Total Lost time (s)	8.2					8.2
Lane Util. Factor	0.95					1.00
Frt	1.00					0.86
Flt Protected	1.00					1.00
Satd. Flow (prot)	3632					1654
Flt Permitted	1.00					1.00
Satd. Flow (perm)	3632					1654
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1202	0	0	0	0	309
RTOR Reduction (vph)	0	0	0	0	0	39
Lane Group Flow (vph)	1202	0	0	0	0	270
Turn Type	NA					Prot
Protected Phases	2					1
Permitted Phases						
Actuated Green, G (s)	28.9					24.7
Effective Green, g (s)	28.9					24.7
Actuated g/C Ratio	0.41					0.35
Clearance Time (s)	8.2					8.2
Vehicle Extension (s)	2.0					2.0
Lane Grp Cap (vph)	1499					583
v/s Ratio Prot	c0.33					c0.16
v/s Ratio Perm						
v/c Ratio	0.80					0.46
Uniform Delay, d1	18.0					17.5
Progression Factor	0.15					1.00
Incremental Delay, d2	2.7					0.2
Delay (s)	5.3					17.7
Level of Service	A					B
Approach Delay (s)	5.3			0.0	17.7	
Approach LOS	A			A	B	

Intersection Summary			
HCM 2000 Control Delay	7.9	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	16.4
Intersection Capacity Utilization	68.3%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	NBL	NBT	NBR	SBL	SBT	SBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (vph)	0	0	0	0	923	0	0	1106	0	0	0	0
Future Volume (vph)	0	0	0	0	923	0	0	1106	0	0	0	0
Ideal Flow (vphpl)	1950	1950	1950	1950	1950	1950	1950	1950	1950	1950	1950	1950
Total Lost time (s)					8.2			8.2				
Lane Util. Factor					0.95			0.95				
Frt					1.00			1.00				
Flt Protected					1.00			1.00				
Satd. Flow (prot)					3632			3632				
Flt Permitted					1.00			1.00				
Satd. Flow (perm)					3632			3632				
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	0	1003	0	0	1202	0	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	1003	0	0	1202	0	0	0	0
Turn Type					NA			NA				
Protected Phases					1			2				
Permitted Phases												
Actuated Green, G (s)					24.7			28.9				
Effective Green, g (s)					24.7			28.9				
Actuated g/C Ratio					0.35			0.41				
Clearance Time (s)					8.2			8.2				
Vehicle Extension (s)					2.0			2.0				
Lane Grp Cap (vph)					1281			1499				
v/s Ratio Prot					c0.28			c0.33				
v/s Ratio Perm												
v/c Ratio					0.78			0.80				
Uniform Delay, d1					20.3			18.0				
Progression Factor					1.00			0.83				
Incremental Delay, d2					3.0			3.9				
Delay (s)					23.2			19.0				
Level of Service					C			B				
Approach Delay (s)		0.0			23.2			19.0			0.0	
Approach LOS		A			C			B			A	

Intersection Summary			
HCM 2000 Control Delay	20.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	16.4
Intersection Capacity Utilization	68.3%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	NBT	NBR	SBL	SBT	SWL	SWR
Lane Configurations						
Traffic Volume (vph)	0	0	0	923	214	0
Future Volume (vph)	0	0	0	923	214	0
Ideal Flow (vphpl)	1950	1950	1950	1950	1950	1950
Total Lost time (s)				8.2	8.2	
Lane Util. Factor				0.95	0.97	
Frt				1.00	1.00	
Flt Protected				1.00	0.95	
Satd. Flow (prot)				3632	3523	
Flt Permitted				1.00	0.95	
Satd. Flow (perm)				3632	3523	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	1003	233	0
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	1003	233	0
Turn Type				NA	Prot	
Protected Phases				1	2	
Permitted Phases						
Actuated Green, G (s)				24.7	28.9	
Effective Green, g (s)				24.7	28.9	
Actuated g/C Ratio				0.35	0.41	
Clearance Time (s)				8.2	8.2	
Vehicle Extension (s)				2.0	2.0	
Lane Grp Cap (vph)				1281	1454	
v/s Ratio Prot				c0.28	c0.07	
v/s Ratio Perm						
v/c Ratio				0.78	0.16	
Uniform Delay, d1				20.3	12.9	
Progression Factor				0.21	1.00	
Incremental Delay, d2				1.8	0.2	
Delay (s)				6.0	13.2	
Level of Service				A	B	
Approach Delay (s)	0.0			6.0	13.2	
Approach LOS	A			A	B	

Intersection Summary			
HCM 2000 Control Delay	7.4	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.45		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	16.4
Intersection Capacity Utilization	45.2%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	NBL	NBT	SBT	SBR	NEL	NER
Lane Configurations						
Traffic Volume (vph)	0	760	0	0	599	0
Future Volume (vph)	0	760	0	0	599	0
Ideal Flow (vphpl)	1950	1950	1950	1950	1950	1950
Total Lost time (s)		9.2			9.2	
Lane Util. Factor		0.95			0.97	
Frt		1.00			1.00	
Flt Protected		1.00			0.95	
Satd. Flow (prot)		3632			3523	
Flt Permitted		1.00			0.95	
Satd. Flow (perm)		3632			3523	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	826	0	0	651	0
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	0	826	0	0	651	0
Turn Type		NA			Prot	
Protected Phases		2			1	
Permitted Phases						
Actuated Green, G (s)		25.9			25.7	
Effective Green, g (s)		25.9			25.7	
Actuated g/C Ratio		0.37			0.37	
Clearance Time (s)		9.2			9.2	
Vehicle Extension (s)		2.0			2.0	
Lane Grp Cap (vph)		1343			1293	
v/s Ratio Prot		c0.23			c0.18	
v/s Ratio Perm						
v/c Ratio		0.62			0.50	
Uniform Delay, d1		18.0			17.2	
Progression Factor		0.26			1.00	
Incremental Delay, d2		1.7			0.1	
Delay (s)		6.3			17.3	
Level of Service		A			B	
Approach Delay (s)		6.3	0.0		17.3	
Approach LOS		A	A		B	

