DRAFT EIR

FOR THE

NORTH MANTECA ANNEXATION #1 PROJECT

JULY 26, 2022

Prepared for:

City of Manteca
Development Services
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A Land Use Planning, Design, and Environmental Firm

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INTRODUCTION

The City of Manteca, as the lead agency, determined that the proposed North Manteca Annexation #1 Project (proposed Project) is a "project" within the definition of CEQA. CEQA requires the preparation of an environmental impact report (EIR) prior to approving any project, which may have a significant impact on the environment. For the purposes of CEQA, the term "project" refers to the whole of an action, which has the potential for resulting in a direct physical change or a reasonably foreseeable indirect physical change in the environment (CEQA Guidelines Section 15378[a]).

The EIR contains a description of the Project, description of the environmental setting, identification of Project impacts, and mitigation measures for impacts found to be significant, as well as an analysis of Project alternatives, identification of significant irreversible environmental changes, growth-inducing impacts, and cumulative impacts. This EIR identifies issues determined to have no impact or a less than significant impact, and provides detailed analysis of potentially significant and significant impacts. Comments received in response to the Notice of Preparation (NOP) were considered in preparing the analysis in this EIR.

PROJECT DESCRIPTION

The Project site is directly north of the City of Manteca's limit line adjacent to the Union Ranch development. The Project site is immediately west of State Route 99 (SR 99) and east of the Union Ranch Specific Plan Area. The Project site is bounded on the north by farmland, on the east by SR 99 Frontage Road, on the south by existing residences and agricultural fields, and on the west by Union Road and the Union Ranch Specific Plan.

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

- Annexation Area – includes the whole of the Project site (approximately 202.81 acres), including the approximate 175.67-acre Development Area, the approximate 27.14-acre Non-Development Areas, and all public right-of-way along Union Road fronting the Development, all public right-of-way along SR 99 Frontage Road, and Non-Development Areas.

- Development Area - includes the parcels being annexed that will be entitled for subdivision and development. This includes the Union Ranch North Project Area (Subdivision 1) (approximately 106.04 acres) and the Stagecoach at M&E Project Area (Subdivision 2) (approximately 69.63 acres). The two areas total (175.67 acres) and are further defined below

    - Union Ranch North Project Area is Subdivision 1 (approximately 106.04 acres) – includes the western portion of the Annexation and Development Area.

    - Stagecoach at M&E Project Area is Subdivision 2 (approximately 69.93 acres) – includes the eastern portion of the Annexation and Development Area.

- Non-Development Area - includes the parcels being annexed that will not be entitled for subdivision or development. This includes three separate areas, each described as an Annexation SubArea. The three areas total (27.14 acres) and are further defined below:
    - Annexation SubArea 1 - 9.82 acres
    - Annexation SubArea 2 - 6.04 acres
    - Annexation SubArea 3 - 11.28 acres

The proposed Project is primarily a residential development anticipated to provide up to 915 residential units. The Development Project would provide 10.66 acres of neighborhood parks, plus 3.45 acres of the continuation of the Tide Water Bike Trail. Total parkland is 14.55 acres. Other uses to support and compliment the proposed residential development include underground wet and dry utility infrastructure, roadways, curb/gutters/sidewalks, bicycle/pedestrian facilities, street lighting, and street signage.

The proposed Project will provide a variety of housing types and lot sizes that will accommodate a range of housing objectives and buyer needs with a goal to ensure housing for a variety of families and lifestyles. At full build-out, the Development Area will accommodate up to 915 residential units. Specifically, the proposed Project would include the development of 715 single family residential units, (410 units in Subdivision 1 and 305 units in Subdivision 2), and 200 multi-family residential units in Subdivision 1. The residential units would be split between the Union Ranch North portion of the Project (410 single family units and 200 multi-family units) and the Stagecoach at M&E portion of the Project (305 single family units). Development of housing will depend on market conditions and demand. Figure 2.0-8a and Figure 2.0-8b illustrate the two Project site plans.

The proposed Project includes 10.66 acres of neighborhood park, park/basin and open space and 3.45 acres of the continuation of the Tide Water Bike Trail. The total area of park space is 14.55 acres. After dedication to the City, the parks, parkways, and recreation facilities will be under the jurisdiction of the City, and will be operated and maintained by the City for the enjoyment of the residents of Manteca. Maintenance will be funded through a community facilities district.

The proposed Project will expand the existing circulation system to serve the proposed Project and northern Manteca. This includes construction of a new East-West Connector Street connecting Union Road with State Route 99 Frontage Road. This also includes the buildout of Union Road along the western side of the Project site. This section of Union Road is partially improved along the frontage of the Woodbridge Subdivision, and unimproved along the remaining portion of this roadway. Additionally, the proposed Project will provide sidewalks, bike lanes, and landscaping to offer additional bicycling and walking facilities for all of Manteca's residents. This includes the continuation of the Tide Water Bike Trail through the Project site. The Development Area and its circulation system is a natural progression of the existing developed land uses and the street network in northern Manteca.

The proposed Project includes an annexation of nineteen APNs totaling approximately 202.81 acres. This includes 175.67 acres for development, and 27.14 acres that is not proposed for development,

ut is being annexed to avoid the creation of county islands. The 27.14 acres is located on nine APNs and will be designated as an existing and legal non-conforming use whereby all property owners are allowed to continue to use and enjoy their properties in perpetuity in the same manner as prior to annexation. Non-conforming uses include the existing agricultural uses (orchards, row crops, livestock/farm animal, fowl/poultry, apiary, etc.), existing residences, existing outbuildings, equipment storage, roadways, irrigation, etc. even if left fallow or not used for such temporarily.

The proposed Project anticipates a Development Agreement that will be negotiated between the City and Applicant. Terms of the Development Agreement are not available at this early stage of review but will be required to be consistent with the environmental analysis, including any mitigation measures that are created to reduce impacts.

AREAS OF CONTROVERSY AND ISSUES TO BE RESOLVED

This Draft EIR addresses environmental impacts associated with the proposed Project that are known to the City of Manteca, were raised during the NOP process, or raised during preparation of the Draft EIR. This Draft EIR discusses impacts associated with aesthetics and visual resources, agricultural resources, air quality, biological resources, biological resources, cultural and tribal resources, energy, geology and soils, greenhouse gas emissions, hazards and hazardous materials, hydrology and water quality, land use planning, noise, public services, traffic, utilities, and wildfire.

The following are topics of public concern or potential controversy that have become known to the City staff based on public input, known regional issues, and staff observations:

- Projects impacts to agricultural resources;
- Project impacts on regional stormwater, drainage, groundwater, and water quality;
- Climate change impacts related to potential volumes of channel flows expected to be in and along the South Delta Lower San Joaquin River System;
- Contaminated on-site soils due to the Project site's close proximity to roadways and historical past uses (i.e., agricultural);
- Demolition of on-site buildings or structures potentially containing lead-based paints, mercury, asbestos containing materials, and polychlorinated biphenyl caulk;
- Increased traffic on project area roadways including Union Road, and State highway facilities; and
- Annexation of the existing residences located in the Non-development Areas.
- Agricultural Manufacturing Industries.

ALTERNATIVES TO THE PROPOSED PROJECT

The CEQA Guidelines require an EIR to describe a reasonable range of alternatives to the Project or to the location of the Project which would reduce or avoid significant impacts, and which could feasibly accomplish the basic objectives of the proposed Project. Three alternatives to the proposed Project were developed based on input from City staff and the technical analysis performed to identify the environmental effects of the proposed Project. The alternatives analyzed in this EIR include the following three alternatives in addition to the proposed Project.

- **No Project (No Build) Alternative**: Under this alternative, development of the Project site would not occur, and the Project site would remain in its current existing condition.
- **Increased Density Alternative:** Under this alternative, the proposed Project would be developed with the same amenities as described in the Project Description, but the density of the residential uses would be increased.
- **Agriculture Protection Alternative:** Under this alternative, the proposed Project would be developed in such a way to protect those lands currently identified as prime farmland and farmland of statewide importance, by reducing the overall footprint of the developed areas to a greater extent than the Increased Density Alternative.

Alternatives are described in detail in Chapter 5. Table ES-1 provides a comparison of the alternatives using a qualitative matrix that compares each alternative relative to the other Project alternatives.

TABLE ES-1: COMPARISON OF ALTERNATIVE PROJECT IMPACTS TO THE PROPOSED PROJECT

ENVIRONMENTAL ISSUE	NO PROJECT (NO BUILD) ALTERNATIVE	INCREASED DENSITY ALTERNATIVE	AGRICULTURE PROTECTION ALTERNATIVE
Aesthetics and Visual Resources	Less (Best)	Less (3rd Best)	Less (2nd Best)
Agricultural Resources	Less (Best)	Equal (3rd Best)	Less (2nd Best)
Air Quality	Less (Best)	Equal (3rd Best)	Less (2nd Best)
Biological Resources	Less (Best)	Less (3rd Best)	Less (2nd Best)
Cultural and Tribal Resources	Less (Best)	Equal (3rd Best)	Less (2nd Best)
Geology and Soils	Less (Best)	Equal (3rd Best)	Less (2nd Best)
Greenhouse Gases, Climate Change and Energy	Less (Best)	Equal (3rd Best)	Less (2nd Best)
Hazards and Hazardous Materials	Less (Best)	Equal (3rd Best)	Less (2nd Best)
Hydrology and Water Quality	Less (Best)	Less (3rd Best)	Less (2nd Best)
Land Use, Population, and Housing	Less (Best)	Equal (3rd Best)	Less (2nd Best)
Noise	Less (Best)	Equal (3rd Best)	Less (2nd Best)
Public Services and Recreation	Less (Best)	Less (3rd Best)	Less (2nd Best)
Transportation and Circulation	Less (Best)	Equal (3rd Best)	Less (2nd Best)
Utilities	Less (Best)	Equal (3rd Best)	Less (2nd Best)
Wildfire	Less (Best)	Equal (3rd Best)	Less (2nd Best)

GREATER = GREATER IMPACT THAN THAT OF THE PROPOSED PROJECT
LESS = LESS IMPACT THAN THAT OF THE PROPOSED PROJECT
EQUAL = NO SUBSTANTIAL CHANGE IN IMPACT FROM THAT OF THE PROPOSED PROJECT

As Table ES-1 presents a comparison of the alternative Project impacts with those of the proposed Project. As shown in the table, the No Project (No Build) Alternative is the environmentally superior alternative. However, as required by CEQA, when the No Project (No Build) Alternative is the environmentally superior alternative, the environmentally superior alternative among the others must be identified. Therefore, the Agricultural Protection Alternative would be the environmentally superior alternative because all environmental issues would have reduced impacts compared to the Project. It is noted that neither the Agricultural Protection Alternative nor the Increased Density Alternative fully meet all of the Project objectives.

SUMMARY OF IMPACTS AND MITIGATION MEASURES

In accordance with the CEQA Guidelines, this EIR focuses on the significant effects on the environment. The CEQA Guidelines defines a significant effect as a substantial adverse change in the physical conditions which exist in the area affected by the proposed Project. A less than significant effect is one in which there is no long or short-term significant adverse change in environmental conditions. Some impacts are reduced to a less than significant level with the implementation of mitigation measures and/or compliance with regulations.

The environmental impacts of the proposed Project, the impact level of significance prior to mitigation, the proposed mitigation measures and/or adopted policies and standard measures that are already in place to mitigate an impact, and the impact level of significance after mitigation are summarized in Table ES-2.

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TABLE ES-2: PROJECT IMPACTS AND PROPOSED MITIGATION MEASURES

ENVIRONMENTAL IMPACT	*LEVEL OF SIGNIFICANCE WITHOUT MITIGATION*	*MITIGATION MEASURE*	*RESULTING LEVEL OF SIGNIFICANCE*
AESTHETICS AND VISUAL RESOURCES			
Impact 3.1-1: Project implementation may result in substantial adverse effects on scenic vistas and resources or substantial degradation of visual character.	SU	*None feasible.*	SU
Impact 3.1-2: Project implementation may substantially damage scenic resources within a State Scenic Highway.	LS	*None required.*	--
Impact 3.1-3: Project implementation may result in light and glare impacts.	PS	*Conditions of Approval will require compliance with the Development Standards for lighting, landscaping, and building design, which would collectively minimize the visual impacts to the greatest extent feasible as the site transitions from agricultural to urban/suburban uses.*	LS
AGRICULTURAL RESOURCES			
Impact 3.2-1: The proposed Project has the potential to result in the conversion of Farmlands, including Prime Farmland and Farmland of Statewide Importance, as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural uses.	PS	***Mitigation Measure 3.2-1:*** *Prior to the issuance of a Grading Permit, 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.*	SU
Impact 3.2-2: The proposed Project has the potential to conflict with existing zoning for agricultural use, or Williamson Act Contracts.	LS	*None required.*	--

CC – cumulatively considerable *LCC – less than cumulatively considerable* *LS – less than significant*

PS – potentially significant *B – beneficial impact* *SU – significant and unavoidable*

ENVIRONMENTAL IMPACT	*LEVEL OF SIGNIFICANCE WITHOUT MITIGATION*	*MITIGATION MEASURE*	*RESULTING LEVEL OF SIGNIFICANCE*
Impact 3.2-3: The proposed Project has the potential to result in conflicts with adjacent agricultural lands or indirectly cause conversion of agricultural lands.	PS	***Mitigation Measure 3.2-2****: Prior to approval of the Tentative Subdivision Map the Project applicant shall demonstrate that the Project site plans include adequate measures to buffer adjacent agricultural uses from urban uses on the Project site and to reduce adverse impacts to neighboring agricultural uses; such measures shall include, but not be limited to:* - *The Project shall provide adequate and secure fencing at the interface of the Project site, or any individual phase of the Project, and adjacent agricultural uses.* - *The Project shall provide buffers, which may include parking areas, roadways and streets, drainage channels, and landscaped corridors, to buffer adjacent agricultural uses from the Project, including any individual phase of the Project, from proposed urban uses.* - *The Project shall provide notifications to all operators of uses on the Project site that are adjacent or in the vicinity of existing agricultural land of the City's Right-to-Farm Ordinance.*	LS
AIR QUALITY			
Impact 3.3-1: Project operation would result in a cumulatively considerable net increase of any criteria pollutant for which the Project region is in non-attainment, or conflict or obstruct implementation of the District's air quality plan.	LS	*None Required.*	--
Impact 3.3-2: Proposed Project construction activities would not result in a cumulatively considerable net increase of any criteria pollutant for which the Project region is in non-attainment, or conflict or obstruct implementation of the District's air quality plan.	LS	***Mitigation Measure 3.3-1:*** *Prior to the issuance of a Grading Permit for each phase of the Project, the Project Proponent shall prepare and submit a Dust Control Plan that meets all of the applicable requirements of APCD Rule 8021, Section 6.3, for the review and approval of the APCD Air Pollution Control Officer.* ***Mitigation Measure 3.3-2:*** *During all construction activities, the Project Proponent shall implement dust control measures, as required by APCD Rules 8011-8081, to limit Visible Dust Emissions to 20% opacity or less. Dust control measures shall include application of water*	LS

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ENVIRONMENTAL IMPACT	LEVEL OF SIGNIFICANCE WITHOUT MITIGATION	MITIGATION MEASURE	RESULTING LEVEL OF SIGNIFICANCE
		or chemical dust suppressants to unpaved roads and graded areas, covering or stabilization of transported bulk materials, prevention of carryout or trackout of soil materials to public roads, limiting the area subject to soil disturbance, construction of wind barriers, access restrictions to inactive sites as required by the applicable rules. ***Mitigation Measure 3.3-3:*** *During all construction activities, the Project proponent shall implement the following dust control practices identified in Tables 6-2 and 6-3 of the GAMAQI (2002).* *a. All disturbed areas, including storage piles, which are not being actively utilized for construction purposes, shall be effectively stabilized of dust emissions using water, chemical stabilizer/suppressant, or vegetative ground cover.* *b. All on-site unpaved roads and off-site unpaved access roads shall be effectively stabilized of dust emissions using water or chemical stabilizer/suppressant.* *c. All land clearing, grubbing, scraping, excavation, land leveling, grading, cut and fill, and demolition activities shall control fugitive dust emissions by application of water or by presoaking.* *d. When materials are transported off-site, all material shall be covered, effectively wetted to limit visible dust emissions, or at least six inches of freeboard space from the top of the container shall be maintained.* *e. All operations shall limit or expeditiously remove the accumulation of mud or dirt from adjacent public streets at least once every 24 hours when operations are occurring. The use of dry rotary brushes is expressly prohibited except where preceded or accompanied by sufficient wetting to limit the visible dust emissions. Use of blower devices is expressly forbidden.* *f. Following the addition of materials to, or the removal of materials from, the surface of outdoor storage piles, said piles shall be effectively stabilized of fugitive dust emissions utilizing sufficient water or chemical stabilizer/suppressant.* *g. Limit traffic speeds on unpaved roads to 5 mph.*	

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		h. Install sandbags or other erosion control measures to prevent silt runoff to public roadways from sites with a slope greater than one percent. ***Mitigation Measure 3.3-4:*** *Asphalt paving shall be applied in accordance with APCD Rule 4641, the purpose of which is to limit VOC emissions by restricting the application and manufacturing of certain types of asphalt for paving and maintenance operations. This rule applies to the manufacture and use of cutback asphalt, slow cure asphalt and emulsified asphalt for paving and maintenance operations. The Project Applicant shall coordinate with the APCD, prior to Project asphalt paving activities, to ensure all Project asphalt paving would comply with this rule. The Project Applicant shall provide the City of Manteca with evidence of consultation with the APCD, including confirmation of compliance with APCD Rule 4641.*	
Impact 3.3-3: The proposed Project would not generate carbon monoxide hotspot impacts.	LS	*None required.*	--
Impact 3.3-4: The proposed Project would not cause exposure to other emissions (such as those leading to odors) adversely affecting a substantial number of people.	LS	*None required.*	--

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BIOLOGICAL RESOURCES			
Impact 3.4-1: The proposed Project has the potential to have a direct or indirect effect on special-status invertebrate species.	LS	*None required.*	--
Impact 3.4-2: The proposed Project has the potential to have direct or indirect effects on special-status reptile and amphibian species.	LS	*None required.*	--
Impact 3.4-3: The proposed Project has the potential to have direct or indirect effects on special-status bird species.	PS	***Mitigation Measure 3.4-1****: Prior to commencement of any grading activities, the Project proponent shall obtain 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.*	LS
Impact 3.4-4: The proposed Project has the potential to result in direct or indirect effects on special-status mammal species.	PS	*Implement* ***Mitigation Measure 3.4-1****.*	LS
Impact 3.4-5: The proposed Project has the potential for direct or indirect effects on candidate, sensitive, or special-status plant species.	LS	*None required.*	--
Impact 3.4-6: The proposed Project has the potential to effect protected wetlands and jurisdictional waters.	LS	*None required.*	--
Impact 3.4-7: The proposed Project has the potential to result in adverse effects on riparian habitat or a sensitive natural community.	LS	*None required.*	--
Impact 3.4-8: The proposed Project has the potential to result in interference with the	LS	*None required.*	--

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movement of native fish or wildlife species or with established wildlife corridors, or impede the use of native wildlife nursery sites.			
Impact 3.4-9: The proposed Project has the potential to conflict with an adopted Habitat Conservation Plan.	PS	*Implement **Mitigation Measure 3.4-1**.*	LS
Impact 3.4-10: The proposed Project has the potential to conflict with local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance.	LS	*None required.*	--
CULTURAL AND TRIBAL RESOURCES			
Impact 3.5-1: Project implementation has the potential to cause a substantial adverse change to a significant historical or archaeological resource, as defined in CEQA Guidelines §15064.5	PS	***Mitigation Measure 3.5-1:** Prior to the initiation of any site disturbing activities, a training session for all workers shall be conducted at the site by a qualified archeologist. 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 3.5-2:** In concurrence with initial grading, contractors shall stop work in case of accidental discovery of buried archeological resources if buried cultural resources, such as chipped or ground stone, historic debris, building foundations, or human bone, are inadvertently discovered during ground-disturbing activities. In such instances, work shall stop within 100 feet of the discovery, until a qualified archaeologist can assess the significance of the find and, if necessary, develop appropriate treatment measures in consultation with the city and other appropriate agencies. See implementation measure RC-1-46 of the city of Manteca General Plan 2023 policy document for further detail.* ***Mitigation Measure 3.5-3:** If any historical resources, cultural resources, including prehistoric or historic artifacts, or other indications of archaeological or paleontological resources, are found during grading and construction activities during any phase of the Project, all work shall be halted immediately within a 200-foot radius of the discovery until an archaeologist meeting the Secretary of the Interior's Professional Qualifications Standards in prehistoric or historical archaeology, as appropriate, has evaluated the find(s).*	LS

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		Work shall not continue at the discovery site until the archaeologist conducts sufficient research and data collection to make a determination that the resource is either 1) not cultural in origin; or 2) not potentially significant or eligible for listing on the NRHP or CRHR; or 3) not a significant Public Trust Resource. *If 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 Project applicant's expense.*	
Impact 3.5-2: Project implementation has the potential to disturb human remains, including those interred outside of formal cemeteries.	PS	***Mitigation Measure 3.5-4:*** *If human remains are discovered during the course of construction during any phase of the Project, work shall be halted at the site and at any nearby area reasonably suspected to overlie adjacent human remains until the San Joaquin County Coroner has been informed and has determined that no investigation of the cause of death is required. If the remains are of Native American origin, either of the following steps will be taken:* • *The coroner shall contact the Native American Heritage Commission in order to ascertain the proper descendants from the deceased individual. The coroner shall make a recommendation to the landowner or the person responsible for the excavation work, for means of treating or disposing of, with appropriate dignity, the human remains and any associated grave goods, which may include obtaining a qualified archaeologist or team of archaeologists to properly excavate the human remains.* • *The landowner shall retain a Native American monitor, and an archaeologist, if recommended by the Native American monitor, and rebury the Native American human remains and any associated grave goods, with appropriate dignity, on the property and in a location that is not subject to further subsurface disturbance when any of the following conditions occurs:* o *The Native American Heritage Commission is unable to identify a descendent.*	LS

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		○ *The descendant identified fails to make a recommendation.* ○ *The City of Manteca or its authorized representative rejects the recommendation of the descendant, and the mediation by the Native American Heritage Commission fails to provide measures acceptable to the landowner.*	
Impact 3.5-3: Cause a substantial adverse change in the significance of a tribal cultural resource, defined in Public Resources Code Section 21074, and that is: Listed or eligible for listing in the California Register of Historical Resources, or in a local register of historical resources as defined in Public Resources Code Section 5020.1(k), or a resource determined by the lead agency.	LS	*None required.*	--
GEOLOGY AND SOILS			
Impact 3.6-1: The proposed Project may directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving: rupture of a known earthquake fault, strong seismic ground shaking, seismic related ground failure, or landslides.	PS	***Mitigation Measure 3.6-1****: Prior to issuance of a Grading Permit, a certified geotechnical engineer, or equivalent, shall be retained to perform a final geotechnical evaluation of the soils at a design-level as required by the requirements of the California Building Code Title 24, Part 2, Chapter 18, Section 1803.1.1.2 related to expansive soils and other soil conditions. The evaluation shall be prepared in accordance with the standards and requirements outlined in California Building Code, Title 24, Part 2, Chapter 16, Chapter 17, and Chapter 18, which addresses structural design, tests and inspections, and soils and foundation standards. The final geotechnical evaluation shall include design recommendations to ensure that soil conditions do not pose a threat to the health and safety of people or structures, including threats from liquefaction or lateral spreading. The grading and improvement plans, as well as the storm drainage and building plans for each phase of the Project shall be designed in accordance with the recommendations provided in the final geotechnical evaluation.*	LS

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Impact 3.6-2: Implementation and construction of the proposed Project may result in substantial soil erosion or the loss of topsoil.	PS	*Implement **Mitigation Measure 3.9-1.***	LS
Impact 3.6-3: The proposed project has the potential to be located on a geologic unit or soil that is unstable, or that would become unstable as a result of project implementation, and potentially result in landslide, lateral spreading, subsidence, liquefaction or collapse.	PS	*Implement **Mitigation Measure 3.6-1.***	LS
Impact 3.6-4: The proposed Project has the potential to result in development 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.	PS	*Implement **Mitigation Measure 3.6-1.***	LS
Impact 3.6-5: The proposed Project does not have the potential to 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	LS	*None Required.*	--
Impact 3.6-6: The proposed Project has the potential to directly or indirectly destroy a unique paleontological resource or site or unique geologic feature	PS	***Mitigation Measure 3.6-2:** If any paleontological resources are found during grading and construction activities of the Project, all work shall be halted immediately within a 200-foot radius of the discovery until a qualified paleontologist has evaluated the find.* *Work shall not continue at the discovery site until the paleontologist evaluates the find and makes a determination regarding the significance of the resource and identifies recommendations for conservation of the resource, including preserving in place or relocating on the Project site, if feasible, or collecting the resource to the extent feasible and documenting the find with the University of California Museum of Paleontology.*	LS

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GREENHOUSE GASES, CLIMATE CHANGE AND ENERGY			
Impact 3.7-1: Project implementation would generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment to conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of greenhouse gases.	LS	*None Required.*	--
Impact 3.7-2: Project implementation would not result in the inefficient, wasteful, or unnecessary use of energy resources.	LS	*None required.*	--
HAZARDS AND HAZARDOUS MATERIALS			
Impact 3.8-1: Potential to create a significant hazard through the routine transport, use, or disposal of hazardous materials or through the reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment.	PS	***Mitigation Measure 3.8-1****: Prior to the issuance of a Grading Permit, a Soils Management Plan (SMP) shall be submitted and approved by the San Joaquin County Department of Environmental Health. The SMP shall establish management practices for handling hazardous materials, including fuels, paints, cleaners, solvents, etc., during construction. The approved SMP shall be posted and maintained onsite during construction activities and all construction personnel shall acknowledge that they have reviewed and understand the plan.* ***Mitigation Measure 3.8-2****: Prior to the acceptance of improvements, the 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.* ***Mitigation Measure 3.8-3****: The applicant shall hire a qualified consultant to perform additional testing prior to the issuance of grading permits or demolition permits for construction activities in the following areas that have been deemed to have potentially hazardous conditions present:*	LS

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		• *The residential units and adjoining structures.* • *The soils in the area where farming equipment and above ground tanks have been used.* *The intent of the additional testing is to investigate whether any of the buildings, facilities, or soils contain hazardous materials. If asbestos-containing materials and/or lead are found in the buildings, a Cal-OSHA certified ACBM and lead based paint contractor shall be retained to remove the asbestos-containing materials and lead in accordance with EPA and California Occupational Safety and Health Administration (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. If surface staining is found on the Project site, a hazardous waste specialist shall be engaged to further assess the stained area.*	
Impact 3.8-2: Potential to emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school.	LS	*None required.*	--
Impact 3.8-3: Potential to result in impacts from being included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5.	LS	*None required.*	--
Impact 3.8-4: Potential for the Project to result in a safety hazards for people residing or working on the project site as a result of public airport or public use airport.	LS	*None required.*	--
Impact 3.8-5: Potential to impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan.	LS	*None required.*	--

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Impact 3.8-6: Potential to expose people or structures to a risk of loss, injury or death from wildland fires.	LS	*None required.*	--
HYDROLOGY AND WATER QUALITY			
Impact 3.9-1: The proposed Project has the potential to violate water quality standards or waste discharge requirements during construction.	PS	***Mitigation Measure 3.9-1:*** *Prior to clearing, grading, and disturbances to the ground such as stockpiling, or excavation for each phase of the Project, the Project proponent shall submit a Notice of Intent (NOI) and Storm Water Pollution Prevention Plan (SWPPP) to the RWQCB to obtain coverage under the General Permit for Discharges of Storm Water Associated with Construction Activity (Construction General Permit Order 2009-0009-DWQ amended by 2010-0014-DWQ & 2012-0006-DWQ). The SWPPP shall be designed with Best Management Practices (BMPs) that the RWQCB has deemed as effective at reducing erosion, controlling sediment, and managing runoff. These include: covering disturbed areas with mulch, temporary seeding, soil stabilizers, binders, fiber rolls or blankets, temporary vegetation, and permanent seeding. Sediment control BMPs, installing silt fences or placing straw wattles below slopes, installing berms and other temporary run-on and runoff diversions. These BMPs are only examples of what should be considered and should not preclude new or innovative approaches currently available or being developed. Final selection of BMPs will be subject to approval by 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.*	LS
Impact 3.9-2: The proposed Project has the potential to violate water quality standards or waste discharge requirements during operation.	PS	***Mitigation Measure 3.9-2****: The Project applicant shall implement the following nonstructural BMPs that focus on preventing pollutants from entering stormwater:* • *Pollution Prevention/Good Housekeeping* o *Prior to clearing, grading, and disturbances to the ground such as stockpiling, or excavation in each phase of the Project, the Project proponent shall develop a spill response and prevention plan as a component of (1) SWPPPs prepared for construction activities, (2) SWPPPs for facilities subject to the NPDES Stormwater Permit, and (3)*	LS

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		spill prevention control and countermeasure plans for qualifying facilities. The spill response and prevention plan shall be implemented during all construction activities. o *Streets and parking lots in all non-residential portions, including the right-of-way, of the Project site shall be swept at least once every two weeks.* • *Operation and Maintenance (O&M) of Treatment Controls* o *Prior to clearing, grading, and disturbances to the ground such as stockpiling, or excavation in each phase of the Project, the Project proponent shall develop an Operation and Maintenance (O&M) Plan for the storm drainage facilities to ensure long-term performance. The O&M plan shall incorporate the manufacturers' recommended maintenance procedures and include (1) provisions for debris removal, (2) guidance for addressing public health or safety issues, and (3) methods and criteria for assessing the efficacy of the storm drainage system. An annual report shall be submitted to the City certifying that maintenance of the facilities was conducted according to the O&M plan.* ***Mitigation Measure 3.9-3**: The Project applicant shall implement the following structural BMPs that focus on preventing pollutants from entering stormwater, or alternative BMPs approved by the City of Manteca. Implementation of BMPs apply to all non-residential parcels, including the right-of-way, as appropriate.* • *Extended Detention Facilities: Extended detention refers to the facilities proposed for the Project site that would detain and temporarily store stormwater runoff to reduce the peak rates of discharge to the storm drainage system. Detention of stormwater allows particles and other pollutants to settle and thereby potentially reduce concentrations and mass loading of contaminants in the discharge.* • *Grassed Swales: A swale is a vegetated, open channel management practice designed to treat and attenuate stormwater runoff for a specified water quality*	

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		volume. Stormwater runoff flowing through these channels is treated by being filtered through vegetation in the channel, through a subsoil matrix, and/or through infiltration into the underlying soils. Swales can be used throughout the proposed Project area where feasible in the landscape design to treat parking lot runoff. • *Proprietary Devices: There are a variety of commercially available stormwater treatment devices designed to remove contaminants from drainage once flows enter the conveyance systems. StormFilter™ units, or equivalent filtration-type systems, and Bioswales are recommended for streets and parking areas. Drop inlet filters should also be used to control drainage runoff water quality.*	
Impact 3.9-3: The proposed Project has the potential to substantially deplete groundwater supplies or interfere substantially with groundwater recharge.	LS	*None required.*	--
Impact 3.9-4: The proposed Project has the potential to alter the existing drainage pattern in a manner which would result in substantial erosion, siltation, flooding, or polluted runoff.	LS	*None required.*	--
Impact 3.9-5 The proposed Project has the potential to otherwise substantially degrade water quality.	LS	*Implement* ***Mitigation Measure 3.6-1*** *and* ***Mitigation Measures 3.9-1 and 3.9-2.***	--
Impact 3.9-6 Place housing or structures that would impede/redirect flows within a 100-year, or 200-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map.	LS	*None required.*	--
Impact 3.9-7 The proposed Project has the potential to expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the	LS	*None required.*	--

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failure of a levee or dam, seiche, tsunami, or mudflow.			
LAND USE AND POPULATION			
Impact 3.10-1: The proposed Project would not physically divide an established community.	LS	*None required.*	--
Impact 3.10-2: The proposed Project would not conflict with an applicable land use plan, policy, or regulation of an agency with jurisdiction over the Project adopted to avoid or mitigate an environmental effect.	LS	*None required.*	--
Impact 3.10-3: The proposed Project would not significantly conflict with an applicable habitat conservation plan or natural community conservation plan.	LS	*None required.*	--
Impact 3.10-4: The proposed Project has the potential to induce substantial population growth in an area.	LS	*None required.*	--
Impact 3.10-5: The proposed Project has the potential to displace substantial numbers of people or existing housing.	LS	*None required.*	--
NOISE			
Impact 3.11-1: The proposed Project may 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.	PS	***Mitigation Measure 3.11-1a:*** *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 3.11-1b:*** *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 3.11-2:*** *An 8-foot tall barrier shall be constructed along the Union Road Frontage, adjacent to proposed Project residential uses, in order to achieve the City's*	LS

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		exterior noise standards. Noise barrier walls shall be constructed of concrete panels, concrete masonry units, earthen berms, or any combination of these materials that achieve the required total height. Wood is not recommended due to eventual warping and degradation of acoustical performance. These requirements shall be included in the improvements plans prior to their approval by the City's Public Works Department. Figure 3.11-2 shows the recommended sound wall locations. It should be noted that this noise control measure could be phased, under the condition that a supplemental analysis were to be conducted that demonstrates that interim phases would meet the City's noise standards without full Project buildout. ***Mitigation Measure 3.11-3:*** *A 16-foot tall barrier shall be constructed along the boundary of the proposed residential uses and Highway 99, in order to achieve the City's exterior noise standards. The barriers may gradually transition from the 16-foot height down to a final height of 8-feet for the sections of wall wrapping towards the west, as shown on Figure 3.10-3 of the Noise Report (see Appendix D of this EIR). Noise barrier walls shall be constructed of concrete panels, concrete masonry units, earthen berms, or any combination of these materials that achieve the required total height. Wood is not recommended due to eventual warping and degradation of acoustical performance. These requirements shall be included in the improvements plans prior to their approval by the City's Public Works Department. Figure 3.10-3 of the Noise Report shows the recommended sound wall locations. It should be noted that this noise control measure could be phased, under the condition that a supplemental analysis were to be conducted that demonstrates that interim phases would meet the City's noise standards without full Project buildout.* ***Mitigation Measure 3.11-4:*** *For the first rows of lots on the Union Ranch North subdivision adjacent to the Union Road right of way, second floor exterior facades with a view of Union Road would need the following noise control measures:* • *Windows shall have a sound transmission class (STC) rating of 34,* • *Interior gypsum at exterior walls shall be 5/8";* • *Ceiling gypsum shall be 5/8";* • *Exterior finish shall be stucco, fiber cement lap siding, or system with equivalent weight per square foot;*	

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		• *Mechanical ventilation shall be installed in all residential uses to allow residents to keep doors and windows closed, as desired for acoustical isolation.* • *As an alternative to the above-listed interior noise control measures, the applicant may provide a detailed analysis of interior noise control measures once building plans become available. The analysis should be prepared by a qualified noise control engineer and shall outline the specific measures required to meet the City of Manteca 45 dB Ldn interior noise level standard.* ***Mitigation Measure 3.11-5:*** *For the first rows of lots on the Stagecoach M&E subdivision adjacent to the Highway 99 and Highway 99 Frontage Road right of way, second floor exterior facades with a view of Highway 99 would need the following noise control measures:* • *Windows shall have a sound transmission class (STC) rating of 40.* • *Interior gypsum at exterior walls shall be 5/8" hung on resilient channels;* • *Ceiling gypsum shall be 5/8";* • *Exterior finish shall be stucco with sheathing, fiber cement lap siding with sheathing, or system with equivalent weight per square foot;* • *Mechanical ventilation shall be installed in all residential uses to allow residents to keep doors and windows closed, as desired for acoustical isolation.* • *As an alternative to the above-listed interior noise control measures, the applicant may provide a detailed analysis of interior noise control measures once building plans become available. The analysis should be prepared by a qualified noise control engineer and shall outline the specific measures required to meet the City of Manteca 45 dB L_{dn} interior noise level standard.* ***Mitigation Measure 3.11-6:*** *A 12-foot-tall barrier shall be constructed along the south boundary of the Stagecoach at M&E Project site, adjacent to the George Perry & Sons agricultural operations, in order to achieve the City's exterior noise standards. Noise barrier walls shall be constructed of concrete panels, concrete masonry units, earthen berms, or any combination of these materials that achieve the required total height. Wood is not*	

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ENVIRONMENTAL IMPACT	*LEVEL OF SIGNIFICANCE WITHOUT MITIGATION*	*MITIGATION MEASURE*	*RESULTING LEVEL OF SIGNIFICANCE*
		recommended due to eventual warping and degradation of acoustical performance. These requirements shall be included in the improvements plans prior to their approval by the City's Public Works Department. Figure 3.11-3 shows the recommended sound wall locations. It should be noted that this noise control measure could be phased, under the condition that a supplemental analysis were to be conducted that demonstrates that interim phases would meet the City's noise standards without full Project buildout.	
Impact 3.11-2: The proposed Project would not generate excessive groundborne vibration or groundborne noise levels.	PS	***Mitigation Measure 3.11-7**: 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.*	LS
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.	LS	*None required.*	--
PUBLIC SERVICES AND RECREATION			
Impact 3.12-1: The proposed Project has the potential to require the construction of police department facilities which may cause substantial adverse physical environmental impacts.	LS	*None required.*	--
Impact 3.12-2: The proposed Project has the potential to require the construction of fire department facilities which may cause substantial adverse physical environmental impacts.	LS	*None required.*	--

CC – cumulatively considerable *LCC – less than cumulatively considerable* *LS – less than significant*

PS – potentially significant *B – beneficial impact* *SU – significant and unavoidable*

ENVIRONMENTAL IMPACT	*LEVEL OF SIGNIFICANCE WITHOUT MITIGATION*	*MITIGATION MEASURE*	*RESULTING LEVEL OF SIGNIFICANCE*
Impact 3.12-3: The proposed Project has the potential to require the construction of school facilities which may cause substantial adverse physical environmental impacts.	LS	*None required.*	--
Impact 3.12-4: The proposed Project has the potential to have effects on other public facilities.	LS	*None required.*	--
Impact 3.12-5: The proposed Project has the potential to require the construction of park and recreational facilities which may cause substantial adverse physical environmental impacts.	LS	*None required.*	--
Impact 3.12-6: The proposed Project has the potential to 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.	LS	*None required.*	--
TRANSPORTATION AND CIRCULATION			
Impact 3.13-1: Project implementation would not result in VMT increases that are greater than 85 percent of Baseline conditions.	PS	***Mitigation Measure 3.13-1****: As feasible, and where applicable at the improvement plan stage of development, as determined through consultation between the Project applicant and the City of Manteca, the Project applicant shall implement the following measures, which are identified in the CAPCOA Draft Handbook for Analyzing Greenhouse Gas (GHG) Emission Reductions, assessing Climate Vulnerabilities, and Advancing Health and Equity (GHG Handbook):* • *Increase residential density;* • *Limit residential parking supply;* • *Unbundle residential parking cost from property cost;* • *Provide access to transit (Transit Oriented Development);* • *Improve street connectivity;* • *Provide ride-share program;*	SU

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ENVIRONMENTAL IMPACT	*LEVEL OF SIGNIFICANCE WITHOUT MITIGATION*	*MITIGATION MEASURE*	*RESULTING LEVEL OF SIGNIFICANCE*
		• *Implement subsidized or discounted transit program;* • *Provide end-of-trip bicycle facilities;* • *Provide community-based travel planning;* • *Implement market price public on-street parking;* • *Provide pedestrian network improvement;* • *Construct or improve bike facility;* • *Construct or improve bike boulevard;* • *Expand bikeway network;* • *Implement conventional or electric carshare program;* • *Implement pedal or electric bikeshare program;* • *Implement scooter-share program;* • *Extend transit network coverage or hours;* • *Increase transit service frequency;* • *Implement transit-supportive roadway treatments;* • *Reduce Transit Fares*	
Impact 3.13-2: Project implementation may conflict with a program, plan, policy or ordinance addressing the circulation system, including transit, bicycle, and pedestrian facilities.	LS	*None required.*	--
Impact 3.13-3: Project implementation may increase hazards due to a design feature, incompatible uses, or inadequate emergency access.	LS	*None required.*	--
UTILITIES			
Impact 3.14-1: The proposed Project would not result in a determination by the wastewater treatment provider which serves or may serve the Project that it does not have adequate capacity to serve the project's projected demand in addition to the providers existing commitments.	LS	*None required.*	--

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PS – potentially significant *B – beneficial impact* *SU – significant and unavoidable*

ENVIRONMENTAL IMPACT	*LEVEL OF SIGNIFICANCE WITHOUT MITIGATION*	*MITIGATION MEASURE*	*RESULTING LEVEL OF SIGNIFICANCE*
Impact 3.14-2: The proposed Project would not require or result in the relocation or construction of new or expanded wastewater facilities, the construction or relocation of which could cause significant environmental effects.	LS	*None required.*	--
Impact 3.14-3: The proposed Project has the potential to require or result in the construction of new water treatment facilities or expansion of existing water facilities, the construction of which could cause significant environmental effects.	LS	*None required.*	--
Impact 3.14-4: The proposed Project has the potential to have insufficient water supplies available to serve the Project and reasonably foreseeable future development during normal, dry and multiple dry years.	LS	*None required.*	--
Impact 3.14-5: The proposed Project has the potential to require or result in the construction of new stormwater drainage facilities, the construction of which could cause significant environmental effects.	LS	***Mitigation Measure 3.14-1**: 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 discharge and describes the treatment controls used to reach attainment consistent with the Manteca Storm Drain Master Plan.*	--
Impact 3.14-6: The proposed Project has the potential to be served by a landfill with sufficient permitted capacity to accommodate the Project's solid waste disposal needs and comply with federal, State, and local statutes and regulations related to solid waste.	PS	***Mitigation Measure 3.14-2**: Prior to the issuance of a building or grading permit for each phase of the Project, the Project applicant shall pay the City's waste collection fee which equates to the Project's fair share contribution, consistent with section 13.02.050, Charges for solid waste collection services, of the City's municipal code.*	LS
WILDFIRES			
Impact 3.15-1: Project implementation would not have a significant impact related to wildfire risks associated with lands in or near State	LS	*None required.*	--

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ENVIRONMENTAL IMPACT	*LEVEL OF SIGNIFICANCE WITHOUT MITIGATION*	*MITIGATION MEASURE*	*RESULTING LEVEL OF SIGNIFICANCE*
Responsibility Areas or lands classified as very high fire hazard severity zones.			
CUMULATIVE IMPACTS			
Impact 4.1: Cumulative Damage to Scenic Resources within a State Scenic Highway	LS and LCC	*None required.*	--
Impact 4.2: Cumulative Degradation of the Existing Visual Character of the Region	PS	*None feasible.*	CC and SU
Impact 4.3: Cumulative Impact on Light and Glare	LS and LCC	*None required.*	--
Impact 4.4: Cumulative Impact on Agricultural Resources	PS	*Implement **Mitigation Measure 3.2-1**.*	CC and SU
Impact 4.5: Cumulative Impact on the Region's Air Quality	LS and LCC	*None required.*	--
Impact 4.6: Cumulative Loss of Biological Resources Including Habitats and Special Status Species	LS and LCC	*None required.*	--
Impact 4.7: Cumulative Impacts on Known and Undiscovered Cultural and Tribal Resources	LS and LCC	*None required.*	--
Impact 4.8: Cumulative Impact on Geologic and Soils Resources	LS and LCC	*None required.*	--
Impact 4.9: Cumulative Impact on Climate Change from Increased Project-Related Greenhouse Gas Emissions	LS and LCC	*None required.*	--
Impact 4.10: Cumulative Impact Related to Hazards and Hazardous Materials	LS and LCC	*None required.*	--
Impact 4.11: Cumulative Increases in Peak Stormwater Runoff from the Project site	LS and LCC	*None required.*	--
Impact 4.12: Cumulative Impacts Related to Degradation of Water Quality	LS and LCC	*None required.*	--
Impact 4.13: Cumulative Impacts Related to Degradation of Groundwater Supply or Recharge	LS and LCC	*None required.*	--
Impact 4.14: Cumulative Impacts Related to Flooding	LS and LCC	*None required.*	--

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PS – potentially significant *B – beneficial impact* *SU – significant and unavoidable*

ENVIRONMENTAL IMPACT	*LEVEL OF SIGNIFICANCE WITHOUT MITIGATION*	*MITIGATION MEASURE*	*RESULTING LEVEL OF SIGNIFICANCE*
Impact 4.15: Cumulative Impact on Communities and Local Land Uses	LS and LCC	*None required.*	--
Impact 4.16: Cumulative Impacts on Population and Housing	LS and LCC	*None required.*	--
Impact 4.17: Cumulative Exposure of Existing and Future Noise-Sensitive Land Uses to Increased Noise Resulting from Cumulative Development	PS	*Implement* ***Mitigation Measures 3.11-1 to 3.11-7.***	LS and LCC
Impact 4.18: Cumulative Impact on Public Services and Recreation	LS and LCC	*None required.*	--
Impact 4.19: Under Cumulative conditions, Project implementation would not result in VMT increases that are greater than 85 percent of Baseline conditions	PS	*Implement* ***Mitigation Measures 3.13-1.***	CC and SU
Impact 4.20: Under Cumulative conditions, the proposed Project would not conflict with a program, plan, policy or ordinance addressing the circulation system, including transit, bicycle, and pedestrian facilities	LS and LCC	*None required.*	--
Impact 4.21: Cumulative Impact on Wastewater Utilities	LS and LCC	*None required.*	--
Impact 4.22: Cumulative Impact on Water Utilities	LS and LCC	*None required.*	--
Impact 4.23: Cumulative Impact on Stormwater Facilities	LS and LCC	*None required.*	--
Impact 4.24: Cumulative Impact on Solid Waste Facilities	LS and LCC	*None required.*	--
Impact 4.25: Cumulative impact related to wildfire	LS and LCC	*None required.*	--

CC – cumulatively considerable *LCC – less than cumulatively considerable* *LS – less than significant*

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1.1 PURPOSE AND INTENDED USES OF THE EIR

The City of Manteca, as the lead agency, determined that the proposed North Manteca Annexation #1 Project is a "project" within the definition of CEQA. CEQA requires the preparation of an environmental impact report (EIR) prior to approving any project, which may have a significant impact on the environment. For the purposes of CEQA, the term "project" refers to the whole of an action, which has the potential for resulting in a direct physical change or a reasonably foreseeable indirect physical change in the environment (CEQA Guidelines Section 15378[a]).

An EIR must disclose the expected environmental impacts, including impacts that cannot be avoided, growth-inducing effects, impacts found not to be significant, and significant cumulative impacts, as well as identify mitigation measures and alternatives to the proposed project that could reduce or avoid its adverse environmental impacts. CEQA requires government agencies to consider and, where feasible, minimize environmental impacts of proposed development, and an obligation to balance a variety of public objectives, including economic, environmental, and social factors.

The City of Manteca, as the lead agency, has prepared this Draft EIR to provide the public and responsible and trustee agencies with an objective analysis of the potential environmental impacts resulting from implementation of the proposed Project. The environmental review process enables interested parties to evaluate the proposed Project in terms of its environmental consequences, to examine and recommend methods to eliminate or reduce potential adverse impacts, and to consider a reasonable range of alternatives to the proposed Project. This EIR will be used by the City of Manteca to determine whether to approve, modify, or deny the proposed Project and associated approvals in light of the Project's environmental effects. The EIR will be used as the primary environmental document to evaluate full development, all associated infrastructure improvements, and permitting actions associated with the proposed Project. All of the actions and components of the proposed Project are described in detail in Chapter 2.0, Project Description.