Intersection Summary			
HCM 2000 Control Delay	11.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	18.4
Intersection Capacity Utilization	52.5%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	NBL	NBT	NBR	SBL	SBT	SBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations		↑↑									↑↑	
Traffic Volume (vph)	0	760	0	0	0	0	0	0	0	0	910	0
Future Volume (vph)	0	760	0	0	0	0	0	0	0	0	910	0
Ideal Flow (vphpl)	1950	1950	1950	1950	1950	1950	1950	1950	1950	1950	1950	1950
Total Lost time (s)		9.2									9.2	
Lane Util. Factor		0.95									0.95	
Frt		1.00									1.00	
Flt Protected		1.00									1.00	
Satd. Flow (prot)		3632									3632	
Flt Permitted		1.00									1.00	
Satd. Flow (perm)		3632									3632	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	826	0	0	0	0	0	0	0	0	989	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	826	0	0	0	0	0	0	0	0	989	0
Turn Type		NA									NA	
Protected Phases		2									1	
Permitted Phases												
Actuated Green, G (s)		25.9									25.7	
Effective Green, g (s)		25.9									25.7	
Actuated g/C Ratio		0.37									0.37	
Clearance Time (s)		9.2									9.2	
Vehicle Extension (s)		2.0									2.0	
Lane Grp Cap (vph)		1343									1333	
v/s Ratio Prot		c0.23									c0.27	
v/s Ratio Perm												
v/c Ratio		0.62									0.74	
Uniform Delay, d1		18.0									19.3	
Progression Factor		1.00									1.32	
Incremental Delay, d2		2.1									1.2	
Delay (s)		20.1									26.7	
Level of Service		C									C	
Approach Delay (s)		20.1			0.0			0.0			26.7	
Approach LOS		C			A			A			C	

Intersection Summary			
HCM 2000 Control Delay	23.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	18.4
Intersection Capacity Utilization	60.3%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	NBT	NBR	SBL	SBT	SWL	SWR
Lane Configurations				↑↑	↰↰	
Traffic Volume (vph)	0	0	0	384	910	0
Future Volume (vph)	0	0	0	384	910	0
Ideal Flow (vphpl)	1950	1950	1950	1950	1950	1950
Total Lost time (s)				9.2	9.2	
Lane Util. Factor				0.95	0.97	
Frt				1.00	1.00	
Flt Protected				1.00	0.95	
Satd. Flow (prot)				3632	3523	
Flt Permitted				1.00	0.95	
Satd. Flow (perm)				3632	3523	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	417	989	0
RTOR Reduction (vph)	0	0	0	0	270	0
Lane Group Flow (vph)	0	0	0	417	719	0
Turn Type				NA	Prot	
Protected Phases				2	1	
Permitted Phases						
Actuated Green, G (s)				25.9	25.7	
Effective Green, g (s)				25.9	25.7	
Actuated g/C Ratio				0.37	0.37	
Clearance Time (s)				9.2	9.2	
Vehicle Extension (s)				2.0	2.0	
Lane Grp Cap (vph)				1343	1293	
v/s Ratio Prot				c0.11	c0.20	
v/s Ratio Perm						
v/c Ratio				0.31	0.56	
Uniform Delay, d1				15.7	17.6	
Progression Factor				1.00	0.20	
Incremental Delay, d2				0.6	0.2	
Delay (s)				16.3	3.7	
Level of Service				B	A	
Approach Delay (s)	0.0			16.3	3.7	
Approach LOS	A			B	A	

Intersection Summary			
HCM 2000 Control Delay	7.5	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.43		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	18.4
Intersection Capacity Utilization	60.3%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	91	148	20	29	97	336	6	214	25	445	581	138
Future Volume (veh/h)	91	148	20	29	97	336	6	214	25	445	581	138
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		0.98	1.00		0.96	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	99	161	22	32	105	365	7	233	27	484	632	150
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	128	379	321	63	311	763	16	397	171	567	1495	665
Arrive On Green	0.07	0.20	0.20	0.04	0.17	0.17	0.01	0.11	0.11	0.32	0.42	0.42
Sat Flow, veh/h	1781	1870	1583	1781	1870	1556	1781	3554	1527	1781	3554	1581
Grp Volume(v), veh/h	99	161	22	32	105	365	7	233	27	484	632	150
Grp Sat Flow(s),veh/h/ln	1781	1870	1583	1781	1870	1556	1781	1777	1527	1781	1777	1581
Q Serve(g_s), s	3.0	4.1	0.6	1.0	2.7	8.6	0.2	3.4	0.9	13.8	6.8	3.3
Cycle Q Clear(g_c), s	3.0	4.1	0.6	1.0	2.7	8.6	0.2	3.4	0.9	13.8	6.8	3.3
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	128	379	321	63	311	763	16	397	171	567	1495	665
V/C Ratio(X)	0.77	0.42	0.07	0.51	0.34	0.48	0.43	0.59	0.16	0.85	0.42	0.23
Avail Cap(c_a), veh/h	296	449	380	164	311	763	164	721	310	1084	2557	1138
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	24.7	18.9	17.5	25.7	20.0	9.4	26.7	22.9	21.8	17.3	11.1	10.0
Incr Delay (d2), s/veh	9.5	0.8	0.1	6.3	0.6	0.5	16.5	1.4	0.4	3.8	0.2	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.5	1.7	0.2	0.5	1.1	2.4	0.2	1.4	0.3	5.5	2.3	1.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	34.2	19.6	17.6	31.9	20.6	9.9	43.2	24.3	22.2	21.1	11.2	10.2
LnGrp LOS	C	B	B	C	C	A	D	C	C	C	B	B
Approach Vol, veh/h		282			502			267			1266	
Approach Delay, s/veh		24.6			13.5			24.5			14.9	
Approach LOS		C			B			C			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	21.3	11.1	5.9	16.0	4.5	27.8	7.9	14.0
Change Period (Y+Rc), s	4.0	5.0	4.0	5.0	4.0	5.0	4.0	5.0
Max Green Setting (Gmax), s	33.0	11.0	5.0	13.0	5.0	39.0	9.0	9.0
Max Q Clear Time (g_c+I1), s	15.8	5.4	3.0	6.1	2.2	8.8	5.0	10.6
Green Ext Time (p_c), s	1.5	0.7	0.0	0.5	0.0	5.4	0.1	0.0