1.2 TYPE OF EIR

The State CEQA Guidelines identify several types of EIRs, each applicable to different project circumstances. This EIR has been prepared as a Project-level EIR, which is described in State CEQA Guidelines § 15161 as: "The most common type of EIR (which) examines the environmental impacts of a specific development project. This type of EIR should focus primarily on the changes in the environment that would result from the development project. The EIR shall examine all phases of the project including planning, construction, and operation".

1.3 KNOWN RESPONSIBLE AND TRUSTEE AGENCIES

The term "Responsible Agency" includes all public agencies other than the Lead Agency that have discretionary approval power over the proposed Project or an aspect of the proposed Project (CEQA Guidelines Section 15381). For the purpose of CEQA, a "Trustee" agency has jurisdiction by law over natural resources that are held in trust for the people of the State of California (CEQA Guidelines Section 15386). The following agencies are considered "Responsible Agencies" or "Trustee

Agencies" for the proposed Project, and may be required to issue permits or approve certain aspects of the proposed Project:

- San Joaquin Local Agency Formation Commission (LAFCo) – Annexation and Detachment from Lathrop Manteca Fire District;
- 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); and
- South San Joaquin Irrigation District - Irrigation Service Abandonment Agreements, Improvement Plan review and Board of Directors consideration.

1.4 ENVIRONMENTAL REVIEW PROCESS

The review and certification process for the EIR has involved, or will involve, the following general procedural steps:

NOTICE OF PREPARATION

The City of Manteca circulated a Notice of Preparation (NOP) of an EIR for the proposed Project on October 22, 2021 to the State Clearinghouse, State Responsible Agencies, State Trustee Agencies, Other Public Agencies, Organizations and Interested Persons. A public scoping meeting was held on November 9, 2021 to present the project description to the public and interested agencies, and to receive comments from the public and interested agencies regarding the scope of the environmental analysis to be included in the Draft EIR. Concerns raised in response to the NOP were considered during preparation of the Draft EIR. The NOP and comments received on the NOP by interested parties are presented in Appendix A.

DRAFT EIR

This document constitutes the Draft EIR. The Draft EIR contains a description of the proposed Project, description of the environmental setting, identification of project impacts, and mitigation measures for impacts found to be significant, as well as an analysis of project alternatives, identification of significant irreversible environmental changes, growth-inducing impacts, and cumulative impacts. This Draft EIR identifies issues determined to have no impact or a less than significant impact, and provides detailed analysis of potentially significant and significant impacts. Comments received in response to the NOP were considered in preparing the analysis in this EIR. Upon completion of the Draft EIR, the City of Manteca will file the Notice of Completion (NOC) with the State Clearinghouse of the Governor's Office of Planning and Research to begin the public review

period. Additionally, the City of Manteca will file the Notice of Availability with the County Clerk and have it published in a newspaper of regional circulation to begin the local public review period.

PUBLIC NOTICE/PUBLIC REVIEW

The City of Manteca will provide a public notice of availability for the Draft EIR, and invite comment from the general public, agencies, organizations, and other interested parties. Consistent with CEQA, the review period for this Draft EIR is forty-five (45) days. Public comment on the Draft EIR will be accepted in written form. All comments or questions regarding the Draft EIR should be addressed to:

Attn: Lea Simvoulakis, Senior Planner
Manteca Community Development Department, Planning Division
1215 W. Center Street, Suite 201
Manteca, CA 95337
Phone: (209) 456-8516
Email: lsimvoulakis@ci.manteca.ca.us

RESPONSE TO COMMENTS/FINAL EIR

Following the public review period, a Final EIR will be prepared. The Final EIR will respond to written comments received during the public review period and to oral comments received at a public hearing during such review period.

CERTIFICATION OF THE EIR/PROJECT CONSIDERATION

The City will review and consider the Final EIR. If the City finds that the Final EIR is "adequate and complete", the City Council may certify the Final EIR in accordance with CEQA. The rule of adequacy generally holds that an EIR can be certified if:

1) The EIR shows a good faith effort at full disclosure of environmental information; and

2) The EIR provides sufficient analysis to allow decisions to be made regarding the proposed Project in contemplation of environmental considerations.

The level of detail contained throughout this EIR is consistent with Section 15151 of the CEQA Guidelines and recent court decisions, which provide the standard of adequacy on which this document is based. The Guidelines state as follows:

> *An EIR should be prepared with a sufficient degree of analysis to provide decision makers with information which enables them to make a decision which intelligently takes account of the environmental consequences. An evaluation of the environmental effects of a proposed project need not be exhaustive, but the sufficiency of an EIR is to be reviewed in the light of what is reasonably feasible. Disagreement among experts does not make an EIR inadequate, but the EIR should summarize the main points of disagreement among the experts. The courts have looked not for perfection but for adequacy, completeness, and a good faith effort at full disclosure.*

Following review and consideration of the Final EIR, the City may take action to approve, modify, or reject the Project. A Mitigation Monitoring and Reporting Program, as described below, would also be adopted in accordance with Public Resources Code Section 21081.6(a) and CEQA Guidelines Section 15097 for mitigation measures that have been incorporated into or imposed upon the Project to reduce or avoid significant effects on the environment. This Mitigation Monitoring and Reporting Program will be designed to ensure that these measures are carried out during Project implementation, in a manner that is consistent with the EIR.

1.5 ORGANIZATION AND SCOPE

Sections 15122 through 15132 of the State CEQA Guidelines identify the content requirements for Draft and Final EIRs. An EIR must include a description of the environmental setting, an environmental impact analysis, mitigation measures, alternatives, significant irreversible environmental changes, growth-inducing impacts, and cumulative impacts. Discussion of the environmental issues addressed in the Draft EIR was established through review of environmental and planning documentation developed for the proposed Project, environmental and planning documentation prepared for recent projects located within the City of Manteca, applicable local and regional planning documents, and responses to the Notice of Preparation (NOP).

This Draft EIR is organized in the following manner:

EXECUTIVE SUMMARY

This Executive Summary summarizes the characteristics of the proposed Project, known areas of controversy and issues to be resolved, and provides a concise summary matrix of the proposed Project's environmental impacts and possible mitigation measures. This chapter identifies alternatives that reduce or avoid at least one significant environmental effect of the proposed Project.

CHAPTER 1.0 – INTRODUCTION

Chapter 1.0 briefly describes the purpose of the environmental evaluation, identifies the lead, trustee, and responsible agencies, summarizes the process associated with preparation and certification of an EIR, and identifies the scope and organization of the Draft EIR.

CHAPTER 2.0 – PROJECT DESCRIPTION

Chapter 2.0 provides a detailed description of the proposed Project, including the location, intended objectives, background information, the physical and technical characteristics, including the decisions subject to CEQA, related improvements, and a list of related agency action requirements.

CHAPTER 3.0 – ENVIRONMENTAL SETTING, IMPACTS AND MITIGATION MEASURES

Chapter 3.0 contains an analysis of environmental topic areas as identified below. Each subchapter addressing a topical area is organized as follows:

Environmental Setting. A description of the existing environment as it pertains to the topical area.

Regulatory Setting. A description of the regulatory environment that may be applicable to the proposed Project.

Impacts and Mitigation Measures. Identification of the thresholds of significance by which impacts are determined, a description of project-related impacts associated with the environmental topic, identification of appropriate mitigation measures, and a conclusion as to the significance of each impact.

The following environmental topics are addressed in this section:

- Aesthetics and Visual Resources
- Agricultural Resources
- Air Quality
- Biological Resources
- Cultural and Tribal Resources
- Geology and Soils
- Greenhouse Gases, Climate Change, and Energy
- Hazards and Hazardous Materials
- Hydrology and Water Quality
- Land Use, Population, and Housing
- Noise
- Public Services and Recreation
- Transportation and Circulation
- Utilities
- Wildfire

CHAPTER 4.0 – OTHER CEQA-REQUIRED TOPICS

Chapter 4.0 evaluates and describes the following CEQA required topics: impacts considered less-than-significant, significant and irreversible impacts, growth-inducing effects, cumulative, and significant and unavoidable environmental effects.

CHAPTER 5.0 – ALTERNATIVES TO THE PROJECT

State CEQA Guidelines Section 15126.6 requires that an EIR describe a range of reasonable alternatives to the proposed Project, which could feasibly attain the basic objectives of the proposed Project and avoid and/or lessen any significant environmental effects of the proposed Project.

Chapter 5.0 provides a comparative analysis between the environmental impacts of the proposed Project and the selected alternatives.

CHAPTER 6 – REPORT PREPARERS

This section lists all authors and agencies that assisted in the preparation of the EIR, by name, title, and company or agency affiliation.

APPENDICES

This section includes all notices and other procedural documents pertinent to the EIR, as well as technical material prepared to support the analysis.

1.6 COMMENTS RECEIVED ON THE NOTICE OF PREPARATION

The City of Manteca received four (4) written comment letters on the NOP for the proposed Project. Copies of the letters is provided in Appendix A of this Draft EIR. The commenting agency/citizen is provided below. The City also held a public scoping meeting on November 9, 2021.

- Herum/Crabtree/Suntag Attorneys (1);
- Herum/Crabtree/Suntag Attorneys (2);
- Herum/Crabtree/Suntag Attorneys (3); and
- Brian Bergerson and Larissa Founts-Bergerson

1.7 POTENTIAL AREAS OF CONCERN

The following are topics of public concern or potential controversy that have become known to the City staff based on public input, known regional issues, and staff observations:

- Projects impacts to agricultural resources;
- Project impacts on regional stormwater, drainage, groundwater, and water quality;
- Short-term and long-term flood water, stormwater, and wastewater drainage and other hydrology-related backwater impacts on rural areas of south Manteca due to Project implementation, specifically the drainage areas in and along Walthall Slough and the South San Joaquin Irrigation District (SSJID) canals and pipelines;
- Flood and drainage impacts due to SB5 200-year levee modification/alignment;
- Climate change impacts related to potential volumes of channel flows expected to be in and along the South Delta Lower San Joaquin River System;
- Contaminated on-site soils due to the Project site's close proximity to roadways and historical past uses (i.e., agricultural);
- Demolition of on-site buildings or structures potentially containing lead-based paints, mercury, asbestos containing materials, and polychlorinated biphenyl caulk;
- Increased traffic on project area roadways including Union Road, and State highway facilities; and
- Annexation of the existing residences located in the Non-development Areas.

2.1 PROJECT LOCATION

The Project site is directly north of the City of Manteca's limit line adjacent to the Union Ranch development. The Project site is immediately west of State Route 99 (SR 99) and east of the Union Ranch Specific Plan Area. The Project site is bounded on the north by farmland, on the east by SR 99, on the south by existing residences and agricultural fields, and on the west by Union Road and the Union Ranch Specific Plan. Figures 2.0-1 and 2.0-2 in show the Project's regional location and vicinity. The Project site is in the northwest ¼ of Section 20, Township 1 South, Range 7 East Mount Diablo Base and Meridian (MDBM). Figure 2.0-3 illustrates the Project location on the USGS Manteca, California, 7.5-minute series quadrangle map.

2.2 PROJECT SITE DEFINED

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

- Annexation Area – includes the whole of the Project site (approximately 202.81 acres), including the approximate 175.67-acre Development Area, the approximate 27.14-acre Non-Development Areas, and all public right-of-way along Union Road fronting the Development and Non-Development Areas.

- Development Area - includes the parcels being annexed that will be entitled for subdivision and development. This includes the Union Ranch North Project Area (Subdivision 1) (approximately 106.04 acres) and the Stagecoach at M&E Project Area (Subdivision 2) (approximately 69.63 acres). The two areas total (175.67 acres) and are further defined below

    - Union Ranch North Project Area is Subdivision 1 (approximately 106.04 acres) – includes the western portion of the Annexation and Development Area.

    - Stagecoach at M&E Project Area is Subdivision 2 (approximately 69.93 acres) – includes the eastern portion of the Annexation and Development Area.

- Non-Development Area - includes the parcels being annexed that will not be entitled for subdivision or development. This includes three separate areas, each described as an Annexation SubArea. The three areas total (27.14 acres) and are further defined below:

    - Annexation SubArea 1 - 9.82 acres

    - Annexation SubArea 2 - 6.04 acres

    - Annexation SubArea 3 - 11.28 acres

2.3 PROJECT SETTING

EXISTING SITE CONDITIONS

The Project site is 202.81 acres and includes 18 Assessor parcels (APNs): Development Area (106.04-acre Subdivision 1, Union Ranch North Project Area, and 69.93-acre, Subdivision 2, Stagecoach at M&E Project Area), Non-development Subarea 1 (9.82 acres), Non-development Subarea 2 (6.04 acres), and Non-development Subarea 3 (11.28 acres). Figure 2.0-4 illustrates the APNs.

SITE TOPOGRAPHY

The Project site is relatively flat with natural gentle slope from south to north. The Project site topography ranges in elevation from approximately 29 to 36' feet above sea level.

EXISTING SITE USES

The Development Area primarily contains farmland, with a few existing homes and outbuildings. The outbuildings include barns, sheds, livestock/farm animal pens, beehives, equipment yards, dirt/gravel roadways, irrigation ditches, and overhead power lines. The majority of the Development Area is in active agricultural use (orchards), with all existing homes and outbuildings clustered on each parcel.

The Non-Development areas contains farmland and existing ranchettes. Each SubArea is uniquely different and is described in detail below:

Annexation SubArea 1 includes mostly active agricultural use (orchards), with a cluster of existing structures along Union Road. The cluster of structures in this SubArea includes existing homes, barns, sheds, livestock/farm animal pens, equipment yards, dirt/gravel roadways, irrigation ditches, and overhead power lines. Union Road is located along the western side of this SubArea and is fully improved on the southbound portion of the roadway to a City standard with 2 southbound lanes, a landscaped median, and landscaped pedestrian sidewalks. The eastside of Union Road functions as an unimproved County roadway with one northbound lane and no pedestrian sidewalk, curb/gutter, or landscaping.

Annexation SubArea 2 is characterized as existing ranchettes, with homes, barns, sheds, livestock/farm animal pens, equipment yards, dirt/gravel roadways, irrigation ditches, and overhead power lines. The agricultural land within this SubArea is pasture and/or cropland. Union Road is located along the western side of this SubArea and is an unimproved 2-lane County roadway without any landscaping or pedestrian facilities in either the northbound or southbound direction.

Annexation SubArea 3 is characterized as existing ranchettes, with existing homes, barns, sheds, livestock/farm animal pens, equipment yards, dirt/gravel roadways, and overhead power lines. This is no active production agricultural operation in this area, but there are small livestock pens that would be expected to house sheep, goats, horses, cows, hogs, foul, or poultry. Union Road is located along the eastern side of this SubArea and is a rural 2-lane County roadway without any landscaping or pedestrian facilities in either the northbound or southbound direction. Shady Pines Street is located along the southern side of this SubArea and is a fully improved City roadway that serves as an access road into the existing Woodbridge residential development.

Figure 2.0-5 shows aerial imagery of the existing site uses within the Project site.

EXISTING SURROUNDING USES

The Project site is surrounded by a variety of agricultural and residential land uses. Uses immediately adjacent to the north of the Project site include agricultural uses. Uses immediately to the south and southwest of the Project site include residential uses such as the Union Ranch Subdivision and an agribusiness. Uses to the south and east of the Project site include agricultural and residential uses, including ranchettes and large estates lots (to the south and east) and a residential subdivision (to the east).

EXISTING GENERAL PLAN LAND USE DESIGNATIONS AND ZONING

The following section outlines the City and County General Plan land use designations and zoning for the Project site. It should be noted that the Project site is currently outside of the jurisdiction of the City of Manteca, and therefore does not have a City of Manteca zoning.

City of Manteca

The currently adopted General Plan is the 2023 General Plan; however, the City is currently undergoing an Update to the General Plan. Therefore, the following describes the existing land use designations for the Project site under the 2023 General Plan and the proposed General Plan Update. Figure 2.0-6a and Figure 2.0-6b depict the land use designations for the Project site and the surrounding areas under the adopted Manteca General Plan 2023 as well as the Manteca General Plan Update, respectively.

The Development Area is designated as Agriculture (AG), Very Low Density Residential (VLDR, 0.5-2 du/ac) with a Park (P) designation under the current 2023 General Plan. The proposed General Plan Update shows the Development Area portion of the Project site with a Low Density Residential, High Density Residential, and Park land use designation. It is noted that the proposed Project includes a General Plan Amendment that proposes land uses consistent with the proposed General Plan Update.

The proposed General Plan Update shows the Annexation SubArea 1 and 2 as Low Density Residential, and Annexation SubArea 3 as Low Density Residential, Medium Density Residential, and Commercial. It is noted that the proposed Project includes a General Plan Amendment that proposes land uses in the Annexation SubAreas consistent with the proposed General Plan Update; however, because no development is proposed in the Annexation SubAreas, an alternative also includes annexation of these areas without any land use changes. Under this Alternative, it would be anticipated that the City's General Plan Update would change the land uses to what is described above.

The 2023 General Plan and General Plan Update both contain standards to guide development for these land uses, as noted below:

2023 GENERAL PLAN

VLDR (Very Low Density Residential): The VLDR land use category will provide for residences on larger lots and small, quasi-agricultural activities, including raising and boarding livestock. Residential units shall be permitted to deviate from standard lot dimensions within agricultural areas in order to cluster

dwellings together and thereby allow for continued agricultural use. The agricultural use areas that remain on the residential parcel shall be subject to an easement dedicated to the City that allow continued agricultural use but prohibits any further non-agricultural related development.

AG (Agriculture): This designation provides for agricultural uses (such as vineyards, orchards, row crops, farm animals), single family homes directly related to the agricultural use of the property, limited industrial uses directly related to agriculture, and similar and compatible uses.

GENERAL PLAN UPDATE

LDR (Low Density Residential): This designation provides for a mix of single-family housing, including small lots, clustered lots, attached homes, and conventional large lot detached residences. Density ranges from 2.1 to 8 dwelling units per acre.

HDR (High Density Residential): This designation provides for multi-family townhome, condominium, and apartment style housing and mobile home parks. The multi-family dwelling sites are typically located with direct access to arterial streets. The sites have access to the pedestrian and bikeway network along the street corridor and are located along the conceptual route of a public transportation shuttle route. Sites should be located near a neighborhood park, a neighborhood commercial center, or jobs centers and should provide pedestrian and bicycle connections to these amenities and services

San Joaquin County

Figure 2.0-7a identifies the San Joaquin County land use designations and zoning for the Project site and the surrounding area. The Project site is designated as Agriculture by the County's General Plan Land Use Map and is zoned as AG-40 Agriculture by the County. Figure 2.0-7b identifies the proposed rezone associated with the proposed Project.

2.4 PROJECT GOALS AND OBJECTIVES

Consistent with CEQA Guidelines Section 15124(b), a clear statement of objectives and the underlying purpose of the proposed Project shall be discussed.

PROJECT OBJECTIVES

The principal objective of the proposed Project is the annexation of the Project site into the City of Manteca, and approval and subsequent development of Subdivision 1 and Subdivision 2.

The quantifiable objectives include the development of 715 single family residential units, (410 units in Subdivision 1 and 305 units in Subdivision 2), 200 multi-family residential units in Subdivision 1. The quantifiable objectives include the development of park, open space, and trail totaling 14.55 acres, including 10.66 acres of neighborhood park, park/basin and open space and 3.45 acres of the continuation of the Tide Water Bike Trail. The Project objectives also include the installation of new public roadways that will provide pedestrian and vehicular access to the Project site and surrounding community areas, and other improvements, including water supply, storm drainage, sewer facilities and landscaping.

The goals of the proposed Development are as follows:

- Provide residential housing opportunities that are visually attractive and accommodate the future housing demand in Manteca.
- Establish a mixture of residential product types that collectively provide for local and regional housing and that take advantage of the area's high level of accessibility.
- Provide infrastructure and park space that meets City standards, is integrated with existing and planned facilities and connections, and increases recreation opportunities for existing and future residents of the City.
- Establish a logical phasing plan designed to ensure that each phase of development would include necessary public improvements required to meet City standards.
- Annex the three Annexation SubAreas in order to avoid the creation of islands. Annexation of these areas would establish a logical and orderly city limit line that promotes the efficient extension of municipal services.
- Allow all existing property owners with existing and legal non-conforming uses located in the Non-Development Areas (SubArea 1, 2, and 3) to continue to use and enjoy their properties in perpetuity in the same manner as prior to annexation. Non-conforming uses include but may not be limited to the existing agricultural uses (orchards, row crops, livestock/farm animal, fowl/poultry, apiary, etc.), existing residences, existing health and wellness service buildings, existing outbuildings, equipment storage, roadways, irrigation, etc. even if left fallow or not used for such temporarily.

2.5 PROJECT ENTITLEMENTS

GENERAL PLAN AMENDMENT

The proposed Project would require a General Plan Land Use Amendment to adjust the land uses to LDR and HDR for the Development Area.

Additionally, the proposed Project includes a General Plan Land Use Amendment to adjust the land uses in Annexation SubArea 1, 2, and 3 to be consistent with the proposed General Plan Update. Because the Annexation SubAreas are not proposed for development, establishment of the land uses under this proposed General Plan Amendment is not necessary, and as an alternative they may be left as currently designated. It is noted that the proposed General Plan Update is anticipated to change the land uses in the Annexation SubAreas, although the exact timing of that change is not defined.

PRE-ZONING

As previously stated, the Project site is currently outside of the jurisdiction of the City of Manteca, and therefore does not have zoning. The proposed Project includes a request for pre-zoning of the Development Area and Non-development Areas consistent with the General Plan Land Uses.

Development Area: The pre-zoning request is for R-1, R-3, and P zoning designations over these lots.

- **R-1 Single-Family Dwelling Zoning**. This designation allows for substantial flexibility in selecting dwelling unit types and parcel configurations to suit site conditions and housing needs. The types of dwelling units include small lots and clustered lots as well as conventional large-lot detached residences.

- **R-3 Multiple-Family Dwelling.** This designation provides for multi-family townhome, condominium, and apartment style housing and mobile home parks. The multi-family dwelling sites are typically located with direct access to arterial streets. The sites have access to the pedestrian and bikeway network along the street corridor and are located along the conceptual route of a public transportation shuttle route. Sites should be located near a neighborhood park, a neighborhood commercial center, or jobs centers and should provide pedestrian and bicycle connections to these amenities and services

Non-development SubArea 1: The pre-zoning request is for an R-1 zoning designation over the existing lots. The R-1 is defined as follows:

- **R-1 One-Family Dwelling Zoning**. This designation allows for substantial flexibility in selecting dwelling unit types and parcel configurations to suit site conditions and housing needs. The types of dwelling units include small lots and clustered lots as well as conventional large-lot detached residences.

Non-development SubArea 2: The pre-zoning request is for an R-1 zoning designation over the existing lots. The R-1 is defined as follows:

- **R-1 One-Family Dwelling Zoning**. This designation allows for substantial flexibility in selecting dwelling unit types and parcel configurations to suit site conditions and housing needs. The types of dwelling units include small lots and clustered lots as well as conventional large-lot detached residences.

Non-development SubArea 3: The pre-zoning request is for General Commercial (GC), R-1, and R-2, zoning over these lots. The GC, R-1, and R-2 are defined as follows:

- **General Commercial Zoning.** This category provides for wholesale, warehousing, and heavy commercial uses, highway-oriented commercial retail, public and quasi-public uses, and similar and compatible uses. The designation is also intended to accommodate visitor lodging, commercial recreation and public gathering facilities, such as amphitheaters, or public gardens. It also allows most neighborhood and mixed commercial uses.

- **R-1 One-Family Dwelling Zoning**. This designation allows for substantial flexibility in selecting dwelling unit types and parcel configurations to suit site conditions and housing needs. The types of dwelling units include small lots and clustered lots as well as conventional large-lot detached residences.

- **R-2 Limited Multiple-Family Dwelling Zoning**. This designation allows for medium density residential use includes single family homes, smaller scale multi-family developments, including

garden apartments, townhouses, and cluster housing. The density range accommodates small-lot single family homes that will typically be smaller in size and more affordable to residents.

The proposed zoning for the Project site is shown on Figure 2.0-7b.

TENTATIVE SUBDIVISION MAPS

The proposed Project includes a Tentative Map for each of the subdivisions (i.e., Subdivision 1 and Subdivision 2) that would ultimately be developed in phases. The Tentative Map covers approximately 175.67 acres within nine Assessor parcels (APNs). This includes the Union Ranch North Project Area (APNs 197-020-21, 197-020-22, 197-020-23, 197-020-35, 197-020-41, 197-020-46, 197-020-47), and the Stagecoach at M&E Project Area (APNs 197-020-020 and 197-020-390).

The Tentative Maps would result in the subdivision of a total of approximately 175.67 acres into 715 single family residential units, (410 units in Subdivision 1 and 305 units in Subdivision 2), 200 multi-family residential units in Subdivision 1.

10.66 acres of neighborhood park, park/basin and open space and 3.45 acres of the continuation of the Tide Water Bike Trail. The Project objectives also include the installation of new public roadways that will provide pedestrian and vehicular access to the Project site and surrounding community areas, and other improvements, including water supply, storm drainage, sewer facilities and landscaping.

The Tentative Maps would result in 14.55 acres for the development of park, open space, and trail, including 10.66 acres of neighborhood park, park/basin and open space and 3.45 acres of the continuation of the Tide Water Bike Trail. The Tentative Maps calls for the installation of new public roadways that will provide pedestrian and vehicular access to the Project site and surrounding community areas, and other improvements, including water supply, storm drainage, sewer facilities and landscaping. Figure 2.0-8a and Figure-2.0-8b illustrate the proposed site plans for Subdivision 1 and Subdivision 2 (respectively).

ANNEXATION

The proposed Project includes an annexation of nineteen APNs totaling approximately 202.81 acres. This includes 175.67 acres for development, and 27.14 acres that is not proposed for development, but is being annexed to avoid the creation of islands. The 27.14 acres is located on nine APNs and will be designated as an existing and legal non-conforming use whereby all property owners are allowed to continue to use and enjoy their properties in perpetuity in the same manner as prior to annexation. Non-conforming uses include the existing agricultural uses (orchards, row crops, livestock/farm animal, fowl/poultry, apiary, etc.), existing residences, existing outbuildings, equipment storage, roadways, irrigation, etc. even if left fallow or not used for such temporarily.

DEVELOPMENT AGREEMENT

The proposed Project anticipates a Development Agreement that will be negotiated between the City and Applicant. Terms of the Development Agreement are not available at this early stage of review but will be required to be consistent with the environmental analysis, including any mitigation measures that are created to reduce impacts.

2.6 DEVELOPMENT PROJECT CHARACTERISTICS

The proposed Project is primarily a residential development anticipated to provide up to 915 residential units. The Development Project would provide 10.66 acres of neighborhood parks, plus 3.45 acres of the continuation of the Tide Water Bike Trail. Total parkland is 14.55 acres. Other uses to support and compliment the proposed residential development include underground wet and dry utility infrastructure, roadways, curb/gutters/sidewalks, bicycle/pedestrian facilities, street lighting, and street signage.

Development of housing will depend on market conditions and demand. The plan for infrastructure allows for development to occur in phases to respond to the market conditions and demand.

RESIDENTIAL DEVELOPMENT

The proposed Project will provide a variety of housing types and lot sizes that will accommodate a range of housing objectives and buyer needs with a goal to ensure housing for a variety of families and lifestyles. At full build-out, the Development Area will accommodate up to 915 residential units. Specifically, the proposed Project would include the development of 715 single family residential units, (410 units in Subdivision 1 and 305 units in Subdivision 2), and 200 multi-family residential units in Subdivision 1. The residential units would be split between the Union Ranch North portion of the Project (410 single family units and 200 multi-family units) and the Stagecoach at M&E portion of the Project (305 single family units). Development of housing will depend on market conditions and demand. Figure 2.0-8a and Figure 2.0-8b illustrate the two Project site plans.

PARKS

The proposed Project includes 10.66 acres of neighborhood park, park/basin and open space and 3.45 acres of the continuation of the Tide Water Bike Trail. The total area of park space is 14.55 acres. After dedication to the City, the parks, parkways, and recreation facilities will be under the jurisdiction of the City, and will be operated and maintained by the City for the enjoyment of the residents of Manteca. Maintenance will be funded through a community facilities district.

CIRCULATION

The proposed Project will expand the existing circulation system to serve the proposed Project and northern Manteca. This includes construction of a new East-West Connector Street connecting Union Road with State Route 99. This also includes the buildout of Union Road along the western side of the Project site. This section of Union Road is partially improved along the frontage of the Woodbridge Subdivision, and unimproved along the remaining portion of this roadway. Additionally, the proposed Project will provide sidewalks, bike lanes, and landscaping to offer additional bicycling and walking facilities for all of Manteca's residents. This includes the continuation of the Tide Water Bike Trail through the Project site. The Development Area and its circulation system is a natural progression of the existing developed land uses and the street network in northern Manteca.

The proposed Project includes a hierarchy of roadways to accommodate the capacity needs of the existing street network as well as provide additional vehicular access to the Development Area that will also

benefit the vehicular circulation for the entire City. Union Road and South Frontage Road are the main arterial roadways providing access to the Development Area. The proposed Project includes annexation of right-of-way along Union Road, which will be improved to a City of Manteca standard.

The neighborhoods within the Development Area will include a network of minor collectors, and residential streets to provide an efficient flow of traffic through the area. Additionally, sidewalks and bicycle lanes will be included per the City standards.

UTILITIES AND PLANNED INFRASTRUCTURE IMPROVEMENTS

The construction of on-site infrastructure improvements would be required to accommodate development of the Development Area, as described below.

Water System

The Project site would be served by a new potable and non-potable water distribution system. The proposed water system will be a looped system of water lines with various points-of-connection to existing City mains to comply with City Master Plans and standards. A water system analysis will be prepared during future design of Improvement Plans to ensure that the final design is compliant with fire flow and pressure standards.

Potable Water

The Development Area would be served by a new potable water distribution system. Development of the proposed potable water system will require the installation of additional water mains within the proposed roadways to comply with the 2005 City of Manteca Master Water Plan. The proposed on-site water distribution system will have various points-of-connection to the City mains. The Development Project will connect to the existing water main lines along nearby roadways, such as Union Road. Additionally, an internally looped system of water lines will be installed within the Development Area. A water system analysis will be prepared during future design of Improvement Plans to ensure that the final design is compliant with City of Manteca fire flow and pressure standards.

The proposed water distribution system may utilize Best Management Practices (BMP) and design control features, including the following Low Impact Development (LID) measures:

1. Implementation of the City of Manteca water recycling program for irrigation of public areas.
2. Irrigation system designs may include “purple pipe” for distribution of recycled water.
3. Reduction of turf areas on lots.
4. Use of rain gardens on lots and in public areas.
5. Use of drought-resistant vegetation in landscaping on lots and public areas.
6. Use of native trees and vegetation for landscaping on lots and in public areas.
7. Lot designs may include features that receive roof runoff from downspouts and provide for reuse of rainwater for irrigation.

Non-Potable Water

The Development Area would include the development of an on-site non-potable water distribution system that would eventually provide irrigation water to planned parks, open space, and landscaped areas. All landscape irrigation is to be installed with non-potable components.

Connection from all irrigation systems to the non-potable water service will be provided in the proposed streets. This connection is to be provided per the requirements of the City Water Division with a valve. Irrigation shall be designed to maximize efficiency and meet the requirements of the City Parks Maintenance Division.

Wastewater System

The Project site would be served by a new wastewater collection system installed within the North Manteca Collection Shed (NMCS). The NMCS has been planned to serve areas of future growth in the north of Manteca. The proposed wastewater conveyance facilities would connect to the existing sewer mains as part of the City of Manteca collection and treatment system. Wastewater treatment would be provided at the City's existing Wastewater Quality Control Facility (WQCF) at 2450 West Yosemite Avenue in western Manteca.

Storm Drainage

The Project site would include construction of a new storm drainage system, including a drainage collection system, storm drain pump stations, and detention basins. The final basin location and design will conform to the Manteca Design Specifications and Standards and will be finalized during the Improvement Plan phase. The detention basins are intended to help attenuate peak flows before drainage discharge is pumped into storm drainage facilities. The proposed detention basins are joint-use facilities providing park/recreation uses when not being used for stormwater detention. The storm drainage collection and detention system will be subject to the State Water Resources Control Board Requirements (SWRCB) and City of Manteca regulations, including: Manteca Storm Drain Master Plan, 2013; Phase II, National Pollutant Discharge Elimination System (NPDES) Permit Requirements; NPDES-MS4 Permit Requirements; and LID Guidelines.

Regulated Public Utilities

Electrical, gas, phone, cable and related internet services would be extended to all portions of the Project site from existing facilities located along Union Road, SR 99, and from existing residential development surrounding the Project site. Proposed utilities would be located within public utility easements to be dedicated along street frontages. Utility improvements would be installed in conjunction with planned street improvements.

2.7 USES OF THE EIR AND REQUIRED AGENCY APPROVALS

This EIR may be used for the following direct and indirect approvals and permits associated with adoption and implementation of the proposed Project.

CITY OF MANTECA

The City of Manteca will be the Lead Agency for the proposed Project, pursuant to the State Guidelines for Implementation of CEQA, Section 15050. Actions that would be required from the City include, but are not limited to the following:

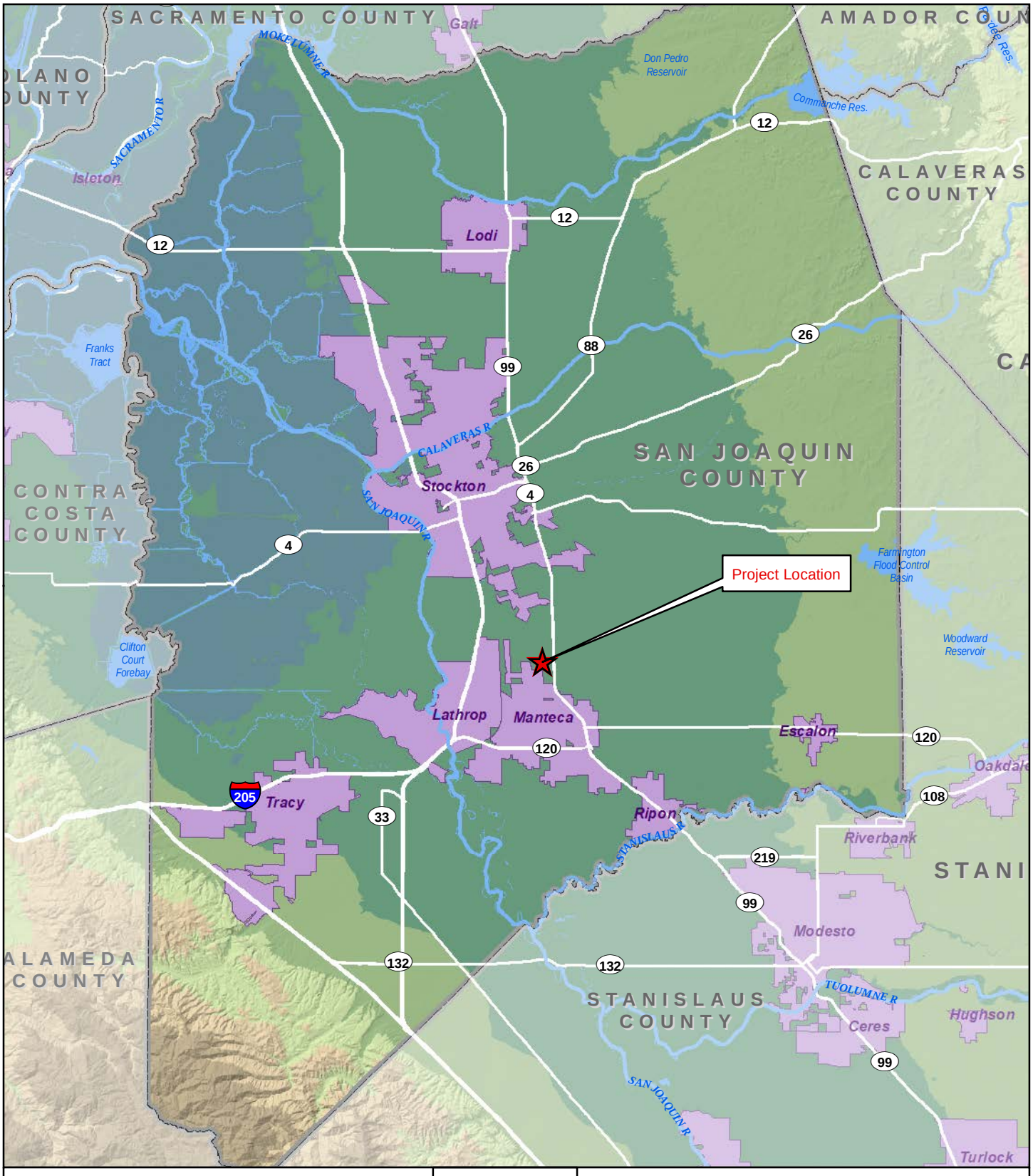
- Certification of the EIR;
- Adoption of the Mitigation Monitoring and Reporting Program;
- Approval of City of Manteca General Plan Amendment (Land Use Element);
- Approval of City of Manteca Zoning Pre-zoning;
- Approval of Development Agreement;
- Approval of Tentative Maps;
- Approval of Annexation of the Development Area and Inhabited 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.

OTHER GOVERNMENTAL AGENCY APPROVALS

The following agencies may be required to issue permits or approve certain aspects of the proposed Project. Other governmental agencies that may require approval include, but are not limited to, the following:

- San Joaquin Local Agency Formation Commission (LAFCo) – Annexation and Detachment from Lathrop Manteca Fire District;
- 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);
- South San Joaquin Irrigation District - Irrigation Service Abandonment Agreements, Improvement Plan review and Board of Directors consideration.



Legend

- Project Location
- Incorporated Area
- County Boundary

0 2½ 5
Miles

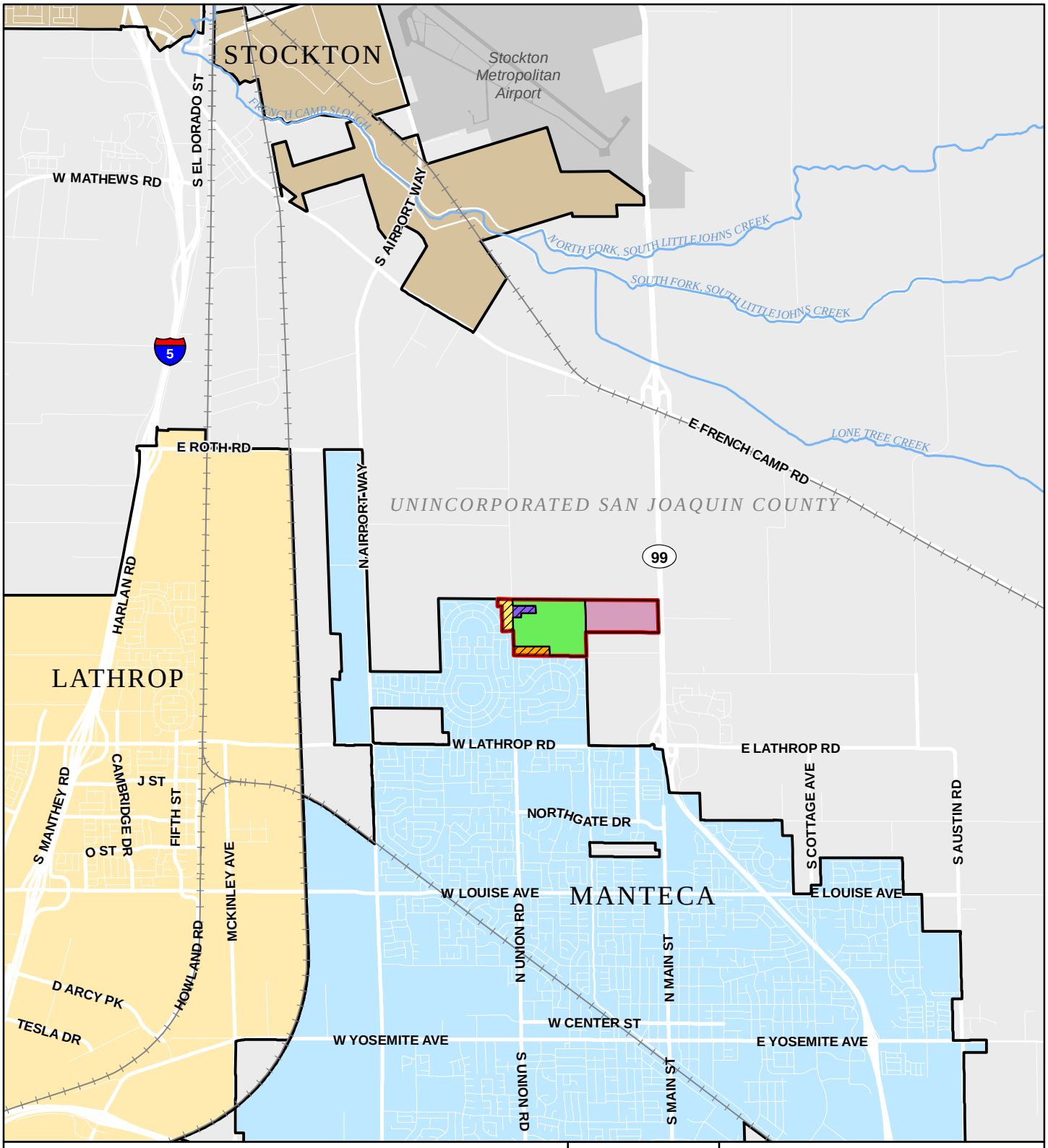
Sources: California State Geoportal. Map date: August 23, 2021.

MANTECA ANNEXATION #1

Figure 2.0-1. Regional Location Map

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Legend

- Annexation Area #1 Overall Boundary
- Project Area
- Annexation SubArea
- City of Manteca
- City of Lathrop
- City of Stockton
- Annexation SubArea #1
- Annexation SubArea #2
- Annexation SubArea #3
- Stagecoach at M & E
- Union Ranch North
- Airport Runway
- Unpaved Airport Area

0 2,000 4,000 Feet

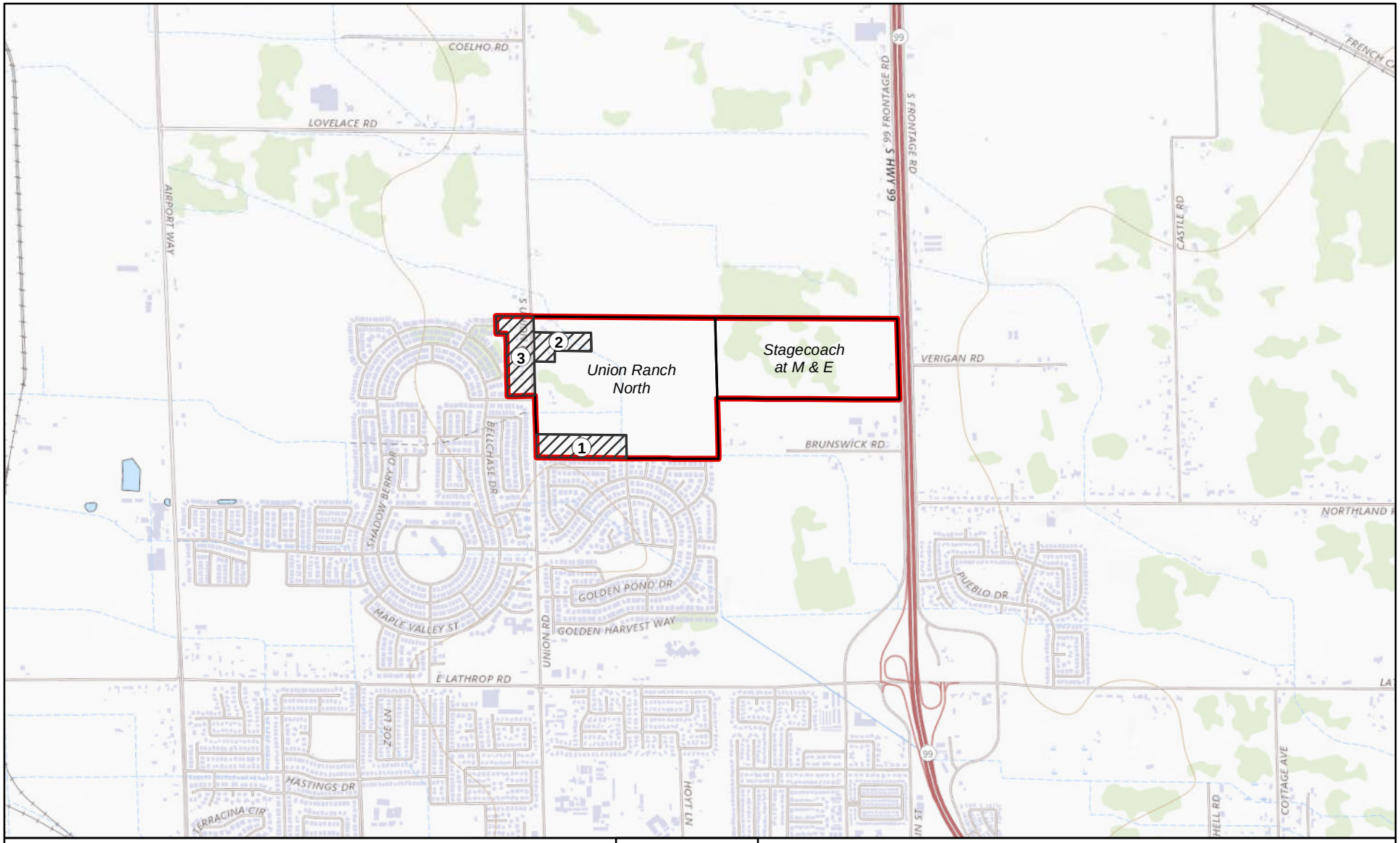
Sources: San Joaquin County GIS. Map date: September 8, 2021.

MANTECA ANNEXATION #1

Figure 2.0-2. Vicinity Map

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Legend

- Annexation #1 Overall Boundary
- Project Area
- (#) Annexation SubArea

0 600 1,200
Feet

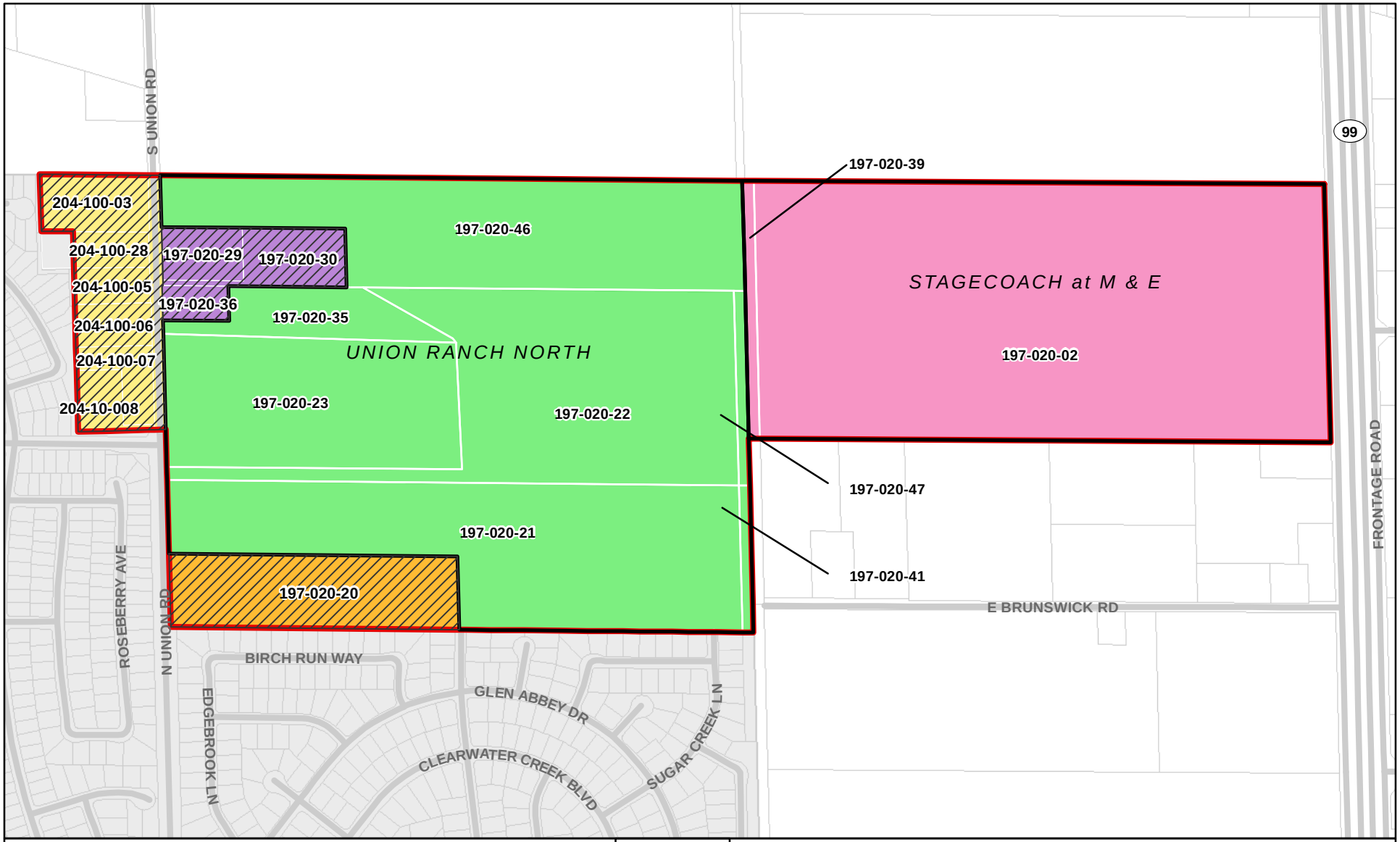
Sources: San Joaquin County GIS; USGS National Map. Map date: September 8, 2021.

MANTECA ANNEXATION #1

Figure 2.0-3. USGS Topographic Map

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Legend

- Annexation #1 Overall Boundary
- Project Area
- Annexation SubArea
- City of Manteca
- Union Ranch North
- Stagecoach at M & E
- Annexation SubArea #1
- Annexation SubArea #2
- Annexation SubArea #3

0 150 300
Feet

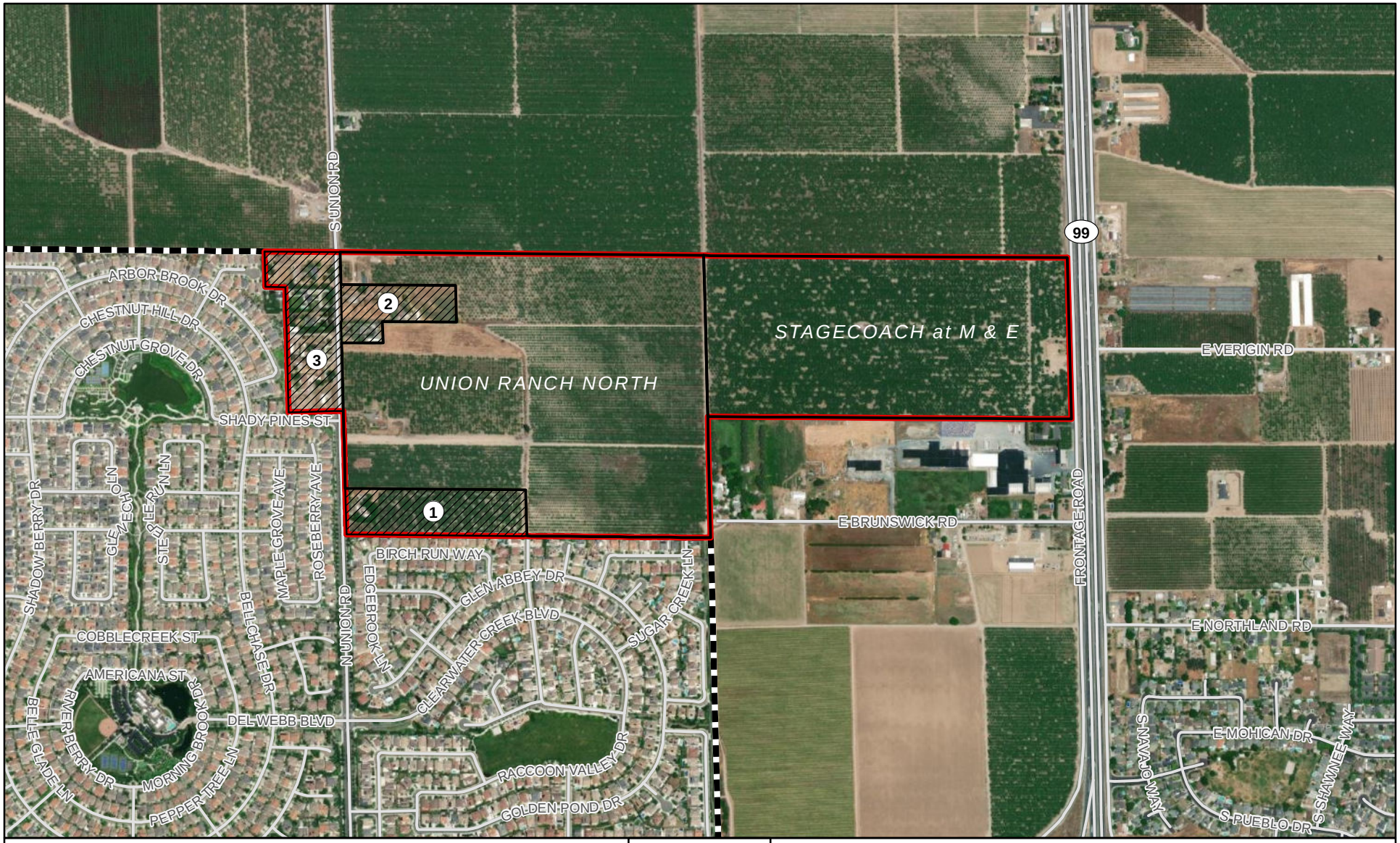
Sources: San Joaquin County GIS; RLC Associates 8/17/2021.
Map date: September 8, 2021.

MANTECA ANNEXATION #1

Figure 2.0-4. Assessor Parcel Map

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Legend

- Annexation #1 Overall Boundary
- Project Area
- # Annexation SubArea
- Manteca City Boundary

Sources: San Joaquin County GIS; ArcGIS Online World Imagery Map Service 5/4/2020. Map date: September 8, 2021.

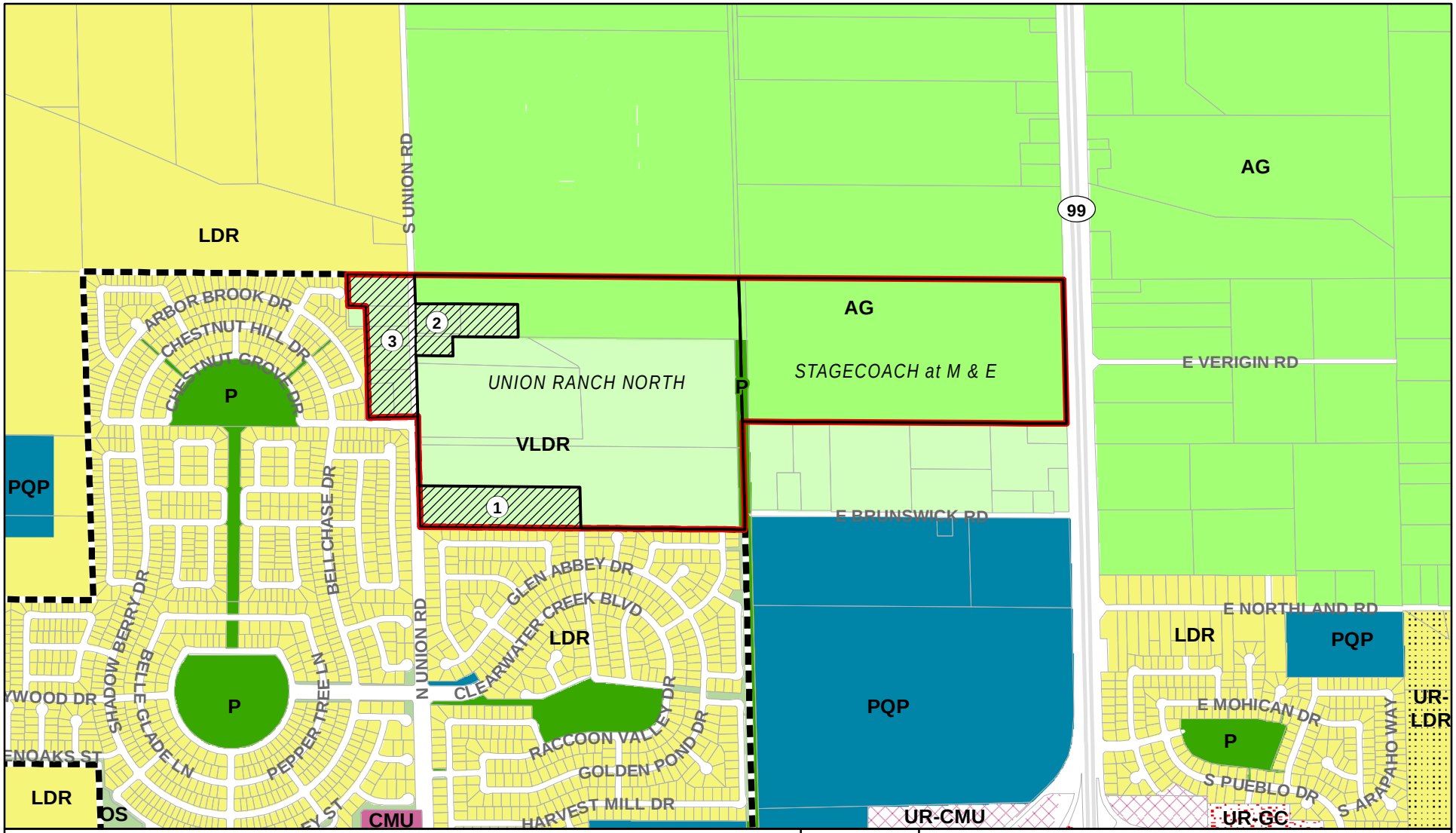
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Feet

MANTECA ANNEXATION #1

Figure 2.0-5. Aerial View of Project Site

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Legend

- Annexation #1 Overall Boundary
- Project Area
- Annexation SubArea
- Manteca City Boundary
- AG - Agriculture
- CMU - Commercial Mixed Use
- GC - General Commercial
- VLDR - Very Low Density Residential
- LDR - Low Density Residential
- OS - Open Space
- P - Park
- PQP - Public/Quasi-Public
- UR-CMU - Urban Reserve-Commercial Mixed Use
- UR-GC - Urban Reserve-General Commercial
- UR-LDR - Urban Reserve-Low Density Residential

0 250 500
Feet

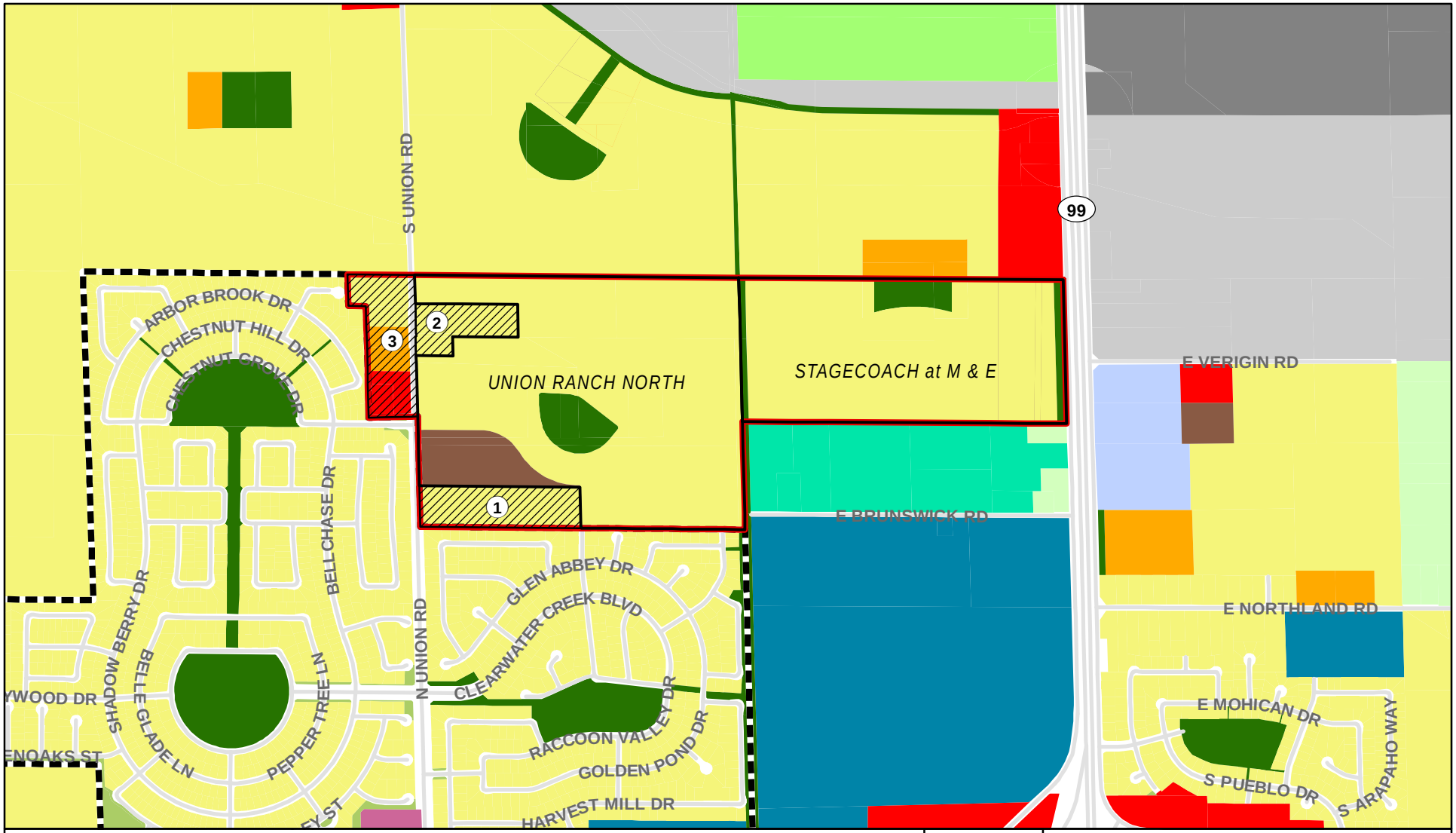
Sources: San Joaquin County GIS; City of Manteca. Map date: October 14, 2021.

MANTECA ANNEXATION #1

Figure 2.0-6a. Existing General Plan Land Uses

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Legend

- Annexation #1 Overall Boundary
- Project Area
- Annexation SubArea
- Manteca City Boundary

Land Use Designation

- AI - Agricultural Industrial
- AG - Agriculture
- C - Commercial
- CMU - Commercial Mixed Use
- VLDR - Very Low Density Residential
- LDR - Low Density Residential
- MDR - Medium Density Residential
- HDR - High Density Residential
- BIP - Business Industrial Park
- BP - Business Professional
- I - Industrial
- OS - Open Space
- P - Park
- PQP - Public/Quasi-Public

0 250 500
Feet

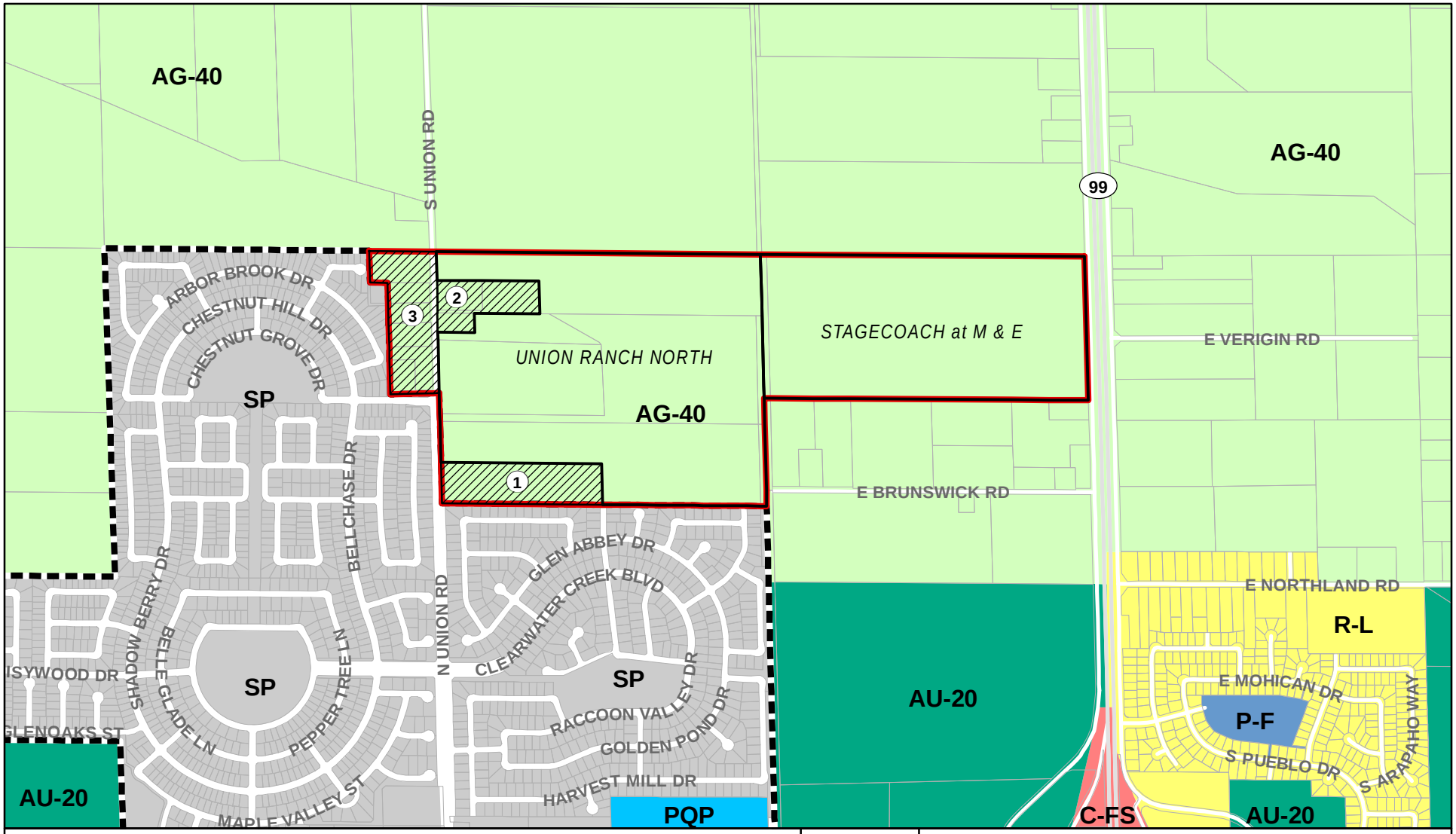
Sources: San Joaquin County GIS; City of Manteca, General Plan Update Alt D. Map date: October 19, 2021.

MANTECA ANNEXATION #1

Figure 2.0-6b. Proposed General Plan Land Uses

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Legend

- Annexation #1 Overall Boundary
- Project Area
- (#) Annexation SubArea
- Manteca City Boundary

City of Manteca Zoning

- PQP- Public/Quasi-Public
- SP - Union Ranch Specific Plan

San Joaquin County Zoning

- AG-40- General Agriculture
- AU-20- Agriculture Urban Reserve
- C-FS- Freeway Service Commercial
- P-F- Public Facilities
- R-L- Low Density Residential

0 250 500
Feet

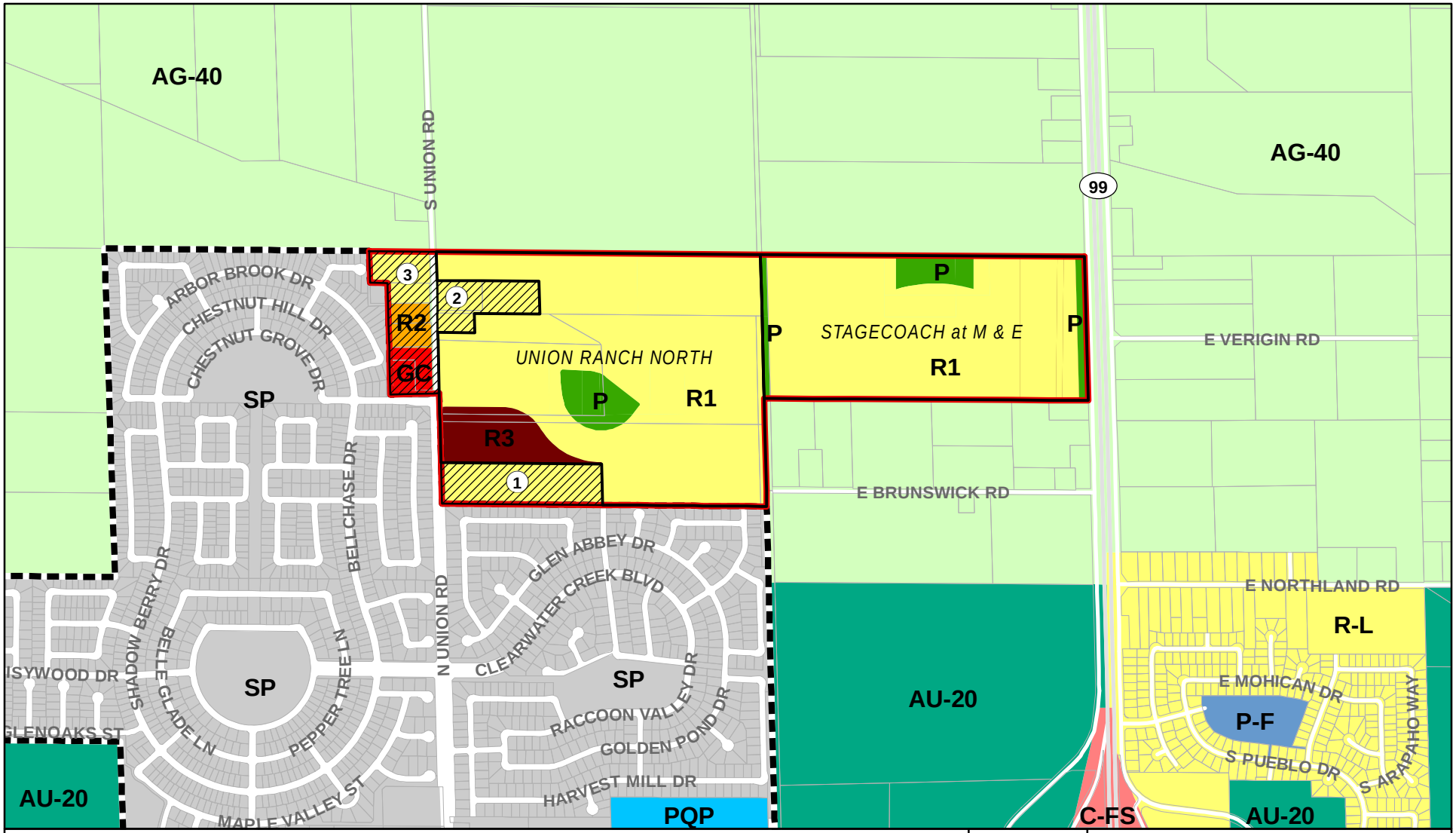
Sources: San Joaquin County GIS; City of Manteca. Map date: October 14, 2021.

MANTECA ANNEXATION #1

Figure 2.0-7a. Existing Zoning Designations

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Legend

- Annexation #1 Overall Boundary
- Project Area
- Annexation SubArea (#)
- Manteca City Boundary

City of Manteca Zoning

- PQP- Public/Quasi-Public
- SP - Union Ranch Specific Plan
- R1- One-Family Dwelling
- R2- Limited Multiple-Family Dwelling
- R3- Multiple-Family Dwelling
- GC - General Commercial
- P - Park

San Joaquin County Zoning

- AG-40- General Agriculture
- AU-20- Agriculture Urban Reserve
- C-FS- Freeway Service Commercial
- P-F- Public Facilities
- R-L- Low Density Residential

0 250 500 Feet

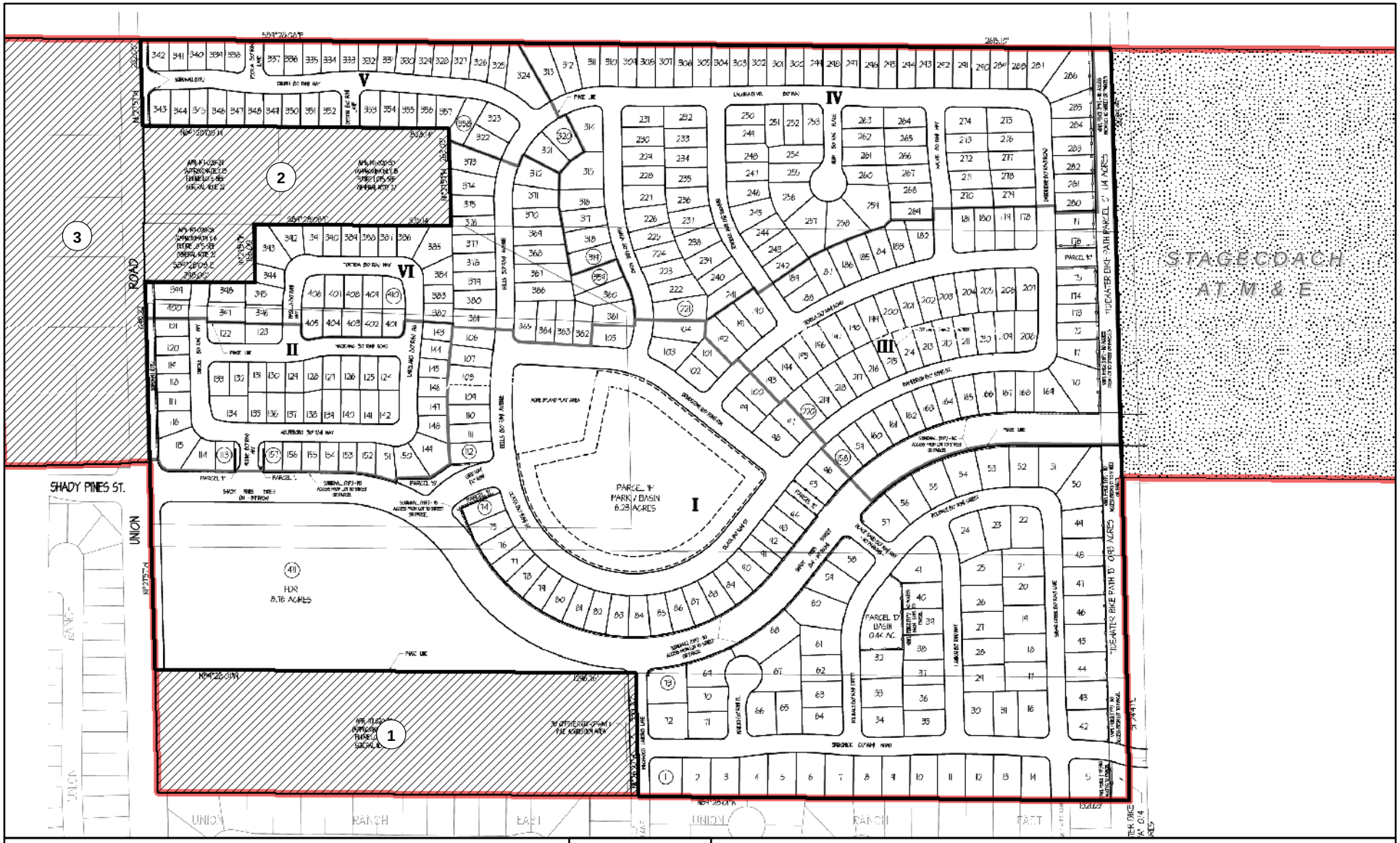
Sources: San Joaquin County GIS; City of Manteca.
Map date: October 14, 2021.

MANTECA ANNEXATION #1

Figure 2.0-7b.
Proposed Rezone

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Legend

- Annexation Area #1 Overall Boundary
- Union Ranch North Project Area
- Stagecoach at M & E Project Area
- # Annexation SubArea

0 100 200
Feet

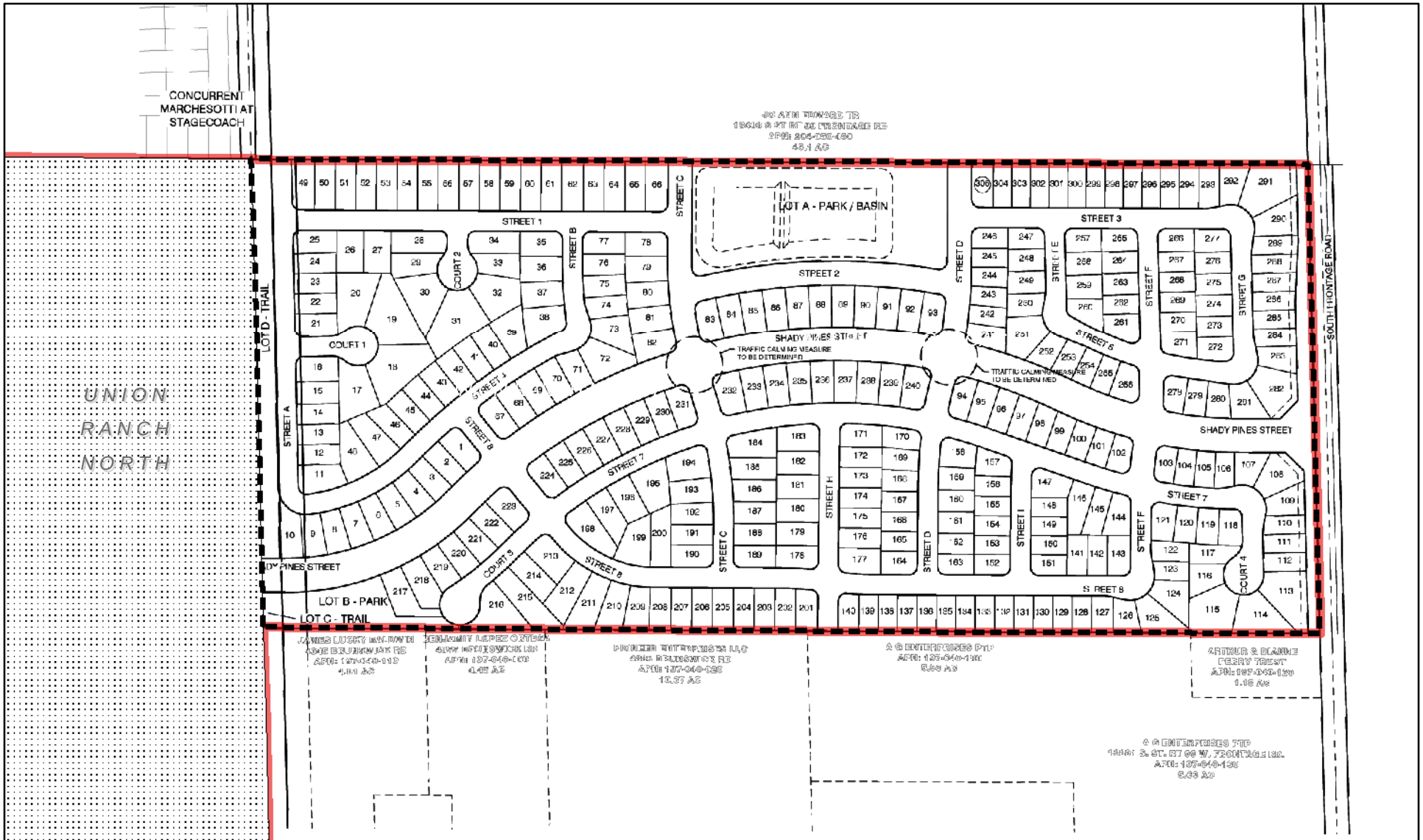
Sources: San Joaquin County GIS; RLC Associates 9/30/2021. Map date: October 8, 2021.

MANTECA ANNEXATION #1

Figure 2.08a. Proposed Site Plan - Union Ranch North

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Legend

- Annexation Area #1 Overall Boundary
- Stagecoach at M & E Project Area
- Union Ranch North Project Area

0 100 200
Feet

Sources: San Joaquin County GIS; MCR Engineering 10/5/2021. Map date: October 14, 2021.

MANTECA ANNEXATION #1

Figure 2.0-8b. Proposed Site Plan - Stagecoach at M & E

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The City of Manteca possesses multiple scenic resources, and there are also scenic resources within the unincorporated areas of San Joaquin County. These resources enhance the quality of life for Manteca residents, and provide for outdoor recreational uses. Landscapes can be defined as a combination of four visual elements: landforms, water, vegetation, and man-made structures. Scenic resource quality is an assessment of the uniqueness or desirability of a visual element. This section provides a background discussion of the scenic highways and corridors, and natural scenic resources such as creeks, wildlife areas, and prominent visual features found in the Project area. This section is organized with an existing setting, regulatory setting, and impact analysis.

This section was prepared based on existing reports and literature for Manteca and the surrounding areas in San Joaquin County. Additional sources of information included the California Department of Transportation's (Caltrans) Designated Scenic Route map for San Joaquin County.

There were no comments received during the NOP comment period related to this environmental topic.

3.1.1 ENVIRONMENTAL SETTING

REGIONAL SCENIC RESOURCES

Visual resources are generally classified into two categories: scenic views and scenic resources. Scenic views are elements of the broader viewshed such as mountain ranges, valleys, and ridgelines. They are usually mid-ground or background elements of a viewshed that can be seen from a range of viewpoints, often along a roadway or other corridor. Scenic resources are specific features of a viewing area (or viewshed) such as trees, rock outcroppings, and historic buildings. They are specific features that act as the focal point of a viewshed and are usually foreground elements.

Aesthetically significant features occur in a diverse array of environments within the region, ranging in character from urban centers to rural agricultural lands to natural water bodies. Features of the built environment that may also have visual significance include individual or groups of structures that are distinctive due to their aesthetic, historical, social, or cultural significance or characteristics. Examples of the visually significant built environment may include bridges or overpasses, architecturally appealing buildings or groups of buildings, landscaped freeways, and a location where a historic event occurred.

SCENIC HIGHWAYS AND CORRIDORS

Scenic highways and corridors make major contributions to the quality of life enjoyed by the residents of a region. The development of community pride, the enhancement of property values, and the protection of aesthetically-pleasing open spaces reflecting a preference for the local lifestyle are all ways in which scenic corridors are valuable to residents.

Scenic highways and corridors can also strengthen the tourist industry. For many visitors, highway corridors will provide their only experience of the region. Enhancement and protection of these

corridors ensures that the tourist experience continues to be a positive one and, consequently, provides support for the tourist-related activities of the region's economy.

Scenic Highways

A scenic highway is generally defined by Caltrans as a public highway that traverses an area of outstanding scenic quality, containing striking views, flora, geology, or other unique natural attributes. A highway may be designated scenic depending upon how much of the natural landscape can be seen by travelers, the scenic quality of the landscape, and the extent to which development intrudes upon the traveler's enjoyment of the view.

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. This route traverses the edge of the Coast Range to the west and Central Valley to the east. The City of Manteca and the Project site are not visible from this roadway segment.

Scenic Corridors

A scenic corridor is the view from the road that may include a distant panorama and/or the immediate roadside area. A scenic corridor encompasses the outstanding natural features and landscapes that are considered scenic. It is the visual quality of the man-made or natural environments within a scenic corridor that are responsible for its scenic value. Commonly, the physical limits of a scenic corridor are broken down into foreground views (zero to one quarter mile) and distant views (over one quarter mile). In addition to distinct foreground and distant views, the visual quality of a scenic corridor is defined by special features, which include:

- Focal points - prominent natural or man-made features which immediately catch the eye.
- Transition areas - locations where the visual environment changes dramatically.
- Gateways - locations which mark the entrance to a community or geographic area.

The City of Manteca has not designated any scenic corridors or viewsheds. As identified in the Open Space Element of the San Joaquin County General Plan, designated scenic routes in the county include Interstate 5 from the Sacramento County line south to Stockton. The City of Manteca is located south of Stockton, and Manteca is not visible from this segment of Interstate 5.

LIGHT AND GLARE

During the day, sunlight reflecting from structures is a primary source of glare, while nighttime light and glare can be divided into both stationary and mobile sources. Stationary sources of nighttime light include structure illumination, interior lighting, decorative landscape lighting, and streetlights. The principal mobile source of nighttime light and glare is vehicle headlamp illumination. This ambient light environment can be accentuated during periods of low clouds or fog.

The variety of urban land uses in the City of Manteca are the main source of daytime and nighttime light and glare. They are typified by single and multi-family residences, commercial structures,

industrial areas, and streetlights. These areas and their associated human activities (inclusive of vehicular traffic) characterize the existing light and glare environment present during daytime and nighttime hours in the urbanized portions of the city. Areas to the north, east and south, outside of the city limits are characterized primarily by open space, agricultural and lower intensity residential development, and generally have lower levels of ambient nighttime lighting and daytime glare. However, areas along State Route (SR) 120 at the southern portion of the city as well as the areas along SR 99 at the eastern portion of the city generally have more sources of glare.

Sources of glare in urbanized portions of the city come from light reflecting off surfaces, including glass, and certain siding and paving materials, as well as metal roofing. The urbanized areas of Manteca contain sidewalks and paved parking areas which reflect street and vehicle lights. The existing light environment found in the project area is considered typical of suburban areas.

Sky glow is the effect created by light reflecting into the night sky. Sky glow is of particular concern in areas surrounding observatories, where darker night sky conditions are necessary, but is also of concern in more rural or natural areas where a darker night sky is either the norm or is important to wildlife. Due to the urban nature of the city limits, a number of existing light sources affect residential areas and illuminate the night sky. Isolating impacts of particular sources of light or glare is therefore not appropriate or feasible for the proposed Project.

VISUAL CHARACTER AND SCENIC WATER RESOURCES

Visual Character and Other Scenic Resources Areas

Manteca's visual character is shaped by its agricultural heritage and suburban development pattern. The City is mostly urbanized with commercial, residential, and industrial uses concentrated along the Highway 99 and Highway 120 interchanges and corridors and other major roadway corridors, including Yosemite Avenue, Airport Way, Main Street, Union Road, Louise Avenue, and Atherton Drive. Residential neighborhoods, including parks and schools, occupy the remainder of the City's urbanized area. Much of the undeveloped land within the City surrounds the developed portion of Manteca and consists of predominantly farmland, including alfalfa, orchards, row crops, and pasture, and rural residential uses.

Farmland and open space, interspersed with rural residential, agricultural, and industrial uses, generally border the City to the north, south, and east. To the west, the City is bordered by industrial uses, the City of Lathrop, the San Joaquin River, Oakwood Lake, and the Oakwood Shores community. Agricultural lands have become important visual resources that contribute to the community identity of Manteca, and the Central Valley region. Agricultural lands provide for visual relief form urbanized areas and act as community separators to nearby urban areas.

Wild and Scenic Rivers

Water resources are important visual resources that draw tourists to the area for recreational opportunities. The most visually significant water body in the region is the San Joaquin River located approximately 4.5 miles west of the Project site along the southwest border of the City.

Federal agencies have jurisdiction, under the Wild and Scenic Rivers Act, to designate rivers or river sections to "be preserved in free-flowing condition and…protected for the benefit and enjoyment of present and future generations." The San Joaquin River is not designated a Wild and Scenic River under the Federal Wild and Scenic Rivers Act.

PROJECT SITE

The Project site is in the northern portion of the City of Manteca directly adjacent to the Union Ranch development and the city limits of Manteca. The Project site is immediately northwest of the intersection of Brunswick Road and 99 Frontage Road. The Project site is bounded on the north by the existing agricultural lands, on the east by State Highway 99, on the south by the Union Ranch development and existing agricultural fields, and on the west by the existing single-family subdivisions. The Project site encompasses development of approximately 175-acres, including 148.99-acres of single-family and multi-family housing units, 13.34 acres for the development of park, open space, and trail, including 9.89 acres of park/basin and open space and 3.45 acres of the continuation of the Tide Water Bike Trail.

The Development Area is bordered on the north by agricultural lands occupied by orchards, on the east by State Route 99 Frontage Road, on the south by the Union Ranch Subdivision and large lot residential housing, and on the west by the Union Ranch Subdivision and Union Rd. The current uses on the Development Area are predominantly agricultural. There are two existing residential units containing outbuildings and two large barns within the western edge of the Union Ranch North portion of the Development Area. One large gravel road runs north to south and bisects the Union Ranch North and Stagecoach at M&E sections of the Development Area. Four smaller gravel roads used to service the surrounding orchards run east to west within the Union Ranch North section of the Development Area. A South San Joaquin Irrigation District (SSJID) pipeline exists within the Union Ranch North section of the Development Area. The pipeline generally runs northwest to southeast until paralleling the gravel road bisecting the two portions of the proposed annexation. Irrigation structures are also found running north to south on the eastern edge of the Stagecoach at M&E portion of the Development Area.

Non-development Area 1 (Annexation Subarea 1) includes a single ranchette style residential unit with three large and one small outbuilding just to the southwest of the Development Area along Union Rd. The rest of the area consists of almond orchards.

Non-development Area 2 (Annexation Subarea 2) includes two ranchette style residential units with seven outbuildings east of Union Rd. Orchards border the southern boundary of the area and a large lot residential unit and additional orchards border the northern boundary.

Non-development Area 3 (Annexation Subarea 3) encompasses the western boundary of the project area and parallels Union Rd. Approximately seven ranchette style residential units are within Non-development Area 3. Undeveloped portions of the Union Ranch Subdivision are located to the west and south of the area, orchards are located to the north, and Union Rd. to the east.

The Project site is located in a portion of the northwest ¼ of Section 20, Township 1 South, Range 7 East Mount Diablo Base and Meridian (MDBM), and located on the USGS Lathrop, California, 7.5-minute series quadrangle map.

The land to the north of the Project site is active agricultural land. While this land is disturbed from its natural condition, developed agricultural land can provide visual relief to a passerby/viewer from common manmade structures and visual obstructions found in an urban environment. Agricultural lands provide a sense of openness that is common in natural environments. Throughout the year agricultural operations would result in the land evolving from an environment that appears lush with vegetation (green crops) to an environment that appears barren (recently tilled). Agricultural land in the Central Valley is generally accepted as an important visual resource.

There are no Officially Designated Scenic Highways located through or adjacent to the Project site. The only Officially Designated Scenic Highway in San Joaquin County is I-580 from I-5 to SR 205 located approximately 16 miles southwest of the Project site. This scenic highway is not visible from the Project site.

There are minimal existing light sources on the Project site. Light sources are limited to the existing residential homes and barn structures. Other existing lighting in the Project site include: roadway lighting on State Route 99 and Union Rd, and lighting from existing residences south and west of the Project site.

3.1.2 REGULATORY SETTING

STATE

California Scenic Highway Program

The intent of the California Scenic Highway Program is "to protect and enhance California's natural scenic beauty and to protect the social and economic values provided by the State's scenic resources." Caltrans administers the program, which was established in 1963 and is governed by the California Streets and Highways Code §260 et seq. The goal of the program is to preserve and protect scenic highway corridors from changes that would diminish the aesthetic value of the adjacent land. Caltrans has compiled a list of state highways that are designated as scenic and county highways that are officially designated or eligible for designation as scenic. Scenic highway designation can provide several types of benefits to the region. Scenic areas are protected from encroachment of inappropriate land uses, free of billboards, and are generally required to maintain existing contours and preserve important vegetative features. Only low-density development is allowed on steep slopes and along ridgelines on scenic highways, and noise setbacks are required for residential development.

To obtain an official "Scenic Highway" designation, the State and Caltrans require a responsible local agency or Local Governing Body (LGB) to prepare a scenic corridor protection plan. In the Manteca

area, San Joaquin County is the LGB. Corridor protection programs are required to contain the following five elements, which have been included in the San Joaquin County's policies:

- Regulations of land use and density of development;
- Detailed land and site planning;
- Control of outdoor advertising;
- Careful attention to and control of earthmoving and landscaping; and
- The design and appearance of structures and equipment.[1]

According to the Caltrans Scenic Highway Programs website, Caltrans monitors state-designated scenic routes in order to ensure each local jurisdiction's consistency with State guidelines. Specifically, Caltrans District Scenic Highway Coordinator (DSHC) will review a scenic highway for compliance every five years, but can recommend the revocation of scenic designation at any time. To enforce the program, the DSHC will contact the responsible local agency or LGB, in this case, San Joaquin County. The LGB must either respond by submitting its current Corridor Protection Program or a letter of intent to request a revocation of the scenic designation. The DSHC reviews the submittal and takes corrective action to resolve any issues of non-compliance, certifies compliance, or recommends revocation of scenic designation.

LOCAL

The City of Manteca General Plan identifies visual and scenic resources within the city and recommends measures to protect these resources.

City of Manteca General Plan

The City of Manteca General Plan identifies the importance of visual characteristics in establishing community identity. Attractive new land uses along the major highways, new landmarks visible from several vantage points throughout the city, and new gateway features along the highways and other major roads at city boundaries can contribute significantly to establishing a strong positive identity for Manteca.

The City of Manteca General Plan 2023 includes several policies that are relevant to an evaluation of the visual quality of the Project site. However, as previously stated, the City is undergoing an Update to the General Plan. Both existing 2023 General Plan policies and proposed General Plan Update policies applicable to the Project are identified below:

2023 GENERAL PLAN (EXISTING)

Policies: Community Design Element

[1] Scenic Highways Program website, List of eligible and officially designated State Scenic Highways (XLSX), https:// Scenic Highways | Caltrans, accessed on February 9, 2021.

- CD-P-44. Provide minimal levels of street, parking, building, site and public area lighting to meet safety standards and provide direction.
- CD-P-45. Provide directional shielding for all exterior lighting to minimize the annoyance of direct or indirect glare.
- CD-P-46. Provide automatic shutoff or motion sensors for lighting features in newly developed areas.
- CD-P-47. The City shall adopt light and glare standards that minimize the creation of new light source and the annoyance of direct and indirect glare.