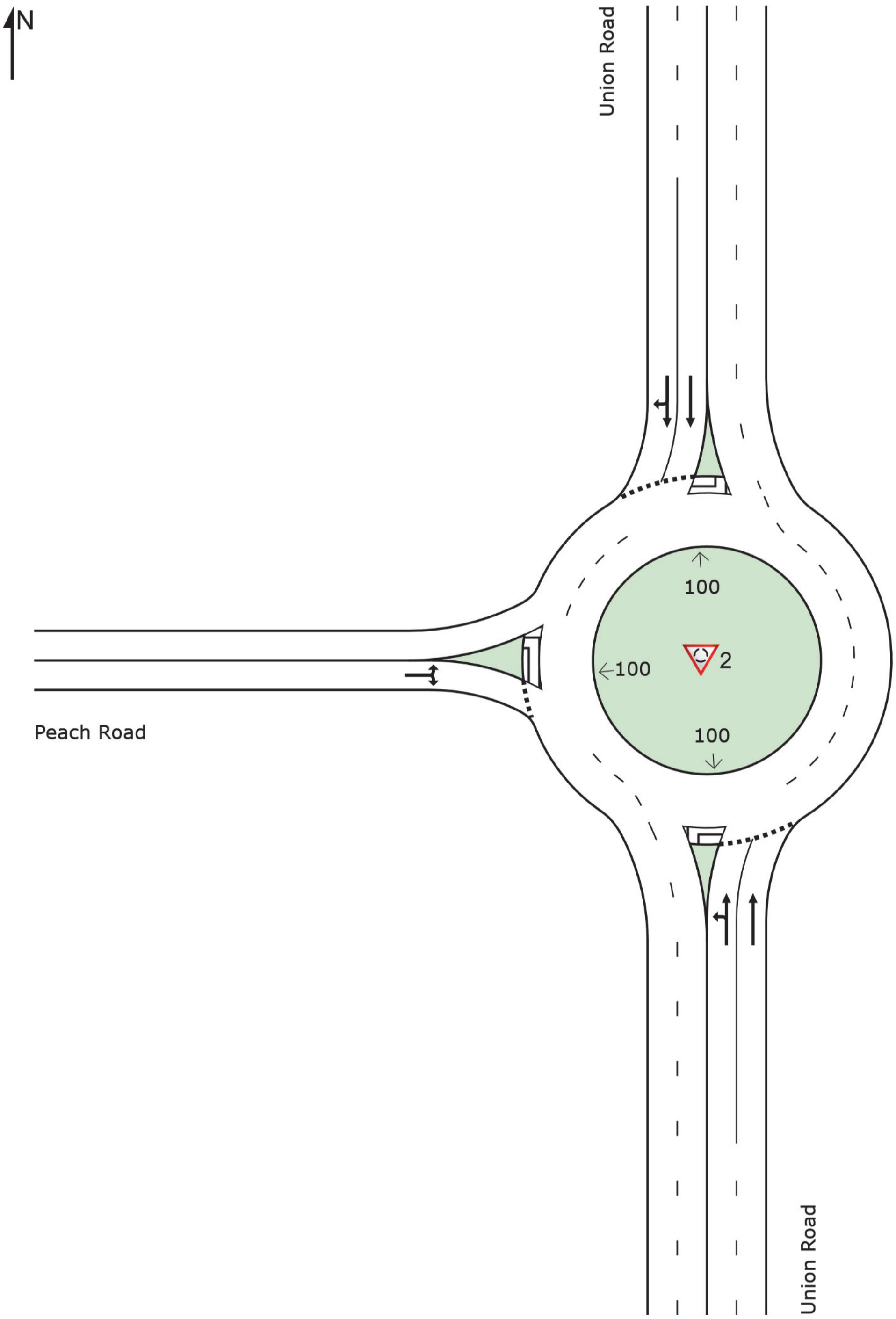
Intersection Summary	
HCM 6th Ctrl Delay	16.9
HCM 6th LOS	B

SITE LAYOUT

Site: 2 [Union Road & Peach Road (Site Folder: General)]

New Site
Site Category: (None)
Roundabout

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



MOVEMENT SUMMARY

Site: 2 [Union Road & Peach Road (Site Folder: General)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] ft	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed mph
South: Union Road														
3	L2	6	3.0	7	3.0	0.074	3.3	LOS A	0.3	7.6	0.10	0.03	0.10	36.1
8	T1	177	3.0	192	3.0	0.074	3.3	LOS A	0.3	7.6	0.10	0.03	0.10	36.1
Approach		183	3.0	199	3.0	0.074	3.3	LOS A	0.3	7.6	0.10	0.03	0.10	36.1
North: Union Road														
4	T1	483	3.0	525	3.0	0.209	4.4	LOS A	1.0	25.0	0.05	0.01	0.05	35.6
14	R2	43	3.0	47	3.0	0.209	4.4	LOS A	1.0	25.0	0.05	0.01	0.05	34.4
Approach		526	3.0	572	3.0	0.209	4.4	LOS A	1.0	25.0	0.05	0.01	0.05	35.5
West: Peach Road														
5	L2	23	3.0	25	3.0	0.038	5.0	LOS A	0.1	3.7	0.53	0.42	0.53	32.8
12	R2	4	3.0	4	3.0	0.038	5.0	LOS A	0.1	3.7	0.53	0.42	0.53	31.9
Approach		27	3.0	29	3.0	0.038	5.0	LOS A	0.1	3.7	0.53	0.42	0.53	32.7
All Vehicles		736	3.0	800	3.0	0.209	4.1	LOS A	1.0	25.0	0.08	0.03	0.08	35.5

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
Delay Model: HCM Delay Formula (Geometric Delay is not included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Intersection	
Int Delay, s/veh	7.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	2	20	4	4	20	2	2	4	3	4	4	2
Future Vol, veh/h	2	20	4	4	20	2	2	4	3	4	4	2
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	6	6	6	2	2	2	14	14	14	11	11	11
Mvmt Flow	2	22	4	4	22	2	2	4	3	4	4	2

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	35	24	5	36	24	6	6	0	0	7	0	0
Stage 1	13	13	-	10	10	-	-	-	-	-	-	-
Stage 2	22	11	-	26	14	-	-	-	-	-	-	-
Critical Hdwy	7.16	6.56	6.26	7.12	6.52	6.22	4.24	-	-	4.21	-	-
Critical Hdwy Stg 1	6.16	5.56	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.16	5.56	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.554	4.054	3.354	3.518	4.018	3.318	2.326	-	-	2.299	-	-
Pot Cap-1 Maneuver	961	862	1067	970	869	1077	1540	-	-	1557	-	-
Stage 1	997	877	-	1011	887	-	-	-	-	-	-	-
Stage 2	986	878	-	992	884	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	938	859	1067	945	866	1077	1540	-	-	1557	-	-
Mov Cap-2 Maneuver	938	859	-	945	866	-	-	-	-	-	-	-
Stage 1	996	874	-	1010	886	-	-	-	-	-	-	-
Stage 2	959	877	-	960	881	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	9.2	9.2	1.6	2.9
HCM LOS	A	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1540	-	-	892	891	1557	-	-
HCM Lane V/C Ratio	0.001	-	-	0.032	0.032	0.003	-	-
HCM Control Delay (s)	7.3	0	-	9.2	9.2	7.3	0	-
HCM Lane LOS	A	A	-	A	A	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.1	0.1	0	-	-

Intersection						
Int Delay, s/veh	3.2					

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	46	1	1	7	9	72
Future Vol, veh/h	46	1	1	7	9	72
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	50	1	1	8	10	78

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	59	49	88	0	-	0
Stage 1	49	-	-	-	-	-
Stage 2	10	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	948	1020	1508	-	-	-
Stage 1	973	-	-	-	-	-
Stage 2	1013	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	947	1020	1508	-	-	-
Mov Cap-2 Maneuver	947	-	-	-	-	-
Stage 1	972	-	-	-	-	-
Stage 2	1013	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	9	0.9	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1508	-	948	-	-
HCM Lane V/C Ratio	0.001	-	0.054	-	-
HCM Control Delay (s)	7.4	0	9	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	0.2	-	-

Intersection	
Int Delay, s/veh	4.4

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	29	18	8	16	8	15
Future Vol, veh/h	29	18	8	16	8	15
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	32	20	9	17	9	16