GENERAL PLAN UPDATE (PROPOSED)

Policies: Community Design Element

- CD-2.1 Promote architectural design that exhibits timeless character and is constructed with high quality materials.
- CD-2.2 Utilize architectural design features (e.g., windows, columns, offset roof planes, etc.) to vertically and horizontally articulate elevations for all sides of buildings.
- CD-2.3 Provide purposeful variations in color, texture, materials, articulation, and architectural treatments that coincide with the associated architectural style. Avoid long expanses of blank, monotonous walls or fences through the use of vertical and horizontal façade or fence articulation achieved through stamping, colors, materials, modulation, and landscaping.
- CD-2.4 For projects that include multiple buildings, encourage differing, but complementary architectural styles that incorporate representative characteristics of a given area.
- CD-2.5 Employ design strategies and building materials that evoke a sense of quality and permanence.
- CD-2.6 Orient building entrance toward the street and provide parking in the rear, when possible.
- CD-2.9 Ensure that new development and redevelopment reinforces desirable elements of its neighborhood, district, or center, including architectural style, scale, and setback patterns.
- CD-2.10. Encourage context-sensitive transitions in architectural scale and character between new and existing residential development.
- CD-2.11. Provide special building-form elements, such as towers and archways, and other building massing elements to help distinguish activity nodes and establish landmarks within the community.
- CD-2.12. For infill development, incorporate context sensitive design elements that maintain compatibility and raise the quality of the area's architectural character.

- CD-2.15. Where practical, and in compliance with ADA standards, separate common areas that provide seating from the primary walkways by informal barriers, such as planters, bollards, fountains, low fences, and/or changes in elevation.
- CD-2.16. Design retention/detention basins to be visually attractive and well-integrated with any associated project and with adjacent land uses.
- CD-2.17. Require that lighting and fixtures be integrated with the design and layout of a project and that they provide a desirable level of security and illumination.
- CD-4.1. Strengthen the positive qualities of the City's neighborhoods, districts, and centers.
- CD-4.2. Support the development and preservation of unique neighborhoods, districts, and centers that exhibit a special sense of place and quality of design.
- CD-4.3. Strengthen the identity of individual neighborhoods, districts, and centers through the use of entry monuments, flags, street signs, themed streets, natural features, landscaping, and lighting.
- CD-4.6. Design neighborhoods, districts, and centers to provide access to adjacent open spaces.
- CD-4.7. Design neighborhoods in new growth areas to incorporate the following characteristics:
    - The edges of the neighborhood shall be identifiable by use of landscaped areas along major streets or natural features, such as permanent open space. Primary arterial streets may be used to define the boundaries of neighborhoods. The street system shall be designed to discourage high volume and high speed traffic through the neighborhood.
    - Neighborhoods shall be not more than one mile in length or width.
    - Each neighborhood shall include a distinct center, such as an elementary school, neighborhood park(s), and/or a mixed-use commercial area within a reasonable walking distance of the homes, approximately one-half mile.
    - Each neighborhood shall include an extensive pedestrian and bikeway system comprised of sidewalks and bike lanes along streets and dedicated trails.
- CD-8.1. To the extent possible, require new development to retain or incorporate visual reminders of the agricultural heritage of the community.
- CD-8.2. Utilize wood, wrought-iron, or other types of open fencing instead of block walls in rural areas as needed.
- CD-8.3. Allow for the elimination of vertical curbs, paved gutters, and sidewalks in rural areas if adequate drainage conditions are provided.
- CD-8.4. For lighting in rural areas of the community, provide:

- Minimal levels of street, parking, building, site and public area lighting to meet safety standards and provide direction.
- Directional shielding for all exterior lighting to minimize the annoyance of direct or indirect glare.
- Automatic shutoff or motion sensors for lighting features in newly developed areas.

Implementation: Community Design Element

- CD-2a. Adopt and maintain, in consistency with the General Plan, the City's Zoning regulations, and current best practice design solutions, Citywide Design Guidelines for the architectural review of discretionary projects.
- CD-2b. Require development projects to incorporate Crime Prevention through Environmental Design (CPTED) techniques and defensible space design concepts.
- CD-8a. Require projects developing on the fringe of the City or adjacent to agricultural or rural residential uses to be compatible with the character of the area, including implementing the City's light and glare standards, use of appropriate materials and design, and siting of more intense uses away from rural and agricultural uses, where feasible.

City of Manteca Zoning Ordinance

Chapter 17.48 Landscaping, of the City Zoning Ordinance contains standards and provisions related to landscaping design requirements that would apply to the proposed Project. The primary intent of Chapter 17.48 Landscaping, is to require water efficient landscaping and to promote water conservation. However, this chapter also includes provisions related to landscape design that would apply to the proposed Project. These applicable provisions include parking lot landscaping design standards, setback area landscaping standards, and landscaping standards adjacent to fences and walls.

Chapter 17.50 Lighting, of the City Zoning Ordinance contains standards and provisions related to exterior lighting. The primary purpose of this chapter is to regulate lighting to balance the safety and security needs for lighting with the City's desire to preserve dark skies and to ensure that light trespass and glare have negligible impacts on surrounding uses (especially residential uses) and roadways. Section 17.50.070 requires the preparation of an outdoor lighting plan as part of each Site Plan and Design Review application. At a minimum, the outdoor lighting plan shall include the following:

1. Manufacturer specifications sheets, cut sheets, and other manufacturer-provided information for all proposed outdoor light fixtures to show fixture diagrams and outdoor light output levels.
2. The proposed location, mounting height, and aiming point of all outdoor lighting fixtures.

3. If building elevations are proposed for illumination, drawings of all relevant building elevations showing the fixtures, the portions of the elevations to be illuminated, the illumination level of the elevations, and the aiming point for any remote light fixture.

4. Photometric data including a computer-generated photometric grid showing foot-candle readings every 10 feet within the property or site and 10 feet beyond the property lines.

3.1.3 IMPACTS AND MITIGATION MEASURES

THRESHOLDS OF SIGNIFICANCE

Consistent with Appendix G of the CEQA Guidelines, the proposed Project will have a significant impact on aesthetics if it will:

- Have a substantial adverse effect on a scenic vista;
- Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a State scenic highway;
- 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; and/or
- Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area.

IMPACTS AND MITIGATION MEASURES

Impact 3.1-1: Project implementation may result in substantial adverse effects on scenic vistas and resources or substantial degradation of visual character. (Significant and Unavoidable)

The proposed Project involves the annexation of 202.81 acres into the City of Manteca, including the proposed 175.97-acre Development Area, a 27.14-acre Non-development Area, and all public right-of-way along Union Road, to develop 715 single family detached units, 200 multi-family units, parks and trails totaling 14.55 acres, and associated roadway improvements. No new development or improvements are proposed as part of this proposed Project for the Non-development Area, which is improved with 12 existing residential homes. Therefore, the existing visual character of the Non-development Area and half of the existing right-of-way would not change as part of this proposed Project.

Development of the proposed Project would convert the 175.97-acre Development Area from its existing use as primarily agricultural land to a residential neighborhood with associated park areas. The residential neighborhood is divided into two sections, Union Ranch North and Stagecoach at

M&E as part of two tentative subdivision maps. The neighborhoods within the Development Area would include a network of minor collector and residential streets to provide an efficient flow of traffic through the area. Other uses to support and compliment the proposed residential development include underground wet and dry utility infrastructure, roadways, curb/gutters/sidewalks, bicycle/pedestrian facilities, street lighting, and street signage.

The Project site is not designated as a scenic vista by the City of Manteca General Plan or the San Joaquin County General Plan, nor does it contain any unique or distinguishing features that would qualify the site for designation as a scenic vista. However, the City's General Plan EIR does note that new development will impact current views of open space, which are primarily vistas of agricultural fields and orchards. These public views are primarily available to motorists traveling along Union Road and State Route 99, which bound the Development Area to the west and east respectively. Implementation of the proposed Project would change the existing visual character of the Development Area from a primarily agricultural site to an urbanized site. Impacts related to a change in visual character are largely subjective and very difficult to quantify. People have different reactions to the visual quality of a project or a project feature, and what is considered "attractive" to one viewer may be considered "unattractive" to other viewers.

The Project site currently consists primarily of agricultural lands. Agricultural lands provide visual relief from urban and suburban developments, and help to define the character of a region. The proposed Project would introduce residential uses and supporting infrastructure into the area, created the loss of these agricultural uses. The loss of agricultural lands can have an adverse cumulative impact on the overall visual character and quality of a region.

Despite the loss of agricultural land, the proposed Project will include visual components that will enhance the appearance of the site once developed. These improvements include landscaping improvements like new street trees and other neighborhood greenery. The proposed Project would also result in the construction of park areas and will facilitate the continuation of the Tide Water Bike Trail. While implementation of the proposed Project would change the existing visual character of the area, the development components of the subdivisions will add new visual interest to the area. The removal of the existing agricultural land will not result in substantial adverse effects on a designated scenic vista. There are no structures over 45 feet high that would impede views of the surrounding agricultural areas from the Project vicinity.

In order to reduce the visual impacts of the development, development within the Project site is required to be consistent with the General Plan and the Manteca Zoning Ordinance which includes design standards. The design standards will ensure quality and cohesive design of the Project site. These standards include specifications for building height, massing, and orientation, exterior lighting standards, and landscaping standards. Following the City's design requirements will produce a project that will be internally cohesive, while maintaining and aesthetic feel similar to that of the surrounding uses.

Despite the conformity to existing neighborhoods, the loss of the agricultural use on the Project site will change the visual character of the Project site in perpetuity. Adherence to the Conditions of

Approval which will require compliance with the Development Standards for lighting, landscaping, and building design, will collectively minimize the visual impacts to the greatest extent feasible as the site transitions from agricultural to urban/suburban uses. However, there is no development standard that would fully reduce the impact caused by the loss of the agricultural character. This is considered a **significant and unavoidable** impact. There is no additional feasible mitigation available that would reduce this impact to a less than significant level.

Impact 3.1-2: Project implementation may substantially damage scenic resources within a State Scenic Highway. (Less than Significant)

There are no designated State Scenic Highways in the vicinity of the Project site. 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. This Designated Scenic Highway is located approximately 16 miles southwest of the Project site and is not visible from the Project site. This route traverses the edge of the Coast Range to the west and Central Valley to the east. The City of Manteca and the Project site are not visible from this roadway segment. As identified in the Open Space Element of the San Joaquin County General Plan, designated scenic routes in the county include Interstate 5 from the Sacramento County line south to Stockton. The City of Manteca is located south of Stockton, and neither the City nor the Project site is visible from this segment of Interstate 5. Additionally, there are no "eligible" highway segments in the Project vicinity that may be included in the State Scenic Highway system. As such, this is a **less than significant** impact, and no mitigation is required.

Impact 3.1-3: Project implementation may result in light and glare impacts. (Less than Significant with Mitigation)

As noted in Impact 3.1-1, the proposed Project involves the annexation of 202.81 acres into the City of Manteca, including the proposed 175.97-acre Development Area and 27.14-acre Non-development Area to develop 715 single family detached units, parks and trails totaling 14.55-acres, and associated roadway improvements. No new development or improvements are proposed as part of the proposed Project for the Non-development Area, which is improved with twelve (12) existing residential homes. Additionally, existing County right-of-way annexed into the city limits would remain roadways but would be improved to City of Manteca standards. Therefore, implementation of the proposed Project is expected to introduce new sources of light and glare into the Development Area only.

New sources of glare would occur primarily from the windshields of vehicles travelling to and from the Development Area and from vehicles parked within the Project site. However, parking for the proposed residential uses in the Development Area would primarily occur within enclosed garages and driveways. Headlights and windshields would be shielded by the proposed residential structures within the site. Additionally, the Project includes plans for extensive landscaping and open space areas throughout the site, which would provide visual screening and block potential windshield glare for sensitive receptors within the Project site. Residential structures placed along the boundaries of

the Development Area would provide visual screening and block potential windshield glare to areas surrounding the Project site.

Additionally, several roadways would be constructed within the Development Area, extending from Union Ranch and Frontage Road 99 to serve the proposed single-family residential uses. These roadways would result in the introduction of street lighting into a currently undeveloped site. However, the proposed single-family residential uses and local roadway would be typical of what is already experienced as a result of the existing single-family residential uses and local roadways that occur within the surrounding area. The proposed single-family residential uses would be an extension of single-family residential uses to the south and west.

The proposed Project would be required to implement existing City regulations aimed at reducing light and glare impacts to ensure that no unusual daytime glare or nighttime lighting is produced. Specifically, the Manteca Municipal Code Chapter 17 (Zoning Code) states that direct glare shall not be permitted and provides standards for nuisance prevention and shielding requirements. Chapter 17.50, Lighting, of the City Zoning Ordinance contains standards and provisions related to exterior lighting. The primary purpose of this chapter is to regulate lighting to balance the safety and security needs for lighting with the City's desire to preserve dark skies and to ensure that light trespass and glare have negligible impacts on surrounding property (especially residential) and roadways. At a minimum, the outdoor lighting plan shall include the following:

1. Manufacturer specifications sheets, cut sheets, and other manufacturer-provided information for all proposed outdoor light fixtures to show fixture diagrams and outdoor light output levels.
2. The proposed location, mounting height, and aiming point of all outdoor lighting fixtures.
3. If building elevations are proposed for illumination, drawings of all relevant building elevations showing the fixtures, the portions of the elevations to be illuminated, the illumination level of the elevations, and the aiming point for any remote light fixture.
4. Photometric data including a computer-generated photometric grid showing foot-candle readings every 10 feet within the property or site and 10 feet beyond the property lines.

While implementation of regulations and standards within the Manteca Municipal Code would reduce impacts associated with increased light and glare, the impacts would not be eliminated entirely, and the overall level of light and glare in the Project area would increase in general as urban development occurs.

Overall, the proposed Project would introduce new sources of daytime and nighttime lighting within the Project area that do not currently exist. However, it is noted there are no specific features within the proposed Project that would create unusual light and glare. Further, the portion of the site adjacent to Union Avenue already experiences similar lighting due to the existing development within the surrounding areas. A detailed lighting plan has not yet been prepared for the Project, but for the purposes of this analysis, it has been conservatively assumed that nighttime street lighting and exterior lighting would be located within the park areas and on the single-family homes.

Light sources from the proposed Project can have an adverse impact on the surrounding areas, by introducing nuisance light into the area and decreasing the visibility of nighttime skies. Additionally, light sources can create light spillover impacts on surrounding land uses in the absence of a lighting plan that includes photometrics of the lighting. Manteca Municipal Code Chapter 17 (Chapter 17.50, Lighting) requires the preparation of a lighting plan that meets the City's standards and provisions related to exterior lighting. A lighting plan for each phase of the Development Area will be prepared prior to the submittal of improvement plans. As a Condition of Approval, a lighting plan will be prepared prior to approval of improvement plans (for onsite and offsite improvements), and prior to issuance of a building permit for multi-family improvements.[2] The City reviews the lighting plan to ensure that the lighting systems and other exterior lighting throughout the residential portion of the Project site has been designed to minimize light spillage onto adjacent properties to the greatest extent feasible. Compliance with the Condition of Approval would ensure that the potential impacts associated with nighttime lighting and light spillage onto adjacent properties is **less than significant**.

[2] As described in the Manteca Municipal Code 17.50.070: "A preliminary outdoor lighting plan shall be submitted as part of each Site Plan and Design Review application, and a final plan shall be submitted as part of an application for a building permit for a new structure or an addition of 25 percent of the gross floor area, seating capacity, or parking spaces. A final outdoor lighting plan is required for all new outdoor lighting installations on commercial, mixed-use, multi-unit residential, industrial, and institutional properties."

This section provides an overview of the agricultural crops in San Joaquin County and the City of Manteca, agricultural capability of the soils on the Project site, and existing site conditions. This section concludes with an evaluation of the impacts related to agricultural resources and recommendations for mitigating impacts as needed. Information in this section is derived primarily from:

- *City of Manteca General Plan 2023* (City of Manteca, as amended through 2013);
- *Manteca General Plan 2023 Draft Environmental Impact Report* (City of Manteca, 2003);
- *California Important Farmlands Map* (California Department of Conservation, 2019);
- *California Land Conservation (Williamson) Act Status Report* (California Department of Conservation, 2010);
- *San Joaquin County Agricultural Report* (San Joaquin County Agricultural Commissioner, 2016); and
- *Natural Resources Conservation Service* (NRCS) Web Soil Survey (NRCS, 2020).

It is noted that there are no forest resources located on the Project site or in the City of Manteca, thus this CEQA topic is not relevant to the proposed Project and will not be addressed further in this EIR.

This is one comment received during the NOP scoping process related to this environmental topic (Steven A. Herum, 11-17-21). The comment is included as an appendix to this report, and is addressed in part by the contents of this section.

3.2.1 ENVIRONMENTAL SETTING

SAN JOAQUIN COUNTY AGRICULTURE

San Joaquin County occupies a central location in California's vast agricultural heartland, the San Joaquin Valley. The County's Agricultural Commissioner's most recent published Agricultural Report (2020) contains the following information relating to agriculture in the County.

Agricultural Value

San Joaquin County has a total land area of 1,391 square miles. The total acreage of crop land in the county is approximately 772,762 acres. The gross value of agricultural production in San Joaquin County for 2020 was $3,046,537,000 which represents a 16.2 percent increase from 2018 when gross production value totaled $2,620,983,000. Table 3.2-1 lists the nine primary commodities in San Joaquin County in 2019 and 2020.

TABLE 3.2-1: SUMMARY COMPARISON OF CROP VALUES

PRODUCT TYPE	*2019 VALUE IN DOLLARS*	*2020 VALUE IN DOLLARS*
Field Crops	$204,057,000	$235,304,000
Vegetable Crops	$228,893,000	$260,363,000
Fruit and Nut Crops	$1,354,789,000	$1,603,784,000
Nursery Products	$115,542,000	$132,255,000
Livestock and Poultry	$121,085,000	$124,305,000

PRODUCT TYPE	*2019 VALUE IN DOLLARS*	*2020 VALUE IN DOLLARS*
Livestock and Poultry Products	$540,204,000	$622,507,000
Seed Crops	$3,281,000	$4,090,000
Apiary Products	$37,853,000	$48,461,000
Other Products (Biomass/Firewood)	$15,279,000	$15,285,000

SOURCE: SAN JOAQUIN COUNTY AGRICULTURAL REPORT, 2020.

AGRICULTURAL CAPABILITY

The California Department of Conservation Farmland Mapping and Monitoring Program identifies lands that have agriculture value and maintains a statewide map of these lands called the Important Farmlands Inventory (IFI). IFI classifies land based upon the productive capabilities of the land, rather than the mere presence of ideal soil conditions.

The suitability of soils for agricultural use is just one factor for determining the productive capabilities of land. Suitability is determined based on many characteristics, including fertility, slope, texture, drainage, depth, and salt content. A variety of classification systems have been devised by the State to categorize soil capabilities. The two most widely used systems are the Capability Classification System and the Storie Index. The Capability Classification System classifies soils from Class I to Class VIII based on their ability to support agriculture with Class I being the highest quality soil. The Storie Index considers other factors such as slope and texture to arrive at a rating. The IFI is in part based upon both of these two classification systems.

Soil Capability Classification System

The Soil Capability Classification System takes into consideration soil limitations, the risk of damage when soils are used, and the way in which soils respond to treatment. Capability classes range from Class I soils, which have few limitations for agriculture, to Class VIII soils that are unsuitable for agriculture. Generally, as the rating of the capability classification increases, yields and profits are more difficult to obtain. A general description of soil classifications, as defined by the Natural Resources Conservation Service (NRCS) is provided in Table 3.2-2 below.

TABLE 3.2-2: SOIL CAPABILITY CLASSIFICATION

CLASS	*DEFINITION*
I	Soils have slight limitations that restrict their use.
II	Soils have moderate limitations that restrict choice plants or that require moderate conservation practices.
III	Soils have severe limitations that restrict the choice of plants or that require special conservation practices, or both.
IV	Soils have very severe limitations that restrict the choice of plants or that require very careful management, or both.
V	Soils are not likely to erode but have other limitations; impractical to remove that limits their use largely to pasture or range, woodland, or wildlife habitat.
VI	Soils have severe limitations that make them generally unsuited to cultivation and limit their use largely to pasture or range, woodland, or wildlife habitat.
VII	Soils have very severe limitations that make them unsuited to cultivation and that restrict their use largely to pasture or range, woodland, or wildlife habitat.
VIII	Soils and landforms have limitations that preclude their use for commercial plans and restrict their use to recreation, wildlife habitat, water supply, or aesthetic purposes.

SOURCE: USDA SOIL CONSERVATION SERVICE.

Storie Index Rating System

The Storie Index Rating system ranks soil characteristics according to their suitability for agriculture from Grade 1 soils (80 to 100 rating) which have few or no limitations for agricultural production, to Grade 6 soils (less than 10) which are not suitable for agriculture. Under this system, soils deemed less than prime can function as prime soils when limitations such as poor drainage, slopes, or soil nutrient deficiencies are partially or entirely removed. The six grades, ranges in index rating, and definition of the grades, as defined by the NRCS, are provided below in Table 3.2-3.

TABLE 3.2-3: STORIE INDEX RATING SYSTEM

GRADE	*INDEX RATING*	*DEFINITION*
1	80 – 100	Few limitations that restrict their use for crops
2	60 – 80	Suitable for most crops, but have minor limitations that narrow the choice of crops and have a few special management needs
3	40 – 60	Suited to a few crops or to special crops and require special management
4	20 – 40	If used for crops, severely limited and require special management
5	10 – 20	Not suited for cultivated crops, but can be used for pasture and range
6	Less than 10	Soil and land types generally not suited to farming

SOURCE: USDA SOIL CONSERVATION SERVICE, SOIL SURVEY OF YOLO COUNTY, CALIFORNIA, 1972.

In addition to soil suitability, other factors for determining the agricultural value of land include whether soils are irrigated, the depth of soil, water-holding capacity, and physical and chemical characteristics. Areas considered to have the greatest agricultural potential are designated as Prime Farmland or Farmland of Statewide Importance.

Important Farmlands

The Farmland Mapping and Monitoring Program (FMMP) is a farmland classification system administered by the California Department of Conservation. Important farmland maps are based on the Land Inventory and Monitoring criteria, which classify a land's suitability for agricultural production based on both the physical and chemical characteristics of soils, and the actual land use. The system maps five categories of agricultural land, which include important farmlands (prime farmland, farmland of statewide importance, unique farmland, and farmland of local importance) and grazing land, as well as three categories of non-agricultural land, which include urban and built-up land, other land, and water area.

IMPORTANT FARMLANDS IN SAN JOAQUIN COUNTY

Data from the Department of Conservation indicates that approximately 1,858 acres of Prime Farmland in the County was developed for other uses between 2016 and 2018, resulting in an existing total of 381,934 acres of Prime Farmland (42 percent of agricultural land). The remaining agricultural land is comprised of Farmland of Statewide Importance (9 percent), Unique Farmland (9 percent), Farmland of Local Importance (7 percent), and Grazing Land (14 percent). The types and acreages of farmland in 2016 and 2018 are shown in Table 3.2-4.

TABLE 3.2-4: SAN JOAQUIN COUNTY FARMLANDS SUMMARY AND CHANGE BY LAND USE CATEGORY

LAND USE CATEGORY	2016-2018 ACREAGE CHANGES							
	TOTAL ACREAGE INVENTORIED				ACRES LOST	ACRES GAINED	TOTAL ACREAGE CHANGED	NET ACREAGE CHANGED
	2016		2018		(-)	(+)		
	Acres	Percent	Acres	Percent				
Prime Farmland	381,634	42%	381,984	42%	1,858	2,210	4,068	352
Farmland of Statewide Importance	82,618	9%	82,163	9%	921	466	1,387	-455
Unique Farmland	81,920	9%	85,694	9%	402	4,174	4,576	3,772
Farmland of Local Importance	68,903	8%	65,944	7%	5,507	2,547	8,054	-2,960
IMPORTANT FARMLAND SUBTOTAL	**615,075**	**67%**	**615,785**	**67%**	**8,688**	**9,397**	**18,085**	**709**
Grazing Land	129,760	14%	126,902	14%	2,893	37	2,930	-2,856
AGRICULTURAL LAND SUBTOTAL	**744,835**	**82%**	**742,687**	**81%**	**11,581**	**9,434**	**21,015**	**-2,147**
Urban and Built-up Land	95,329	10%	97,541	11%	121	2,332	2,453	2,211
Other Land	60,602	7%	60,987	7%	922	1,312	2,234	390
Water Area	11,836	1%	11,382	1%	680	226	906	-454
TOTAL AREA INVENTORIED	**912,602**	**100%**	**912,597**	**100%**	**13,304**	**13,304**	**26,608**	**0**

SOURCE: CA DEPARTMENT OF CONSERVATION, DIVISION OF LAND RESOURCE PROTECTION TABLE A-30, 2018.

EXISTING SITE CONDITIONS

The project site is directly north of the City of Manteca's limit line adjacent to the Union Ranch development. The Project site is immediately west of State Route 99 (SR 99) and east of the Union Ranch Specific Plan Area. The Project site is bounded on the north by farmland, on the east by SR 99, on the south by existing residences and agricultural fields, and on the west by Union Road and the Union Ranch Specific Plan. The Project site is 202.81 acres and includes 18 Assessor parcels (APNs): Development Area (106.04-acre Subdivision 1, Union Ranch North Project Area, and 69.93-acre, Subdivision 2, Stagecoach at M&E Project Area), Non-development Area 1 (an inhabited annexation of 6 parcels on 6 acres), Non-development Area (9.82-acre SubArea 1, 6.04-acre SubArea 2, and 11.28-acre SubArea 3).

The Development Area primarily contains farmland, with a few existing homes and outbuildings. The outbuildings include barns, sheds, livestock/farm animal pens, beehives, equipment yards, dirt/gravel roadways, irrigation ditches, and overhead power lines. The majority of the Development Area is in active agricultural use (orchards), with all existing homes and outbuildings clustered on each parcel.

The Non-Development areas contains farmland and existing ranchettes. Each SubArea is uniquely different and is described in detail below:

Annexation SubArea 1 includes mostly active agricultural use (orchards), with a cluster of existing structures along Union Road. The cluster of structures in this SubArea includes existing homes,

barns, sheds, livestock/farm animal pens, equipment yards, dirt/gravel roadways, irrigation ditches, and overhead power lines. Union Road is located along the western side of this SubArea and is fully improved on the southbound portion of the roadway to a City standard with 2 southbound lanes, a landscaped median, and landscaped pedestrian sidewalks. The eastside of Union Road functions as an unimproved County roadway with one northbound lane and no pedestrian sidewalk, curb/gutter, or landscaping.

Annexation SubArea 2 is characterized as existing ranchettes, with homes, barns, sheds, livestock/farm animal pens, equipment yards, dirt/gravel roadways, irrigation ditches, and overhead power lines. The agricultural land within this SubArea is pasture and/or cropland. Union Road is located along the western side of this SubArea and is an unimproved 2-lane County roadway without any landscaping or pedestrian facilities in either the northbound or southbound direction.

Annexation SubArea 3 is characterized as existing ranchettes, with existing homes, barns, sheds, livestock/farm animal pens, equipment yards, dirt/gravel roadways, and overhead power lines. This is no active production agricultural operation in this area, but there are small livestock pens that would be expected to house sheep, goats, horses, cows, hogs, foul, or poultry. Union Road is located along the eastern side of this SubArea and is an unimproved 2-lane County roadway without any landscaping or pedestrian facilities in either the northbound or southbound direction. Shady Pines Street is located along the southern side of this SubArea and is a fully improved City roadway that serves as an access road into the existing Woodbridge residential development.

The Project site is in the northwest ¼ of Section 20, Township 1 South, Range 7 East Mount Diablo Base and Meridian (MDBM). Figure 2.0-3 illustrates the project location on the USGS Manteca, California, 7.5-minute series quadrangle map. The Project site is relatively flat with natural gentle slope from south to north. The Project site topography ranges in elevation from approximately 29 to 36’ feet above sea level.

Surrounding Land Uses

The Project site is surrounded by a variety of agricultural and residential land uses. Uses immediately adjacent to the north of the Project site include agricultural uses. Uses immediately to the south and southwest of the Project site include residential uses such as the Union Ranch Subdivision. Uses to the south and east of the Project site include agricultural and residential uses, including ranchettes and large estates lots (to the south and east) and a residential subdivision (to the east).

Project Site Farmland Characteristics

The State of California Department of Conservation FMMP and San Joaquin County GIS data were used to illustrate the farmland characteristics for the Project site. Farmlands on the Project site are identified in Figure 3.2-1. The farmland classifications for the site and surrounding area are described below.

PRIME FARMLAND

Prime Farmland is farmland with the best combination of physical and chemical features able to sustain long term agricultural production. This land has the soil quality, growing season, and moisture supply needed to produce sustained high yields. Land must have been used for irrigated agricultural production at some time during the four years prior to the mapping date.

Approximately 29.48 acres of Prime Farmland are in the Project site. The bulk of the Prime Farmland is in the center of the project site along the boundary of Stagecoach at M&E and Union Ranch North. Prime Farmlands are also at the southwest portion of the Project site.

FARMLAND OF STATEWIDE IMPORTANCE

Farmland of Statewide Importance is farmland with characteristics similar to those of Prime Farmland but with minor shortcomings, such as greater slopes or less ability to store soil moisture. Land must have been used for irrigated agricultural production at some time during the four years prior to the mapping date.

The majority of the Project site, approximately 155.31 acres, is designated Farmland of Statewide Importance as shown on Figure 3.2-1. Farmland of Statewide Importance is also located in the general vicinity of the Project site to the north, south, and west.

UNIQUE FARMLAND

Unique Farmland is farmland of lesser quality soils used for the production of the state's leading agricultural crops. This land is usually irrigated but may include non-irrigated orchards or vineyards as found in some climatic zones in California. Land must have been cropped at some time during the four years prior to the mapping date.

There is no Unique Farmland within the Project site, or in the immediately vicinity, that is designated Unique Farmland.

FARMLAND OF LOCAL IMPORTANCE

Farmland of Local Importance is land of importance to the local agricultural economy, as determined by each county's board of supervisors and a local advisory committee.

There is no Farmland of Local Importance located within the Project site. Farmland of Local Importance is located to the east of the Project site.

URBAN AND BUILT-UP LAND

Urban and Built-up Land is land occupied by structures with a building density of at least one (1) unit to 1.5 acres, or approximately 6 structures to a 10-acre parcel. This land is used for residential, industrial, commercial, construction, institutional, public administration, railroad and other transportation yards, cemeteries, airports, golf courses, sanitary landfills, sewage treatment, water control structures, and other developed purposes.

Approximately 1.51 acres of Urban and Built-up Land is located on the western portion of the Project site. Urban and Built-up Land is located to the south and west of the Project site.

RURAL RESIDENTIAL LAND

Rural Residential Land has a building density of less than 1 structure per 1.5 acres, but with at least 1 structure per 10 acres.

Approximately 16.5 acres of Rural Residential land are located within the northeastern portion of the Project site.

OTHER LAND

Other Land is not included in any other mapping category. Common examples include brush, timber, wetland, and riparian areas not suitable for livestock grazing; confined livestock, poultry or aquaculture facilities; strip mines, borrow pits; and water bodies smaller than forty (40) acres. Vacant and nonagricultural land surrounded on all sides by urban development and greater than 40 acres is mapped as Other Land.

Other Land is not located on the Project site or within the general vicinity of the Project as shown on Figure 3.2-1.

Soils and Farmland Characteristics

A Custom Soil Survey was completed for the Project site using the NRCS Web Soil Survey program. Table 3.2-5 identifies the soils found in the Project area. The NRCS Soils Map is provided on Figure 3.2-2.

TABLE 3.2-5: PROJECT SITE SOILS

UNIT SYMBOL	*NAME*	*ACRES IN AOI (AREA OF INTEREST)*	*PERCENT OF AOI*	*CAPABILITY CLASSIFICATION**
254	Timor loamy sand	6.44	3.2%	III-IV
255	Tinnin loamy coarse sand	166.81	82.2%	III-IV
266	Veritas fine sandy loam	29.56	14.6%	II-IV

** DEPICTS IRRIGATED VS NON IRRIGATED CAPABILITY RATING*

SOURCE: SAN JOAQUIN COUNTY GIS, NRCS SOILS DATABASE, OCTOBER 23, 2021.

Timor loamy sand. This series consists of deep to hardpan, moderately well drained soils formed in granitic alluvium. The slopes range from 0-2 percent at 20-40 feet elevation. These soils can be used as irrigated cropland, growing primarily almonds, alfalfa, onions, tomatoes, small grains, grapes, and as pasture. Vegetation consists of red brome, filaree, soft chess, wildoats, ripgut brome, and scattered California White Oaks.

Tinnin loamy coarse sand. This series consists of well drained soils on low fan terraces and alluvial fans. These soils are very deep, and form in alluvium derived from granitic rock sources. Slopes range from 0 to 2 percent. This series is characterized as well draining, slow runoff, and rapid permeability.

Common uses for this series are irrigated cropland growing primarily almonds, alfalfa, onions, tomatoes, small grains, grapes and pasture. Vegetation consists of red brome, filaree, soft chess, wildoats, ripgut brome and scattered valley oaks.

Veritas fine sandy loam. This series consists of deep to duripan, moderately well drained soils. They formed in alluvium derived from mixed rock sources. Veritas soils are on low fan terraces. They have slow runoff and moderately rapid permeability. Common uses for this series include irrigated cropland. Alfalfa, barley and corn are the principal crops. Vegetation is annual grasses, forbs and scattered valley oaks.

3.2.2 REGULATORY SETTING

FEDERAL

Farmland Protection Policy Act

The Farmland Protection Policy Act (FPPA) is intended to minimize the extent to which federal programs contribute to the unnecessary and irreversible conversion of farmland to nonagricultural uses. It ensures that, to the extent practicable, federal programs are compatible with State and local units of government as well as private programs and policies to protect farmland. Projects are subject to FPPA requirements if they may irreversibly convert farmland (directly or indirectly) to nonagricultural use and are completed by a federal agency or with assistance from a federal agency. For the purpose of the FPPA, farmland includes Prime Farmland, Unique Farmland, and Land of Statewide or Local Importance. Farmland subject to FPPA requirements does not have to be currently used for crop production. In fact, the land can be forest land, pastureland, cropland, or other land but does not include water bodies or land developed for urban land uses (i.e., residential, commercial, or industrial uses).

The Natural Resource Conservation Service (NRCS) administers the Farmland Protection Program. NRCS uses a land evaluation and site assessment (LESA) system to establish a farmland conversion impact rating score on proposed sites of federally funded and assisted projects. This score is used as an indicator for the project sponsor to consider alternative sites if the potential adverse impacts on the farmland exceed the recommended allowable level. The assessment is completed on form AD-1006, Farmland Conversion Impact Rating. The sponsoring agency completes the site assessment portion of the AD-1006, which assesses non-soil related criteria such as the potential for impact on the local agricultural economy if the land is converted to non-farm use and compatibility with existing agricultural use.

The Project site and adjacent parcels will not be completed by a federal agency, or with assistance from a federal agency. Therefore, the Project will not be subject to the FPPA.

STATE

Williamson Act

The California Land Conservation Act of 1965, commonly known as the Williamson Act, was established based on numerous State legislative findings regarding the importance of agricultural lands in an urbanizing society. Policies emanating from those findings include those that discourage premature and unnecessary conversion of agricultural land to urban uses and discourage discontinuous urban development patterns, which unnecessarily increase the costs of community services to community residents.

The Williamson Act authorizes each County to establish an agricultural preserve. Land that is within the agricultural preserve is eligible to be placed under a contract between the property owner and County that would restrict the use of the land to agriculture in exchange for a tax assessment that is based on the yearly production yield. The contracts have a 10-year term that is automatically renewed each year, unless the property owner requests a non-renewal or the contract is cancelled. If the contract is cancelled the property owner is assessed a fee of up to 12.5 percent of the property value.

The Project site is not under a Williamson Act contract, nor are any of the parcels that are located adjacent to the Project site under a current contract.

Farmland Security Zones

In 1998 the State legislature established the Farmland Security Zone (FSZ) program. FSZs are similar to Williamson Act contracts, in that the intention is to protect farmland from conversion. The main difference however, is that the FSZ must be designated as Prime Farmland, Farmland of Statewide Importance, Unique Farmland, or Farmland of Local Importance. The term of the contract is a minimum of 20 years. The property owners are offered an incentive of greater property tax reductions when compared to the Williamson Act contract tax incentives; the incentives were developed to encourage conservation of prime farmland through FSZs. The non-renewal and cancellation procedures are similar to those for Williamson Act contracts.

The Project site and the adjacent parcels are not within the FSZ program.

California Government Code Section 56064

This section of the Government Codes defines “Prime agricultural land” as follows:

- Prime agricultural land means an area of land, whether a single parcel or contiguous parcels, that has not been developed for a use other than an agricultural use and that meets any of the following qualifications:
    - Land that qualifies, if irrigated, for rating as Class I or Class II in the USDA Natural Resources Conservation Service land use capability classification, whether or not land is actually irrigated, provided that irrigation is feasible.

- Land that qualifies for rating 80 through 100 Storie Index Rating.
- Land that supports livestock used for the production of food and fiber and that has an annual carrying capacity equivalent to at least one animal unit per acre as defined by the United States Department of Agriculture in the National Range and Pasture Handbook, Revision 1, December 2003.
- Land planted with fruit or nut-bearing trees, vines, bushes, or crops that have a nonbearing period of less than five years and that will re-turn during the commercial bearing period on an annual basis from the production of unprocessed agricultural plant production not less than four hundred dollars ($400) per acre.
- Land that has returned from the production of unprocessed agricultural plant products an annual gross value of not less than four hundred dollars ($400) per acre for three of the previous five calendar years.

LOCAL

Local Agency Formation Commission Boundary Controls

The San Joaquin Local Agency Formation Commission (LAFCo) is responsible for coordinating orderly amendments to local jurisdictional boundaries, including annexations. Annexation of the Project site into the City of Manteca would be subject to LAFCo approval, and LAFCo's decision is governed by state law (Gov't Code § 56001 et seq.) and the local LAFCo Policies and Procedures. State law requires LAFCo to consider agricultural land and open space preservation in all decisions related to expansion of urban development. LAFCO's definition of Prime Agriculture land refers to California Government Code Section 56064, which is described above.

City of Manteca General Plan

The General Plan includes several policies relevant to agricultural resources. 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 existing 2023 General Plan policies and proposed General Plan Update policies applicable to the Project are identified below:

2023 GENERAL PLAN (EXISTING)

Policies: Resource Conservation Element

- RC-P-19. The City shall support the continuation of agricultural uses on lands designated for urban use, until urban development is imminent.
- RC-P-20. The City shall provide an orderly and phased development pattern so that farmland is not subjected to premature development pressure.
- RC-P-21. In approving urban development near existing agricultural lands, the City shall take actions so that such development will not unnecessarily constrain agricultural practices or adversely affect the viability of nearby agricultural operations.

- RC-P-23. Protect designated agricultural lands, without placing an undue burden on agricultural landowners.
- RC-P-24. Provide buffers at the interface of urban development and farmland; in order to minimize conflicts between these uses.
- RC-P-25. The City shall ensure, in approving urban development near existing agricultural lands, that such development will not unnecessarily constrain agricultural practices or adversely affect the economic viability of nearby agricultural operations.
- RC-P-28. The City shall not extend water and sewer lines to premature urban development that would adversely affect agricultural operations.
- RC-P-30. The City of Manteca will participate in a county-wide program to mitigate the conversion of Prime Farmland and Farmlands of Statewide Importance to urban uses.

Implementation: Resource Conservation Element

- RC-I-30. Apply the following conditions of approval where urban development occurs next to farmland:
    - Require notifications in urban property deeds that agricultural operations are in the vicinity, in keeping with the City's right-to-farm ordinance.
    - Require adequate and secure fencing at the interface of urban and agricultural use.
    - Require phasing of new residential subdivisions; so as to include an interim buffer between residential and agricultural use.

GENERAL PLAN UPDATE (PROPOSED)

Policies: Resource Conservation Element

- RC-8.1. Support the continuation of agricultural uses on lands designated for urban use, until urban development is imminent.
- RC-8.2. Provide an orderly and phased development pattern, encouraging the development of vacant lands within City boundaries prior to conversion of agricultural lands, so that farmland is not subjected to premature development pressure.
- RC-8.3. Encourage permanent agricultural lands surrounding the Planning Area to serve as community separators and continue the agricultural heritage of Manteca.
- RC-8.4. Support and encourage the preservation of designated Agriculture lands, without placing an undue burden on agricultural landowners.
- RC-8.5. Minimize conflicts between agricultural and urban land uses.
- RC-8.6. Ensure that urban development near existing agricultural lands will not unnecessarily constrain agricultural practices or adversely affect the economic viability of nearby agricultural operations.

- RC-8.7. Prohibit the fragmentation of agricultural parcels into small rural residential parcels except in areas designated for urban development in the Land Use Diagram.

- RC-8.9. Work with the Local Agency Formation Commission (LAFCO) on issues of mutual concern including the conservation of agricultural land through consistent use of LAFCO policies, particularly those related to conversion of agricultural lands and establishment of adequate buffers between agricultural and non-agricultural uses, and the designation of a reasonable and logical Sphere of Influence boundary for the City.

- RC-8.10. Prohibit re-designation of Agricultural lands to other land use designations unless all of the following findings can be made:

    - There is a public need or net community benefit derived from the conversion of the land that outweighs the need to protect the land for long-term agricultural use.

    - There are no feasible alternative locations for the proposed project that are either designated for non-agricultural land uses or are less productive agricultural lands.

    - The use would not have a significant adverse effect on existing or potential agricultural activities on surrounding lands designated Agriculture.

- RC- P-8.11. Require the development projects to reduce impacts on agricultural lands through the use of buffers, such as greenbelts, drainage features, parks, or other improved and maintained features, in order to separate residential and other sensitive land uses, such as schools and hospitals, from agricultural operations and from lands designated Agriculture.

- RC-8.12. Work with agricultural landowners to improve practices that have resulted in adverse impacts to adjacent properties. Such practices include site drainage and flood control measures.

- RC-8.15. Do not extend water and sewer lines to noncontiguous urban development that would adversely affect agricultural operations.

Implementation: Resource Conservation Element

- RC-8a. Continue to implement Chapter 8.24 (Right to Farm) of the Municipal Code in order to protect farming uses from encroaching urban uses and to notify potential homebuyers of nearby agricultural operations.

- RC-8b. Consider impacts to agricultural lands and agricultural productivity when reviewing new development projects, amendments to the General Plan, and rezoning applications.

- RC-8c. Amend Title 17 (Zoning) of the Municipal Code to include specific agricultural buffer requirements for residential and sensitive land uses (i.e., schools, day care facilities, and medical facilities) that are proposed near existing agricultural lands in order to protect the associated agricultural operations from encroachment by incompatible uses. Buffers shall generally be defined as a physical separation, depending on the land use, and may consist of topographic features, roadways, bike/pedestrian paths, greenbelts, water courses, or similar features. The buffer shall occur on the parcel for which a permit is sought and shall favor protection of the maximum amount of agricultural land.

- RC-8e. Apply the following conditions of approval where urban development occurs next to farmland.
    - Require notifications in urban property deeds that agricultural operations are in the vicinity, in keeping with the City's right-to- farm ordinance.
    - Require adequate and secure fencing at the interface of urban and agricultural use.
    - Require phasing of new residential subdivisions; so as to include an interim buffer between residential and agricultural use.
    - Require a buffer, which may include a roadway and landscaped buffer, open space, fencing, transition area, or low intensity uses, between urban uses and lands designated Agriculture on the Tentative Map.
- RC-8f. Work with San Joaquin County on the following issues:
    - The establishment and implementation of consistent policies for agricultural lands in the Planning Area that prioritize the preservation of agricultural lands and support ongoing agricultural activities.
    - Pesticide application and types of agricultural operations adjacent to urban uses.
    - Support the continuation of County agricultural zoning in areas designated for agricultural land use in the Area Plan.

City of Manteca Agricultural Mitigation Fee Program

Chapter 13.42 of the Municipal Code establishes the City's Agricultural Mitigation Fee Program, which authorizes the collection of development impact fees to offset costs associated with the loss of productive agricultural lands converted for urban uses within the City. Agricultural mitigation fees are required to be paid prior to issuance of any building permit. Fees are used to protect agricultural lands planned for agricultural use. Fees collected under Chapter 13.42 may be used as fair compensation for farmland conservation easements or farmland deed restrictions that conserve existing agricultural land.

City of Manteca Right to Farm Ordinance

Chapter 8.24 of the Municipal Code establishes the City's "Right to Farm" ordinance, which is intended to protect agricultural uses in the City. The ordinance establishes the City's policy to preserve, protect and encourage the use of viable agricultural land for the production of food and other agricultural products. Chapter 8.24 identifies that when nonagricultural land uses extend into or approach agricultural areas, conflicts may arise between such land uses and agricultural operations that often result in the involuntary curtailment or cessation of agricultural operations, and discourage investment in such operations.

Chapter 8.24 of the City's Municipal Code is intended to reduce the occurrence of such conflicts between nonagricultural and agricultural land uses within the City through requiring the transferor of any property in the City to provide a disclosure statement describing that the City permits

agricultural operations, including those that utilize chemical fertilizers and pesticides. The disclosure statement notifies the purchaser that the property being purchased may be located close to agricultural lands and operations and that the purchaser may be subject to inconvenience or discomfort arising from the lawful and proper use of agricultural chemical and pesticides and from other agricultural activities, including without limitation, cultivation, plowing, spraying, irrigation, pruning, harvesting, burning of agricultural waste products, protection of crops and animals from depredation, and other activities which occasionally generate dust, smoke, noise and odor. In addition, prior to issuance of a city building permit for construction of a residential building, the owner of the property upon which the building is to be constructed is required to file a disclosure statement acknowledging the proximity of agricultural operations and the potential for inconvenience or nuisance associated with those uses.

San Joaquin County Multi-Species Habitat Conservation and Open Space Plan (SJMSCP)

The SJMSCP provides comprehensive measures for compensation and avoidance of impacts on various biological resources, which includes ancillary benefits to agricultural resources. For instance, many of the habitat easements that are purchased or facilitated by the SJMSCP program are targeted for the protection of Swainson's hawk or other sensitive species habitat that are dependent on agricultural lands. The biological mitigation for these species through the SJMSCP includes the purchase of certain conservation easements for habitat purposes; however, the conservation easements are placed over agricultural land, such as alfalfa and row crops (not vines or orchards). As such, SJMSCP fees paid to San Joaquin Council of Governments (SJCOG) as administrator of the SJMSCP will result in the preservation of agricultural lands in perpetuity.

3.2.3 IMPACTS AND MITIGATION MEASURES

THRESHOLDS OF SIGNIFICANCE

Consistent with Appendix G of the CEQA Guidelines, the proposed Project will have a significant impact on agricultural and forest resources if it will:

- 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;
- Conflict with existing zoning for agricultural use, or a Williamson Act contract;
- Conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code section 12220(g)) or timberland zoned Timberland Production (as defined in Public Resources Code section 51104 (g));
- Result in the loss of forest land or conversion of forest land to non-forest use; or
- Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland, to non-agricultural use or conversion of forest land to non-forest use.

There are no forest lands or timber lands located within the Manteca Planning Area. There are also no parcels that are currently zoned as forest land, timber, or timber production. Therefore, implementation of the proposed Project would have no impact on forest land, timber, or timber production and this impact will not be discussed further.

IMPACTS AND MITIGATION MEASURES

Impact 3.2-1: The proposed Project has the potential to result in the conversion of Farmlands, including Prime Farmland and Farmland of Statewide Importance, as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural uses. (Significant and Unavoidable)

Development of the proposed Project would result in the permanent conversion of approximately 26.2 acres of Prime Farmland and 146.25 acres of Farmland of Statewide Importance, as shown on Figure 3.2-1, to nonagricultural use. The loss of Important Farmland as classified under the FMMP is considered a potentially significant environmental impact.

As previously discussed, Chapter 13.42 of the Municipal Code establishes the City's Agricultural Mitigation Fee Program, which authorizes the collection of development impact fees to offset costs associated with the loss of productive agricultural lands converted for urban uses within the City. The City's agricultural mitigation fee program requires that future development pay the agricultural mitigation fee, currently $2,956.20 per acre, to mitigate the conversion of agricultural land to urban use. The City will use these funds to purchase conservation easements or deed restrictions on agricultural land to ensure that the land remains in agricultural use in perpetuity.

In addition to the City's agricultural mitigation fee program, the SJMSCP requires development to pay fees on a per-acre basis for impacts to agricultural lands that function as habitat for biological resources. As discussed in section 3.4, Biological Resources, the Project site functions as biological habitat because it has been previously and actively used for agricultural use (i.e., crop production, pasture uses, dairy, and grazing). Agricultural fields commonly have irrigation canals, ditches, and stock ponds that serve as a water source or drainage for the fields and habitat for a limited variety of plants and animals.

SJCOG will then use these funds to purchase the conservation easements on agricultural and habitat lands in the Project vicinity. The compensation results in the purchase of conservation easements that are placed over agricultural land. As such, the Project fees paid to SJCOG as administrator of the SJMSCP will result in the preservation of agricultural lands in perpetuity.

The purchase of conservation easements and/or deed restrictions through the City agricultural mitigation fee program and the SJMSCP allows the landowners to retain ownership of the land and continue agricultural operations, and preserves such lands in perpetuity.

The proposed conversion in land use is not consistent with the City's 2023 General Plan which identifies these parcels as Agriculture and Very Low Density Residential (VLDR). The proposed

project is consistent with the proposed General Plan Update, which assumes the site would be developed with low density residential uses. The General Plan Update and General Plan EIR anticipated development of the Project site as part of the overall evaluation of buildout of the City. 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. However, the 2023 General Plan EIR concluded that although these policies and regulations would reduce impacts related to the conversion of Prime Farmland, Unique Farmland, and Farmland of Statewide Importance, the permanent loss of farmland would result in a significant and unavoidable impact to agricultural resources.

While the proposed Project will contribute fees toward the purchase of conservation easements on agricultural lands through the City's agricultural mitigation fee program and the SJMSCP (as required by Mitigation Measure 3.2-1), those fees and conservation easements would not result in the creation of new farmland to offset the loss that would occur with Project implementation. As such, the loss of Important Farmland would be a **significant and unavoidable** impact relative to this topic.

MITIGATION MEASURE(S)

Mitigation Measure 3.2-1: *Prior to the issuance of a Grading Permit, 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.*

Impact 3.2-2: The proposed Project has the potential to conflict with existing zoning for agricultural use, or Williamson Act Contracts (Less than Significant)

The Project site is not under a Williamson Act Contract. As shown on Figure 2.0-6 in Chapter 2.0, Project Description, the San Joaquin County General Plan designates the site Agriculture (A) and is zoned as General Agriculture (AG-40). The AG Zone is established to preserve agricultural lands for the continuation of commercial agriculture enterprises. 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 will include the following zoning designations: One-Family Dwelling (R-1), Limited Multiple-Family Dwelling (R-2), Multiple-Family Dwelling (R-3), General Commercial (CG), and Park (P). The pre-zoning would go into effect upon annexation into the City of Manteca.

Although the Project site is currently zoned for agricultural use by the County, the proposed Project includes pre-zoning consistent with the proposed residential and commercial uses. Additionally, conversion of the Project site from agricultural to urban uses has been anticipated by the City as part of the General Plan Update and associated EIR. Therefore, implementation of the proposed Project would have a **less than significant** impact relative to this topic and no mitigation is required.

Impact 3.2-3: The proposed Project has the potential to result in conflicts with adjacent agricultural lands or indirectly cause conversion of agricultural lands (Less than Significant with Mitigation)

Neighboring agricultural land, including Prime Farmland and Farmland of Statewide Importance, are located to the north and south of the Project site as shown on Figure 3.2-1. A variety of residential uses would be developed on the Project site with implementation of the proposed Project.

As shown on Figure 2.0-7b in Chapter 2.0, Project Description, the City's existing 2023 General Plan anticipates that agricultural lands south of Project site and immediately east of the Union Ranch subdivision would develop with urban uses. Additionally, the proposed General Plan Update anticipates that the agricultural lands to the north and east of the Project site would develop with urban uses. However, differing from the existing 2023 General Plan, lands to the south are proposed to be designated for future agricultural uses under the General Plan Update. Existing agricultural lands that are located east of Highway 99 and to the north and south of the site may be impacted by the increased human presence on the Project site. However, the City's Right-to-Farm Ordinance reduces the potential for conflict between existing agricultural lands and adjacent uses. The notification procedures in the ordinance serves to inform landowners and developers of non-agricultural uses of what the expectations are in the area with regard to agricultural activities and to reduce complaints.

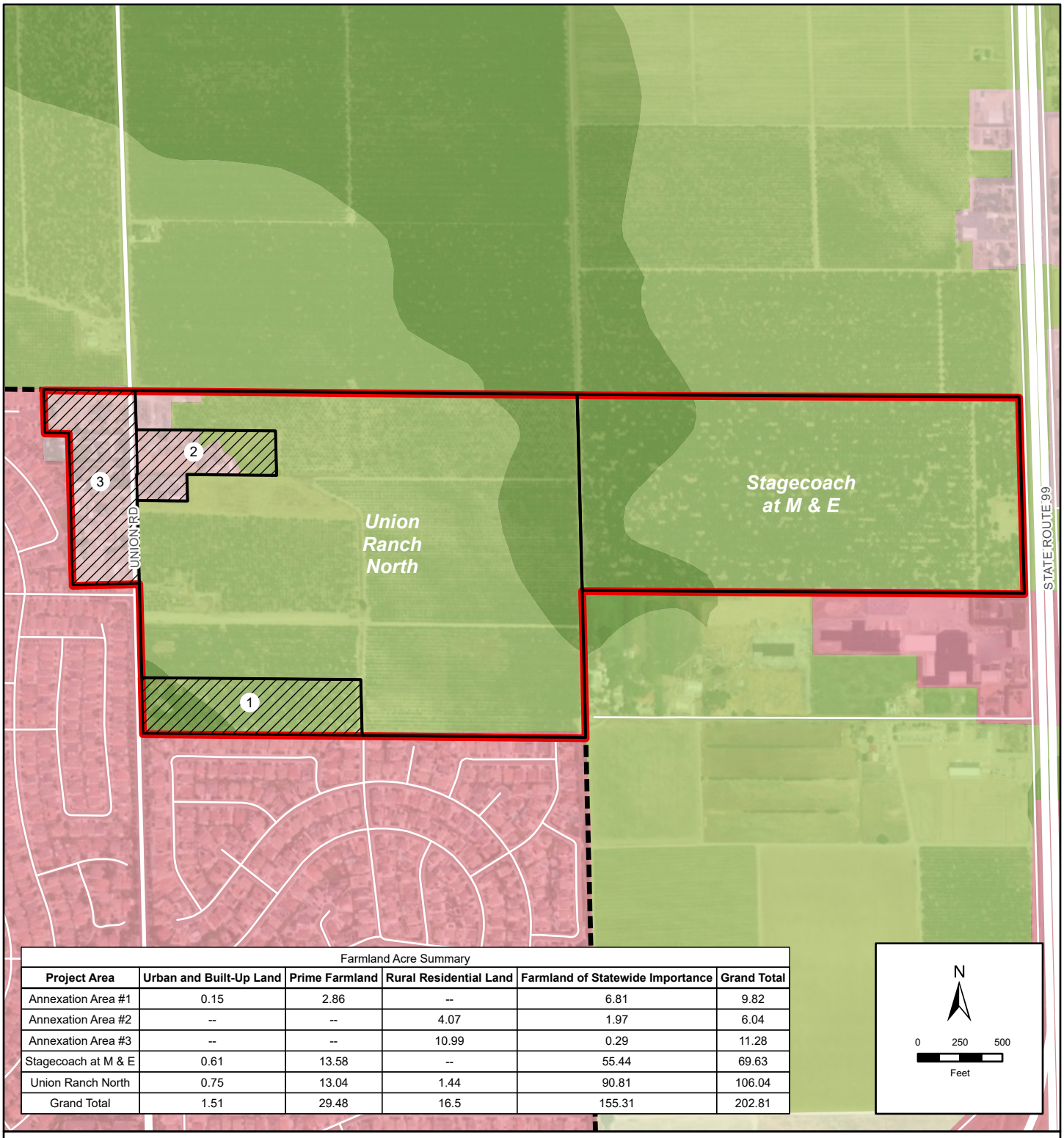
A portion of the proposed development would be buffered from existing agricultural operations by existing roadways including, Highway 99 on the eastern side of the Project site. However, the northern and southeastern portion of the Project site would not be buffered from nearby agricultural operations. As discussed previously, the City's Right to Farm Ordinance is intended to reduce the occurrence of such conflicts between nonagricultural and agricultural land uses within the City through requiring the transferor of any property in the City to provide a disclosure statement describing that the City permits agricultural operations, including those that utilize chemical fertilizers and pesticides. Implementation of Mitigation Measure 3.2-2 would further ensure that the Project includes adequate measures to buffer Project uses from adjacent agricultural uses and would reduce adverse effects on neighboring agricultural uses. Implementation of Mitigation Measure 3.2-2 would reduce potential impacts to **less than significant**.

MITIGATION MEASURE(S)

Mitigation Measure 3.2-2: *Prior to approval of the Tentative Subdivision Map, the Project applicant shall demonstrate that the Project site plans include adequate measures to buffer adjacent agricultural uses from urban uses on the Project site and to reduce adverse impacts to neighboring agricultural uses; such measures shall include, but not be limited to:*

- *The Project shall provide adequate and secure fencing (such as wood and/or wire fences) at the interface of the Project site, or any individual phase of the Project, and adjacent agricultural uses.*

- *The Project shall provide buffers, which may include parking areas, roadways and streets, drainage channels, and landscaped corridors, to buffer adjacent agricultural uses from the Project, including any individual phase of the Project, from proposed urban uses.*
- *The Project shall provide notifications to all operators of uses on the Project site that are adjacent or in the vicinity of existing agricultural land of the City's Right-to-Farm Ordinance.*



Farmland Acre Summary

Project Area	Urban and Built-Up Land	Prime Farmland	Rural Residential Land	Farmland of Statewide Importance	Grand Total
Annexation Area #1	0.15	2.86	--	6.81	9.82
Annexation Area #2	--	--	4.07	1.97	6.04
Annexation Area #3	--	--	10.99	0.29	11.28
Stagecoach at M & E	0.61	13.58	--	55.44	69.63
Union Ranch North	0.75	13.04	1.44	90.81	106.04
Grand Total	1.51	29.48	16.5	155.31	202.81

LEGEND

- Annexation #1 Overall Project Boundary
- Project Area
- Annexation Sub-Area
- City Limits

Farmland Classification

- Prime Farmland
- Farmland of Statewide Importance
- Farmland of Local Importance
- Rural Residential Land
- Urban and Built-Up Land

MANTECA ANNEXATION #1

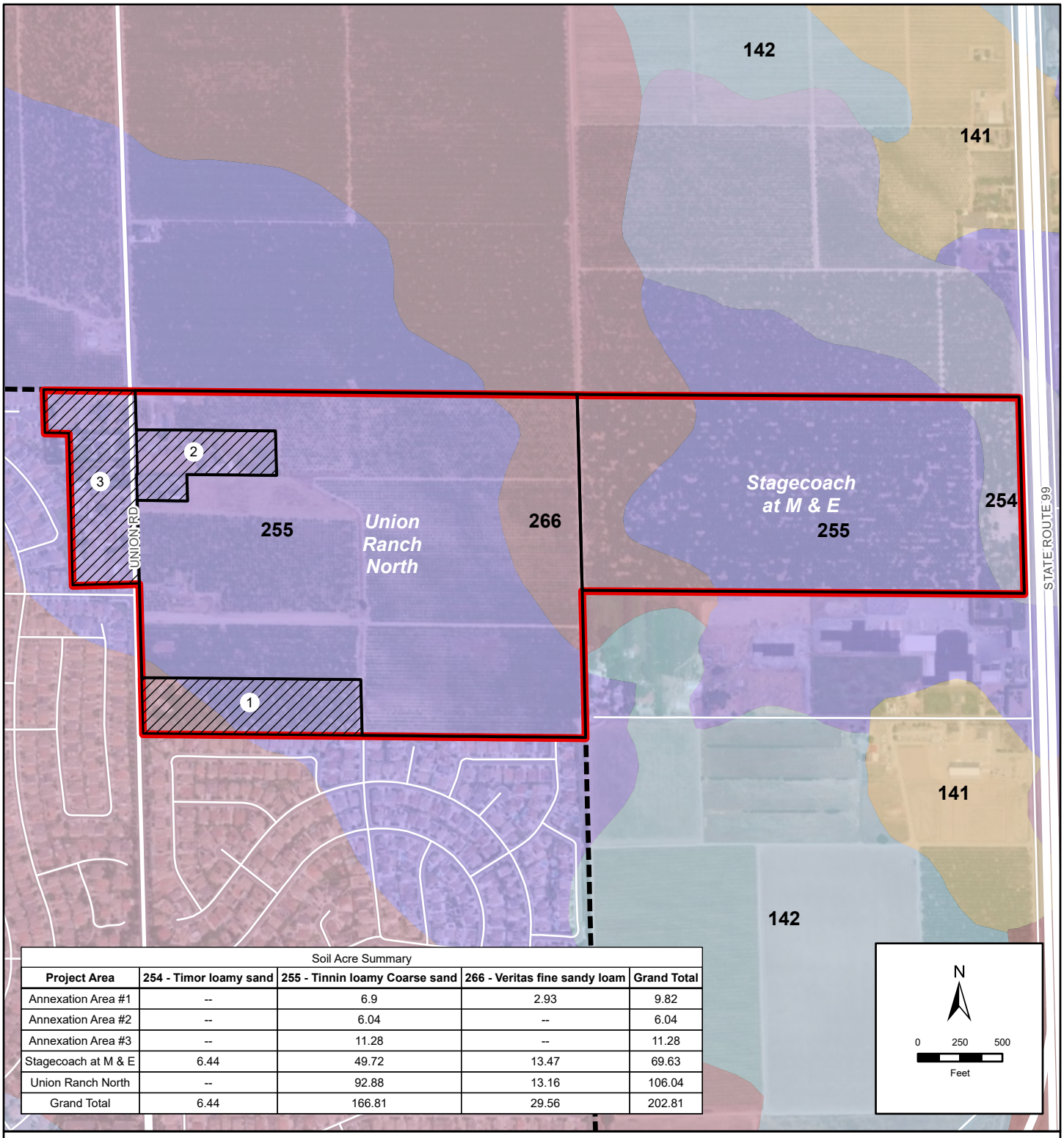
Figure 3.2-1: Farmland Classification

Sources: California Department of Conservation, Farmland Mapping and Monitoring Program, San Joaquin County 2018; San Joaquin County GIS; ArcGIS Online World Imagery Map Service. Map date: October 25, 2021.

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Soil Acre Summary				
Project Area	**254 - Timor loamy sand**	**255 - Tinnin loamy Coarse sand**	**266 - Veritas fine sandy loam**	**Grand Total**
Annexation Area #1	--	6.9	2.93	9.82
Annexation Area #2	--	6.04	--	6.04
Annexation Area #3	--	11.28	--	11.28
Stagecoach at M & E	6.44	49.72	13.47	69.63
Union Ranch North	--	92.88	13.16	106.04
Grand Total	6.44	166.81	29.56	202.81

LEGEND

- Annexation #1 Overall Project Boundary
- Project Area
- Annexation Sub-Area
- City Limits

NRCS Soil Description

- 141 - Delhi fine sand, 0-5% slopes
- 142 - Delhi loamy sand, 0-2% slopes, MLRA 17
- 143 - Delhi-Urban land complex, 0-2% slopes
- 254 - Timor loamy sand, 0-2% slopes
- 255 - Tinnin loamy coarse sand, 0-2% slopes
- 266 - Veritas fine sandy loam, 0-2% slopes

MANTECA ANNEXATION #1

Figure 3.2-2: Soils Map

Sources: San Joaquin County GIS; NRCS Soils Database. Map date: October 23, 2021.

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This section describes the regional air quality, current attainment status of the air basin, local sensitive receptors, emission sources, and impacts that are likely to result from Project implementation. The analysis contained in this section is intended to be at a project-level, and covers impacts associated with the conversion of the entire site to urban uses. Following this discussion is an assessment of consistency of the proposed Project with applicable policies and local plans. The Greenhouse Gases and Climate Change analysis is located in a separate section of this document. This section is based in part on the following technical studies: *Air Quality and Land Use Handbook: A Community Health Perspective* (California Air Resources Board [CARB], 2007), *Guide for Assessing and Mitigation Air Quality Impacts* (San Joaquin Valley Air Pollution Control District [SJAVPCD], 2002), *Guidance for Assessing and Mitigating Air Quality Impacts - 2015* (SJAVPCD, 2015), and CalEEMod *(v.2020.4.0)* (CARB, 2021).

There were no comments received during the NOP scoping process related to this environmental topic.

3.3.1 ENVIRONMENTAL SETTING

SAN JOAQUIN VALLEY AIR BASIN

The City of Manteca (City) is in the southern portion of the San Joaquin Air Basin (SJVAB). The SJVAB consists of eight counties: Fresno, Kern (western and central), Kings, Tulare, Madera, Merced, San Joaquin, and Stanislaus. Air pollution from significant activities in the SJVAB includes a variety of industrial-based sources as well as on- and off-road mobile sources. These sources, coupled with geographical and meteorological conditions unique to the area, stimulate the formation of unhealthy air.

The SJVAB is approximately 250 miles long and an average of 35 miles wide. It is bordered by the Sierra Nevada in the east, the Coast Ranges in the west, and the Tehachapi Mountains in the south. There is a slight downward elevation gradient from Bakersfield in the southeast end (elevation 408 feet) to sea level at the northwest end where the valley opens to the San Francisco Bay at the Carquinez Straits. At its northern end is the Sacramento Valley, which comprises the northern half of California's Central Valley. The bowl-shaped topography inhibits movement of pollutants out of the valley (San Joaquin Valley Air Pollution Control District (SJVAPCD), 2015).

Climate

The SJVAB is in a Mediterranean climate zone and is influenced by a subtropical high-pressure cell most of the year. Mediterranean climates are characterized by sparse rainfall, which occurs mainly in winter. Summers are hot and dry. Summertime maximum temperatures often exceed 100°F in the valley.

The subtropical high-pressure cell is strongest during spring, summer, and fall and produces subsiding air, which can result in temperature inversions in the valley. A temperature inversion can act like a lid, inhibiting vertical mixing of the air mass at the surface. Any emissions of pollutants can be trapped below the inversion. Most of the surrounding mountains are above the normal height of

summer inversions (1,500 to 3,000 feet).

Winter-time high pressure events can often last many weeks, with surface temperatures often lowering into the 30°F. During these events, fog can be present and inversions are extremely strong. These wintertime inversions can inhibit vertical mixing of pollutants to a few hundred feet (SJVAPCD, 2015).

Wind Patterns

Wind speed and direction play an important role in dispersion and transport of air pollutants. Wind at the surface and aloft can disperse pollution by mixing and transporting it to other locations.

Especially in summer, winds in the San Joaquin Valley most frequently blow from the northwest. The region's topographic features restrict air movement and channel the air mass towards the southeastern end of the valley. Marine air can flow into the basin from the San Joaquin River Delta and over Altamont Pass and Pacheco Pass, where it can flow along the axis of the valley, over the Tehachapi Pass, into the Southeast Desert Air Basin. This wind pattern contributes to transporting pollutants from the Sacramento Valley and the Bay Area into the SJVAB. Approximately 27 percent of the total emissions in the northern portion, 11 percent of total emissions in the central region, and 7 percent of total emission in the south valley of the SJVAB are attributed to air pollution transported from these two areas.[1] The Coastal Range is a barrier to air movement to the west and the high Sierra Nevada Range is a significant barrier to the east (the highest peaks in the southern Sierra Nevada reach almost halfway through the Earth's atmosphere). Many days in the winter are marked by stagnation events where winds are very weak. Transport of pollutants during winter can be very limited. A secondary but significant summer wind pattern is from the southeast and can be associated with nighttime drainage winds, prefrontal conditions, and summer monsoons.

Two significant diurnal wind cycles that occur frequently in the valley are the sea breeze and mountain-valley upslope and drainage flows. The sea breeze can accentuate the northwest wind flow, especially on summer afternoons. Nighttime drainage flows can accentuate the southeast movement of air down the valley. In the mountains during periods of weak synoptic scale winds, winds tend to be upslope during the day and downslope at night. Nighttime and drainage flows are especially pronounced during the winter when flow from the easterly direction is enhanced by nighttime cooling in the Sierra Nevada. Eddies can form in the valley wind flow and can recirculate a polluted air mass for an extended period.

Temperature

Solar radiation and temperature are particularly important in the chemistry of ozone formation. The SJVAB averages over 260 sunny days per year. Photochemical air pollution (primarily ozone) is produced by the atmospheric reaction of organic substances (such as volatile organic compounds) and nitrogen dioxide under the influence of sunlight. Ozone concentrations are very dependent on

[1] SJVAPCD. Frequently Asked Questions, http://www.valleyair.org/general_info/frequently_asked_questions.htm#What%20is%20being%20done%20to%20improve%20ai r%20quality%20in%20the%20San%20Joaquin%20Valley, accessed March 3, 2020.

the amount of solar radiation, especially during late spring, summer, and early fall. Ozone levels typically peak in the afternoon. After the sun goes down, the chemical reaction between nitrous oxide and ozone begins to dominate. This reaction tends to scavenge and remove the ozone in the metropolitan areas through the early morning hours, resulting in the lowest ozone levels, possibly reaching zero at sunrise in areas with high nitrogen oxides emissions. At sunrise, nitrogen oxides tend to peak, partly due to low levels of ozone at this time and also due to the morning commuter vehicle emissions of nitrogen oxides.

Generally, the higher the temperature, the more ozone formed, since reaction rates increase with temperature. However, extremely hot temperatures can "lift" or "break" the inversion layer. Typically, if the inversion layer does not lift to allow the buildup of contaminants to be dispersed, the ozone levels will peak in the late afternoon. If the inversion layer breaks and the resultant afternoon winds occur, the ozone will peak in the early afternoon and decrease in the late afternoon as the contaminants are dispersed or transported out of the SJVAB.

Ozone levels are low during winter periods when there is much less sunlight to drive the photochemical reaction (SJVAPCD, 2015).

Precipitation, Humidity, and Fog

Precipitation and fog may reduce or limit some pollutant concentrations. Ozone needs sunlight for its formation, and clouds and fog can block the required solar radiation. Wet fogs can cleanse the air during winter as moisture collects on particles and deposits them on the ground. Atmospheric moisture can also increase pollution levels. In fogs with less water content, the moisture acts to form secondary ammonium nitrate particulate matter. This ammonium nitrate is part of the valley's $PM_{2.5}$ and PM_{10} problem. The winds and unstable air conditions experienced during the passage of winter storms result in periods of low pollutant concentrations and excellent visibility. Between winter storms, high pressure and light winds allow cold moist air to pool on the SJVAB floor. This creates strong low-level temperature inversions and very stable air conditions, which can lead to tule fog. Wintertime conditions favorable to fog formation are also conditions favorable to high concentrations of $PM_{2.5}$ and PM_{10} (SJVAPCD, 2015).

Inversions

The vertical dispersion of air pollutants in the San Joaquin Valley can be limited by persistent temperature inversions. Air temperature in the lowest layer of the atmosphere typically decreases with altitude. A reversal of this atmospheric state, where the air temperature increases with height, is termed an inversion. The height of the base of the inversion is known as the "mixing height." This is the level to which pollutants can mix vertically. Mixing of air is minimized above and below the inversion base. The inversion base represents an abrupt density change where little air movement occurs.

Inversion layers are significant in determining pollutant concentrations. Concentration levels can be related to the amount of mixing space below the inversion. Temperature inversions that occur on the summer days are usually 2,000 to 2,500 feet above the valley floor. In winter months, overnight inversions occur 500 to 1,500 feet above the valley floor (SJVAPCD, 2015).

CRITERIA POLLUTANTS

All criteria pollutants can have human health and environmental effects at certain concentrations. The United States Environmental Protection Agency (U.S. EPA) uses six "criteria pollutants" as indicators of air quality and has established for each of them a maximum concentration above which adverse effects on human health may occur. These threshold concentrations are called National Ambient Air Quality Standards (NAAQS). In addition, California establishes ambient air quality standards, called California Ambient Air Quality Standards (CAAQS). California law does not require that the CAAQS be met by a specified date as is the case with NAAQS.

The ambient air quality standards for the six criteria pollutants (as shown in Table 3.3-1) are set to public health and the environment within an adequate margin of safety (as provided under Section 109 of the Federal Clean Air Act). Epidemiological, controlled human exposure, and toxicology studies evaluate potential health and environmental effects of criteria pollutants, and form the scientific basis for new and revised ambient air quality standards. Principal characteristics and possible health and environmental effects from exposure to the six primary criteria pollutants generated by the Project are discussed below.

Ozone (O_3) is a photochemical oxidant and the major component of smog. While O_3 in the upper atmosphere is beneficial to life by shielding the earth from harmful ultraviolet radiation from the sun, high concentrations of O_3 at ground level are a major health and environmental concern. O_3 is not emitted directly into the air but is formed through complex chemical reactions between precursor emissions of volatile organic compounds (ROG) and oxides of nitrogen (NO_x) in the presence of sunlight. These reactions are stimulated by sunlight and temperature so that peak O_3 levels occur typically during the warmer times of the year. Both ROGs and NO_x are emitted by transportation and industrial sources. ROGs are emitted from sources as diverse as autos, chemical manufacturing, dry cleaners, paint shops and other sources using solvents. Relatedly, reactive organic compounds (ROG) are defined as the subset of ROGs that are reactive enough to contribute substantially to atmospheric photochemistry.

The reactivity of O_3 causes health problems because it damages lung tissue, reduces lung function and sensitizes the lungs to other irritants. Scientific evidence indicates that ambient levels of O_3 not only affect people with impaired respiratory systems, such as asthmatics, but healthy adults and children as well. Exposure to O_3 for several hours at relatively low concentrations has been found to significantly reduce lung function and induce respiratory inflammation in normal, healthy people during exercise. This decrease in lung function generally is accompanied by symptoms including chest pain, coughing, sneezing and pulmonary congestion.

Studies show associations between short-term ozone exposure and non-accidental mortality, including deaths from respiratory issues. Studies also suggest long-term exposure to ozone may increase the risk of respiratory-related deaths (U.S. EPA, 2019a). The concentration of ozone at which health effects are observed depends on an individual's sensitivity, level of exertion (i.e., breathing rate), and duration of exposure. Studies show large individual differences in the intensity of symptomatic responses, with one study finding no symptoms to the least responsive individual after a 2-hour exposure to 400 parts per billion of ozone and a 50 percent decrement in forced

airway volume in the most responsive individual. Although the results vary, evidence suggest that sensitive populations (e.g., asthmatics) may be affected on days when the 8-hour maximum ozone concentration reaches 80 parts per billion (U.S. EPA, 2019b). The average background level of ozone in California and Nevada is approximately 48.3 parts per billion, which represents approximately 77 percent of the total ozone in the western region of the U.S. (NASA, 2015).

In addition to human health effect, ozone has been tied to crop damage, typically in the form of stunted growth, leaf discoloration, cell damage, and premature death. O_3 can also act as a corrosive and oxidant, resulting in property damage such as the degradation of rubber products and other materials.

Carbon monoxide (CO) is a colorless, odorless and poisonous gas produced by incomplete burning of carbon in fuels. Carbon monoxide is harmful because it binds to hemoglobin in the blood, reducing the ability of blood to carry oxygen. This interferes with oxygen delivery to the body's organs. The most common effects of CO exposure are fatigue, headaches, confusion, and dizziness due to inadequate oxygen delivery to the brain. For people with cardiovascular disease, short-term CO exposure can further reduce their body's already compromised ability to respond to the increased oxygen demands of exercise, exertion, or stress. Inadequate oxygen delivery to the heart muscle leads to chest pain and decreased exercise tolerance. Unborn babies whose mothers experience high levels of CO exposure during pregnancy are at risk of adverse developmental effects. Exposure to CO at high concentrations can also cause fatigue, headaches, confusion, dizziness, and chest pain. There are no ecological or environmental effects to ambient CO (CARB, 2019a).

Very high levels of CO are not likely to occur outdoors. However, when CO levels are elevated outdoors, they can be of particular concern for people with some types of heart disease. These people already have a reduced ability for getting oxygenated blood to their hearts in situations where the heart needs more oxygen than usual. They are especially vulnerable to the effects of CO when exercising or under increased stress. In these situations, short-term exposure to elevated CO may result in reduced oxygen to the heart accompanied by chest pain also known as angina (U.S. EPA, 2016). Such acute effects may occur under current ambient conditions for some sensitive individuals, while increases in ambient CO levels increases the risk of such incidences.

Nitrogen oxides (NO_x) is a brownish, highly reactive gas that is present in all urban atmospheres. The main effect of increased NO_2 is the increased likelihood of respiratory problems. Under ambient conditions, NO_2 can irritate the lungs, cause bronchitis and pneumonia, and lower resistance to respiratory infections. Nitrogen oxides are an important precursor both to ozone (O_3) and acid rain and may affect both terrestrial and aquatic ecosystems. Longer exposures to elevated concentrations of NO_2 may contribute to the development of asthma and potentially increase susceptibility to respiratory infections. People with asthma, as well as children and the elderly are generally at greater risk for the health effects of NO_2.

The major mechanism for the formation of NO_2 in the atmosphere is the oxidation of the primary air pollutant nitric oxide (NO_x). NO_x plays a major role, together with ROGs, in the atmospheric reactions that produce O_3. NO_x forms when fuel is burned at high temperatures. The two major emission sources are transportation and stationary fuel combustion sources such as electric utility

and industrial boilers.

Sulfur dioxide (SO_2) is one of the multiple gaseous oxidized sulfur species and is formed during the combustion of fuels containing sulfur, primarily coal and oil. The largest anthropogenic source of SO_2 emissions in the U.S. is fossil fuel combustion at electric utilities and other industrial facilities. SO_2 is also emitted from certain manufacturing processes and mobile sources, including locomotives, large ships, and construction equipment.

SO_2 affects breathing and may aggravate existing respiratory and cardiovascular disease in high doses. Sensitive populations include asthmatics, individuals with bronchitis or emphysema, children and the elderly. SO_2 is also a primary contributor to acid deposition, or acid rain, which causes acidification of lakes and streams and can damage trees, crops, historic buildings and statues. In addition, sulfur compounds in the air contribute to visibility impairment in large parts of the country. This is especially noticeable in national parks. Ambient SO_2 results largely from stationary sources such as coal and oil combustion, steel mills, refineries, pulp and paper mills and from nonferrous smelters.

Short-term exposure to ambient SO_2 has been associated with various adverse health effects. Multiple human clinical studies, epidemiological studies, and toxicological studies support a causal relationship between short-term exposure to ambient SO_2 and respiratory morbidity. The observed health effects include decreased lung function, respiratory symptoms, and increased emergency department visits and hospitalizations for all respiratory causes. These studies further suggest that people with asthma are potentially susceptible or vulnerable to these health effects. In addition, SO_2 reacts with other air pollutants to form sulfate particles, which are constituents of fine particulate matter ($PM_{2.5}$). Inhalation exposure to $PM_{2.5}$ has been associated with various cardiovascular and respiratory health effects (U.S. EPA, 2017). Increased ambient SO_2 levels would lead to increased risk of such effects.

SO_2 emissions that lead to high concentrations of SO_2 in the air generally also lead to the formation of other sulfur oxides (SOx). SOx can react with other compounds in the atmosphere to form small particles. These particles contribute to particulate matter (PM) pollution. Small particles may penetrate deeply into the lungs and in sufficient quantity can contribute to health problems.

Particulate matter (PM) includes dust, dirt, soot, smoke and liquid droplets directly emitted into the air by sources such as factories, power plants, cars, construction activity, fires and natural windblown dust. Particles formed in the atmosphere by condensation or the transformation of emitted gases such as SO_2 and ROGs are also considered particulate matter. PM is generally categorized based on the diameter of the particulate matter: PM_{10} is particulate matter 10 micrometers or less in diameter (known as respirable particulate matte*r*), and $PM_{2.5}$ is particulate matter 2.5 micrometers or less in diameter (known as fine particulate matter).

Based on studies of human populations exposed to high concentrations of particles (sometimes in the presence of SO_2) and laboratory studies of animals and humans, there are major effects of concern for human health. These include effects on breathing and respiratory symptoms, aggravation of existing respiratory and cardiovascular disease, alterations in the body's defense

systems against foreign materials, damage to lung tissue, carcinogenesis and premature death. Small particulate pollution causes health impacts even at very low concentrations – indeed no threshold has been identified below which no damage to health is observed.

Respirable particulate matter (PM_{10}) consists of small particles, less than 10 microns in diameter, of dust, smoke, or droplets of liquid which penetrate the human respiratory system and cause irritation by themselves, or in combination with other gases. Particulate matter is caused primarily by dust from grading and excavation activities, from agricultural activities (as created by soil preparation activities, fertilizer and pesticide spraying, weed burning and animal husbandry), and from motor vehicles, particularly diesel-powered vehicles. PM_{10} causes a greater health risk than larger particles, since these fine particles can more easily penetrate the defenses of the human respiratory system.

$PM_{2.5}$ consists of fine particles, which are less than 2.5 microns in size. Similar to PM_{10}, these particles are primarily the result of combustion in motor vehicles, particularly diesel engines, as well as from industrial sources and residential/agricultural activities such as burning. It is also formed through the reaction of other pollutants. As with PM_{10}, these particulates can increase the chance of respiratory disease, and cause lung damage and cancer. In 1997, the U.S. EPA created new Federal air quality standards for $PM_{2.5}$.

The major subgroups of the population that appear to be most sensitive to the effects of particulate matter include individuals with chronic obstructive pulmonary or cardiovascular disease or influenza, asthmatics, the elderly and children. Particulate matter also impacts soils and damages materials and is a major cause of visibility impairment.

Numerous studies have linked PM exposure to premature death in people with preexisting heart or lung disease, nonfatal heart attacks, irregular heartbeat, aggravated asthma, decreased lung function, and increased respiratory symptoms. Studies show that every 1 microgram per cubic meter reduction in $PM_{2.5}$ results in a one percent reduction in mortality rate for individuals over 30 years old (Bay Area Air Quality Management District, 2017). Long-term exposures, such as those experienced by people living for many years in areas with high particle levels, have been associated with problems such as reduced lung function and the development of chronic bronchitis – and even premature death. Additionally, depending on its composition, both PM_{10} and $PM_{2.5}$ can also affect water quality and acidity, deplete soil nutrients, damage sensitive forests and crops, affect ecosystem diversity, and contribute to acid rain (U.S. EPA, 2019c).

Lead (Pb) exposure can occur through multiple pathways, including inhalation of air and ingestion of Pb in food, water, soil or dust. Once taken into the body, lead distributes throughout the body in the blood and is accumulated in the bones. Depending on the level of exposure, lead can adversely affect the nervous system, kidney function, immune system, reproductive and developmental systems and the cardiovascular system. Lead exposure also affects the oxygen carrying capacity of the blood. Excessive Pb exposure can cause seizures, mental retardation and/or behavioral disorders. Low doses of Pb can lead to central nervous system damage. Recent studies have also shown that Pb may be a factor in high blood pressure and subsequent heart disease.

Lead is persistent in the environment and can be added to soils and sediments through deposition

from sources of lead air pollution. Other sources of lead to ecosystems include direct discharge of waste streams to water bodies and mining. Elevated lead in the environment can result in decreased growth and reproductive rates in plants and animals, and neurological effects in vertebrates.

Lead exposure is typically associated with industrial sources; major sources of lead in the air are ore and metals processing and piston-engine aircraft operating on leaded aviation fuel. Other sources are waste incinerators, utilities, and lead-acid battery manufacturers. The highest air concentrations of lead are usually found near lead smelters. As a result of the U.S. EPA's regulatory efforts, including the removal of lead from motor vehicle gasoline, levels of lead in the air decreased by 98 percent between 1980 and 2014 (U.S. EPA, 2019d). Based on this reduction of lead in the air over this period, and since most new developments do not generate an increase in lead exposure, the health impacts of ambient lead levels are not typically monitored by the California Air Resources Board (CARB).

AMBIENT AIR QUALITY STANDARDS

Both the U.S. EPA and the CARB have established ambient air quality standards for common pollutants. These ambient air quality standards represent safe levels of contaminants that avoid specific adverse health effects associated with each pollutant.

The federal and State ambient air quality standards are summarized in Table 3.3-1 for important pollutants. The federal and State ambient standards were developed independently, although both processes attempted to avoid health-related effects. As a result, the federal and State standards differ in some cases. In general, the California standards are more stringent. This is particularly true for ozone, $PM_{2.5}$, and PM_{10}. The U.S. EPA signed a final rule for the federal ozone eight-hour standard of 0.070 ppm on October 1, 2015, and was effective as of December 28, 2015 (equivalent to the California state ambient air quality eight-hour standard for ozone).

TABLE 3.3-1: FEDERAL AND STATE AMBIENT AIR QUALITY STANDARDS

POLLUTANT	*AVERAGING TIME*	*FEDERAL PRIMARY STANDARD*	*STATE STANDARD*
Ozone	1-Hour	--	0.09 ppm
	8-Hour	0.070 ppm	0.070 ppm
Carbon Monoxide	8-Hour	9.0 ppm	9.0 ppm
	1-Hour	35.0 ppm	20.0 ppm
Nitrogen Dioxide	Annual	0.053 ppm	0.03 ppm
	1-Hour	0.100 ppm	0.18 ppm
Sulfur Dioxide	Annual	0.03 ppm	--
	24-Hour	0.14 ppm	0.04 ppm
	1-Hour	0.075 ppm	0.25 ppm
PM_{10}	Annual	--	20 ug/m^3
	24-Hour	150 ug/m^3	50 ug/m^3
$PM_{2.5}$	Annual	12 ug/m^3	12 ug/m^3
	24-Hour	35 ug/m^3	--
Lead	30-Day Avg.	--	1.5 ug/m^3
	3-Month Avg.	0.15 ug/m^3	--

NOTES: PPM = PARTS PER MILLION, UG/M3 = MICROGRAMS PER CUBIC METER

SOURCE: CALIFORNIA AIR RESOURCES BOARD, 2019A.

In 1997, new national standards for fine particulate matter diameter 2.5 microns or less ($PM_{2.5}$) were adopted for 24-hour and annual averaging periods. The existing PM_{10} standards were retained, but the method and form for determining compliance with the standards were revised.

In addition to the criteria pollutants discussed above, Toxic Air Contaminants (TACs) are another group of pollutants of concern. TACs are injurious in small quantities and are regulated despite the absence of criteria documents. The identification, regulation, and monitoring of TACs is relatively recent compared to that for criteria pollutants. Unlike criteria pollutants, TACs are regulated on the basis of risk rather than specification of safe levels of contamination.

Existing air quality concerns within San Joaquin County and the entire air basin are related to increases of regional criteria air pollutants (e.g., ozone and particulate matter), exposure to toxic air contaminants, odors, and increases in greenhouse gas emissions contributing to climate change. The primary source of ozone (smog) pollution is motor vehicles which account for 70 percent of the ozone in the region. Particulate matter is caused by dust, primarily dust generated from construction and grading activities, and smoke which is emitted from fireplaces, wood-burning stoves, and agricultural burning.

Attainment Status

In accordance with the California Clean Air Act (CCAA), the CARB is required to designate areas of the State as attainment, nonattainment, or unclassified with respect to applicable standards. An "attainment" designation for an area signifies that pollutant concentrations did not violate the applicable standard in that area. A "nonattainment" designation indicates that a pollutant concentration violated the applicable standard at least once, excluding those occasions when a violation was caused by an exceptional event, as defined in the criteria.

Depending on the frequency and severity of pollutants exceeding applicable standards, the nonattainment designation can be further classified as serious nonattainment, severe nonattainment, or extreme nonattainment, with extreme nonattainment being the most severe of the classifications. An "unclassified" designation signifies that the data does not support either an attainment or nonattainment status. The CCAA divides districts into moderate, serious, and severe air pollution categories, with increasingly stringent control requirements mandated for each category.

The U.S. EPA designates areas for ozone, carbon monoxide, and nitrogen dioxide as "does not meet the primary standards," "cannot be classified," or "better than national standards." For sulfur dioxide, areas are designated as "does not meet the primary standards," "does not meet the secondary standards," "cannot be classified," or "better than national standards." However, the CARB terminology of attainment, nonattainment, and unclassified is more frequently used.

San Joaquin County has a State designation Attainment or Unclassified for all criteria pollutants except for ozone, PM_{10} and $PM_{2.5}$. San Joaquin County has a national designation of either Unclassified or Attainment for all criteria pollutants except for Ozone and $PM_{2.5}$. Table 3.3-2 presents the state and nation attainment status for San Joaquin County.

TABLE 3.3-2: STATE AND NATIONAL ATTAINMENT STATUS IN SAN JOAQUIN COUNTY

CRITERIA POLLUTANTS	*STATE DESIGNATIONS*	*NATIONAL DESIGNATIONS*
Ozone (O_3)	Nonattainment	Nonattainment
PM_{10}	Nonattainment	Attainment
$PM_{2.5}$	Nonattainment	Nonattainment
Carbon Monoxide (CO)	Attainment	Unclassified/Attainment
Nitrogen Dioxide (NO_2)	Attainment	Unclassified/Attainment
Sulfur Dioxide (SO_2)	Attainment	Unclassified/Attainment
Sulfates	Attainment	
Lead	Attainment	Unclassified/Attainment
Hydrogen Sulfide	Unclassified	
Visibility Reducing Particles	Unclassified	

SOURCE: CALIFORNIA AIR RESOURCES BOARD, 2020.

San Joaquin County Air Quality Monitoring

The San Joaquin Valley Air Pollution District (SJVAPCD) and the CARB maintain air quality monitoring sites throughout San Joaquin County that collect data for ozone and $PM_{2.5}$. In addition, air quality monitoring sites for PM_{10} are located throughout the San Joaquin Valley (though not in San Joaquin County). It is important to note that while the State retains the one-hour standard, the federal ozone 1-hour standard was revoked by the U.S. EPA and is no longer applicable for federal standards. Best available data obtained from the monitoring sites between 2017 and 2019 (latest year of data available) is shown in Table 3.3-3, Table 3.3-4, and Table 3.3-5.

TABLE 3.3-3 AMBIENT AIR QUALITY MONITORING DATA SUMMARY (SAN JOAQUIN COUNTY) - OZONE

YEAR	*DAYS > STANDARD*				*1-HOUR OBSERVATIONS*			*8-HOUR AVERAGES*				*YEAR COVERAGE*	
	STATE		*NATIONAL*			*STATE*	*NAT'L*	*STATE*		*NATIONAL*			
	1-HR	*8-HR*	*1-HR*	*8-HR*	*MAX.*	*D.V.[1]*	*D.V.[2]*	*MAX.*	*D.V.[1]*	*MAX.*	*D.V.[2]*	*MIN*	*MAX*
2019	2	4	0	4	0.098	0.09	0.092	0.08	0.0823	0.079	0.073	91	99
2018	1	8	0	8	0.099	0.10	0.099	0.082	0.0872	0.081	0.076	96	99
2017	0	8	0	6	0.093	0.10	0.105	0.082	0.0898	0.082	0.077	84	95

NOTES: ALL CONCENTRATIONS EXPRESSED IN PARTS PER MILLION. THE NATIONAL 1-HOUR OZONE STANDARD WAS REVOKED IN JUNE 2005 AND IS NO LONGER IN EFFECT. STATISTICS RELATED TO THE REVOKED STANDARD ARE SHOWN IN ITALICS. D.V. [1]= STATE DESIGNATION VALUE. D.V. [2]= NATIONAL DESIGN VALUE.

SOURCE: CALIFORNIA AIR RESOURCES BOARD (AEROMETRIC DATA ANALYSIS AND MANAGEMENT SYSTEM OR iADAM) AIR POLLUTION SUMMARIES.

TABLE 3.3-4: AMBIENT AIR QUALITY MONITORING DATA SUMMARY (SAN JOAQUIN VALLEY) – PM_{10}

YEAR	EST. DAYS > STD.		ANNUAL AVERAGE		HIGH 24-HR AVERAGE		YEAR COVERAGE
	NAT'L	STATE	NAT'L	STATE	NAT'L	STATE	
2019	16.2	129.7	55.6	55.6	652.2	664.2	0 – 100
2018	9.6	164.4	54.5	53.0	250.2	250.4	0 – 100
2017	7.7	145.5	55.3	48.4	298.4	210.0	0 – 100

NOTES: THE NATIONAL ANNUAL AVERAGE PM_{10} STANDARD WAS REVOKED IN DECEMBER 2006 AND IS NO LONGER IN EFFECT. AN EXCEEDANCE IS NOT NECESSARILY A VIOLATION. STATISTICS MAY INCLUDE DATA THAT ARE RELATED TO AN EXCEPTIONAL EVENT. STATE AND NATIONAL STATISTICS MAY DIFFER FOR THE FOLLOWING REASONS: STATE STATISTICS ARE BASED ON CALIFORNIA APPROVED SAMPLERS, WHEREAS NATIONAL STATISTICS ARE BASED ON SAMPLERS USING FEDERAL REFERENCE OR EQUIVALENT METHODS. STATE AND NATIONAL STATISTICS MAY THEREFORE BE BASED ON DIFFERENT SAMPLERS. NATIONAL STATISTICS ARE BASED ON STANDARD CONDITIONS. STATE CRITERIA FOR ENSURING THAT DATA ARE SUFFICIENTLY COMPLETE FOR CALCULATING VALID ANNUAL AVERAGES ARE MORE STRINGENT THAN THE NATIONAL CRITERIA. ND=THERE WAS INSUFFICIENT (OR NO) DATA AVAILABLE TO DETERMINE THE VALUE.

SOURCE: CALIFORNIA AIR RESOURCES BOARD (AEROMETRIC DATA ANALYSIS AND MANAGEMENT SYSTEM OR IADAM) AIR POLLUTION SUMMARIES.

TABLE 3.3-5 AMBIENT AIR QUALITY MONITORING DATA SUMMARY (SAN JOAQUIN COUNTY) - $PM_{2.5}$

YEAR	EST. DAYS > NAT'L '06 STD.	ANNUAL AVERAGE		NAT'L ANN. STD. D.V.[1]	STATE ANNUAL D.V.[2]	NAT'L '06 STD. 98TH PERCENTILE	NAT'L '06 24-HR STD. D.V.[1]	HIGH 24-HOUR AVERAGE		YEAR COVERAGE	
		NAT'L	STATE					NAT'L	STATE	MIN	MAX
2019	6.4	9.6	6.2	13.0	17	32.9	56	50.1	50.1	77	95
2018	25.0	17.6	17.4	13.8	17	96.9	56	188.0	257.5	96	100
2017	16.9	12.1	11.0	12.2	13	44.2	39	53.7	53.7	94	99

NOTES: ALL CONCENTRATIONS EXPRESSED IN PARTS PER MILLION. STATE AND NATIONAL STATISTICS MAY DIFFER FOR THE FOLLOWING REASONS: STATE STATISTICS ARE BASED ON CALIFORNIA APPROVED SAMPLERS, WHEREAS NATIONAL STATISTICS ARE BASED ON SAMPLERS USING FEDERAL REFERENCE OR EQUIVALENT METHODS. STATE AND NATIONAL STATISTICS MAY THEREFORE BE BASED ON DIFFERENT SAMPLERS. STATE CRITERIA FOR ENSURING THAT DATA ARE SUFFICIENTLY COMPLETE FOR CALCULATING VALID ANNUAL AVERAGES ARE MORE STRINGENT THAN THE NATIONAL CRITERIA. D.V. [1] = STATE DESIGNATION VALUE. D.V. [2]= NATIONAL DESIGN VALUE

SOURCE: CALIFORNIA AIR RESOURCES BOARD (AEROMETRIC DATA ANALYSIS AND MANAGEMENT SYSTEM OR IADAM) AIR POLLUTION SUMMARIES.