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	26	0	-	0	102	18
Stage 1	-	-	-	-	18	-
Stage 2	-	-	-	-	84	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1588	-	-	-	896	1061
Stage 1	-	-	-	-	1005	-
Stage 2	-	-	-	-	939	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1588	-	-	-	878	1061
Mov Cap-2 Maneuver	-	-	-	-	878	-
Stage 1	-	-	-	-	985	-
Stage 2	-	-	-	-	939	-

Approach	EB	WB	SB
HCM Control Delay, s	4.5	0	8.7
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1588	-	-	-	989
HCM Lane V/C Ratio	0.02	-	-	-	0.025
HCM Control Delay (s)	7.3	0	-	-	8.7
HCM Lane LOS	A	A	-	-	A
HCM 95th %tile Q(veh)	0.1	-	-	-	0.1

UNION ROAD & SR 120 RAMPS (DDI) DELAY

	Intersection ID	Roadway	Synchro Intersection ID	Scenario			
				Existing			
				Approach	Delay	Entering Vehicles	Total Delay
AM Peak	5	SR 120 WB Ramp	17	WBR	15.2	277	4210
		Union Road	18	SBT	14.9	450	6705
		Union Road	18	NBT	13.5	629	8492
		SR 120 WB Ramp	19	WBL	15.4	64	986
		Weighted Delay		**14.4**			
	6	SR 120 EB Ramp	20	EBL	17.2	185	3182
		Union Road	21	SBT	24.6	336	8266
		Union Road	21	NBT	16.4	618	10135
		SR 120 EB Ramp	22	EBR	13.6	231	3142
		Weighted Delay		**18.0**			

	Intersection ID	Roadway	Synchro Intersection ID	Scenario			
				Existing			
				Approach	Delay	Entering Vehicles	Total Delay
PM Peak	5	SR 120 WB Ramp	17	WBR	17.5	284	4970
		Union Road	18	SBT	19.7	748	14736
		Union Road	18	NBT	15.5	711	11021
		SR 120 WB Ramp	19	WBL	13.4	163	2184
		Weighted Delay		**17.3**			
	6	SR 120 EB Ramp	20	EBL	18.5	379	7012
		Union Road	21	SBT	35.2	689	24253
		Union Road	21	NBT	14.5	465	6743
		SR 120 EB Ramp	22	EBR	13.1	269	3524
		Weighted Delay		**23.0**			

Scenario				Scenario			
Existing + Project				Cumulative			
Approach	Delay	Entering Vehicles	Total Delay	Approach	Delay	Entering Vehicles	Total Delay
WBR	15.3	277	4238	WBR	21	297	6237
SBT	15	451	6765	SBT	22.6	791	17877
NBT	13.3	633	8419	NBT	14.7	1060	15582
WBL	15.3	68	1040	WBL	12.2	104	1269
14.4				**18.2**			
EBL	17.3	185	3201	EBL	21.5	419	9009
SBT	25	341	8525	SBT	29.1	707	20574
NBT	16.2	622	10076	NBT	17.6	1094	19254
EBR	13.5	231	3119	EBR	13.2	598	7894
18.1				**20.1**			

Scenario				Scenario			
Existing + Project				Cumulative			
Approach	Delay	Entering Vehicles	Total Delay	Approach	Delay	Entering Vehicles	Total Delay
WBR	17.1	284	4856	WBR	17.7	284	5027
SBT	18.9	754	14251	SBT	23	917	21091
NBT	17.1	714	12209	NBT	19	1080	20520
WBL	14.1	175	2468	WBL	13.1	202	2646
17.5				**19.8**			
EBL	18	379	6822	EBL	17.4	599	10423
SBT	33.2	707	23472	SBT	26.6	892	23727
NBT	15	468	7020	NBT	19.9	734	14607
EBR	13.5	269	3632	EBR	16.2	384	6221
22.5				**21.1**			

Scenario			
Cumulative + Project			
Approach	**Delay**	**Entering Vehicles**	**Total Delay**
WBR	21	297	6237
SBT	22.6	792	17899
NBT	14.8	1064	15747
WBL	12.2	108	1318
18.2			
EBL	21.5	419	9009
SBT	29.2	712	20790
NBT	17.7	1098	19435
EBR	13.2	598	7894
20.2			

Scenario			
Cumulative + Project			
Approach	**Delay**	**Entering Vehicles**	**Total Delay**
WBR	17.7	284	5027
SBT	23.2	923	21414
NBT	19	1083	20577
WBL	13.2	214	2825
19.9			
EBL	17.3	599	10363
SBT	26.6	910	24206
NBT	20.1	737	14814
EBR	16.3	384	6259
21.2			

RECOMMENDED IMPROVEMENTS ANALYSIS

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	98	83	100	5	81	149	66	146	7	64	136	96
Future Volume (veh/h)	98	83	100	5	81	149	66	146	7	64	136	96
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		0.98	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	1841	1841	1841	1826	1826	1826	1841	1841	1841	1722	1722	1722
Adj Flow Rate, veh/h	136	115	139	7	112	207	92	203	10	89	189	137
Peak Hour Factor	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.70
Percent Heavy Veh, %	4	4	4	5	5	5	4	4	4	12	12	12
Cap, veh/h	249	175	170	16	257	475	227	408	18	184	266	170
Arrive On Green	0.33	0.33	0.33	0.01	0.45	0.45	0.33	0.33	0.33	0.33	0.33	0.33
Sat Flow, veh/h	398	530	514	1739	574	1060	339	1219	53	234	795	507
Grp Volume(v), veh/h	390	0	0	7	0	319	305	0	0	415	0	0
Grp Sat Flow(s),veh/h/ln	1443	0	0	1739	0	1634	1611	0	0	1536	0	0
Q Serve(g_s), s	7.7	0.0	0.0	0.2	0.0	5.6	0.0	0.0	0.0	4.0	0.0	0.0
Cycle Q Clear(g_c), s	10.1	0.0	0.0	0.2	0.0	5.6	5.9	0.0	0.0	9.9	0.0	0.0
Prop In Lane	0.35		0.36	1.00		0.65	0.30		0.03	0.21		0.33
Lane Grp Cap(c), veh/h	593	0	0	16	0	732	653	0	0	620	0	0
V/C Ratio(X)	0.66	0.00	0.00	0.43	0.00	0.44	0.47	0.00	0.00	0.67	0.00	0.00
Avail Cap(c_a), veh/h	787	0	0	214	0	1146	939	0	0	900	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	1.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	12.5	0.0	0.0	20.4	0.0	7.9	11.1	0.0	0.0	12.3	0.0	0.0
Incr Delay (d2), s/veh	1.2	0.0	0.0	17.0	0.0	0.4	0.5	0.0	0.0	1.3	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.7	0.0	0.0	0.1	0.0	1.5	1.8	0.0	0.0	2.9	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	13.7	0.0	0.0	37.4	0.0	8.3	11.6	0.0	0.0	13.6	0.0	0.0
LnGrp LOS	B	A	A	D	A	A	B	A	A	B	A	A
Approach Vol, veh/h		390			326			305			415	
Approach Delay, s/veh		13.7			8.9			11.6			13.6	
Approach LOS		B			A			B			B	
Timer - Assigned Phs		2	3	4		6		8				
Phs Duration (G+Y+Rc), s		18.4	4.9	18.2		18.4		23.1				
Change Period (Y+Rc), s		4.5	4.5	4.5		4.5		4.5				
Max Green Setting (Gmax), s		21.9	5.1	19.5		21.9		29.1				
Max Q Clear Time (g_c+I1), s		7.9	2.2	12.1		11.9		7.6				
Green Ext Time (p_c), s		1.6	0.0	1.6		2.0		2.0				
Intersection Summary												
HCM 6th Ctrl Delay			12.1									
HCM 6th LOS			B									