ODORS

Typically, odors are regarded as an annoyance rather than a health hazard. However, manifestations of a person's reaction to foul odors can range from psychological (e.g., irritation, anger, or anxiety) to physiological (e.g., circulatory and respiratory effects, nausea, vomiting, and headache).

With respect to odors, the human nose is the sole sensing device. The ability to detect odors varies considerably among the population and overall is quite subjective. Some individuals have the ability to smell minute quantities of specific substances; others may not have the same sensitivity but may have sensitivities to odors of other substances. In addition, people may have different reactions to the same odor; in fact, an odor that is offensive to one person (e.g., from a fast-food restaurant) may be perfectly acceptable to another.

It is also important to note that an unfamiliar odor is more easily detected and is more likely to cause complaints than a familiar one. This is because of the phenomenon known as odor fatigue, in which a person can become desensitized to almost any odor and recognition only occurs with an alteration in the intensity.

Quality and intensity are two properties present in any odor. The quality of an odor indicates the nature of the smell experience. For instance, if a person describes an odor as flowery or sweet, then the person is describing the quality of the odor. Intensity refers to the strength of the odor. For example, a person may use the word "strong" to describe the intensity of an odor. Odor intensity depends on the odorant concentration in the air.

When an odorous sample is progressively diluted, the odorant concentration decreases. As this occurs, the odor intensity weakens and eventually becomes so low that the detection or recognition of the odor is quite difficult. At some point during dilution, the concentration of the odorant reaches a detection threshold. An odorant concentration below the detection threshold means that the concentration in the air is not detectable by the average human.

SENSITIVE RECEPTORS

Some land uses are considered more sensitive to air pollution than others due to the types of population groups or activities involved. Sensitive population groups include children, the elderly, the acutely ill, and the chronically ill, especially those with cardiorespiratory diseases. A sensitive receptor is a location where human populations, especially children, seniors, and sick persons, are present and where there is a reasonable expectation of continuous human exposure to pollutants. Examples of sensitive receptors include residences, hospitals, and schools. The closest sensitive receptors to the Planning Area include existing residences located within the Planning Area itself.

3.3.2 REGULATORY SETTING

FEDERAL

Clean Air Act

The Federal Clean Air Act (FCAA) was first signed into law in 1970. In 1977, and again in 1990, the law was substantially amended. The FCAA is the foundation for a national air pollution control effort, and it is composed of the following basic elements: NAAQS for criteria air pollutants, hazardous air pollutant standards, state attainment plans, motor vehicle emissions standards, stationary source emissions standards and permits, acid rain control measures, stratospheric ozone protection, and enforcement provisions.

The U.S. EPA is responsible for administering the FCAA. The FCAA requires the U.S. EPA to set NAAQS for several problem air pollutants based on human health and welfare criteria. Two types of NAAQS were established: primary standards, which protect public health (with an adequate margin of safety, including for sensitive populations such as children, the elderly, and individuals suffering from respiratory diseases), and secondary standards, which protect the public welfare from non-health-related adverse effects such as visibility reduction.

NAAQS standards define clean air and represent the maximum amount of pollution that can be present in outdoor air without any harmful effects on people and the environment. Existing violations of the ozone and $PM_{2.5}$ ambient air quality standards indicate that certain individuals exposed to these pollutants may experience certain health effects, including increased incidence of

cardiovascular and respiratory ailments.

NAAQS standards have been designed to accurately reflect the latest scientific knowledge and are reviewed every five years by a Clean Air Scientific Advisory Committee (CASAC), consisting of seven members appointed by the U.S. EPA Administrator. Reviewing NAAQS is a lengthy undertaking and includes the following major phases: Planning, Integrated Science Assessment (ISA), Risk/Exposure Assessment (REA), Policy Assessment (PA), and Rulemaking. The process starts with a comprehensive review of the relevant scientific literature. The literature is summarized and conclusions are presented in the ISA. Based on the ISA, U.S. EPA staff perform a risk and exposure assessment, which is summarized in the REA document. The third document, the PA, integrates the findings and conclusions of the ISA and REA into a policy context, and provides lines of reasoning that could be used to support retention or revision of the existing NAAQS, as well as several alternative standards that could be supported by the review findings. Each of these three documents are released for public comment and public peer review by the CASAC. Members of CASAC are appointed by the U.S. EPA Administrator for their expertise in one or more of the subject areas covered in the ISA. The CASAC's role is to peer review the NAAQS documents, ensure that they reflect the thinking of the scientific community, and advise the Administrator on the technical and scientific aspects of standard setting. Each document goes through two to three drafts before CASAC deems it to be final.

Although there is some variability among the health effects of the NAAQS pollutants, each has been linked to multiple adverse health effects including, among others, premature death, hospitalizations and emergency department visits for exacerbated chronic disease, and increased symptoms such as coughing and wheezing. NAAQS standards were last revised for each of the six criteria pollutant as listed below, with detail on what aspects of NAAQS changed during the most recent update:

- Ozone: On October 1, 2015, the U.S. EPA lowered the national eight-hour standard from 0.075 ppm to 0.070 ppm, providing for a more stringent standards consistent with the current California state standard.
- CO: In 2011, the primary standards were retained from the original 1971 level, without revision. The secondary standards were revoked in 1985.
- NO_2: The national NO_2 standard was most recently revised in 2010 following an exhaustive review of new literature pointed to evidence for adverse effects in asthmatics at lower NO_2 concentrations than the existing national standard.
- SO_2: On June 2, 2010, a new 1-hour SO_2 standard was established and the existing 24-hour and annual primary standards were revoked. To attain the 1-hour national standard, the 3-year average of the annual 99th percentile of the 1-hour daily maximum concentrations at each site must not exceed 75 ppb.
- PM: the national annual average $PM_{2.5}$ standard was most recently revised in 2012 following an exhaustive review of new literature pointed to evidence for increased risk of premature mortality at lower $PM_{2.5}$ concentrations than the existing standard.
- Lead: The national standard for lead was revised on October 15, 2008 to a rolling 3-month average. In 2016, the primary and secondary standards were retained.

The law recognizes the importance for each state to locally carry out the requirements of the FCAA, as special consideration of local industries, geography, housing patterns, etc. are needed to have full comprehension of the local pollution control problems. As a result, the U.S. EPA requires each state to develop a State Implementation Plan (SIP) that explains how each state will implement the FCAA within their jurisdiction. A SIP is a collection of rules and regulations that a particular state will implement to control air quality within their jurisdiction. The CARB is the state agency that is responsible for preparing the California SIP.

Transportation Conformity

Transportation conformity requirements were added to the FCAA in the 1990 amendments, and the U.S. EPA adopted implementing regulations in 1997. See §176 of the FCAA (42 U.S.C. §7506) and 40 CFR Part 93, Subpart A. Transportation conformity serves much the same purpose as general conformity: it ensures that transportation plans, transportation improvement programs, and projects that are developed, funded, or approved by the United States Department of Transportation or that are recipients of funds under the Federal Transit Act or from the Federal Highway Administration (FHWA), conform to the SIP as approved or promulgated by U.S. EPA.

Currently, transportation conformity applies in nonattainment areas and maintenance areas. Under transportation conformity, a determination of conformity with the applicable SIP must be made by the agency responsible for the proposed Project, such as the Metropolitan Planning Organization, the Council of Governments, or a federal agency. The agency making the determination is also responsible for all the requirements relating to public participation. Generally, a project will be considered in conformance if it is in the transportation improvement plan and the transportation improvement plan is incorporated in the SIP. If an action is covered under transportation conformity, it does not need to be separately evaluated under general conformity.

Transportation Control Measures

One particular aspect of the SIP development process is the consideration of potential control measures as a part of making progress towards clean air goals. While most SIP control measures are aimed at reducing emissions from stationary sources, some are typically created to address mobile or transportation sources. These are known as transportation control measures (TCMs). TCM strategies are designed to reduce vehicle miles traveled and trips, or vehicle idling and associated air pollution. These goals are achieved by developing attractive and convenient alternatives to single-occupant vehicle use. Examples of TCMs include ridesharing programs, transportation infrastructure improvements such as adding bicycle and carpool lanes, and expansion of public transit.

STATE

CARB Mobile-Source Regulation

The State of California is responsible for controlling emissions from the operation of motor vehicles in the State. Rather than mandating the use of specific technology or the reliance on a specific fuel, the CARB motor vehicle standards specify the allowable grams of pollution per mile driven. In other

words, the regulations focus on the reductions needed rather than on the manner in which they are achieved. Towards this end, the CARB has adopted regulations which require auto manufacturers to phase in less polluting vehicles.

California Clean Air Act

The California Clean Air Act (CCAA) was first signed into law in 1988. The CCAA provides a comprehensive framework for air quality planning and regulation, and spells out, in statute, the state's air quality goals, planning and regulatory strategies, and performance. The CARB is the agency responsible for administering the CCAA. The CARB established ambient air quality standards pursuant to the California Health and Safety Code (CH&SC) [§39606(b)], which are similar to the federal standards.

California Air Quality Standards

Although NAAQS are determined by the U.S. EPA, states have the ability to set standards that are more stringent than the federal standards. As such, California established more stringent ambient air quality standards. Federal and state ambient air quality standards have been established for ozone, carbon monoxide, nitrogen dioxide, sulfur dioxide, suspended particulates and lead. In addition, California has created standards for pollutants that are not covered by federal standards. Although there is some variability among the health effects of the CAAQS pollutants, each has been linked to multiple adverse health effects including, among others, premature death, hospitalizations and emergency department visits for exacerbated chronic disease, and increased symptoms such as coughing and wheezing. The existing state and federal primary standards for major pollutants are shown in Table 3.3-1.

Air quality standard setting in California commences with a critical review of all relevant peer reviewed scientific literature. The Office of Environmental Health Hazard Assessment (OEHHA) uses the review of health literature to develop a recommendation for the standard. The recommendation can be for no change, or can recommend a new standard. The review, including the OEHHA recommendation, is summarized in a document called the draft Initial Statement of Reasons (ISOR), which is released for comment by the public, and also for public peer review by the Air Quality Advisory Committee (AQAC). AQAC members are appointed by the President of the University of California for their expertise in the range of subjects covered in the ISOR, including health, exposure, air quality monitoring, atmospheric chemistry and physics, and effects on plants, trees, materials, and ecosystems. The Committee provides written comments on the draft ISOR. The ARB staff next revises the ISOR based on comments from AQAC and the public. The revised ISOR is then released for a 45-day public comment period prior to consideration by the Board at a regularly scheduled Board hearing.

In June of 2002, the CARB adopted revisions to the PM_{10} standard and established a new $PM_{2.5}$ annual standard. The new standards became effective in June 2003. Subsequently, staff reviewed the published scientific literature on ground-level ozone and nitrogen dioxide and the CARB adopted revisions to the standards for these two pollutants. Revised standards for ozone and nitrogen dioxide went into effect on May 17, 2006 and March 20, 2008, respectively. These revisions reflect the most recent changes to the CAAQS.

Tanner Air Toxics Act (TACs)

California regulates TACs primarily through the Tanner Air Toxics Act (AB 1807) and the Air Toxics Hot Spots Information and Assessment Act of 1987 (AB 2588). The Tanner Act sets forth a formal procedure for CARB to designate substances as TACs. This includes research, public participation, and scientific peer review before CARB can designate a substance as a TAC. To date, CARB has identified more than 21 TACs and has adopted U.S. EPA's list of HAPs as TACs. Most recently, diesel PM was added to the CARB list of TACs. Once a TAC is identified, CARB then adopts an Airborne Toxics Control Measure (ATCM) for sources that emit that particular TAC. If there is a safe threshold for a substance at which there is no toxic effect, the control measure must reduce exposure below that threshold. If there is no safe threshold, the measure must incorporate Best Available Control Technologies (BACT) to minimize emissions.

AB 2588 requires that existing facilities that emit toxic substances above a specified level prepare a toxic-emission inventory, prepare a risk assessment if emissions are significant, notify the public of significant risk levels, and prepare and implement risk reduction measures. CARB has adopted diesel exhaust control measures and more stringent emission standards for various on-road mobile sources of emissions, including transit buses and off-road diesel equipment (e.g., tractors, generators). In February 2000, CARB adopted a new public-transit bus-fleet rule and emission standards for new urban buses. These rules and standards provide for (1) more stringent emission standards for some new urban bus engines, beginning with 2002 model year engines; (2) zero-emission bus demonstration and purchase requirements applicable to transit agencies; and (3) reporting requirements under which transit agencies must demonstrate compliance with the urban transit bus fleet rule.

Omnibus Low-NOx Rule

The CARB approved the Omnibus Low-NOx Rule on August 28, 2020, which will require engine NOx emissions to be cut to approximately 75% below current standards beginning in 2024, and 90% below current standards in 2027. The rule also places nine additional regulatory requirements on new heavy-duty truck and engines. Those additional requirements include a 50% reduction in particulate matter emissions, stringent new low-load and idle standards, a new in-use testing protocol, extended deterioration requirements, a new California-only credit program, and extended mandatory warranty requirements. The regulatory requirements in the Omnibus Low-NOX Rule will first become effective in 2024, at the same time as the Advanced Clean Trucks regulations that CARB approved that mandates manufacturers convert increasing percentages of their heavy-duty trucks sold in California to zero-emission vehicles.

Assembly Bill 170

Assembly Bill 170, Reyes (AB 170), was adopted by state lawmakers in 2003, creating Government Code Section 65302.1, which requires cities and counties in the San Joaquin Valley to amend their general plans to include data and analysis, comprehensive goals, policies, and feasible implementation strategies designed to improve air quality. The elements to be amended include, but are not limited to, those elements dealing with land use, circulation, housing, conservation, and open space. Section 65302.1.c identifies four areas of air quality discussion required in these

amendments:

- A report describing local air quality conditions, attainment status, and state and federal air quality and transportation plans;
- A summary of local, district, state, and federal policies, programs, and regulations to improve air quality;
- A comprehensive set of goals, policies, and objectives to improve air quality; and
- Feasible implementation measures designed to achieve these goals.

LOCAL

City of Manteca General Plan

The City of Manteca General Plan includes several policies that are relevant to air quality. 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 the 2023 General Plan policies and the proposed General Plan Update policies applicable to the Project are identified below:

2023 GENERAL PLAN (EXISTING)

Policies: Air Quality- Regional Coordination

- AQ-P-1: Cooperate with other agencies to develop a consistent and coordinated approach to reduction of air pollution and management of hazardous air pollutants.

Implementation: Air Quality- Regional Coordination

- AQ-I-1. Work with the San Joaquin Valley Air Pollution Control District (APCD) to implement the Air Quality Management Plan (AQMP).
    - Cooperate with the APCD to develop consistent and accurate procedures for evaluating project-specific and cumulative air quality impacts.
    - Cooperate with the APCD and the California Air Resources Board in their efforts to develop a local airshed model.
    - Cooperate with the APCD in their efforts to develop a cost/benefit analysis of possible control strategies (mitigation measures to minimize short and long-term stationary and area source emissions as part of the development review process, and monitoring measures to ensure that mitigation measures are implemented.
- AQ-I-2. In accordance with CEQA, submit development proposals to the APCD for review and comment prior to decision.
- AQ-I-3. Cooperate with the San Joaquin County Environmental Health Department in identifying hazardous material users and in developing a hazardous materials management plan.

Policies: Air Quality- Land Use

- AQ-P-2: Develop a land use plan that will help to reduce the need for trips and will facilitate the common use of public transportation, walking, bicycles, and alternative fuel vehicles.
- AQ-P-3: Segregate and provide buffers between land uses that typically generate hazardous

or obnoxious fumes and residential or other sensitive land uses.

Implementation: Air Quality- Land Use

- AQ-I-4. Encourage mixed-use development that is conveniently accessible by pedestrians and public transit.
- AQ-I-5. Locate employment, school, and daily shopping destinations near residential areas.
- AQ-I-6. Locate higher intensity development such as multi-family housing, institutional uses, services, employment centers and retail along existing and proposed transit corridors.
- AQ-I-7. Locate public facilities in areas easily served by current and planned public transportation.
- AQ-I-8. Prior to entitlement of a project that may be an air pollution point source, such as a manufacturing and extracting facility, the developer shall provide documentation that the use is located and appropriately separated from residential areas and sensitive receptors (e.g., homes, schools, and hospitals).

Policies: Air Quality- Transportation

- AQ-P-4: Develop and maintain street systems that provide for efficient traffic flow and thereby minimize air pollution from automobile emissions.
- AQ-P-5: Develop and maintain circulation systems that provide alternatives to the automobile for transportation, including bicycles routes, pedestrian paths, bus transit, and carpooling.
- AQ-P-6: Coordinate public transportation networks, including trains, local bus service, regional bus service and rideshare facilities to provide efficient public transit service.

Implementation: Air Quality- Transportation

- AQ-I-9. Maintain acceptable traffic levels of service (LOS) as specified in the Circulation Element.
- AQ-I-10. In new subdivisions, require the internal street system to include the installation of dedicated pedestrian/bicycle pathways connecting to adjacent residential and commercial areas as well as schools, parks and recreational areas.
- AQ-I-11. Provide adequate pedestrian and bikeway facilities for present and future transportation needs throughout the City.

Policies: Air Quality- Dust and Other Airborne Particulate Materials

- AQ-P-7: New construction will be managed to minimize fugitive dust and construction vehicle emissions.
- AQ-P-8: Woodburning devices shall meet current standards for controlling particulate air pollution.
- AQ-P-9: Burning of any combustible material within the City will be controlled to minimize particulate air pollution.

Implementation: Air Quality- Dust and Other Airborne Particulate Materials

- AQ-I-12. Construction activity plans shall include and/or provide for a dust management plan to prevent fugitive dust from leaving the property boundaries and causing a public

nuisance or a violation of an ambient air standard.
    - Project development applicants shall be responsible for ensuring that all adequate dust control measures are implemented in a timely manner during all phases of project development and construction.
- AQ-I-13. All residences built in a new subdivision or housing development shall be equipped with conventional heating devices with sufficient capacity to heat all areas of the building without reliance on woodburning heating devices.
- AQ-I-14. All woodburning-heating devices installed shall meet EPA standards applicable at the time of project approval.

Policies: Air Quality- Reduce Emissions From Energy Generating Facilities

- AQ-P-10: Encourage energy efficient building designs.

Implementation: Air Quality- Reduce Emissions From Energy Generating Facilities

- AQ-I-15. Design review criteria shall include the following considerations, at a minimum:
    - The developer of a sensitive air pollution receptor shall submit documentation that the project design includes appropriate buffering (e.g., setbacks, landscaping) to separate the use from highways, arterial streets, hazardous material locations and other sources of air pollution or odor.
    - Promote the use of new and replacement fuel storage tanks at refueling stations that are clean fuel compatible, if technically and economically feasible.
    - The use of energy efficient lighting (including controls) and process systems beyond Title 24 requirements shall be encouraged where practicable (e.g., water heating, furnaces, boiler units, etc.)
    - The use of energy efficient automated controls for air conditioning beyond Title 24 requirements shall be encouraged where practicable.
    - Promote solar access through building siting to maximize natural heating and cooling, and landscaping to aid passive cooling and to protect from winds.

Policies: Air Quality – Greenhouse Gas Emissions

- AQ-P-11: Prepare and maintain a Climate Action Plan and community greenhouse gas emission inventory for sectors with the potential for control or influence by the City that demonstrates consistency with State of California targets.
- AQ-P-12: Development projects shall incorporate the applicable strategies of the City of Manteca Climate Action Plan as needed to demonstrate consistency with CAP reduction targets and AB 32.

Implementation: Air Quality – Greenhouse Gases

- AQ-I-16. Track and monitor aspects of development related to CAP strategies on an ongoing basis to measure progress in achieving CAP reduction targets.
- AQ-I-17. Track implementation of municipal and community projects and programs related to energy efficiency, transit service improvements, transportation facilities such as bicycle paths and lanes, pedestrian infrastructure, and other projects that reduce greenhouse gas emissions throughout the community.

- AQ-I-18. Update CAP emission inventories, targets, and strategies to reflect new State of California greenhouse gas reduction targets when adopted for later years and to reflect the benefits of any new State and federal regulatory actions that reduce greenhouse gas emissions to demonstrate continued consistency with State targets.

GENERAL PLAN UPDATE (PROPOSED)

Policies: Land Use Element

- LU-3.9: Locate residences away from areas of excessive noise, smoke, dust, odor, and lighting, and ensure that adequate provisions, including buffers or transitional uses, such as less intensive renewable energy production, light industrial, office, or commercial uses, separate the proposed residential uses from more intensive uses, including industrial, agricultural, or agricultural industrial uses and designated truck routes, to ensure the health and well-being of existing and future residents.

- LU-6.8: Encourage the mixing of retail, service, residential, office, and institutional uses on the properties surrounding The Promenade to create a significant retail, employment, and cultural center south of Highway 120.

- LU-6.9: Require mixed-use development to provide strong connections with the surrounding development and neighborhoods through the provision of pedestrian and bicycle facilities and, where feasible, site consolidation.

- LU-6.10: Encourage the reuse of existing buildings within Downtown and in other developed locations designated for mixed-use development by utilizing the California Existing Building Code which provides flexibility in the retrofitting of buildings.

- LU-6.11: Promote the revitalization of underutilized, deteriorated areas and buildings within Downtown and in other developed locations designated for mixed-use development through development incentives, public/private partnerships, and public investments.

- LU-8.4: Policy Area 3 is the Austin Road Business Park and Residential Community Master Plan area, with boundaries as shown in Figure LU-6. The primary land uses within Policy Area 3 are envisioned to be a master planned residential community with high-quality parks, community-serving commercial uses, and residential development ranging from very low to high density residential in order to accommodate a broad range of housing types, including executive housing and workforce housing. Residential uses located near SR 99 and adjacent the railroad tracks should include appropriate transitions and buffers to address air quality and noise.

- LU-9.1: Require future planning decisions, development, and infrastructure and public projects to consider the effects of planning decisions on the overall health and well-being of the community and its residents, with specific consideration provided regarding addressing impacts to disadvantaged populations and communities and ensuring disadvantaged communities have equitable access to services and amenities.

- LU-9.2: As part of land use decisions, ensure that environmental justice issues related to potential adverse health impacts associated with land use decisions, including methods to reduce exposure to hazardous materials, industrial activity, vehicle exhaust, other sources

of pollution, and excessive noise on residents regardless of age, culture, gender, race, socioeconomic status, or geographic location, are considered and addressed.

Implementation: Land Use Element

- LU-1b: Regularly review and revise, as necessary, the Zoning Code to accomplish the following purposes:
    - Ensure consistency with the General Plan in terms of zoning districts and development standards;
    - Provide for a Downtown zone that permits the vibrant mixing of residential, commercial, office, business-professional, and institutional uses within the Central Business District;
    - Ensure adequate buffers and transitions are required between intensive uses, such as industrial and agricultural industrial, and sensitive receptors, including residential uses and schools; and
    - Provide for an Agricultural Industrial zone that accommodates the processing of crops and livestock.
    - Ensure that land use requirements meet actual demand and needs over time as technology, social expectations, and business practices change.
- LU-6a: Consider implementing incentives to support developers who construct vertical mixed-use projects and/or who build housing above non-residential ground-floor uses within Downtown.
- LU-6d: Promote the intensified use and reuse of existing suites above ground floors.
- LU-9a: Review all development proposals, planning projects, and infrastructure projects to ensure that potential adverse impacts to disadvantaged communities, such as exposure to pollutants, including toxic air contaminants, and unacceptable levels of noise and vibration are reduced to the extent feasible and that measures to improve quality of life, such as connections to bicycle and pedestrian paths, community services, schools, and recreation facilities, access to healthy foods, and improvement of air quality are included in the project. The review shall address both the construction and operation phases of the project.
- LU-9c: Encourage and support local transit service providers to increase and expand services for people who are transit-dependent, including seniors, persons with mobility disabilities, and persons without regular access to automobiles by improving connections to regional medical facilities, senior centers, and other support systems that serve residents and businesses.

Policies: Circulation Element

- C-2.7: Provide access for bicycles and pedestrians at the ends of cul-de-sacs, where right-of-way is available, to provide convenient access within and between neighborhoods and to encourage walking and bicycling to neighborhood destinations.
- C-2.8: Signals, roundabouts, traffic circles and other traffic management techniques shall be applied appropriately at residential and collector street intersections with collector and

arterial streets in order to allow bicyclists and pedestrians to travel conveniently and safely from one neighborhood to another.

- 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-4.1: Through regular updates to the City's Active Transportation Plan, establish a safe and convenient network of identified bicycle and pedestrian routes connecting residential areas with schools, recreation, shopping, and employment areas within the city, generally as shown in Figure CI-2). The City shall also strive to develop connections with existing and planned regional routes shown in the San Joaquin County Bicycle Master Plan.

- C-4.2: Improve safety conditions, efficiency, and comfort for bicyclists and pedestrians by providing shade trees and controlling traffic speeds by implementing narrow lanes or other traffic calming measures in accordance with the City Neighborhood Traffic Calming Program on appropriate streets, in particular residential and downtown areas.

- C-4.3: Provide a sidewalk and bicycle route system that serves all pedestrian and bicycle users and meets the latest guidelines related to the Americans with Disabilities Act (ADA).

- C-4.4: Provide bicycle parking facilities at commercial, business/professional and light industrial uses in accordance with Part 11 of the California Building Standards Code.

- C-4.5: Expand the existing network of off-street bicycle facilities as shown in the City's Active Transportation Plan to accommodate cyclists who prefer to travel on dedicated trails. Further, the City shall strive to develop: 1) a "city-loop" Class I bike path for use by both bicyclists and pedestrians that links Austin Road, Atherton Drive, Airport Way, and a route along or near Lathrop Road to the Tidewater bike path and its existing and planned extensions, and 2) an off-street bicycle trail extension between the Tidewater Bike Trail near the intersection of Moffat Boulevard and Industrial Park Drive to the proposed regional route between Manteca and Ripon.

- C.4-6: Provide on-street Class II bike lanes, Class IV protected bike lanes, or off-street Class I bike paths along major collector and arterial streets whenever feasible.

- C.4.7: Facilitate bicycle travel through residential streets through signage necessary to communicate the presence of Class III bicycle lanes on residential streets that have sufficiently low volumes as to not require bike lanes or have narrower street cross sections that assist in calming traffic.

- C.4.8: Provide sidewalks and/or walkways connecting to the residential neighborhoods, primary public destinations, major public parking areas, transit stops, and intersections with the bikeway system.

- C.4.9: Provide sidewalks along both sides of all new streets in the City.

- C-5.1: Encourage and plan for the expansion of regional bus service in the Manteca area.

- C-5.2: Promote increased commuter and regional passenger rail service that will benefit the businesses and residents of Manteca. Examples include Amtrak, the Altamont Commuter Express (ACE), and high-speed rail.

- C-5.3: Identify and implement means of enhancing the opportunities for residents to commute from residential neighborhoods to the ACE station or other transit facilities that may develop in the City.

- C-5.4: Include primary locations where the transit systems will connect to the major bikeways and pedestrian ways and primary public parking areas in the Active Transportation Plan (see C-4a).

- C-5.5: Encourage programs that provide ridesharing and vanpool opportunities and other alternative modes of transportation for Manteca residents.

- C-5.6: Promote the development of park-and-ride facilities near I-5, SR 120, SR 99, and transit stations.

- C-5.7: Maintain a working relationship between the City administration and the local management of the Union Pacific Railroad regarding expansion of freight and passenger rail service and economic development of the region.

- C-5.8: Design future roadways to accommodate transit facilities, as appropriate. These design elements should include installation of transit stops adjacent to intersections and provision of bus turnouts and sheltered stops, where feasible.

- C-5.9: Encourage land uses and site developments that promote public transit along fixed route public transportation corridors, with priority given to those projects that will bring the greatest increase in transit ridership.

- C-5.10: Ensure that development projects provide adequate facilities to accommodate school buses, including loading and turn-out locations in multifamily and other projects that include medium and high density residential uses, and that the school districts are provided an opportunity to address specific needs associated with school busing.

- C-5.11: As new areas and neighborhoods of the City are developed, fund transit expansion (including capital, operations, and maintenance) to provide service levels consistent with existing development.

- C-7.1: Encourage employers to provide alternative mode subsidies, bicycle facilities, alternative work schedules, ridesharing, telecommuting, and work-at-home programs employee education and preferential parking for carpools/vanpools.

- C-7.2: Require development projects that accommodate or employee 50 or more full-time equivalent employees to establish a transportation demand management (TDM) program.

- C-7.3: Partner with SJCOG on the Dibs program, which is the regional smart travel program, including rideshare, transit, walking, and biking, operated by SJCOG.

- C-7.4: Require proposed development projects that could have a potentially significant

VMT impact to consider reasonable and feasible project modifications and other measures during the project design and environmental review stage of project development that would reduce VMT effects in a manner consistent with state guidance on VMT reduction.

- C-7.5: Evaluate the feasibility of a local or regional VMT impact fee program, bank, or exchange. Such an offset program, if determined feasible, would be administered by the City or a City-approved agency, and would offer demonstrated VMT reduction strategies through transportation demand management programs, impact fee programs, mitigation banks or exchange programs, in-lieu fee programs, or other land use project conditions that reduce VMT in a manner consistent with state guidance on VMT reduction. If, through on-site changes, a subject project cannot eliminate VMT impacts, the project could contribute on a pro-rata basis to a local or regional VMT reduction bank or exchange, as necessary, to reduce net VMT impacts.

- C-7.6: Expand alternatives to driving by increasing opportunities to walk, bike, and use transit.

Implementation: Circulation Element

- C-1c: Develop a pedestrian, bicycle, and transit improvement plan for the Downtown area to facilitate implementation of level of service policy C-1.4. This plan will develop a list of multi-modal improvements in the Downtown area to increase the viability and encourage the use of non-auto modes.

- C-2b: When planning roadway facilities, incorporate the concept of complete streets. Complete streets include design elements for all modes that use streets, including autos, transit, pedestrians, and bicycles. Complete streets shall be developed in a context-sensitive manner. For example, it may be more appropriate to provide a Class I bike path instead of bike lanes along a major arterial. Pedestrian districts like Downtown Manteca or areas near school entrances should have an enhanced streetscape (e.g., narrower travel lanes, landscape buffers with street trees, etc.) to better accommodate and encourage pedestrian travel.

- C-2f: Ensure that bicycle and pedestrian access is provided through walls and berms to minimize travel distances and increase the viability walking and bicycling.

- C-2i: Pursue funding to improve and address areas of traffic, bicycle, and pedestrian hazards and conflicts with vehicular traffic movements.

- C-4a: Periodically update the Active Transportation Plan to include all areas envisioned for development by this General Plan and to address pedestrian and bicycle facilities needed to provide a complete circulation system that adequately meets the needs of pedestrians and bicyclists.

- C.4b: Utilize the standards set forth in the latest editions of the California MUTCD and American Association of State Highway and Transportation Officials (AASHTO) Green Book for improvement and re-striping of appropriate major collector and arterial streets to accommodate Class II bike lanes or Class IV protected bikeways in both directions, where sufficient roadway width is available. This may include narrowing of travel lanes.

- C.4d: Add bicycle facilities whenever possible in conjunction with road rehabilitation, reconstruction, or re-striping projects.

- C-4e: Update the City's standard plans to accommodate pedestrians and bicyclists, including landscape-separated sidewalks where appropriate, and to include bike lanes on collector and arterial streets, as defined by the Active Transportation Plan.

- C-4f: Encourage and facilitate resident and visitor use of the bike trail system by preparing a map of the pedestrian and bike paths and implementing wayfinding signage.

- C-4g: Update the standard plans to specify a set of roadways with narrower lanes (less than 12 feet) and pedestrian bulb-outs to calm traffic and increase pedestrian and bicycle comfort. These narrow lane standards shall be applied to appropriate streets (e.g., they shall not be applied to outside lanes on major truck routes) and new development.

- C-5a: Periodically review transit needs in the city and adjust bus routes to accommodate changing land use and transit demand patterns. The City shall also periodically coordinate with the San Joaquin Regional Transit District to assess the demand for regional transit services.

- C-5b: Explore a transit connections study that would identify improvements to connections and access to the existing ACE station, the Manteca Transit Center, and future planned transit stations.

- C-5c: Update the City's standard plans to include the option for bus turnouts at intersections of major streets.

- C-5d: Review and consider alternatives to conventional bus systems, such as smaller shuttle buses (i.e. micro-transit), on-demand transit services, or transportation networking company services that connect neighborhood centers to local activity centers with greater cost efficiency.

- C-5e: Work with the school districts to identify and implement opportunities for joint-use public transit that would provide both student transportation and local transit service.

- C-5f: Through the development review process, ensure that projects provide increased land use densities and mixed uses, consistent with the Land Use Element to enhance the feasibility of transit and promote alternative transportation modes.

- C-5g: Along fixed route corridors, require that new development to be compatible with and further the achievement of the Circulation Element. Requirements for compatibility may include but are not limited to:

    - Orienting pedestrian access to transit centers and existing and planned transit routes.

    - Orienting buildings, walkways, and other features to provide pedestrian access from the street and locating parking to the side or behind the development, rather than separating the development from the street and pedestrian with parking.

    - Providing clearly delineated routes through parking lots to safely accommodate

pedestrian and bicycle circulation.

- C-5h: Review and update the City's funding programs to provide for adequate transit services, including funding for capital, operations, and maintenance, commensurate with growth of the City.

- C-7a: Provide information about transit services, ridesharing, vanpools, and other transportation alternatives to single occupancy vehicles at City Hall, the library, and on the City website.

- C-7b: Develop TDM program requirements with consideration of addressing CEQA vehicle miles traveled impact analysis requirements (i.e., SB 743) in accordance with implementation measure C-1c. TDM programs shall include measures to reduce total vehicle miles traveled and peak hour vehicle trips. A simplified version of the Air District's Rule 9510 could be used to implement this measure.

- C-7c: Coordinate with the San Joaquin Council of Governments on a Congestion/Mobility Management Program to identify TDM strategies to reduce VMT and mitigate peak-hour congestion impacts. Strategies may include: growth management and activity center strategies, telecommuting, increasing transit service frequency and speed, transit information systems, subsidized and discount transit programs, alternative work hours, carpooling, vanpooling, guaranteed ride home program, parking management, addition of general purpose lanes, channelization, computerized signal systems, intersection or midblock widenings, and Intelligent Transportation Systems.

- C-7d: Proposed development projects shall consider the list of potential measures below. This list is not intended to be exhaustive, and not all measures may be feasible, reasonable, or applicable to all projects. The purpose of this list is to identify options for future development proposals, not to constrain projects to this list, or to require that a project examine or include all measures from this list. Potential measures, with possible ranges of VMT reduction for a project, include:*

    - *Increase density of development (up to 10.75 percent)*
    - *Increase diversity of land uses (up to 12 percent)*
    - *Encourage telecommuting and alternative work schedules (up to 4.5 percent)*
    - *Implement car-sharing programs (up to 5 percent)*
    - *Implement parking management and pricing (up to 6 percent)*
    - *Implement subsidized or discounted transit program (up to 0.7 percent)*
    - *Implement commute trip reduction marketing and launch targeted behavioral interventions (up to 3 percent)*

    **Note: VMT reduction ranges based on Quantifying Greenhouse Gas Mitigation Measures, California Air Pollution Control Officers Association (2010) and new research compiled by Fehr & Peers (2020). Additional engineering analysis is required prior to applying reductions to specific projects. Actual reductions will vary by project and project context.*

- C-7e: Partner with SJCOG, San Joaquin County, and neighboring cities to evaluate a potential regional VMT impact fee program, bank, or exchange.

- C-7f: Implement the Active Transportation Plan and other Bikeway and Pedestrian

Systems goals and polices (C-4).

- C-7g: Expand transit service and increase transit frequency and implement Public Transit goals and policies (C-5).

Policies: Community Facilities and Services Element

- CF-11.2: Implement and enforce the provisions of the City's Source Reduction and Recycling Program and update the program as necessary to meet or exceed the State waste diversion requirements.

- CF-11.3: Reduce municipal waste generation by increasing recycling, on-site composting, and mulching, where feasible, at municipal facilities, as well as using resource efficient landscaping techniques in new or renovated medians and parks.

- CF-11.4: Encourage residential, commercial, and industrial recycling and reuse programs and techniques.

- CF-11.5: Coordinate with and support other local agencies and jurisdictions in the region to develop and implement effective waste management strategies and waste-to-energy technologies.

Policies: Resource Conservation Element

- RC-4.1: Prepare for and respond to the expected impacts of climate change.

- RC-4.2: Assess and monitor the effects of climate change and the associated levels of risk in order to adapt to changing climate conditions and be resilient to negative changes and impacts associated with climate change.

- RC-5.1: Ensure that land use and circulation improvements are coordinated to reduce the number and length of vehicle trips.

- RC-5.2: Encourage private development to explore and apply non-traditional energy sources such as co-generation, wind, and solar to reduce dependence on traditional energy sources.

- RC-5.3: Require all new public and privately constructed buildings to meet and comply with construction and design standards that promote energy conservation, including the most current "green" development standards in the California Green Building Standards Code.

- RC-5.4: Support innovative and green building best practices including, but not limited to, LEED certification for all new development, and encourage public and private projects to exceed the most current "green" development standards in the California Green Building Standards Code.

- RC-5.5: Encourage the conservation of public utilities.

- RC-5.6: Encourage the conservation of petroleum products.

- RC-6.1: Coordinate with the San Joaquin Valley Air Pollution Control District (Air District), San Joaquin Council of Governments, and the California Air Resources Board (State Air

Board), and other agencies to develop and implement regional and county plans, programs, and mitigation measures that address cross-jurisdictional and regional air quality impacts, including land use, transportation, and climate change impacts, and incorporate the relevant provisions of those plans into City planning and project review procedures. Also cooperate with the Air District, SJCOG, and State Air Board in:

  - Enforcing the provisions of the California and Federal Clean Air Acts, state and regional policies, and established standards for air quality.
  - Identifying baseline air pollutant and greenhouse gas emissions.
  - Encouraging economy clean fuel for city vehicle fleets, when feasible.
  - Developing consistent procedures for evaluating and mitigating project-specific and cumulative air quality impacts of projects.

- RC-6.2: Minimize exposure of the public to toxic or harmful air emissions and odors through requiring an adequate buffer or distance between residential and other sensitive land uses and land uses that typically generate air pollutants, toxic air contaminants, or obnoxious fumes or odors, including but not limited to industrial, manufacturing, and processing facilities, highways, and rail lines.
- RC-6.3: Ensure that new construction is managed to minimize fugitive dust and construction vehicle emissions.
- RC-6.4: Require appliances and equipment, including wood-burning devices, in development projects to meet current standards for controlling air pollution, including particulate matter and toxic air contaminants.
- RC-6.5: Require and/or cooperate with the Air District to ensure that burning of any combustible material within the City is consistent with Air District regulations to minimize particulate air pollution.

Implementation: Resource Conservation Element

- RC-4a: Continue to assess and monitor performance of greenhouse gas emissions reduction efforts, including progress toward meeting longer-term GHG emissions reduction goals for 2035 and 2050 by reporting on the City's progress annually, updating the Climate Action Plan and GHG inventory regularly to demonstrate consistency with State-adopted GHG reduction targets, including those targets established beyond 2020, and updating the GHG Strategy in the General Plan, as appropriate.
- RC-4b: When updating master plans for infrastructure, including water supply, flood control, and drainage, and critical facilities, review relevant climate change scenarios and ensure that the plans consider the potential effects of climate change and include measures to provide resilience.
- RC-4c: Incorporate the likelihood of climate change impacts into City emergency response planning and training.
- RC-5a: Implement development standards and best practices that promote energy

conservation and the reduction in greenhouse gases, including:

  - Require new development to be energy-efficient through passive design concepts (e.g., techniques for heating and cooling, building siting orientation, street and lot layout, landscape placement, and protection of solar access;
  - Require construction standards which promote energy conservation including window placement, building eaves, and roof overhangs;
  - Require all projects to meet minimum State and local energy conservation standards;
  - Require best practices in selecting construction methods, building materials, project appliances and equipment, and project design;
  - Encourage and accommodate projects that incorporate alternative energy;
  - Encourage projects to incorporate enhanced energy conservation measures and other voluntary methods of reducing energy usage and greenhouse gas emissions; and
  - Require large energy users to implement an energy conservation plan as part of the project review and approval process, and develop a program to monitor compliance with and effectiveness of that plan.

- RC-5b: Continue to review development projects to ensure that all new public and private development complies with the California Code of Regulations, Title 24 standards as well as the energy efficiency standards established by the General Plan and the Municipal Code.
- RC-5c: Develop a public education program to increase public participation in energy conservation.
- RC-5d: Connect residents and businesses with programs that provide free or low-cost energy efficiency audits and retrofits to existing buildings.
- RC-5e: Update the Municipal Code to incentivize the use of small-scale renewable energy facilities and, where appropriate, to remove impediments to such uses.
- RC-5f: Cooperate with other agencies, jurisdictions, and organizations to expand energy conservation programs.
- RC-5g: Explore alternative energy sources, including co-generation, active solar energy, and wind generation, and identify opportunities for alternative energy to be used in public and private projects.
- RC-5h: Implement transportation measures, as outlined in the Circulation Element, which reduce the need for automobile use and petroleum products.
- RC-6a: Work with the Air District to implement the Air Quality Management Plan (AQMP).
  - Cooperate with the Air District to develop consistent and accurate procedures for evaluating project-specific and cumulative air quality impacts.
  - Cooperate with the Air District and the State Air Board in their efforts to develop a

local airshed model.

- Cooperate with the Air District in its efforts to develop a cost/benefit analysis of possible control strategies (mitigation measures to minimize short and long-term stationary and area source emissions as part of the development review process, and monitoring measures to ensure that mitigation measures are implemented.

- RC-6b: Review development, land use, transportation, and other projects that are subject to CEQA for potentially significant climate change and air quality impacts, including toxic and hazardous emissions and require that projects provide adequate, appropriate, and cost-effective mitigation measures reduce significant and potentially significant impacts. This includes, but is not limited to, the following:

  - *Use of the Air District "Guide for Assessing and Mitigating Air Quality Impacts", as may be amended or replaced from time to time, in identifying thresholds, evaluating potential project and cumulative impacts, and determining appropriate mitigation measures;*
  - *Contact the Air District for comment regarding potential impacts and mitigation measures as part of the evaluation of air quality effects of discretionary projects that are subject to CEQA;*
  - *Require projects to participate in regional air quality mitigation strategies, including Air District-required regulations, as well as recommended best management practices when applicable and appropriate ;*
  - *Promote the use of new and replacement fuel storage tanks at refueling stations that are clean fuel compatible, if technically and economically feasible;*
  - *The use of energy efficient lighting (including controls) and process systems beyond Title 24 requirements shall be encouraged where practicable (e.g., water heating, furnaces, boiler units, etc.);*
  - *The use of energy efficient automated controls for air conditioning beyond Title 24 requirements shall be encouraged where practicable; and*
  - *Promote solar access through building siting to maximize natural heating and cooling, and landscaping to aid passive cooling and to protect from winds;*
  - *The developer of a sensitive air pollution receptor shall submit documentation that the project design includes appropriate buffering (e.g., setbacks, landscaping) to separate the use from highways, arterial streets, hazardous material locations and other sources of air pollution or odor;*
  - *Identify sources of toxic air emissions and, if appropriate, require preparation of a health risk assessment in accordance with Air District-recommended procedures; and*
  - *Circulate the environmental documents for projects with significant air quality impacts to the Air District for review and comment.*

- RC-6c: Review area and stationary source projects that could have a significant air quality impact, either individually or cumulatively, to identify the significance of potential impacts and ensure that adequate air quality mitigation is incorporated into the project, including:

  - *The use of best available and economically feasible control technology for stationary industrial sources;*
  - *All applicable particulate matter control requirements of Air District Regulation VIII;*
  - *The use of new and replacement fuel storage tanks at refueling stations that are*

clean fuel compatible, if technically and economically feasible;
- *Provision of adequate electric or natural gas outlets to encourage use of natural gas or electric barbecues and electric gardening equipment; and*
- *Use of alternative energy sources.*

- RC-6d: Maintain adequate data to analyze cumulative land use impacts on air quality and climate change. This includes tracking proposed, planned, and approved General Plan amendments, development, and land use decisions so that projects can be evaluated for cumulative air quality impacts, including impacts associated with transportation and land use decisions.

- RC-6e: Prior to entitlement of a project that may be an air pollution point source, such as a manufacturing and extracting facility, the developer shall provide documentation that the use is located and appropriately separated from residential areas and sensitive receptors (e.g., homes, schools, and hospitals).

- RC-6f: Construction activity plans shall include and/or provide for a dust management plan to prevent fugitive dust from leaving the property boundaries and causing a public nuisance or a violation of an ambient air standard.

  Project development applicants shall be responsible for ensuring that all adequate dust control measures are implemented in a timely manner during all phases of project development and construction.

City of Manteca Municipal Code

Chapter 17.58 of the Manteca Municipal Code describes the odor, particulate matter, and air containment standards (consistent with the rules and regulations of the SJVAPCD and the California Health and Safety Code. Chapter 15.62 of the Municipal Code provides expedited permitting procedures for electric vehicle charging stations. Furthermore, Chapter 15.60 describes the solar energy system requirements associated with small residential rooftop solar energy systems within the City.

San Joaquin Valley Air Pollution Control District

The primary role of SJVAPCD is to develop plans and implement control measures in the SJVAB to control air pollution. These controls primarily affect stationary sources such as industry and power plants. Rules and regulations have been developed by SJVAPCD to control air pollution from a wide range of air pollution sources. SJVAPCD also provides uniform procedures for assessing potential air quality impacts of proposed projects and for preparing the air quality section of environmental documents.

AIR QUALITY PLANNING

The U.S. EPA requires states that have areas that do not meet the National AAQS to prepare and submit air quality plans showing how the National AAQS will be met. If the states cannot show how the National AAQS will be met, then the states must show progress toward meeting the National AAQS. These plans are referred to as the State Implementation Plans (SIP). California's adopted 2007

State Strategy was submitted to the U.S. EPA as a revision to its SIP in November 2007.[2] More recently, in October 2018, the CARB adopted the 2018 Updates to the California State Implementation Plan.

In addition, the CARB requires regions that do not meet California AAQS for ozone to submit clean air plans (CAPs) that describe measures to attain the standard or show progress toward attainment. To ensure federal CAA compliance, SJVAPCD is currently developing plans for meeting new National AAQS for ozone and $PM_{2.5}$ and the California AAQS for PM_{10} in the SJVAB (for California CAA compliance)[3] The following describes the air plans prepared by the SJVAPCD, which are incorporated by reference per CEQA Guidelines Section 15150.