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	96	169	12	52	137	168	7	194	64	121	133	53
Future Volume (veh/h)	96	169	12	52	137	168	7	194	64	121	133	53
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	148	260	18	80	211	258	11	298	98	186	205	82
Peak Hour Factor	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	179	586	41	110	230	281	71	1119	590	277	242	590
Arrive On Green	0.10	0.34	0.34	0.06	0.30	0.30	0.37	0.37	0.37	0.37	0.37	0.37
Sat Flow, veh/h	1781	1726	120	1781	765	935	15	2995	1581	505	647	1581
Grp Volume(v), veh/h	148	0	278	80	0	469	144	165	98	391	0	82
Grp Sat Flow(s),veh/h/ln	1781	0	1846	1781	0	1700	1394	1617	1581	1152	0	1581
Q Serve(g_s), s	4.9	0.0	7.0	2.6	0.0	15.9	0.5	4.3	2.5	15.5	0.0	2.0
Cycle Q Clear(g_c), s	4.9	0.0	7.0	2.6	0.0	15.9	20.3	4.3	2.5	19.8	0.0	2.0
Prop In Lane	1.00		0.06	1.00		0.55	0.08		1.00	0.48		1.00
Lane Grp Cap(c), veh/h	179	0	626	110	0	511	585	604	590	519	0	590
V/C Ratio(X)	0.83	0.00	0.44	0.73	0.00	0.92	0.25	0.27	0.17	0.75	0.00	0.14
Avail Cap(c_a), veh/h	179	0	626	149	0	512	591	609	595	523	0	595
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	26.4	0.0	15.4	27.6	0.0	20.2	13.0	13.1	12.5	19.0	0.0	12.4
Incr Delay (d2), s/veh	26.4	0.0	0.5	11.2	0.0	21.7	0.2	0.2	0.1	6.1	0.0	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.3	0.0	2.7	1.4	0.0	8.7	1.2	1.4	0.8	5.5	0.0	0.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	52.8	0.0	15.9	38.7	0.0	41.9	13.2	13.3	12.6	25.0	0.0	12.5
LnGrp LOS	D	A	B	D	A	D	B	B	B	C	A	B
Approach Vol, veh/h		426			549			407			473	
Approach Delay, s/veh		28.7			41.4			13.1			22.9	
Approach LOS		C			D			B			C	
Timer - Assigned Phs		2	3	4		6	7	8				
Phs Duration (G+Y+Rc), s		26.8	8.2	24.8		26.8	10.5	22.5				
Change Period (Y+Rc), s		4.5	4.5	4.5		4.5	4.5	4.5				
Max Green Setting (Gmax), s		22.5	5.0	19.0		22.5	6.0	18.0				
Max Q Clear Time (g_c+I1), s		22.3	4.6	9.0		21.8	6.9	17.9				
Green Ext Time (p_c), s		0.1	0.0	1.1		0.2	0.0	0.0				
Intersection Summary												
HCM 6th Ctrl Delay			27.6									
HCM 6th LOS			C									

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	108	81	62	4	35	92	21	161	9	170	251	119
Future Volume (veh/h)	108	81	62	4	35	92	21	161	9	170	251	119
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.99	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	1856	1856	1856	1870	1870	1870	1826	1826	1826	1841	1841	1841
Adj Flow Rate, veh/h	116	87	67	4	38	99	23	173	10	183	270	128
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, %	3	3	3	2	2	2	5	5	5	4	4	4
Cap, veh/h	272	156	93	542	120	312	151	761	41	325	393	164
Arrive On Green	0.26	0.26	0.26	0.26	0.26	0.26	0.48	0.48	0.48	0.48	0.48	0.48
Sat Flow, veh/h	472	593	352	1233	455	1184	75	1590	85	395	820	343
Grp Volume(v), veh/h	270	0	0	4	0	137	206	0	0	581	0	0
Grp Sat Flow(s),veh/h/ln	1417	0	0	1233	0	1639	1750	0	0	1559	0	0
Q Serve(g_s), s	3.9	0.0	0.0	0.0	0.0	2.3	0.0	0.0	0.0	7.7	0.0	0.0
Cycle Q Clear(g_c), s	6.2	0.0	0.0	0.1	0.0	2.3	2.3	0.0	0.0	10.5	0.0	0.0
Prop In Lane	0.43		0.25	1.00		0.72	0.11		0.05	0.31		0.22
Lane Grp Cap(c), veh/h	521	0	0	542	0	432	952	0	0	882	0	0
V/C Ratio(X)	0.52	0.00	0.00	0.01	0.00	0.32	0.22	0.00	0.00	0.66	0.00	0.00
Avail Cap(c_a), veh/h	915	0	0	871	0	869	1698	0	0	1568	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	1.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	11.8	0.0	0.0	9.5	0.0	10.3	5.3	0.0	0.0	7.3	0.0	0.0
Incr Delay (d2), s/veh	0.8	0.0	0.0	0.0	0.0	0.4	0.1	0.0	0.0	0.8	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.5	0.0	0.0	0.0	0.0	0.7	0.5	0.0	0.0	2.1	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	12.6	0.0	0.0	9.5	0.0	10.7	5.5	0.0	0.0	8.2	0.0	0.0
LnGrp LOS	B	A	A	A	A	B	A	A	A	A	A	A
Approach Vol, veh/h		270			141			206			581	
Approach Delay, s/veh		12.6			10.7			5.5			8.2	
Approach LOS		B			B			A			A	
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		21.2		13.7		21.2		13.7				
Change Period (Y+Rc), s		4.5		4.5		4.5		4.5				
Max Green Setting (Gmax), s		32.5		18.5		32.5		18.5				
Max Q Clear Time (g_c+I1), s		4.3		8.2		12.5		4.3				
Green Ext Time (p_c), s		1.3		1.2		4.2		0.6				
Intersection Summary												
HCM 6th Ctrl Delay			9.0									
HCM 6th LOS			A									