1-HOUR OZONE PLAN

Although U.S. EPA revoked its 1979 1-hour ozone standard in June 2005, many planning requirements remain in place, and SJVAPCD must still attain this standard before it can rescind CAA Section 185 fees. The SJVAPCD's most recent 1-hour ozone plan, the 2013 Plan for the Revoked 1-hour Ozone Standard, demonstrated attainment of the 1-hour ozone standard by 2017. However, on July 18, 2016, the U.S. EPA published in the Federal Register a final action determining that SJVAB has attained the 1-hour ozone NAAQS based on the 2012 to 2014 three-year period allowing nonattainment penalties to be lifted under federal Clean Air Act section 179b (SJVAPCD, 2015).

8-HOUR OZONE PLAN

The SJVAPCD's Governing Board adopted the 2007 Ozone Plan on April 30, 2007. This far-reaching plan, with innovative measures and a "dual path" strategy, assures expeditious attainment of the federal 8-hour ozone standard as set by U.S. EPA in 1997. The plan projects that the valley will achieve the 8-hour ozone standard for all areas of the SJVAB no later than 2023. The CARB approved the plan on June 14, 2007. The U.S. EPA approved the 2007 Ozone Plan effective April 30, 2012. SJVAPCD adopted the 2016 Ozone Plan to address the federal 2008 8-hour ozone standard, which must be attained by end of 2031.[4,5]

PM_{10} PLAN

Based on PM_{10} measurements from 2003 to 2006, the U.S. EPA found that the SJVAB has reached federal PM_{10} standards. On September 21, 2007, the SJVAPCD's Governing Board adopted the 2007 PM_{10} Maintenance Plan and Request for Redesignation. This plan demonstrates that the valley will continue to meet the PM_{10} standard. U.S. EPA approved the document and on September 25, 2008,

[2] Note that the plan was adopted by CARB on September 27, 2007; California Air Resources Board. 2007. California Air Resources Board's Proposed State Strategy for California's 2007 State Implementation Plan.

[3] SJVAPCD, 2012. 2012 $PM_{2.5}$ Plan, December 20.

[4] SJVAPCD. Ozone Plans. http://www.valleyair.org/ Air_Quality_Plans/Ozone_Plans.htm, accessed March 3, 2020.

[5] SJVAPCD. 2016 Plan for the 2008 8-Hour Ozone Standard, http://www.valleyair.org/Air_Quality_Plans/Ozone-Plan-2016.htm, accessed March 3, 2020.

the SJVAB was redesignated to attainment/maintenance (SJVAPCD, 2015).

PM2.5 PLAN

The SJVAPCD adopted the 2018 Plan for the 1997, 2006, and 2012 $PM_{2.5}$ Standards on November 15, 2018.[6] This plan addresses the U.S. EPA federal 1997 annual $PM_{2.5}$ standard of 15 µg/m³ and 24-hour $PM_{2.5}$ standard of 65 µg/m³; the 2006 24-hour $PM_{2.5}$ standard of 35 µg/m³; and the 2012 annual $PM_{2.5}$ standard of 12 µg/m³. This plan demonstrates attainment of the federal $PM_{2.5}$ standards as expeditiously as practicable (SJVAPCD, 2020).

All of the above-referenced plans include measures (i.e., federal, state, and local) that would be implemented through rule making or program funding to reduce air pollutant emissions in the SJVAB. Transportation control measures are part of these plans.

SJVAPCD RULES AND REGULATIONS

SJVAPCD Indirect Source Review

On December 15, 2005, SJVAPCD adopted the Indirect Source Review Rule (ISR or Rule 9510) to reduce ozone precursors (i.e., ROG and NOx) and PM_{10} emissions from new land use development projects. Specifically, Rule 9510 targets the indirect emissions from vehicles and construction equipment associated with these projects and applies to both construction and operational-related impacts. The rule applies to any applicant that seeks to gain a final discretionary approval for a development project, or any portion thereof, which upon full buildout would include any one of the following:

- 50 residential units.
- 2,000 square feet of commercial space.
- 25,000 square feet of light industrial space.
- 100,000 square feet of heavy industrial space.
- 20,000 square feet of medical office space.
- 39,000 square feet of general office space.
- 9,000 square feet of educational space.
- 10,000 square feet of government space.
- 20,000 square feet of recreational space.
- 9,000 square feet of space not identified above.
- Transportation/transit projects with construction exhaust emissions of two or more tons of NOx or two or more tons of PM_{10}.
- Residential projects on contiguous or adjacent property under common ownership of a single entity in whole or in part, that is designated and zoned for the same development density and land use, regardless of the number of tract maps, and has the capability of accommodating more than 50 residential units.

[6] SJVAPCD. Particulate Matter Plans. http://valleyair.org/Air_Quality_Plans/PM_Plans.htm, accessed March 9, 2020.

- Nonresidential projects on contiguous or adjacent property under common ownership of a single entity in whole or in part, that is designated and zoned for the same development density and land use, and has the capability of accommodating development projects that emit two or more tons per year of NOx or PM_{10} during project operations.

The rule requires all subject, nonexempt projects to mitigate both construction and operational period emissions by (1) applying feasible SJVAPCD-approved mitigation measures, or (2) paying any applicable fees to support programs that reduce emissions. Off-site emissions reduction fees (off-site fee) are required for projects that do not achieve the required emissions reductions through on-site emission reduction measures. Phased projects can defer payment of fees in accordance with an Off-site Emissions Reduction Fee Deferral Schedule (FDS) approved by the SJVAPCD.

To determine how an individual project would satisfy Rule 9510, each project would submit an air quality impact assessment (AIA) to the SJVAPCD as early as possible, but no later than prior to the project's final discretionary approval, to identify the project's baseline unmitigated emissions inventory for indirect sources: on-site exhaust emissions from construction activities and operational activities from mobile and area sources of emissions (excludes fugitive dust and permitted sources).28 Rule 9510 requires the following reductions, which are levels that the SJVAPCD has identified as necessary, based on their air quality management plans, to reach attainment for ozone and particulate matter:

Construction Equipment Emissions

The exhaust emissions for construction equipment greater than 50 horsepower (hp) used or associated with the development project shall be reduced by the following amounts from the statewide average as estimated by CARB:

- 20 percent of the total NOx emissions
- 45 percent of the total PM_{10} exhaust emissions

Mitigation measures may include those that reduce construction emissions on-site by using less polluting construction equipment, which can be achieved by utilizing add-on controls, cleaner fuels, or newer, lower emitting equipment.

Operational Emissions

- NOx Emissions. Applicants shall reduce 33.3 percent of the project's operational baseline NOx emissions over a period of 10 years as quantified in the approved AIA.
- PM_{10} Emissions. Applicants shall reduce of 50 percent of the project's operational baseline PM_{10} emissions over a period of 10 years as quantified in the approved AIA.

These requirements listed above can be met through any combination of on-site emission reduction measures. In the event that a project cannot achieve the above standards through imposition of mitigation measures, then the project would be required to pay the applicable off-site fees. These fees are used to fund various incentive programs that cover the purchase of new equipment, engine retrofit, and education and outreach.

Fugitive PM_{10} Prohibitions

SJVAPCD controls fugitive PM_{10} through Regulation VIII, Fugitive PM_{10} Prohibitions. The purpose of this regulation is to reduce ambient concentrations of PM_{10} and $PM_{2.5}$ by requiring actions to prevent, reduce, or mitigate anthropogenic (human caused) fugitive dust emissions.

- Regulation VIII, Rule 8021 applies to any construction, demolition, excavation, extraction, and other earthmoving activities, including, but not limited to, land clearing, grubbing, scraping, travel on-site, and travel on access roads to and from the site.
- Regulation VIII, Rule 8031 applies to the outdoor handling, storage, and transport of any bulk material.
- Regulation VIII, Rule 8041 applies to sites where carryout or trackout has occurred or may occur on paved roads or the paved shoulders of public roads.
- Regulation VIII, Rule 8051 applies to any open area having 0.5 acre or more within urban areas or 3.0 acres or more within rural areas, and contains at least 1,000 square feet of disturbed surface area.
- Regulation VIII, Rule 8061 applies to any new or existing public or private paved or unpaved road, road construction project, or road modification project.
- Regulation VIII, Rule 8071 applies to any unpaved vehicle/equipment traffic area.
- Regulation VIII, Rule 8081 applies to off-field agricultural sources.

Sources regulated are required to provide Dust Control Plans that meet the regulation requirements. Under Rule 8021, a Dust Control Plan is required for any residential project that will include 10 or more acres of disturbed surface area, a nonresidential project with 5 or more acres of disturbed surface area, or a project that relocates 2,500 cubic yards per day of bulk materials for at least three days. The Dust Control Plan is required to be submitted to SJVAPCD prior to the start of any construction activity. The Dust Control Plan must also describe fugitive dust control measure to be implemented before, during, and after any dust-generating activity. For sites smaller than those listed above, the project is still required to notify SJVAPCD a minimum of 48 hours prior to commencing earthmoving activities.

National Emission Standards for Hazardous Air Pollutants

Rule 4002 applies in the event an existing building will be renovated, partially demolished or removed (National Emission Standards for Hazardous Air Pollutants); this rule applies to all sources of Hazardous Air Pollutants.

Cutback, Slow Cure, and Emulsified Asphalt, Paving and Maintenance Operations

If asphalt paving will be used, then paving operations of the proposed Project will be subject to Rule 4641. This rule applies to the manufacture and use of cutback asphalt, slow cure asphalt and emulsified asphalt for paving and maintenance operations.

Nuisance Odors

SJVAPCD controls nuisance odors through implementation of Rule 4102, Nuisance. Pursuant to this rule, "a person shall not discharge from any source whatsoever such quantities of air contaminants or other materials which cause injury, detriment, nuisance or annoyance to any considerable number of persons or to the public or which endanger the comfort, repose, health, or safety of any

such person or the public or which cause or have a natural tendency to cause injury or damage to business or property."

Employer Based Trip Reduction Program

SJVAPCD has implemented Rule 9410, Employer Based Trip Reduction. The purpose of this rule is to reduce VMT from private vehicles used by employees to commute to and from their worksites to reduce emissions of NOx, ROG, and particulate matter (PM_{10} and $PM_{2.5}$). The rule applies to employers with at least 100 employees. Employers are required to implement an Employer Trip Reduction Implementation Plan (ETRIP) for each worksite with 100 or more eligible employees to meet applicable targets specified in the rule. Employers are required to facilitate the participation of the development of ETRIPs by providing information to its employees explaining the requirements and applicability of this rule. Employers are required to prepare and submit an ETRIP for each worksite to the District. The ETRIP must be updated annually. Under this rule, employers shall collect information on the modes of transportation used for each eligible employee's commutes both to and from work for every day of the commute verification period, as defined in using either the mandatory commute verification method or a representative survey method. Annual reporting includes the results of the commute verification for the previous calendar year along with the measures implemented as outlined in the ETRIP and, if necessary, any updates to the ETRIP.

3.3.3 IMPACTS AND MITIGATION MEASURES

THRESHOLDS OF SIGNIFICANCE

Consistent with Appendix G of the CEQA Guidelines, the proposed Project will have a significant impact on the environment associated with air quality if it will:

- Conflict with or obstruct implementation of the applicable air quality plan;
- Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is in non-attainment under an applicable federal or state ambient air quality standard;
- Expose sensitive receptors to substantial pollutant concentrations; and/or
- Result in other emissions (such as those leading to odors) adversely affecting a substantial number of people.

CRITERIA POLLUTANT EMISSIONS MODELING

California Emission Estimator Model (CalEEMod)™ (v.2020.4.0), developed for the California Air Pollution Officers Association (CAPCOA) in collaboration with California air districts, was used to estimate emissions for the proposed Project. Project buildout was assumed to be completed in 2025. This may prove to be a conservative estimate, because criteria pollutant emission rates are reduced over time (due to state and federal mandates) and would be expected to be even lower than reported in this analysis, should the Project buildout be completed after 2025.

The assumptions for the modeling were selected on a best-fit basis, and are consistent with the information provided in Chapter 2.0: Project Description. The land uses modeled include: Single Family Housing – (715 dwelling units); Condo/Townhouse – (200 dwelling units); and City Park –

(10.37 acres). Vehicle trip rates estimated in the modeling are consistent with the vehicle trips rates included in the modeling developed by Fehr & Peers. The construction phase includes demolition, site preparation, grading, building construction, paving, and architectural coating phases. See Appendix B for further detail.

IMPACTS RELATED TO PROJECT-GENERATED POLLUTANTS OF HUMAN HEALTH CONCERN

In December 2018, the California Supreme Court issued its decision in *Sierra Club v. County of Fresno* (226 Cal.App.4th 704) (hereafter referred to as the Friant Ranch Decision). The case reviewed the long-term, regional air quality analysis contained in the EIR for the proposed Friant Ranch development. The Friant Ranch Project is a 942-acre master-plan development in unincorporated Fresno County within the San Joaquin Valley Air Basin. The Court found that the air quality analysis was inadequate because it failed to provide enough detail "for the public to translate the bare [criteria pollutant emissions] numbers provided into adverse health impacts or to understand why such a translation is not possible at this time." The Court's decision clarifies that the agencies authoring environmental documents must make reasonable efforts to connect a project's air quality impacts to specific health effects or explain why it is not technically feasible to perform such an analysis.

All criteria pollutants that would be generated by the Project are associated with some form of health risk (e.g., asthma). Criteria pollutants can be classified as either regional or localized pollutants. Regional pollutants can be transported over long distances and affect ambient air quality far from the emissions source. Localized pollutants affect ambient air quality near the emissions source. Ozone is considered a regional criteria pollutant, whereas CO, NO_2, SO_2, and lead (Pb) are localized pollutants. PM can be both a local and a regional pollutant, depending on its composition. As discussed above, the primary criteria pollutants of concern generated by the Project are ozone precursors (ROG and NO_x) and PM (including Diesel PM). The SJVAPCD does not currently have a methodology that would correlate the expected air quality emissions of Projects to the likely health consequences of the increased emissions.

Regional Project-Generated Criteria Pollutants (Ozone Precursors and Regional PM)

Adverse health effects induced by regional criteria pollutant emissions generated by the Project (ozone precursors and PM) are highly dependent on a multitude of interconnected variables (e.g., cumulative concentrations, local meteorology and atmospheric conditions, the number and character of exposed individuals [e.g., age, gender]). For these reasons, ozone precursors (ROG and NO_x) contribute to the formation of ground-borne ozone on a regional scale, where emissions of ROG and NO_x generated in one area may not equate to a specific ozone concentration in that same area. Similarly, some types of particulate pollutants may be transported over long-distances or formed through atmospheric reactions. As such, the magnitude and locations of specific health effects from exposure to increased ozone or regional PM concentrations are the product of emissions generated by numerous sources throughout a region, as opposed to a single individual project.

Models and tools have been developed to correlate regional criteria pollutant emissions to potential community health impacts. Appendix B contains a table that summarizes many of these tools, identifies the analyzed pollutants, describes their intended application and resolution, and analyzes whether they could be used to reasonably correlate project-level emissions to specific health consequences. As provided in Appendix B, while there are models capable of quantifying ozone and secondary PM formation and associated health effects, these tools were developed to support regional planning and policy analysis and have limited sensitivity to small changes in criteria pollutant concentrations induced by individual projects. Therefore, translating project generated criteria pollutants to the locations where specific health effects could occur or the resultant number of additional days of nonattainment cannot be estimated with a high degree of accuracy.

Technical limitations of existing models to correlate project-level regional emissions to specific health consequences are recognized by air quality management districts throughout the state, including the SJVAPCD and South Coast Air Quality Management District (SCAQMD), who provided amici curiae briefs for the Friant Ranch legal proceedings. In its brief, SJVAPCD (2015) acknowledges that while health risk assessments for localized air toxics, such as DPM, are commonly prepared, "it is not feasible to conduct a similar analysis for criteria air pollutants because currently available computer modeling tools are not equipped for this task." The air district further notes that emissions solely from the Friant Ranch Project (which equate to less than one-tenth of one percent of the total NO_x and VOC in the Valley) is not likely to yield valid information," and that any such information should not be "accurate when applied at the local level." SCAQMD presents similar information in their brief, stating that "it takes a large amount of additional precursor emissions to cause a modeled increase in ambient ozone levels"[7].

As discussed above, air districts develop region-specific CEQA thresholds of significance in consideration of existing air quality concentrations and attainment or nonattainment designations under the NAAQS and CAAQS. The NAAQS and CAAQS are informed by a wide range of scientific evidence that demonstrates there are known safe concentrations of criteria pollutants. While recognizing that air quality is cumulative problem, air districts typically consider projects that generate criteria pollutant and ozone precursor emissions below these thresholds to be minor in nature and would not adversely affect air quality such that the NAAQS or CAAQS would be exceeded. Emissions generated by the Project could increase photochemical reactions and the formation of tropospheric ozone and secondary PM, which at certain concentrations, could lead to increased incidence of specific health consequences. Although these health effects are associated with ozone and particulate pollution, the effects are a result of cumulative and regional emissions. As such, a project's incremental contribution cannot be traced to specific health outcomes on a regional scale without speculation, and a quantitative correlation of project-generated regional criteria pollutant emissions to specific human health impacts is not included in this analysis.

[7] For example, SCAQMD's analysis of their 2012 Air Quality Attainment Plan showed that modeled NO_x and ROG reductions of 432 and 187 tons per day, respectively, only reduced ozone levels by 9 parts per billion. Analysis of SCAQMD's Rule 1315 showed that emissions of NO_x and ROG of 6,620 and 89,180 pounds per day, respectively, contributed to 20 premature deaths per year and 89,947 school absence (South Coast Air Quality Management District, 2015).

Models and Tools to Correlate Project-generated Criteria Pollutant Emissions to Health Impacts

Although available tools to correlate Project-generated criteria pollutant emissions to health impacts are designed to be used at the national, state, regional, and/or city-levels rather than the project level, this impact analysis includes CalEEMod modeling to identify criteria pollutant emissions that affect health. The higher the emissions generated by a project, the higher the chance that a given individual's health would be affected by the development of a particular project.

The impact analysis does not directly evaluate airborne lead. Neither construction nor future operations would generate quantifiable lead emissions because of regulations that require unleaded fuel and that prohibit lead in new building materials.

TAC emissions associated with Project construction that could affect surrounding areas are evaluated qualitatively. The potential for the Project operations to expose residents to TAC emissions that would exceed applicable health standards is analyzed qualitatively.

Lastly, the SJVPACD recommends that odor impacts be addressed in a qualitative manner. Such an analysis must determine if the Project would result in excessive nuisance odors, as defined under the SJVAPCD's Rule 4102 and California Code of Regulations, Health and Safety Code Section 41700, Air Quality Public Nuisance.

IMPACTS AND MITIGATION MEASURES

Impact 3.3-1: Project operation has the potential to result in a cumulatively considerable net increase of any criteria pollutant for which the Project region is in non-attainment, or conflict or obstruct implementation of the District's air quality plan. (Less than Significant)

The SJVAPCD is tasked with implementing programs and regulations required by the Federal Clean Air Act and the California Clean Air Act. In that capacity, the SJVAPCD has prepared plans to attain Federal and State ambient air quality standards. To achieve attainment with the standards, the SJVAPCD has established thresholds of significance for criteria pollutant emissions in their *SJVAPCD Guidance for Assessing and Mitigating Air Quality Impacts* (2015). Projects with emissions below the thresholds of significance for criteria pollutants would be determined to "Not conflict or obstruct implementation of the District's air quality plan".

The proposed Project would be both a direct and indirect source of air pollution. Direct sources of pollution include area, energy, and water and waste sources, due to development of the on-site buildings and associated infrastructure. Indirect sources of pollution would be due to the generation of trips of from vehicles traveling to and from the Project site.

CalEEMod™ (v.2020.4.0) was used to model operational emissions of the proposed Project. Table 3.3-6 shows proposed Project emissions as provided by CalEEMod. The SJVAPCD provides a list of applicable air quality emissions thresholds.

TABLE 3.3-6: OPERATIONAL PROJECT GENERATED EMISSIONS (TONS PER YEAR)

POLLUTANT	*CO*	*NOX*	*ROG*	*SOX*	*PM_{10}*	*$PM_{2.5}$*
THRESHOLD	100	10	10	27	15	15
EMISSIONS	40.2	6.5	9.3	0.1	8.4	2.4
EXCEEDS THRESHOLD?	**N**	**N**	**N**	**N**	**N**	**N**

SOURCES: CALEEMOD (V.2020.4.0)

The SJVAPCD has established their thresholds of significance by which the Project emissions are compared against to determine the level of significance. The SJVAPCD has established operations related emissions thresholds of significance as follows: 100 tons per year of carbon monoxide (CO, 10 tons per year of oxides of nitrogen (NO_x), 10 tons per year of reactive organic gases (ROG), 27 tons per year of sulfur oxides (SO_x), 15 tons per year particulate matter of 10 microns or less in size (PM_{10}), and 15 tons per year particulate matter of 2.5 microns or less in size ($PM_{2.5}$). If the proposed Project's emissions will exceed the SJVAPCD's threshold of significance for operational-generated emissions, the proposed Project will have a significant impact on air quality and all feasible mitigation are required to be implemented to reduce emissions to the extent feasible. As shown in Table 3.3-6 above, operational emissions would not exceed any of the SJVACPD operational thresholds of significance.

It should be noted that the emissions of ozone precursors such as ROG and NO_x attributable to the proposed Project would not be substantial enough on a regional basis for the City to be able, with currently available technical tools, to predict how the emissions of such pollutants would translate into either physical environmental changes, such as measurable effects on ambient ozone concentrations within the air basin, or health effects, such as increased respiratory problems, within any discrete population within the City or the region. Such an analysis is not reasonably feasible within the meaning of CEQA because it would require a level of speculation.

PROJECT EFFECTS ON PUBLIC HEALTH

San Joaquin County has a state designation of Nonattainment for ozone, PM_{10} and $PM_{2.5}$. The SJVAPCD developed these Project-level thresholds based on the emissions that would exceed a CAAQS or contribute substantially to an existing or projected violation of a CAAQS. Ambient levels of these criteria pollutants are likely to decrease in the future, based on current and future implementation of federal and/or state regulatory requirements, such as improvements to the statewide vehicle fleet over time (including the long-term replacement of internal combustion engine vehicles with electric vehicles in coming decades).

As shown in the table provided in Appendix B of this EIR, almost all tools available to measure criteria pollutant emissions were designed to be used at the national, state, regional, and/or city-levels. These tools are not well suited to analyze small or localized changes in pollutant concentrations associated with individual projects. Accordingly, they are not recommended by the SJVAPCD for CEQA analyses. Instead, the following analysis of health effects is presented qualitatively.

Ozone

O_3 is not emitted directly into the air but is formed through complex chemical reactions between precursor emissions of volatile organic compounds (VOC) (also known as ROG) and oxides of nitrogen (NO_x) in the presence of sunlight. The reactivity of O_3 causes health problems because it damages lung tissue, reduces lung function and sensitizes the lungs to other irritants. Scientific evidence indicates that ambient levels of O_3 not only affect people with impaired respiratory systems, such as asthmatics, but healthy adults and children as well. Exposure to O_3 for several hours at relatively low concentrations has been found to significantly reduce lung function and induce respiratory inflammation in normal, healthy people during exercise. This decrease in lung function generally is accompanied by symptoms including chest pain, coughing, sneezing and pulmonary congestion.

Studies show associations between short-term ozone exposure and non-accidental mortality, including deaths from respiratory issues. Studies also suggest long-term exposure to ozone may increase the risk of respiratory-related deaths (U.S. Environmental Protection Agency 2019a). The concentration of ozone at which health effects are observed depends on an individual's sensitivity, level of exertion (i.e., breathing rate), and duration of exposure. Studies show large individual differences in the intensity of symptomatic responses, with one study finding no symptoms to the least responsive individual after a 2-hour exposure to 400 parts per billion of ozone and a 50 percent decrement in forced airway volume in the most responsive individual. Although the results vary, evidence suggest that sensitive populations (e.g., asthmatics) may be affected on days when the 8-hour maximum ozone concentration reaches 80 parts per billion (U.S. Environmental Protection Agency 2019b).

The Project would generate emissions of ROG and NO_x during Project operational activities, as shown in Table 3.3-6. Although the exact effects of Project-level emissions on local health are not precisely known, it is likely that the increases in ROG and NO_x generated by the proposed Project would especially affect people with impaired respiratory systems, but also healthy adults and children located in the immediate vicinity of the Project site. However, the increases of these pollutants generated by the proposed Project are not on their own likely to generate an increase in the number of days exceeding the NAAQS or CAAQS standards, based on the size of the proposed Project in comparison to San Joaquin County as a whole. Instead, the increases in ROG and NO_x generated by the proposed Project when combined with the existing ROG and NO_x emitted regionally, would affect people, especially those with impaired respiratory systems located in the immediate vicinity of the Project site.

Particulate Matter

Based on studies of human populations exposed to high concentrations of particles (sometimes in the presence of SO_2) and laboratory studies of animals and humans, PM can cause major effects of concern for human health. These include effects on breathing and respiratory symptoms, aggravation of existing respiratory and cardiovascular disease, alterations in the body's defense systems against foreign materials, damage to lung tissue, carcinogenesis and premature death. Small particulate pollution has health impacts even at very low concentrations – indeed no threshold has been identified below which no damage to health is observed. The major subgroups of the

population that appear to be most sensitive to the effects of particulate matter include individuals with chronic obstructive pulmonary or cardiovascular disease or influenza, asthmatics, the elderly and children.

Numerous studies have linked PM exposure to premature death in people with preexisting heart or lung disease, nonfatal heart attacks, irregular heartbeat, aggravated asthma, decreased lung function, and increased respiratory symptoms. Studies show that every 1 microgram per cubic meter reduction in $PM_{2.5}$ results in a one percent reduction in mortality rate for individuals over 30 years old (Bay Area Air Quality Management District, 2017). Long-term exposures, such as those experienced by people living for many years in areas with high particle levels, have been associated with problems such as reduced lung function and the development of chronic bronchitis – and even premature death. Additionally, depending on its composition, both PM_{10} and $PM_{2.5}$ can also affect water quality and acidity, deplete soil nutrients, damage sensitive forests and crops, affect ecosystem diversity, and contribute to acid rain (U.S. Environmental Protection Agency 2019c).

The Project would generate emissions of PM during Project operational activities, as shown in Table 3.3-6. Although the exact effects of such emissions on local health are not known, it is likely that the increases in PM generated by the proposed Project would especially affect people with impaired respiratory systems, but also healthy adults and children located in the immediate vicinity of the Project site. However, the increases of these pollutants generated by the proposed Project are not on their own likely to generate an increase in the number of days exceeding the NAAQS or CAAQS standards, based on the size of the Project in comparison the San Joaquin County as a whole. Instead, the increases in PM generated by the proposed Project when combined with the existing PM emitted regionally, would affect people, especially those with impaired respiratory systems located in the immediate vicinity of the Project site.

Discussion

The magnitude and locations of any potential changes in ambient air quality, and thus health consequences, from these additional emissions cannot be quantified with a high level of certainty due to the dynamic and complex nature of pollutant formation and distribution (e.g., meteorology, emissions sources, sunlight exposure), as well as the variabilities in the receptors that reside in a particular area. Additionally, SJVAPCD has not established any methodology or thresholds (quantitative or qualitative) for assessing the health effects from criteria pollutants. From a qualitative perspective, it is well documented from scientific studies that criteria pollutants can have adverse health effects. The federal and state governments have established the NAAQS or CAAQS as an attempt to regionally, and cumulatively, assess and control the health effects that criteria pollutants have within Air Basins. It is anticipated that public health will continue to be affected by the emission of criteria pollutants, especially by those with impaired respiratory systems in the City of Manteca and the surrounding region so long as the region does not attain the CAAQS or NAAQS. However, the increases of these pollutants generated by the proposed Project are not on their own likely to generate an increase in the number of days exceeding the NAAQS or CAAQS standards, based on the size of the Project in comparison to the San Joaquin County as a whole. Instead, the increases in criteria pollutants generated by the proposed Project when combined with the existing criteria pollutants emitted regionally, would affect people, especially those with impaired

respiratory systems located in the immediate vicinity of the Project site.

CONCLUSION

As shown in Table 3.3-6, the proposed Project's operational criteria pollutant would not exceed the applicable SJVAPCD thresholds of significance. Therefore, the Project's criteria pollutant emissions would be considered to have a **less than significant** impact.

Impact 3.3-2: Proposed Project construction activities would not result in a cumulatively considerable net increase of any criteria pollutant for which the Project region is in non-attainment, or conflict or obstruct implementation of the District's air quality plan. (Less than Significant with Mitigation)

Emissions from construction activities represent temporary impacts that are typically short in duration, depending on the size, phasing, and type of project. Air quality impacts can nevertheless be acute during construction periods, resulting in significant localized impacts to air quality. Construction-related activities would result in Project-generated emissions from demolition, site preparation, grading, paving, building construction, and architectural coatings. CalEEMod™ (v.2020.4.0) was used to estimate construction emissions for the proposed Project. Table 3.3-7, below, provides the construction criteria pollutant emissions associated with implementation of the proposed Project.

TABLE 3.3-7: MAXIMUM CONSTRUCTION PROJECT GENERATED EMISSIONS (TONS PER YEAR) - MITIGATED

POLLUTANT	*CO*	*NOX*	*ROG*	*SOX*	*PM_{10}*	*$PM_{2.5}$*
THRESHOLD	100	10	10	27	15	15
EMISSIONS	4.3	3.7	6.3	<0.1	0.8	0.3
EXCEEDS THRESHOLD?	**N**	**N**	**N**	**N**	**N**	**N**

SOURCES: CALEEMOD (V.2020.4.0)

If the proposed Project's emissions will exceed the SJVAPCD's threshold of significance for construction-generated emissions, the proposed Project will have a significant impact on air quality and all feasible mitigation are required to be implemented to reduce emissions. As shown in Table 3.3-7, Project maximum construction emissions would not exceed the SJVAPCD thresholds of significance. Nevertheless, regardless of emission quantities, the SJVAPCD requires construction related mitigation in accordance with their rules and regulations. Implementation of the Mitigation Measure 3.3-1 through 3.3-4 would further reduce proposed Project construction related emissions to the extent possible.

CONCLUSION

The proposed Project would comply with pre-existing requisite federal, State, SJVAPCD, and other local regulations and requirements, as well as implement the mitigation measures provided by the SJVAPCD for construction-related PM_{10} emissions, including those provided in Mitigation Measure 3.3-1 through 3.3-4. Therefore, the Project's criteria pollutant emissions would be considered to have a **less than significant** impact.

MITIGATION MEASURE(S)

Mitigation Measure 3.3-1: *Prior to the issuance of a Grading Permit for each phase of the Project, the Project Proponent shall prepare and submit a Dust Control Plan that meets all of the applicable requirements of APCD Rule 8021, Section 6.3, for the review and approval of the APCD Air Pollution Control Officer.*

Mitigation Measure 3.3-2: *During all construction activities, the Project Proponent shall implement dust control measures, as required by APCD Rules 8011-8081, to limit Visible Dust Emissions to 20% opacity or less. Dust control measures shall include application of water or chemical dust suppressants to unpaved roads and graded areas, covering or stabilization of transported bulk materials, prevention of carryout or trackout of soil materials to public roads, limiting the area subject to soil disturbance, construction of wind barriers, access restrictions to inactive sites as required by the applicable rules.*

Mitigation Measure 3.3-3: *During all construction activities, the Project proponent shall implement the following dust control practices identified in Tables 6-2 and 6-3 of the GAMAQI (2002).*

a. *All disturbed areas, including storage piles, which are not being actively utilized for construction purposes, shall be effectively stabilized of dust emissions using water, chemical stabilizer/suppressant, or vegetative ground cover.*
b. *All on-site unpaved roads and off-site unpaved access roads shall be effectively stabilized of dust emissions using water or chemical stabilizer/suppressant.*
c. *All land clearing, grubbing, scraping, excavation, land leveling, grading, cut and fill, and demolition activities shall control fugitive dust emissions by application of water or by presoaking.*
d. *When materials are transported off-site, all material shall be covered, effectively wetted to limit visible dust emissions, or at least six inches of freeboard space from the top of the container shall be maintained.*
e. *All operations shall limit or expeditiously remove the accumulation of mud or dirt from adjacent public streets at least once every 24 hours when operations are occurring. The use of dry rotary brushes is expressly prohibited except where preceded or accompanied by sufficient wetting to limit the visible dust emissions. Use of blower devices is expressly forbidden.*
f. *Following the addition of materials to, or the removal of materials from, the surface of outdoor storage piles, said piles shall be effectively stabilized of fugitive dust emissions utilizing sufficient water or chemical stabilizer/suppressant.*
g. *Limit traffic speeds on unpaved roads to 5 mph.*
h. *Install sandbags or other erosion control measures to prevent silt runoff to public roadways from sites with a slope greater than one percent.*

Mitigation Measure 3.3-4: *Asphalt paving shall be applied in accordance with APCD Rule 4641, the purpose of which is to limit VOC emissions by restricting the application and manufacturing of certain types of asphalt for paving and maintenance operations. This rule applies to the manufacture and use of cutback asphalt, slow cure asphalt and emulsified asphalt for paving and maintenance*

operations. The Project Applicant shall coordinate with the APCD, prior to Project asphalt paving activities, to ensure all Project asphalt paving would comply with this rule. The Project Applicant shall provide the City of Manteca with evidence of consultation with the APCD, including confirmation of compliance with APCD Rule 4641.

Impact 3.3-3: The proposed Project would not generate carbon monoxide hotspot impacts. (Less than Significant)

Very high levels of CO are not likely to occur outdoors. However, when CO levels are elevated outdoors, they can be of particular concern for people with some types of heart disease. These people already have a reduced ability for getting oxygenated blood to their hearts in situations where the heart needs more oxygen than usual. They are especially vulnerable to the effects of CO when exercising or under increased stress. In these situations, short-term exposure to elevated CO may result in reduced oxygen to the heart accompanied by chest pain also known as angina (U.S. EPA, 2016). Such acute effects may occur under current ambient conditions for some sensitive individuals, while increases in ambient CO levels could increase the risk of such incidences.

The Project site is located in a State attainment area and a federal attainment-unclassified area for carbon monoxide. In addition, CO emissions under Project operation are below the applicable significance threshold promulgated by the SJVAPCD. Therefore, no project-level conformity analysis is necessary for CO. Increases in proposed Project VMT would increase concentrations of carbon monoxide (CO) along streets and intersections that provide access to the Project site. Carbon monoxide is a local pollutant (i.e., high concentrations are normally only found very near sources), and can form local elevated concentrations under specific conditions. The major source of carbon monoxide, a colorless, odorless, poisonous gas, is automobile traffic. Elevated concentrations (i.e., hotspots), therefore, are usually only found near areas of very high traffic volume and congestion.

Several factors combine to make substantial concentrations of carbon monoxide unlikely. Existing physical constraints such as high-density, high-profile buildings or other obstructions that could prevent dispersion of carbon monoxide are largely absent. Predominant weather conditions in the area include air movement that would help facilitate carbon monoxide dispersion. Congested traffic conditions that otherwise could result in concentration of carbon monoxide would be of short duration. Further, under existing regulatory and legislative mandates, emissions volumes from all vehicles classes will continue to decline. Given these factors, substantial concentrations of carbon monoxide are not expected at or along any affected roadways or intersections.

CONCLUSION

This Project is located in an area that is designated attainment and attainment-unclassified for carbon monoxide. No Project-level conformity analysis is necessary for CO. Substantial concentrations of carbon monoxide are not expected at or along any streets or intersections affected by the development of the Project site. Impacts associated with carbon monoxide hotspots would be **less than significant***,* and no additional mitigation is required.

Impact 3.3-4: The proposed Project has the potential for public exposure to toxic air contaminants. (Less than Significant with Mitigation)

A toxic air contaminant (TAC) is defined as an air pollutant that may cause or contribute to an increase in mortality or in serious illness, or that may pose a hazard to human health. TACs are usually present in minute quantities in the ambient air. However, their high toxicity or health risk may pose a threat to public health even at very low concentrations. In general, for those TACs that may cause cancer, there is no concentration that does not present some risk. This contrasts with the criteria pollutants for which acceptable levels of exposure can be determined and for which the state and federal governments have set ambient air quality standards.

Controlling air toxic emissions became a national priority with the passage of the Clean Air Act Amendments (CAAA) of 1990, whereby Congress mandated that the U.S. EPA regulate 188 air toxics, also known as hazardous air pollutants. The U.S. EPA has assessed this expansive list in their latest rule on the Control of Hazardous Air Pollutants from Mobile Sources (Federal Register, Vol. 72, No. 37, page 8430, February 26, 2007) and identified a group of 93 compounds emitted from mobile sources. In addition, the U.S. EPA identified seven compounds with significant contributions from mobile sources that are among the national and regional-scale cancer risk drivers from their 1999 National Air Toxics Assessment. These are acrolein, benzene, 1,3-butidiene, diesel particulate matter plus diesel exhaust organic gases (diesel PM), formaldehyde, naphthalene, and polycyclic organic matter.

The 2007 U.S. EPA rule requires controls that will dramatically decrease Mobile Source Air Toxics (MSAT) emissions through cleaner fuels and cleaner engines. According to an FHWA analysis using EPA's MOBILE6.2 model, even if vehicle activity (VMT) increases by 145 percent, a combined reduction of 72 percent in the total annual emission rate for the priority MSAT is projected from 1999 to 2050. California maintains stricter standards for clean fuels and emissions compared to the national standards, therefore it is expected that MSAT trends in California will decrease consistent with or more than the U.S. EPA's national projections.

The California Air Resources Board (CARB) published the *Air Quality and Land Use Handbook: A Community Health Perspective* (CARB, 2005) to provide information to local planners and decision-makers about land use compatibility issues associated with emissions from industrial, commercial and mobile sources of air pollution. The CARB Handbook indicates that mobile sources continue to be the largest overall contributors to the State's air pollution problems, representing the greatest air pollution health risk to most Californians. The most serious pollutants on a statewide basis include diesel exhaust particulate matter (diesel PM), benzene, and 1,3-butadiene, all of which are emitted by motor vehicles. These mobile source air toxics are largely associated with freeways and high traffic roads. Non-mobile source air toxics are largely associated with industrial and commercial uses. Table 3.3-8 provides the California Air Resources Board minimum separation recommendations on siting sensitive land uses.

TABLE 3.3-8: CARB MINIMUM SEPARATION RECOMMENDATIONS ON SITING SENSITIVE LAND USES

SOURCE CATEGORY	*ADVISORY RECOMMENDATIONS*
Freeways and High-Traffic Roads	• Avoid siting new sensitive land uses within 500 feet of a freeway, urban roads with 100,000 vehicles/day, or rural roads with 50,000 vehicles/day.
Distribution Centers	• Avoid siting new sensitive land uses within 1,000 feet of a distribution center (that accommodates more than 100 trucks per day, more than 40 trucks with operating transport refrigeration units (TRUs) per day, or where TRU unit operations exceed 300 hours per week). • Take into account the configuration of existing distribution centers and avoid locating residences and other new sensitive land uses near entry and exit points.
Rail Yards	• Avoid siting new sensitive land uses within 1,000 feet of a major service and maintenance rail yard. • Within one mile of a rail yard, consider possible siting limitations and mitigation approaches.
Ports	• Avoid siting of new sensitive land uses immediately downwind of ports in the most heavily impacted zones. Consult local air districts or the CARB on the status of pending analyses of health risks.
Refineries	• Avoid siting new sensitive land uses immediately downwind of petroleum refineries. Consult with local air districts and other local agencies to determine an appropriate separation.
Chrome Platers	• Avoid siting new sensitive land uses within 1,000 feet of a chrome plater.
Dry Cleaners Using Perchloro-ethylene	• Avoid siting new sensitive land uses within 300 feet of any dry cleaning operation. For operations with two or more machines, provide 500 feet. For operations with 3 or more machines, consult with the local air district. • Do not site new sensitive land uses in the same building with perc dry cleaning operations.
Gasoline Dispensing Facilities	• Avoid siting new sensitive land uses within 300 feet of a large gas station (defined as a facility with a throughput of 3.6 million gallons per year or greater). A 50-foot separation is recommended for typical gas dispensing facilities.

SOURCES: AIR QUALITY AND LAND USE HANDBOOK: A COMMUNITY HEALTH PERSPECTIVE" (CARB 2005)

Residences are proposed as part of the Project, which are considered traditional sensitive receptors. Some residences located at the eastern portion of the Project site would be located within 500 feet of SR 99, which is within the CARB minimum separation recommendations for sensitive land uses, as provided in Table 3.3-8. However, since the proposed Project would not site land uses that would generate a significant risk of public exposure to TACs, the proposed Project would have a **less than significant** impact relative to this topic.

Impact 3.3-5: The proposed Project would not cause exposure to other emissions (such as those leading to odors) adversely affecting a substantial number of people. (Less than Significant)

The following text addresses odors. Other emissions (including criteria pollutants and TACs) are addressed in Impacts 3.3-1 through 3.3-4.

While offensive odors rarely cause any physical harm, they can be very unpleasant, leading to considerable distress among the public and often generating citizen complaints to local governments and the SJVAPCD. The general nuisance rule (Health and Safety Code §41700) is the

basis for the threshold.

Examples of facilities that are known producers of 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 proposes to 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 proposed Project does not include new industrial uses that are not already present in the vicinity of the Project site. Air district Rule 402 prohibits any mobile or stationary source generating an objectionable odor, with the exception of odors emanating from certain agricultural operations. The California Health and Safety Code §41700 and Air District Rule 402 prohibit emissions of air contaminants from any source that cause nuisance or annoyance to a considerable number of people or that present a threat to public health or cause property damage. Compliance with these rules would preclude land uses proposed under the proposed Project from emitting objectionable odors.

CONCLUSION

The proposed Project does not propose sensitive receptors that would be exposed to odors in the vicinity; nor does it propose uses that would create new odors that would expose substantial numbers of people. Therefore, operation of the proposed Project would not result in significant objectionable odors. Impacts associated with exposure to odors would be **less than significant.**

This section describes the regulatory setting, regional biological resources, and impacts that are likely to result from Project implementation. The analysis contained in this section is intended to be at a Project-level, and covers impacts associated with the conversion of the entire site to an urban use. This section is based in part on the following technical studies: *City of Manteca General Plan 2023* (City of Manteca, as amended through 2013), and *Manteca General Plan 2023 Draft Environmental Impact Report* (City of Manteca, 2003), as well as site specific surveys and analysis.

There was one comment regarding a large Cypress tree, and other 50-year old trees located along Union Road in the non-development area received during the Notice of Preparation (NOP) comment period regarding biological resources.

3.4.1 ENVIRONMENTAL SETTING

GEOMORPHIC PROVINCES/BIOREGION

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 Range 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 two 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.

The bioregion is bordered on the west by the coastal mountain ranges. Its eastern boundary joins the southern two-thirds of the Sierra bioregion, which features Yosemite, Kings Canyon, and Sequoia National Parks. At its northern end, the San Joaquin Valley bioregion borders the southern end of the Sacramento Valley bioregion. To the west, south, and east, the bioregion extends to the edges of the valley floor.

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.

LOCAL SETTING

Location

The project site is directly north of the City of Manteca's limit line adjacent to the Union Ranch development. The Project site is immediately west of State Route 99 (SR 99) and east of the Union Ranch Specific Plan Area. The Project site is bounded on the north by farmland, on the east by SR 99, on the south by existing residences and agricultural fields, and on the west by Union Road and the Union Ranch Specific Plan. Figures 2.0-1 and 2.0-2 in show the Project's regional location and vicinity. The Project site is in the northwest ¼ of Section 20, Township 1 South, Range 7 East Mount Diablo Base and Meridian (MDBM). Figure 2.0-3 illustrates the project location on the USGS Manteca, California, 7.5-minute series quadrangle map.

Topography

The Project site is relatively flat with natural gentle slope from south to north. The Project site topography ranges in elevation from approximately 29 to 36' feet above sea level.

Climate

The City of Manteca is located in the northern portion of the San Joaquin Valley, which 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.

Vegetation

Vegetation on the Project site consists of agricultural, ruderal, and landscaping. Because of the active agricultural use over the majority of the Project site, there is very limited natural vegetation on the Project site with the exception of the perimeter of the agricultural fields and near the existing residential uses along Airport Way and Woodward Avenue. Common plant species observed in the perimeter of the agricultural fields include: wild oat (*Avena barbata*), rip-gut brome (*Bromus diandrus*), softchess (*Bromus hordeaceus*) alfalfa (*Medicago sativa*), Russian thistle (*Salsola tragus*), Italian thistle (*Carduus pycnocephalus*), rough pigweed (*Amaranthus retroflexus*), sunflower (*Helianthus annuus*), tarragon (*Artemisia dracunculus*), coyote brush (*Baccharis pilularis*), prickly lettuce (*Lactuca serriola*), milk thistle (*Silybum marianum*), sow thistle (*Sonchus asper*), telegraph weed (*Heterotheca grandiflora*), barley (*Hordeum* sp.), mustard (*Brassica niger*), and heliotrope (*Heliotropium curassavicum*).

Wildlife

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.

Plant Communities

Agricultural and natural plant communities provide habitat for a variety of biological resources in the region. Sensitive habitats include those that are of special concern to resource agencies or those that are protected under a Habitat Conservation Plan, Natural Community Conservation Plan, the California Environmental Quality Act (CEQA), the Fish and Game Code, or the Clean Water Act (CWA). Additionally, sensitive habitats are usually protected under specific policies from local agencies. Figure 3.4-1 illustrates the plant communities (land cover types) in the vicinity of the Project site.

Table 3.4-1 summarizes the plant communities (land cover types) by acreage.

TABLE 3.4-1: LAND COVER TYPES

LAND COVER TYPE	*ACREAGE*
Deciduous Orchard	173.0
Dryland Grain Crops	0.55
Irrigated Hayfield	7.04
Pasture	14.64
Urban	2.49
Vineyard	5.08

SOURCE: CALFIRE FRAP DATA, 2021.

The majority of the Project site is labeled as Deciduous Orchard (173.0 acres) on the land cover types maps. The remainder of the site includes Pasture (14.64 acres), Irrigated Hayfield (7.04 acres), Vineyard (5.08 acres), Urban (2.49 acres), and Dryland Grain Crops (0.55 acres).

The Project site has been previously and actively used for agricultural use (i.e., crop production, pasture uses, dairy, and grazing). Agricultural areas are generally flat and well drained, and as a result are well suited for many crops. Alfalfa fields, hay, row crops, orchards, annual grasslands, cattle pasture, and dairies dominate the agricultural areas in the region. Agricultural fields commonly have irrigation canals, ditches, and stock ponds that serve as a water source or drainage for the fields and habitat for a limited variety of plants and animals.

Hydrogeomorphic Features

The Development Area is bordered on the north by agricultural lands occupied by orchards, on the east by State Route 99, on the south by the Union Ranch Subdivision and large lot residential housing, and on the west by the Union Ranch Subdivision and Union Rd. The current uses on the

Development Area are predominantly agricultural. There are two existing residential units containing outbuildings and two large barns within the western edge of the Union Ranch North portion of the Development Area. One large gravel road runs north to south and bisects the Union Ranch North and Stagecoach at M&E sections of the Development Area. Four smaller gravel roads used to service the surrounding orchards run east to west within the Union Ranch North section of the Development Area. A South San Joaquin Irrigation District (SSJID) pipeline exists within the Union Ranch North section of the Development Area. The pipeline generally runs northwest to southeast until paralleling the gravel road bisecting the two portions of the proposed annexation. Irrigation structures are also found running north to south on the eastern edge of the Stagecoach at M&E portion of the Development Area.