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	82	115	17	29	77	97	6	160	25	183	264	126
Future Volume (veh/h)	82	115	17	29	77	97	6	160	25	183	264	126
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		0.98	1.00		0.98	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	99	139	20	35	93	117	7	193	30	220	318	152
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	127	324	47	65	125	157	89	1831	836	395	495	854
Arrive On Green	0.07	0.20	0.20	0.04	0.17	0.17	0.54	0.54	0.54	0.54	0.54	0.54
Sat Flow, veh/h	1781	1598	230	1781	744	936	48	3390	1548	579	917	1582
Grp Volume(v), veh/h	99	0	159	35	0	210	107	93	30	538	0	152
Grp Sat Flow(s),veh/h/ln	1781	0	1828	1781	0	1681	1821	1617	1548	1495	0	1582
Q Serve(g_s), s	3.3	0.0	4.6	1.2	0.0	7.3	0.0	1.7	0.6	14.0	0.0	3.0
Cycle Q Clear(g_c), s	3.3	0.0	4.6	1.2	0.0	7.3	1.7	1.7	0.6	15.8	0.0	3.0
Prop In Lane	1.00		0.13	1.00		0.56	0.07		1.00	0.41		1.00
Lane Grp Cap(c), veh/h	127	0	370	65	0	282	1046	873	836	890	0	854
V/C Ratio(X)	0.78	0.00	0.43	0.54	0.00	0.74	0.10	0.11	0.04	0.60	0.00	0.18
Avail Cap(c_a), veh/h	160	0	553	146	0	495	1046	873	836	890	0	854
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	27.9	0.0	21.3	28.9	0.0	24.2	6.9	6.9	6.6	10.1	0.0	7.2
Incr Delay (d2), s/veh	17.3	0.0	0.8	6.7	0.0	3.9	0.2	0.2	0.1	3.0	0.0	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.0	0.0	1.9	0.6	0.0	3.0	0.6	0.5	0.2	4.9	0.0	0.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	45.2	0.0	22.1	35.6	0.0	28.0	7.1	7.1	6.7	13.1	0.0	7.6
LnGrp LOS	D	A	C	D	A	C	A	A	A	B	A	A
Approach Vol, veh/h		258			245			230			690	
Approach Delay, s/veh		30.9			29.1			7.0			11.9	
Approach LOS		C			C			A			B	
Timer - Assigned Phs		2	3	4		6	7	8				
Phs Duration (G+Y+Rc), s		37.5	6.7	16.9		37.5	8.8	14.8				
Change Period (Y+Rc), s		4.5	4.5	4.5		4.5	4.5	4.5				
Max Green Setting (Gmax), s		33.0	5.0	18.5		33.0	5.5	18.0				
Max Q Clear Time (g_c+I1), s		3.7	3.2	6.6		17.8	5.3	9.3				
Green Ext Time (p_c), s		1.3	0.0	0.6		3.9	0.0	0.7				

Intersection Summary			
HCM 6th Ctrl Delay			17.5
HCM 6th LOS			B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	183	3	591	456	1516	0	0	961	500
Future Volume (veh/h)	0	0	0	183	3	591	456	1516	0	0	961	500
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)				1.00		0.98	1.00		1.00	1.00		0.97
Parking Bus, Adj				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach					No			No			No	
Adj Sat Flow, veh/h/ln				1796	1796	1796	1811	1811	0	0	1796	1796
Adj Flow Rate, veh/h				199	3	642	496	1648	0	0	1045	543
Peak Hour Factor				0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %				7	7	7	6	6	0	0	7	7
Cap, veh/h				420	6	654	498	3170	0	0	1509	456
Arrive On Green				0.25	0.25	0.25	0.29	0.64	0.00	0.00	0.31	0.31
Sat Flow, veh/h				1687	25	2627	1725	5107	0	0	5065	1481
Grp Volume(v), veh/h				202	0	642	496	1648	0	0	1045	543
Grp Sat Flow(s),veh/h/ln				1712	0	1314	1725	1648	0	0	1635	1481
Q Serve(g_s), s				9.0	0.0	21.9	25.8	16.1	0.0	0.0	16.9	27.7
Cycle Q Clear(g_c), s				9.0	0.0	21.9	25.8	16.1	0.0	0.0	16.9	27.7
Prop In Lane				0.99		1.00	1.00		0.00	0.00		1.00
Lane Grp Cap(c), veh/h				426	0	654	498	3170	0	0	1509	456
V/C Ratio(X)				0.47	0.00	0.98	1.00	0.52	0.00	0.00	0.69	1.19
Avail Cap(c_a), veh/h				426	0	654	498	3170	0	0	1509	456
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	1.00	1.00	1.00	0.00	0.00	1.00	1.00
Uniform Delay (d), s/veh				28.8	0.0	33.6	31.9	8.7	0.0	0.0	27.4	31.1
Incr Delay (d2), s/veh				0.3	0.0	30.4	39.1	0.1	0.0	0.0	1.2	105.9
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				3.7	0.0	9.5	15.8	5.0	0.0	0.0	6.5	22.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh				29.1	0.0	64.0	71.0	8.8	0.0	0.0	28.6	137.0
LnGrp LOS				C	A	E	E	A	A	A	C	F
Approach Vol, veh/h					844			2144			1588	
Approach Delay, s/veh					55.7			23.2			65.6	
Approach LOS					E			C			E	
Timer - Assigned Phs		2			5	6		8				
Phs Duration (G+Y+Rc), s		63.0			30.0	33.0		27.0				
Change Period (Y+Rc), s		5.3			4.0	5.3		4.6				
Max Green Setting (Gmax), s		57.7			26.0	27.7		22.4				
Max Q Clear Time (g_c+I1), s		18.1			27.8	29.7		23.9				
Green Ext Time (p_c), s		3.2			0.0	0.0		0.0				
Intersection Summary												
HCM 6th Ctrl Delay			43.9									
HCM 6th LOS			D									

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	311	0	440	0	0	0	0	1661	161	221	923	0
Future Volume (veh/h)	311	0	440	0	0	0	0	1661	161	221	923	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	1781	0	1781				0	1811	1811	1781	1781	0
Adj Flow Rate, veh/h	338	0	478				0	1805	175	240	1003	0
Peak Hour Factor	0.92	0.92	0.92				0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	8	0	8				0	6	6	8	8	0
Cap, veh/h	933	0	428				0	1959	606	273	2934	0
Arrive On Green	0.28	0.00	0.28				0.00	0.40	0.40	0.16	0.60	0.00
Sat Flow, veh/h	3291	0	1510				0	5107	1529	1697	5024	0
Grp Volume(v), veh/h	338	0	478				0	1805	175	240	1003	0
Grp Sat Flow(s),veh/h/ln	1646	0	1510				0	1648	1529	1697	1621	0
Q Serve(g_s), s	7.1	0.0	24.5				0.0	30.0	6.7	12.0	8.9	0.0
Cycle Q Clear(g_c), s	7.1	0.0	24.5				0.0	30.0	6.7	12.0	8.9	0.0
Prop In Lane	1.00		1.00				0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	933	0	428				0	1959	606	273	2934	0
V/C Ratio(X)	0.36	0.00	1.12				0.00	0.92	0.29	0.88	0.34	0.00
Avail Cap(c_a), veh/h	933	0	428				0	2156	667	275	3133	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	1.00				0.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	24.7	0.0	31.0				0.0	24.8	17.8	35.5	8.6	0.0
Incr Delay (d2), s/veh	0.2	0.0	79.5				0.0	6.4	0.1	25.2	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	2.7	0.0	18.0				0.0	12.2	2.3	6.7	2.8	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	25.0	0.0	110.5				0.0	31.2	17.9	60.6	8.6	0.0
LnGrp LOS	C	A	F				A	C	B	E	A	A
Approach Vol, veh/h		816						1980			1243	
Approach Delay, s/veh		75.1						30.1			18.6	
Approach LOS		E						C			B	

Timer - Assigned Phs	1	2		4		6
Phs Duration (G+Y+Rc), s	17.9	39.6		29.0		57.5
Change Period (Y+Rc), s	4.0	5.3		4.5		5.3
Max Green Setting (Gmax), s	14.0	37.7		24.5		55.7
Max Q Clear Time (g_c+I1), s	14.0	32.0		26.5		10.9
Green Ext Time (p_c), s	0.0	2.2		0.0		1.7

Intersection Summary	
HCM 6th Ctrl Delay	35.6
HCM 6th LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	159	1	577	328	1338	0	0	1660	508
Future Volume (veh/h)	0	0	0	159	1	577	328	1338	0	0	1660	508
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		0.97
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	1841	1841	1841	0	0	1870	1870
Adj Flow Rate, veh/h				173	1	627	357	1454	0	0	1804	552
Peak Hour Factor				0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %				2	4	4	4	4	0	0	2	2
Cap, veh/h				387	2	608	390	3340	0	0	2023	612
Arrive On Green				0.22	0.22	0.22	0.22	0.66	0.00	0.00	0.40	0.40
Sat Flow, veh/h				1743	10	2738	1753	5191	0	0	5274	1544
Grp Volume(v), veh/h				174	0	627	357	1454	0	0	1804	552
Grp Sat Flow(s),veh/h/ln				1754	0	1369	1753	1675	0	0	1702	1544
Q Serve(g_s), s				7.5	0.0	19.4	17.4	11.9	0.0	0.0	28.8	29.4
Cycle Q Clear(g_c), s				7.5	0.0	19.4	17.4	11.9	0.0	0.0	28.8	29.4
Prop In Lane				0.99		1.00	1.00		0.00	0.00		1.00
Lane Grp Cap(c), veh/h				389	0	608	390	3340	0	0	2023	612
V/C Ratio(X)				0.45	0.00	1.03	0.91	0.44	0.00	0.00	0.89	0.90
Avail Cap(c_a), veh/h				389	0	608	401	3491	0	0	2145	648
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	1.00	1.00	1.00	0.00	0.00	1.00	1.00
Uniform Delay (d), s/veh				29.4	0.0	34.0	33.2	6.9	0.0	0.0	24.6	24.8
Incr Delay (d2), s/veh				0.3	0.0	44.8	24.8	0.0	0.0	0.0	4.7	14.8
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				3.1	0.0	10.0	9.9	3.6	0.0	0.0	11.8	12.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh				29.7	0.0	78.8	58.0	6.9	0.0	0.0	29.3	39.5
LnGrp LOS				C	A	F	E	A	A	A	C	D
Approach Vol, veh/h					801			1811			2356	
Approach Delay, s/veh					68.1			17.0			31.7	
Approach LOS					E			B			C	
Timer - Assigned Phs		2			5	6		8				
Phs Duration (G+Y+Rc), s		63.4			23.5	39.9		24.0				
Change Period (Y+Rc), s		5.3			4.0	5.3		4.6				
Max Green Setting (Gmax), s		60.7			20.0	36.7		19.4				
Max Q Clear Time (g_c+I1), s		13.9			19.4	31.4		21.4				
Green Ext Time (p_c), s		2.7			0.1	3.3		0.0				
Intersection Summary												
HCM 6th Ctrl Delay			32.2									
HCM 6th LOS			C									

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	432	0	541	0	0	0	0	1234	112	348	1471	0
Future Volume (veh/h)	432	0	541	0	0	0	0	1234	112	348	1471	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	1856	0	1856				0	1811	1811	1856	1856	0
Adj Flow Rate, veh/h	470	0	588				0	1341	122	378	1599	0
Peak Hour Factor	0.92	0.92	0.92				0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	3	0	3				0	6	6	3	3	0
Cap, veh/h	1108	0	508				0	1443	447	354	2765	0
Arrive On Green	0.32	0.00	0.32				0.00	0.29	0.29	0.20	0.55	0.00
Sat Flow, veh/h	3428	0	1572				0	5107	1530	1767	5233	0
Grp Volume(v), veh/h	470	0	588				0	1341	122	378	1599	0
Grp Sat Flow(s),veh/h/ln	1714	0	1572				0	1648	1530	1767	1689	0
Q Serve(g_s), s	8.0	0.0	24.2				0.0	19.7	4.6	15.0	15.7	0.0
Cycle Q Clear(g_c), s	8.0	0.0	24.2				0.0	19.7	4.6	15.0	15.7	0.0
Prop In Lane	1.00		1.00				0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	1108	0	508				0	1443	447	354	2765	0
V/C Ratio(X)	0.42	0.00	1.16				0.00	0.93	0.27	1.07	0.58	0.00
Avail Cap(c_a), veh/h	1108	0	508				0	1453	450	354	2775	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	1.00				0.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	19.9	0.0	25.3				0.0	25.7	20.4	29.9	11.3	0.0
Incr Delay (d2), s/veh	0.3	0.0	90.8				0.0	10.5	0.1	66.8	0.2	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.1	0.0	21.2				0.0	8.7	1.6	12.7	5.1	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	20.1	0.0	116.1				0.0	36.3	20.5	96.8	11.5	0.0
LnGrp LOS	C	A	F				A	D	C	F	B	A
Approach Vol, veh/h		1058						1463			1977	
Approach Delay, s/veh		73.5						35.0			27.8	
Approach LOS		E						C			C	
Timer - Assigned Phs	1	2		4		6						
Phs Duration (G+Y+Rc), s	19.0	27.2		28.7		46.2						
Change Period (Y+Rc), s	4.0	5.3		4.5		5.3						
Max Green Setting (Gmax), s	15.0	22.0		24.2		41.0						
Max Q Clear Time (g_c+I1), s	17.0	21.7		26.2		17.7						
Green Ext Time (p_c), s	0.0	0.1		0.0		3.0						
Intersection Summary												
HCM 6th Ctrl Delay			40.9									
HCM 6th LOS			D									

SIGNAL WARRANTS

MUTCD SIGNAL WARRANT ANALYSIS

KITTELSON & ASSOCIATES, INC.
155 Grand Avenue, Suite 505
Oakland, CA 94612
Phone: (510) 839-1742

Project #:	26781
Project Name:	Manteca Dutra Property
Analyst:	SAM
Date:	2/21/2022
Intersection:	Airport Way and Woodward Ave
Scenario:	Existing PM

Input Assumptions	
North-South Approach =	Major
East-West Approach =	Minor
Major Street Thru Lanes =	1
Minor Street Thru Lanes =	1
Speed > 40 mph?	Yes
Population < 10,000?	Yes

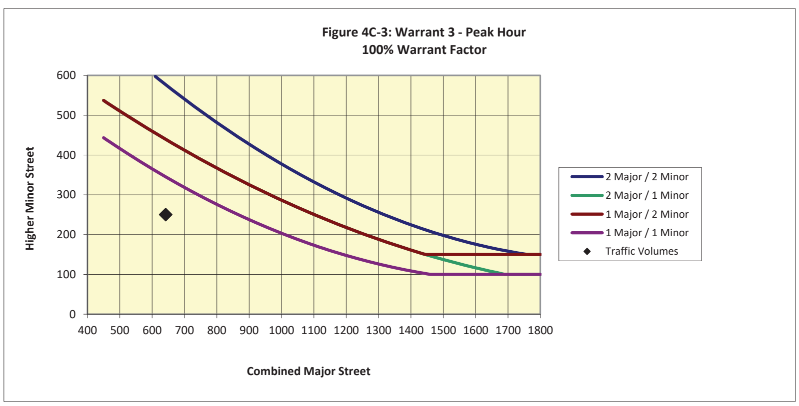
Analysis Volumes	
Major Street	
NB	177
SB	465
Minor Street	
EB	250
WB	100

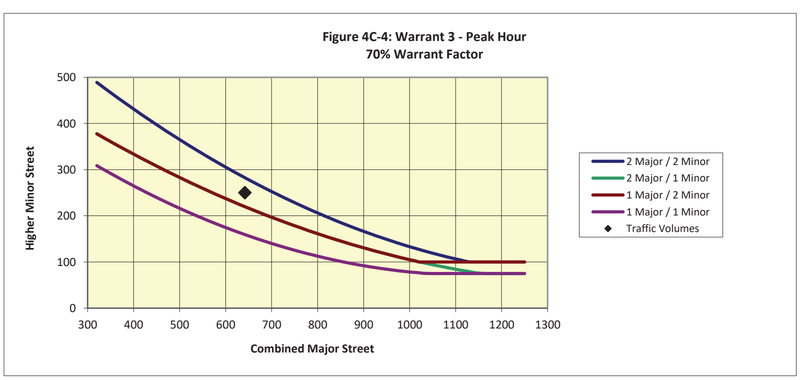
WARRANT 3 - Peak Hour — **SATISFIED** Yes*

PART A — **SATISFIED** No

		EB	WB
1	Total Stopped Delay Per Vehicle On Minor Approach (sec)	14.4	10.9
	Number Of Lanes On Minor Street Approach	1	2
	Vehicle-Hours Of Stopped Delay On Minor Approach	1.00	0.30
	Satisfied	**No**	**No**
2	Volume on Minor Street Approach During Same Hour	250	100
	Satisfied	**Yes**	**No**
3	Total Entering Volume On All Approaches During Same Hour	992	
	Number of Approaches to Intersection	4	
	Satisfied	**Yes**	

PART B — **SATISFIED** Yes





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MUTCD SIGNAL WARRANT ANALYSIS

KITTELSON & ASSOCIATES, INC.
155 Grand Avenue, Suite 505
Oakland, CA 94612
Phone: (510) 839-1742

Project #:	26781
Project Name:	Manteca Dutra Property
Analyst:	SAM
Date:	2/21/2022
Intersection:	Union Road and Woodward Ave
Scenario:	Existing AM

Input Assumptions	
North-South Approach =	Minor
East-West Approach =	Major
Major Street Thru Lanes =	1
Minor Street Thru Lanes =	2
Speed > 40 mph?	Yes
Population < 10,000?	Yes

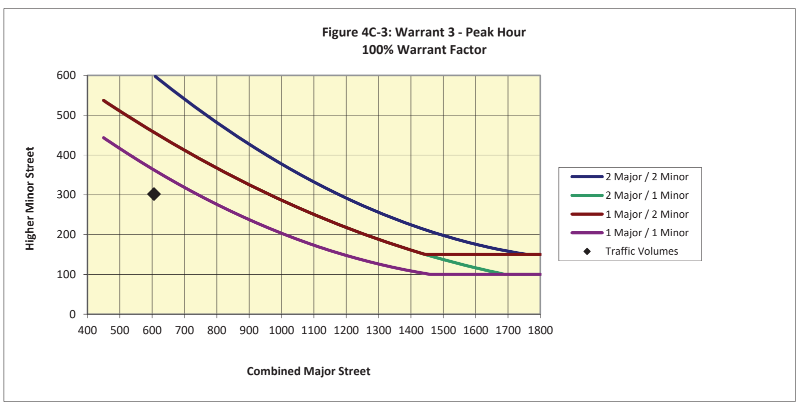
Analysis Volumes	
Major Street	
EB	351
WB	255
Minor Street	
NB	254
SB	302

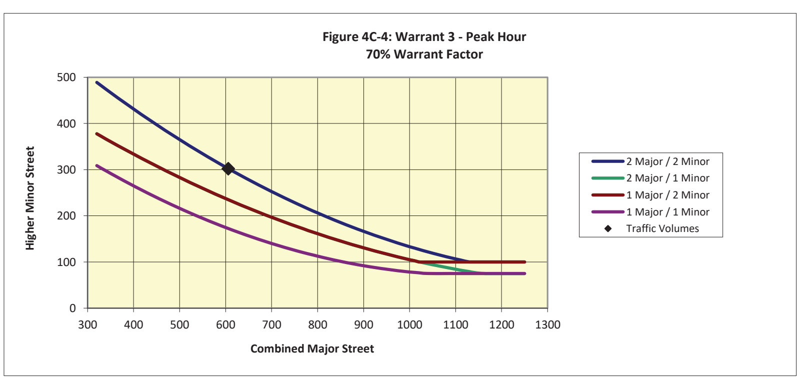
WARRANT 3 - Peak Hour — **SATISFIED** Yes*

PART A — **SATISFIED** Yes

		NB	SB
1	Total Stopped Delay Per Vehicle On Minor Approach (sec)	22.2	92.9
	Number Of Lanes On Minor Street Approach	3	2
	Vehicle-Hours Of Stopped Delay On Minor Approach	1.57	7.79
	Satisfied	**No**	**Yes**
2	Volume on Minor Street Approach During Same Hour	254	302
	Satisfied	**Yes**	**Yes**
3	Total Entering Volume On All Approaches During Same Hour	1162	
	Number of Approaches to Intersection	4	
	Satisfied	**Yes**	

PART B — **SATISFIED** Yes





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