The Non-development Area is located north and east of the City of Manteca city limits, adjacent to the Union Ranch Subdivision. The Non-development Area contains 10 parcels each developed with a single-family residence aside from a single parcel containing 2 residential units. Nine of the existing residential units (Non-development Subarea 3) are located just west of the Development Area and Union Road in the northwest corner of the Project site, two residential units are located east of Union Road (Non-development Subarea 2), and the remaining single residential unit (Non-development Subarea 1) is east of Union Road in the southeast corner of the Project site.

There are no rivers, streams, or other aquatic habitats on the Project site.

SPECIAL-STATUS SPECIES

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 Information for Planning and Consultation (IPaC) database. The background search was regional in scope and focused on the documented occurrences within the nine-quadrangle region (approximately 10 miles) of the Project site. The background search included the following USGS quadrangles: Stockton West, Stockton East, Peters, Lathrop, Manteca, Avena, Vernalis, Ripon, and Salida. The Table 3.4-2 provides a list of special-status plants and Table 3.4-3 provides a list of special-status animals. Figure 3.4-2 presents the documented occurrences within the nine-quadrangle region for the Project site.

TABLE 3.4-2: SPECIAL-STATUS PLANT SPECIES WHICH MAY OCCUR IN PROJECT AREA

SPECIES	*STATUS (FED./CA/ CNPS/SJMSCP)*	*GEOGRAPHIC DISTRIBUTION*	*HABITAT AND BLOOMING PERIOD*	*PRESENCE DETERMINATION*
alkali-sink goldfields *Lasthenia chrysantha*	--/--/1B.1/No	Sacramento Valley, San Joaquin Valley	Vernal pools. Alkaline. 0-200 m. Feb-April.	Not Present
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.	Not Present
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.	Not Present
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.	Not Present
diamond-petaled California poppy *Eschscholzia rhombipetala*	--/--/1B.1/Yes	Found in Alameda, Contra Costa*, Colusa*, San Joaquin, San Luis Obispo (SLO), Stanislaus* Counties *presumed extirpated	Valley and foothill grassland. Alkaline, clay slopes and flats. 30-625 m. March-April.	Not Present
large-flowered fiddleneck *Amsinckia grandiflora*	E/E/1B.1/Yes	Native to California found in Contra Costa, Alameda, and San Joaquin Counties	Found in grasslands; it grows on sedimentary loam in mesic areas of its range. April–May.	Not Present
lesser saltscale *Atriplex minuscula*	--/--/1B.2/No	Scattered locations in the Central Valley in Alameda, Butte, Fresno, Kings, Kern, Madera, Merced, Stanislaus, Tulare counties	Alkaline, sandy soils. Chenopod scrub, playas, valley and foothill grassland. May-October.	Not Present
Mason's lilaeopsis *Lilaeopsis masonii*	--/R/1B.1/Yes	Sacramento-San Joaquin River Delta and nearby shores of San Francisco Bay	Marshes and swamps, riparian scrub. Tidal zones, in muddy or silty soil formed through river deposition or river bank erosion. In brackish or freshwater. 0-10 m. April-November.	Not Present

SPECIES	*STATUS (FED./CA/ CNPS/SJMSCP)*	*GEOGRAPHIC DISTRIBUTION*	*HABITAT AND BLOOMING PERIOD*	*PRESENCE DETERMINATION*
palmate-bracted bird's-beak *Chloropyron palmatum*	E/E/1B.1/Yes	Scattered locations in Fresno and Madera counties in the San Joaquin Valley, San Joaquin, Yolo, and Colusa counties in the Sacramento Valley, and the Livermore Valley area of Alameda County	Saline-alkaline soils in seasonally-flooded lowland plains and basins at elevations of less than 500 feet. May-October.	Not Present
showy golden madia *Madia radiata*	--/--/1B.1/Yes	It is endemic to California, where it is known mostly from the Central Coast Ranges and adjacent edges of the San Francisco Bay Area and Central Valley	Valley and foothill grassland, cismontane woodland. Mostly on adobe clay in grassland or among shrubs. 75-1220 m. March-May.	Not Present
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.	Not Present
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.	Not Present
saline clover *Trifolium hydrophilum*	--/--/1B.2/No	Eastern and Northern San Francisco Bay region, the Delta, western San Joaquin Valley, southern San Jose	Marshes and swamps, Valley and foothill grassland (mesic, alkaline), and Vernal pools. April-June.	Not Present
San Joaquin spearscale *Extriplex joaquinana*	--/--/1B.2/Yes	Delta region, central valley and central coast	Alkaline. Chenopod scrub, Meadows and seeps, Playas, Valley and foothill grassland. April-October.	Not Present
Sanford's arrowhead *Sagittaria sanfordii*	--/--/1B.2/Yes	Butte, Del Norte, El Dorado, Fresno, Merced, Mariposa, Marin, Napa, Orange, Placer, Sacramento, San Bernardino, Shasta, San Joaquin, Solano, Tehama, Tulare, Ventura, and Yuba Counties	Marshes and swamps. In standing or slow-moving freshwater ponds, marshes, and ditches. 0-605 m. May-October (November).	Not Present
Suisun Marsh aster *Symphyotrichum lentum*	--/--/1B.2/Yes	Contra Costa, Napa, Sacramento, San Joaquin, Solano, and Yolo Counties	Marshes and swamps (brackish and freshwater). Most often seen along sloughs with Phragmites, Scirpus, blackberry, Typha, etc. 0-15 m. (April) May-November.	Not Present
woolly rose-mallow *Hibiscus lasiocarpos var. occidentalis*	--/--/1B.2/No	Central Valley of California, as well as populations in eastern North America	All along the waterways of the Delta. June-September.	Not Present

SPECIES	*STATUS (FED./CA/ CNPS/SJMSCP)*	*GEOGRAPHIC DISTRIBUTION*	*HABITAT AND BLOOMING PERIOD*	*PRESENCE DETERMINATION*
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.	Not Present
watershield *Brasenia schreberi*	--/--/2B.3/No	Central Valley of California and western North America	Freshwater Marshes and swamps. June-September.	Not Present

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).

TABLE 3.4-3: SPECIAL-STATUS WILDLIFE AND FISH SPECIES WHICH MAY OCCUR IN PROJECT AREA

SPECIES	*STATUS (FED/CA/ SJMSCP)*	*GEOGRAPHIC DISTRIBUTION*	*HABITAT REQUIREMENTS*
INVERTEBRATES			
California linderiella *Linderiella occidentalis*	--/--/No	Ranges from near Redding in the north to as far south as Fresno County, mainly to the east of the Sacramento and San Joaquin Rivers	Natural, and artificial, seasonally ponded habitat types including: vernal pools, swales, ephemeral drainages, stock ponds, reservoirs, ditches, backhoe pits, and ruts caused by vehicular activities
Conservancy fairy shrimp *Branchinecta conservatio*	E/--/Yes	Sacramento Valley and the northern San Joaquin Valley, and the eastern flank of the central coastal range	Large to very large vernal pools and vernal lakes although they also have been found in alkaline pools
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.
Crotch bumble bee *Bombus crotchii*	--/CE/No	Central California south to Baja California del Norte, Mexico, and includes coastal areas east to the edges of the deserts and the Central Valley	Open grassland and scrub
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.
western bumble bee *Bombus occidentalis*	--/CE/No	Western North America, ranging from the tundra region in Alaska and Yukon south along the west coast to southern British Columbia to central California, Arizona and New Mexico and east into southern Saskatchewan and northwestern Great Plains	Open coniferous, deciduous and mixed-wood forests, wet and dry meadows, montane meadows and prairie grasslands, meadows bordering riparian zones, and along roadsides in taiga adjacent to wooded areas, urban parks, gardens and agricultural areas, subalpine habitats and more isolated natural areas
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.
foothill yellow-legged frog *Rana boylii*	T/SSC/Yes	Coast Ranges from northern Oregon, through California, and into Baja California, Mexico as well as in the foothills of the Sierra Nevada and southern Cascade Range in California.	Partly-shaded, shallow streams and riffles with a rocky substrate in a variety of habitats. Needs at least some cobble-sized substrate for egg-laying. Needs at least 15 weeks to attain metamorphosis.

SPECIES	*STATUS (FED/CA/ SJMSCP)*	*GEOGRAPHIC DISTRIBUTION*	*HABITAT REQUIREMENTS*
western spadefoot *Spea hammondii*	T/T/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
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
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
California horned lark *Eremophila alpestris actia*	--/WL/Yes	Central Valley and coastal valleys and foothills.	Forage in large groups in open grasslands, nesting in hollows on the ground, and are also regularly found breeding on the Valley floor in suitable habitat.
least Bell's vireo *Vireo bellii pusillus*	E/E/No	Central Valley of California and other low-elevation river valleys.	Dense brush, mesquite, willow-cottonwood forest, streamside thickets, and scrub oak.
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
merlin *Falco columbarius*	--/WL/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
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
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

SPECIES	*STATUS (FED/CA/ SJMSCP)*	*GEOGRAPHIC DISTRIBUTION*	*HABITAT REQUIREMENTS*
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
white-tailed kite *Elanus leucurus*	--/FP/Yes	Gulf Coast in Texas and Mexico and in the valley and coastal regions of central and southern California	Grasslands, marshes, row crops and alfalfa, where they hover while foraging for rodents and insects.
Yellow-headed blackbird *Xanthocephalus 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.
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.
steelhead - Central Valley DPS *Oncorhynchus mykiss irideus pop. 11*	T/--/No	From Russian River, south to Soquel Creek and to, but not including, Pajaro River. Also San Francisco and San Pablo Bay basins.	Aquatic, flowing waters. Populations in the Sacramento and San Joaquin rivers and their tributaries.
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			
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
pallid bat *Antrozous pallidus*	--/SSC/No	Occurs throughout California except the high Sierra from Shasta to Kern County and the northwest coast, primarily at lower and mid elevations	Occurs in a variety of habitats from desert to coniferous forest. Most closely associated with oak, yellow pine, redwood, and giant sequoia habitats in northern California and oak woodland, grassland, and desert scrub in southern California. Relies heavily on trees for roosts

SPECIES	*STATUS (FED/CA/ SJMSCP)*	*GEOGRAPHIC DISTRIBUTION*	*HABITAT REQUIREMENTS*
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
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
San Joaquin pocket mouse *Perognathus inornatus*	--/--/Yes	Occurs throughout the San Joaquin Valley and in the Salinas Valley	Favors grasslands and scrub habitats with fine textured soils
Townsend's big-eared bat *Corynorhinus townsendii*	--/SSC/Yes	Throughout California in a wide variety of habitats	Most common in mesic sites. Roosts in the open, hanging from walls and ceilings. Roosting sites limiting. Extremely sensitive to human disturbance.
western mastiff bat *Eumops perotis californicus*	--/SSC/Yes	Ranges from central Mexico across the southwestern United States (parts of California, southern Nevada, southwestern Arizona, southern New Mexico and western Texas). Significant populations of E. perotis occur in many of the Sierra Nevada river drainages, particularly in the central and southern Sierra, i.e., the Stanislaus, Tuolumne, Merced (North and South Forks), San Joaquin, Kaweah, Tule, and Kern rivers.	Many open, semi-arid to arid habitats, including conifer & deciduous woodlands, coastal scrub, grasslands, chaparral, etc. Roosts in crevices in cliff faces, high buildings, trees and tunnels.
REPTILES			
California glossy snake *Arizona elegans occidentalis*	--/SSC/No	Patchily distributed from the eastern portion of San Francisco Bay, southern San Joaquin Valley, and the Coast, Transverse, and Peninsular ranges, south to Baja California.	Generalist reported from a range of scrub and grassland habitats, often with loose or sandy soils
coast horned lizard *Phrynosoma blainvillii*	--/SSC/No	Historically found in California along the Pacific coast from the Baja California border west of the deserts and the Sierra Nevada, north to the Bay Area, and inland as far north as Shasta Reservoir, and south into Baja California.	Frequents a wide variety of habitats, most common in lowlands along sandy washes with scattered low bushes. Open areas for sunning, bushes for cover, patches of loose soil for burial, and abundant supply of ants and other insects.
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.
San Joaquin coachwhip *Masticophis flagellum ruddocki*	--/SSC/Yes	The San Joaquin coachwhip is endemic to California, ranging from Arbuckle in the Sacramento Valley in Colusa County southward to the Grapevine in the Kern County portion of the San Joaquin Valley and westward into the inner South Coast Ranges.	Open, dry habitats with little or no tree cover. Found in valley grassland and saltbush scrub in the San Joaquin Valley. Needs mammal burrows for refuge and oviposition sites.

SPECIES	*STATUS (FED/CA/ SJMSCP)*	*GEOGRAPHIC DISTRIBUTION*	*HABITAT REQUIREMENTS*
western pond turtle *Emys marmorata*	--/SSC/Yes	Southern Central Valley (San Joaquin clade), a limited region in Santa Barbara and Ventura counties (Santa Barbara clade), and a region south of the Tehachapi Mountains and west of the Tranverse ranges south to Baja California (Southern clade)	A thoroughly aquatic turtle of ponds, marshes, rivers, streams and irrigation ditches, usually with aquatic vegetation, below 6000 ft elevation. Needs basking sites and suitable (sandy banks or grassy open fields) upland habitat up to 0.5 km from water for egg-laying

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 CALIFORNIA ENDANGERED SPECIES ACT.
FP = FULLY PROTECTED UNDER THE CALIFORNIA FISH AND GAME CODE.
SSC = SPECIES OF SPECIAL CONCERN IN CALIFORNIA.

3.4.2 REGULATORY SETTING

There are a number of regulatory agencies whose responsibility includes the oversight of the natural resources of the State and nation including the California Department of Fish and Wildlife (CDFW), USFWS, U.S. Army Corps of Engineers (USACE), and the Central Valley Regional Water Quality Control Board (CVRWQCB). These agencies often respond to declines in the quantity of a particular habitat or plant or animal species by developing protective measures for those species or habitat type. The following is an overview of the Federal, State and local regulations that are applicable to the proposed Project.

FEDERAL

Federal Endangered Species Act

The Federal Endangered Species Act (FESA), passed in 1973, defines an endangered species as any species or subspecies that is in danger of extinction throughout all or a significant portion of its range. A threatened species is defined as any species or subspecies that is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.

Once a species is listed it is fully protected from a "take" unless a take permit is issued by the USFWS. A take is defined as the harassing, harming, pursuing, hunting, shooting, wounding, killing, trapping, capturing, or collecting wildlife species or any attempt to engage in such conduct, including modification of its habitat (16 USC 1532, 50 CFR 17.3). Proposed endangered or threatened species are those species for which a proposed regulation, but not a final rule, has been published in the Federal Register.

Migratory Bird Treaty Act

To kill, possess, or trade a migratory bird, bird part, nest, or egg is a violation of the Federal Migratory Bird Treaty Act (FMBTA: 16 U.S.C., §703, Supp. I, 1989), unless it is in accordance with the regulations that have been set forth by the Secretary of the Interior.

Federal Bald and Golden Eagle Protection Act

The Federal Bald and Golden Eagle Protection Act provide regulations to protect bald and golden eagles as well as their nests and eggs from willful damage or injury.

Clean Water Act – Section 404

Section 404 of the CWA regulates all discharges of dredged or fill material into waters of the U.S. Discharges of fill material includes the placement of fill that is necessary for the construction of any structure, or impoundment requiring rock, sand, dirt, or other material for its construction; site-development fills for recreational, industrial, commercial, residential, and other uses; causeways or road fills; and fill for intake and outfall pipes and subaqueous utility lines [33 C.F.R. §328.2(f)].

Waters of the U.S. include lakes, rivers, streams, intermittent drainages, mudflats, sandflats, wetlands, sloughs, and wet meadows. Wetlands are defined as "those areas that are inundated or

saturated by surface or groundwater at a frequency and duration sufficient to support and under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions" [33 C.F.R. §328.3(b)]. Waters of the U.S. exhibit a defined bed and bank and ordinary high-water mark (OHWM). The OHWM is defined by the USACE as "that line on shore established by the fluctuations of water and indicated by physical character of the soil, destruction of terrestrial vegetation, the presence of litter and debris, or other appropriate means that consider the characteristics of the surrounding areas" [33 C.F.R. §328.3(e)].

The USACE is the agency responsible for administering the permit process for activities that affect waters of the U.S. Executive Order 11990 is a federal implementation policy, which is intended to result in no net loss of wetlands.

Clean Water Act – Section 401

Section 401 of the CWA (33 U.S.C. 1341) requires an applicant who is seeking a 404 permit to first obtain a water quality certification from the CVRWQCB. To obtain the water quality certification, the CVRWQCB must indicate that the proposed fill would be consistent with the standards set forth by the State.

Rivers and Harbors Act of 1899

The Rivers and Harbors Act prohibits the obstruction or alteration of any navigable water of the United States. The Act requires authorization from the USACE for any excavation or deposition of materials into these waters or for any work that could affect the course, location, condition, or capacity of rivers or harbors.

STATE

Fish and Game Code §2050-2097 – California Endangered Species Act

The California Endangered Species Act (CESA) protects certain plant and animal species when they are of special ecological, educational, historical, recreational, aesthetic, economic, and scientific value to the people of the State. CESA established that it is State policy to conserve, protect, restore, and enhance endangered species and their habitats.

CESA was expanded upon the original Native Plant Protection Act and enhanced legal protection for plants. To be consistent with Federal regulations, CESA created the categories of "threatened" and "endangered" species. It converted all "rare" animals into the Act as threatened species, but did not do so for rare plants. Thus, there are three listing categories for plants in California: rare, threatened, and endangered. Under State law, plant and animal species may be formally designated by official listing by the California Fish and Game Commission.

Fish and Game Code §1900-1913 – California Native Plant Protection Act

In 1977 the State Legislature passed the Native Plant Protection Act (NPPA) in recognition of rare and endangered plants of the State. The intent of the law was to preserve, protect, and enhance endangered plants. The NPPA gave the California Fish and Game Commission the power to designate

native plants as endangered or rare, and to require permits for collecting, transporting, or selling such plants. The NPPA includes provisions that prohibit the taking of plants designated as "rare" from the wild, and a salvage mandate for landowners, which requires notification of the CDFW 10 days in advance of approving a building site.

Fish and Game Code §3503, 3503.5, 3800 – Predatory Birds

Under the California Fish and Game Code, all predatory birds in the order Falconiformes or Strigiformes in California, generally called "raptors," are protected. The law indicates that it is unlawful to take, possess, or destroy the nest or eggs of any such bird unless it is in accordance with the code. Any activity that would cause a nest to be abandoned or cause a reduction or loss in a reproductive effort is considered a take. This generally includes construction activities.

Fish and Game Code §1601-1603 – Streambed Alteration

Under the California Fish and Game Code, CDFW has jurisdiction over any proposed activities that would divert or obstruct the natural flow or change the bed, channel, or bank of any lake or stream. Private landowners or project proponents must obtain a "Streambed Alteration Agreement" from CDFW prior to any alteration of a lake bed, stream channel, or their banks. Through this agreement, the CDFW may impose conditions to limit and fully mitigate impacts on fish and wildlife resources. These agreements are usually initiated through the local CDFW warden and will specify timing and construction conditions, including any mitigation necessary to protect fish and wildlife from impacts of the work.

Public Resources Code §21000 - California Environmental Quality Act

CEQA identifies that a species that is not listed on the Federal or State endangered species list may be considered rare or endangered if the species meets certain criteria. (CEQA Guidelines § 15380) Species that are not listed under FESA or CESA, but are otherwise eligible for listing (i.e., candidate, or proposed) may be protected by the local government until the opportunity to list the species arises for the responsible agency.

Species that may be considered for review are included on a list of "Species of Special Concern," developed by the CDFW. Additionally, the California Native Plant Society (CNPS) maintains a list of plant species native to California that have low populations, limited distribution, or are otherwise threatened with extinction. This information is published in the Inventory of Rare and Endangered Vascular Plants of California. List 1A contains plants that are believed to be extinct. List 1B contains plants that are rare, threatened, or endangered in California and elsewhere. List 2 contains plants that are rare, threatened, or endangered in California, but more numerous elsewhere.

California Wetlands Conservation Policy

In August 1993, the Governor announced the "California Wetlands Conservation Policy." The goals of the policy are to establish a framework and strategy that will:

- Ensure no overall net loss and to achieve a long-term net gain in the quantity, quality, and permanence of wetland acreage and values in California in a manner that fosters creativity, stewardship, and respect for private property.
- Reduce procedural complexity in the administration of State and Federal wetland conservation programs.
- Encourage partnerships to make landowner incentive programs and cooperative planning efforts the primary focus of wetland conservation and restoration.

The Governor also signed Executive Order W-59-93, which incorporates the goals and objectives contained in the new policy and directs the Resources Agency to establish an Interagency Task Force to direct and coordinate administration and implementation of the policy.

Natural Community Conservation Planning Act

The Natural Community Conservation Planning Act provides long-term protection of species and habitats through regional, multi-species planning before the special measures of the CESA become necessary.

Porter-Cologne Water Quality Control Act

The Porter-Cologne Water Quality Control Act authorizes the SWRCB to regulate State water quality and protect beneficial uses.

Water Quality Control Plan for the Sacramento-San Joaquin River Basins

The Water Quality Control Plan for the Sacramento-San Joaquin River Basins (Basin Plan), adopted by the CVRWQCB in 1998, identifies the beneficial uses of water bodies and provides water quality objectives and standards for waters of the Sacramento River and SJR basins, including the Delta.

State and Federal laws mandate the protection of designated "beneficial uses" of water bodies. State law defines beneficial uses as "domestic; municipal; agricultural and industrial supply; power generation; recreation; aesthetic enjoyment; navigation; and preservation and enhancement of fish, wildlife, and other aquatic resources or preserves" (Water Code Section 13050[f]). Additional protected beneficial uses of the SJR include groundwater recharge and fresh water replenishment. Major issues and the general conditions of existing beneficial uses in the SJR are as follows:

- Water Supply: The SJR is not currently a source of municipal water supply for the City of Manteca and is not identified as a source for the proposed Project, although some farms in the region use the river as a source of water for irrigation. The City currently uses groundwater only and surface water from the SSJID South County Surface Water Supply Project (SCSWSP), which does not rely on the SJR.
- Agricultural Supply: Extensive use is made of SJR and Delta waters for agricultural purposes. Annual water diversions from the Delta by the State Water Project (SWP) and the Central Valley Project (CVP) for agriculture are estimated to reach 4.3 million acre-feet (MAF) per year by 2030. In addition, about 2,000 privately owned agricultural water supply diversions are scattered throughout the Delta, generally consisting of riverside pumping stations.

- Recreation: Water-dependent recreation uses of the SJR and the Delta include swimming, wading, waterskiing, sport fishing, and a variety of other activities that involve contact with the water. Noncontact (water-enhanced) recreation uses include picnicking, camping, pleasure boating, hunting, bird watching, education, and aesthetic enjoyment.
- Groundwater Recharge: Water from the SJR and the Delta recharges the San Joaquin Valley groundwater basin. Recharge serves to maintain salt balance in the soil column, prevent saltwater intrusion into freshwater aquifers, and provide for water supplies. Groundwater is replenished through deep percolation of streamflow, precipitation, and applied irrigation water. Groundwater quality is generally adequate throughout the San Joaquin Valley and the Delta, although at shallow depths within the Delta the water is often saline and contains high levels of total dissolved solids (TDS) and dissolved minerals. Enforceable TDS standards do not exist for drinking water. The need for treatment generally depends on consumer acceptance.
- Fish and Wildlife: The SJR and the waterways of the Delta provide important habitat for a diverse variety of aquatic life and terrestrial wildlife. This includes temporary habitat and migration routes for anadromous and other migratory species, as well as permanent habitat for resident species. Fish dependent on the Delta as a migration corridor, nursery, or permanent residence include Chinook salmon, steelhead, delta smelt, Sacramento splittail, striped bass, American shad, sturgeon, catfish, largemouth bass, and numerous other estuary and freshwater species. The amount and quality of water flowing through the Delta greatly influences the overall productivity of the area on an annual basis. A large assemblage of wildlife uses the Delta either seasonally or year-round, including waterfowl; migratory and resident songbirds; mice, rabbits, and other small mammals; water dependent mammals, such as beaver and muskrat; and predators such as skunk, raccoon, northern harrier, and coyote.

LOCAL

San Joaquin County Multi-Species Habitat Conservation and Open Space Plan

A Habitat Conservation Plan (HCP) is a Federal planning document that is prepared pursuant to Section 10 of the FESA. An approved HCP within a defined plan area allows for the incidental take of species and habitat that are otherwise protected under FESA during development activities.

A Natural Community Conservation Plan (NCCP) is a State planning document administered by CDFW. An approved NCCP within a defined plan area allows for the incidental take of species and habitat that are otherwise protected under CESA during growth and development activities.

BACKGROUND

The key purpose of the San Joaquin County Multi-Species Habitat Conservation and Open Space Plan (SJMSCP), is to provide a strategy for balancing the need to conserve Open Space and the need to Convert Open Space to non-Open Space uses while protecting the region's agricultural economy; preserving landowner property rights; providing for the long-term management of plant, fish and

wildlife species, especially those that are currently listed, or may be listed in the future, under the Federal Endangered Species Act (ESA) or the California Endangered Species Act (CESA); providing and maintaining multiple-use Open Spaces which contribute to the quality of life of the residents of San Joaquin County; and accommodating a growing population while minimizing costs to Project Proponents and society at large.

San Joaquin County's past and future (2001-2051) growth has affected and will continue to affect 97 special status plant, fish and wildlife species in 52 vegetative communities scattered throughout San Joaquin County's 1,400+ square miles and 900,000+ acres, which include 43% of the Sacramento-San Joaquin Delta's Primary Zone. The SJMSCP, in accordance with ESA Section 10(a)(1)(B) and CESA Section 2081(b) Incidental Take Permits, provides compensation for the Conversion of Open Space to non-Open Space uses which affect the plant, fish and wildlife species covered by the Plan, hereinafter referred to as "SJMSCP Covered Species". In addition, the SJMSCP provides some compensation to offset the impacts of open space land conversions on non-wildlife related resources such as recreation, agriculture, scenic values and other beneficial Open Space uses.

The SJMSCP compensates for Conversions of Open Space for the following activities: urban development, mining, expansion of existing urban boundaries, non-agricultural activities occurring outside of urban boundaries, levee maintenance undertaken by the San Joaquin Area Flood Control Agency, transportation projects, school expansions, non-Federal flood control projects, new parks and trails, maintenance of existing facilities for non-Federal irrigation district projects, utility installation, maintenance activities, managing Preserves, and similar public agency projects. These activities will be undertaken by both public and private individuals and agencies throughout San Joaquin County and within the County's incorporated cities of Escalon, Manteca, Lodi, Manteca, Ripon, Stockton and Tracy. Public agencies including Caltrans (for transportation projects), and the San Joaquin Council of Governments (for transportation projects) also will undertake activities which will be covered by the SJMSCP. In addition, 5,340 acres is allocated for anticipated projects (e.g., annexations, general plan amendments)

The 97 SJMSCP Covered Species include 25 State and/or federally listed species. The SJMSCP Covered Species include 27 plants (6 listed), 4 fish (2 listed), 4 amphibians (1 listed), 4 reptiles (1 listed), 33 birds (7 listed), 15 mammals (3 listed) and 10 invertebrates (5 listed).

IMPLEMENTATION

The SJMSCP is administered by a Joint Powers Authority consisting of members of the San Joaquin County Council of Governments (SJCOG), the CDFW, and the USFWS. Development project applicants are given the option of participating in the SJMSCP as a way to streamline compliance with required local, State and Federal laws regarding biological resources, and typically avoid having to approach each agency independently. 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, as established by the Joint Powers Authority according to the measures needed to mitigate impacts to the various habitat and biological resources. Different types of land require different levels of mitigation; i.e., one category requires that one acre of a similar land type be preserved for each acre developed, while another type requires that two acres be preserved for each acre developed. The entire County is mapped according to these categories so that land owners, 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. Development occurring on land that has been classified under the SJMSCP as "no-pay" would not be required to pay a fee. This category usually refers to already urbanized land and infill development areas. Although the fees are automatically adjusted on an annual basis, based on the construction cost index, they often cannot keep pace with the rapidly rising land prices in the Central Valley.

City of Manteca General Plan

The City of Manteca General Plan includes several policies that are relevant to biological resources and the conservation of sensitive environmental resources. 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 General Plan policies applicable to the Project are identified below:

2023 GENERAL PLAN (EXISTING)

Policies: Resource Conservation Element

- RC-P-31. Minimize impact of new development on native vegetation and wildlife.
- RC-P-32. Condition new development in the vicinity of the San Joaquin River and Walthall Slough to protect riparian habitat, wetlands, and other native vegetation and wildlife communities and habitats.
- 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.
- RC-P-34. Protect special status species and other species that are sensitive to human activities.
- RC-P-35. Allow contiguous habitat areas.
- RC-P-36. Consider the development of new drainage channels planted with native vegetation, which would provide habitat as well as drainage.

Implementation: Resource Conservation Element

- RC-I-32. Continue to support and comply with the requirements of the San Joaquin County Multi-Species Habitat Conservation and Open Space Plan (SJMSCP) when reviewing proposed public and private land use changes.
- RC-I-33. Project proponents who opt not to participate in the SJMSCP shall:
  - Satisfy applicable U.S. Endangered Species Act (ESA), California Endangered Species Act (CESA), National Environmental Policy Act (NEPA), California Environmental Quality Act (CEQA), and other applicable local, state, and federal laws and regulation provisions through consultations with the Permitting Agencies and local planning agencies.
  - Provide site-specific research and ground surveys for proposed development projects. This research must include a detailed inventory of all biological resources onsite, and appropriate mitigation measures for avoiding or reducing impact to these biological resources. This requirement may be waived if determined by the City that the proposed project area is already sufficiently surveyed.
- RC-I-34. Until such time that a Clean Water Act regional general permit or its equivalent is issued for coverage under the SJMSCP, acquisition of a Section 404 permit by project proponents will continue to occur as required by existing regulations. Project proponents shall comply with all requirements for protecting federally protected wetlands.
- RC-I-35. Continue to enforce the City's heritage tree ordinance which defines and identifies mature trees to be protected, and establishes regulations for their protection and removal.
- RC-I-36. Limit the access of pedestrians and bicyclists to wetland areas so that access is compatible with long-term protection of these natural resources.
- RC-I-37. The City shall implement multiple use of resource areas, where feasible, that includes passive recreational and educational opportunities with the protection of wildlife and vegetation habitat areas.

MANTECA GENERAL PLAN UPDATE (PROPOSED)

Policies: Resource Conservation Element

- RC-1.1: Where feasible, protect and enhance surface water resources in creeks, streams, channels, seasonal and permanent marshland, wetlands, sloughs, riparian habitat, and vernal pools through sound land use planning, community design, and site planning.
- RC-1.4: Encourage the rehabilitation of culverted or open existing channelized waterways to a more natural condition, as feasible, to remove concrete linings and allow for a connection between the stream channel and the natural water table. Avoid creating additional culverted or open channelized waterways, unless no other alternative is available to protect human health, safety, and welfare.
- RC-1.5: Where feasible, require development projects adjacent to creeks and streams to include opportunities for beneficial uses, such as flood control, ecological restoration, public access trails, and walkways.
- RC-1.6: Encourage the conservation of riparian habitat along local creeks and waterways in order to maintain water quality and provide suitable habitat for native fish and plant species.
- RC-1.8: Minimize pollution of water resources, including the San Joaquin River, other waterways, and the groundwater basin, from urban runoff, soil erosion, and sedimentation.

- RC-7.1: Consider General Plan land use designations that include agriculture, permanent open space, parks and similar uses, as well as waterways (i.e., San Joaquin River, Lower Lone Tree Creek, Middle Lone Tree Creek, Oakwood Lake, Walker Slough, and Walthall Slough), as contributing to the City's open space.
- RC-7.2: Conserve open space for conservation, recreation, and agricultural uses. Conversion of open space, as described under Policy RC-7.1, to developed residential, commercial, industrial, or other similar types of uses, shall be strongly discouraged. Undeveloped land that is designated for urban uses may be developed if needed to support economic development, improve the City's housing stock and range of housing types, and if the proposed development is consistent with the General Plan Land Use Map.
- RCP-8.1: Support the continuation of agricultural uses on lands designated for urban use, until urban development is imminent.
- RC-8.2: Provide an orderly and phased development pattern, encouraging the development of vacant lands within City boundaries prior to conversion of agricultural lands, so that farmland is not subjected to premature development pressure.
- RC-8.3: Encourage permanent agricultural lands surrounding the Planning Area to serve as community separators and continue the agricultural heritage of Manteca.
- RC-9.1: Protect sensitive habitats that include creek corridors, wetlands, vernal pools, riparian areas, wildlife and fish migration corridors, native plant nursery sites, waters of the United States, sensitive natural communities, and other habitats designated by State and Federal agencies.
- RC-9.2: Preserve and enhance those biological communities that contribute to Manteca and the region's biodiversity, including but not limited to, wetlands, riparian areas, aquatic habitat, and agricultural lands
- RC-9.3: Focus conservation efforts on high priority conservation areas that contain suitable habitat for endangered, threatened, migratory, or special-status species and that can be managed with minimal interference with nearby urban land uses.
- RC-9.4: Conserve existing native vegetation, where possible, and integrate regionally native plant species into development and infrastructure projects where appropriate.
- RC-9.5: Condition new development in the vicinity of the San Joaquin River and Walthall Slough to protect riparian habitat, wetlands, and other native vegetation and wildlife communities and habitats.
- RC-9.7: Protect special status species and other species that are sensitive to human activities.
- RC-9.9: Encourage the planting of native vegetation on new drainage channels.
- RC-9.8: Encourage contiguous habitat areas.
- RC-9.10: Continue to support and implement the San Joaquin County Multi-Species Habitat Conservation and Open Space Plan (County Habitat Plan).
- RC-11.1: Support the long-term viability and success of the natural Delta ecosystems and the continuation of Delta heritage.

- RC-11.2: Support efforts to ensure the protection, viability, and restoration of the Delta ecosystem in perpetuity, including implementing local conservation efforts that improve adequate water supply and quality.
- RC-11.4: Promote protection of areas for habitat restoration, including remnants of riparian and aquatic habitat, particularly in the Delta.
- RC-11.5: Encourage compatibility between agricultural practices and wildlife habitat.
- RC-11.6: Preserve and protect the water availability and quality of the Delta for designated beneficial uses and habitat protection.
- RC-11.7: Encourage and promote the expansion of floodplains and riparian habitats in levee projects.
- RC-12.1: Ensure the long-term viability, success of the natural Delta ecosystems, and continuation of Delta heritage.
- RC-12.2: Support efforts for the protection and restoration of the Delta ecosystem in perpetuity, including implementing local conservation efforts that improve adequate water supply and quality.
- RC-12.4: Support regional efforts to address issues related to urban development, habitat conservation and agricultural protection through participating in the San Joaquin County Multi-Species Habitat Conservation and Open Space Plan (SJMSCP).
- RC-12.5: Promote protection of remnants of riparian and aquatic habitat.
- RC-12.7: Preserve and protect the water availability and quality of the Delta for both designated beneficial uses, and habitat protections.
- RC-12.8: Protect opportunities for habitat restoration.
- RC-12.9: Encourage and promote the expansion of floodplains and riparian habitats in levee projects.

Implementation: Resource Conservation Element

- RC-1f: Coordinate with the California Department of Fish and Wildlife, San Joaquin County, and local watershed protection groups to identify potentially impacted aquatic habitat within Manteca's Planning Area and to develop riparian management guidelines to be implemented by development, recreation, and other projects adjacent to creeks, streams, and other waterways.
- RC-1g: Explore revising Title 17 (Zoning) of the Municipal Code to include standards for the protection of riparian habitat. The standards should include minimum setback requirements, site design standards, and requirements for the ongoing maintenance of creek and riparian habitat on public and private lands.
- RC-1h: Conserve, and where feasible, create or restore areas that provide important water quality benefits such as riparian corridors, buffer zones, wetlands, undeveloped open space areas, levees, and drainage canals. Restoration efforts should provide for naturalized hydraulic functioning. Restoration should also promote the growth of riparian vegetation to effectively stabilize banks, screen pollutants from runoff entering the channel, enhance fisheries, and provide other opportunities for natural habitat restoration.
- RC-1k: Maintain a buffer area between waterways and urban development to protect water quality and riparian areas.

- RC-7e: Review all development proposals within or adjacent to the Sphere of Influence, to ensure adequate preservation of community separators and open space resources.
- RC-9a: Continue to require projects to comply with the requirements of the County Habitat Plan when reviewing proposed public and private land use changes.
- RC-9b: Require project proponents who opt not to participate in the SJMSCP to:
    - Satisfy applicable U.S. Endangered Species Act (ESA), California Endangered Species Act (CESA), National Environmental Policy Act (NEPA), California Environmental Quality Act (CEQA), and other applicable local, state, and federal laws and regulation provisions through consultations with the Permitting Agencies and local planning agencies.
    - Provide site-specific research and ground surveys for proposed development projects. This research must include a detailed inventory of all biological resources onsite, and appropriate mitigation measures for avoiding or reducing impact to these biological resources. This requirement may be waived if determined by the City that the proposed project area is already sufficiently surveyed.
- RC-9c: Until such time that a Clean Water Act regional general permit or its equivalent is issued for coverage under the SJMSCP, acquisition of a Section 404 permit by project proponents will continue to occur as required by existing regulations. Project proponents shall comply with all requirements for protecting federally protected wetlands.
- RC-9e: Limit the access of pedestrians and bicyclists to wetland areas so that access is compatible with long-term protection of these natural resources.
- RC-9f: Implement the multiple use of resource areas, where feasible, that includes passive recreational and educational opportunities with the protection of wildlife and vegetation habitat areas.
- RC-9g: Where sensitive biological habitats have been identified on or immediately adjacent to a project site, the project shall include appropriate mitigation measures identified by a qualified biologist.
- RC-9h: Utilize existing regulations and procedures, including but not limited to, the Zoning Ordinance and the environmental review process, in order to address impacts to special-status species and conserve sensitive habitats, including wetlands and riparian habitat.
- RC-9i: Consult with State and Federal agencies during the development review process to help identify wetland and riparian habitat that has candidacy for restoration, conservation, and/or mitigation. Focus restoration and/or conservation efforts on areas that would maximize multiple beneficial uses for such habitat.
- RC-11a: Review all projects affecting areas within the Delta Secondary Zone to ensure they are consistent with the criteria and policies set forth by the Delta Stewardship Council's "Delta Plan".
- RC-11b: As applicable, provide opportunities for review of and comment by the Reclamation Districts, the Delta Stewardship Council, Delta Protection Commission, and SWRCB during project review.
- RC-11c: Review all projects located within or adjacent to priority habitat restoration areas, and consult the California Department of Fish and Wildlife to ensure that any impacts do

not have a significant effect on the opportunity to restore habitat as described in the Delta Plan.

- RC-12a: Review all projects affecting areas within the Deltas' Secondary Zone to ensure they are consistent with the criteria and policies set forth by the Delta Stewardship Council's "Delta Plan".
- RC-12c: Review all projects located within or adjacent to priority habitat restoration areas, and consult the California Department of Fish and Wildlife to ensure that any impacts do not have a significant effect on the opportunity to restore habitat as described in the Delta Plan.

City of Manteca Municipal Code

The Manteca Municipal Code calls for the avoidance of heritage trees. Heritage trees are defined under Section 17.61.030 of the code as 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. Orchard areas of one acre or more are exempt from Section 17.19.060(A); however, as outlined above, policy RC-P-33 of the City's General Plan discourages the premature removal of orchard trees in advance of development.

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.

3.4.3 IMPACTS AND MITIGATION MEASURES

THRESHOLDS OF SIGNIFICANCE

Consistent with Appendix G of the CEQA Guidelines, the proposed Project will have a significant impact on biological resources if it will:

- 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;
- 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;

- 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;
- 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;
- Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance; or
- Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan.

IMPACTS AND MITIGATION

Impact 3.4-1: The proposed Project has the potential to have a direct or indirect effect on special-status invertebrate species. (Less than Significant)

According to the CNDDB, there are nine (9) special-status invertebrate species that are documented within the nine-quadrangle region for the Project site, including: California linderiella (*Linderiella occidentalis*), Conservancy fairy shrimp (*Branchinecta conservation*), Vernal pool fairy shrimp (*Branchinecta lynchi*), Vernal pool tadpole shrimp (*Lepidurus packardi*), Crotch bumble bee (*Bombus crotchii*), Molestan blister beetle (*Lytta molesta*), Sacramento anthicid beetle (*Anthicus sacramento*), Valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*), and western bumble bee (*Bombus occidentalis*). Conservancy fairy shrimp, vernal pool fairy shrimp, vernal pool tadpole shrimp, Molestan blister beetle, and valley elderberry longhorn beetle are protected by the SJMSCP.

A field survey/habitat evaluation for the entire Project site was performed on July 27 and November 17, 2021.

California linderiella requires natural and artificial, seasonally ponded habitat types including: vernal pools, swales, ephemeral drainages, stock ponds, reservoirs, ditches, backhoe pits, and ruts caused by vehicular activities. California linderiella is not anticipated to be directly affected by any individual phase or component of the proposed Project because there are no seasonally ponded habitat types in the Project site.

Conservancy fairy shrimp is a Federal endangered invertebrate. This species requires large to very large vernal pools and vernal lakes, although they also have been found in alkaline pools. Conservancy fairy shrimp is not anticipated to be directly affected by any individual phase or component of the proposed Project because there are no vernal pools or alkaline pools in the Project site.

Vernal pool fairy shrimp 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. Vernal pool fairy shrimp 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 is a Federal endangered invertebrate found in vernal pools and stock ponds from Shasta County south to Merced County. Vernal pool tadpole shrimp 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 is a Federal threatened insect, proposed for delisting. Elderberry (*Sambucus* sp.), which is a primary host species for valley elderberry longhorn beetle, is not present within the Project site. Valley elderberry longhorn beetle is not anticipated to be directly affected by any individual phase or component of the proposed Project because there are no blue elderberry shrubs in the Project site.

Essential habitat for crotch bumble bee, Molestan blister beetle, Sacramento anthicid beetle, and western bumble bee is not present on the Project site.

No special-status invertebrates, or their habitat, were observed within the Project site during field survey and none are expected to be affected by the proposed Project. Therefore, the proposed Project would have a ***less than significant*** impact on special-status invertebrate species.

Impact 3.4-2: The proposed Project has the potential to have direct or indirect effects on special-status reptile and amphibian species. (Less than Significant)

According to the CNDDB, there are four (4) special-status reptile species that are documented within the nine-quadrangle region for the Project site, including: California glossy snake (*Arizona elegans occidentalis*), coast horned lizard (*Phrynosoma blainvillii*), Giant garter snake (*Thamnophis couchi gigas*), San Joaquin coachwhip (*Masticophis flagellum ruddocki*), and western pond turtle (*Emys marmorata*). Giant garter snake, San Joaquin coachwhip and western pond turtle are protected by the SJMSCP. Additionally, there are four special-status amphibian species that are documented within the nine-quadrangle region for the Project site, including: California tiger salamander (*Ambystoma californiense [A. tigrinum c.]*), California red-legged frog (*Rana aurora draytoni*), foothill yellow-legged frog (*Rana boylii*), and western spadefoot (*Spea hammondii*). All four amphibians are protected by the SJMSCP.

No special-status reptiles or amphibians, or their habitat, were observed within the Project site during the field survey and none are expected to be affected by the proposed Project. Therefore, the proposed Project would have a ***less than significant*** impact on special status reptile or amphibian species.

Impact 3.4-3: The proposed Project has the potential to have direct or indirect effects on special-status bird species. (Less than Significant with Mitigation)

According to the CNDDB, there are thirteen (13) special-status bird species that are documented within the nine-quadrangle region for the Project site, including: Aleutian goose (*Branta canadensis leucopareia*), Burrowing owl (*Athene cunicularia*), California black rail (*Laterallus jamaicensis coturniculus*), California horned lark (*Eremophila alpestris actia*), least Bell's vireo (*Vireo bellii pusillus*), loggerhead shrike (*Lanius ludovicianus*), merlin (*Falco columbarius*), song sparrow (Modesto Population) (*Melospiza melodia*), Swainson's hawk (*Buteo swainsoni*), tricolored blackbird (*Agelaius tricolor*), Western yellow-billed cuckoo (*Coccyzus americanus occidentalis*), white-tailed kite (*Elanus leucurus*), and Yellow-headed blackbird (*Xanthocephalus xanthocephalus*). Least Bell's vireo is not protected by the SJMSCP; the remaining bird species are protected by the SJMSCP.

The Project site may provide suitable foraging habitat for a variety of potentially occurring special-status birds, including some of those listed above. Potential nesting habitat is present in a variety of trees located within the Project site and in the vicinity. 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: burrowing owl (*Athene cunicularia*), red-tailed

hawk *(Buteo jamaicensis),* Swainson's hawk *(Buteo swainsoni*), and white-tailed kite *(Elanus leucurus*), among others.

Analysis: Powerlines and trees located in the region 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. 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 records for Swainson's hawk, burrowing owl, loggerhead shrike, and tricolored blackbird within two miles 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 3.4-1 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 3.4-1, would ensure that potential impacts to special status birds are reduced to a ***less than significant*** level.

MITIGATION MEASURE(S)

Mitigation Measure 3.4-1*: Prior to commencement of any grading activities, the Project proponent shall obtain 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.*

Impact 3.4-4: The proposed Project has the potential to result in direct or indirect effects on special-status mammal species. (Less than Significant)

According to the CNDDB, there are eight (8) special-status mammal species that are documented within the nine-quadrangle region for the Project site, including: American badger (*Taxidea taxus*), pallid bat (*Antrozous pallidus*), Riparian (San Joaquin Valley) woodrat (*Neotoma fuscipes riparia*), Riparian brush rabbit (*Sylvilagus bachmani riparius*), San Joaquin kit fox (*Vulpes macrotis mutica*), San Joaquin pocket mouse (*Perognathus inornatus*), Townsend's big-eared bat (*Corynorhinus townsendii*), and western mastiff bat (*Eumops perotis californicus*). Pallid bat is not protected by the SJMSCP; the remaining mammal species are protected by the SJMSCP.

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. These species were not observed during the field survey and have not been documented on the Project site. Based on a field survey these species are not present. Therefore, the proposed Project would have a ***less than significant*** impact on this special-status species.

American badger, San Joaquin kit fox, or San Joaquin pocket mouse: The Project site is frequently disturbed from active agricultural activities. As a result, the Project site does not contain high quality habitat for the American badger. These species have not been documented within two miles 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. Therefore, the proposed Project would have a ***less than significant*** impact on these species.

Special-status bats: The Project site provides potential habitat for several special-status bats, including: pallid bat (*Antrozous pallidus*), Townsend's big-eared bat (*Corynorhinus townsendii*), and western mastiff bat (*Eumops perotis californicus*). All three bat species are Species of Special Concern; pallid bat is not protected by the SJMSCP, but the other two bat species are protected by the SJMSCP.

Development of the Project site would eliminate foraging habitat for special status bats by removing the agricultural areas. These special status bat species were not observed during the field survey and have not been documented on the Project site; therefore, they are not expected to be directly affected. Implementation of Mitigation Measure 3.4-1 would provide compensation for the loss of the potential foraging habitat. Therefore, the proposed Project would have a ***less than significant*** impact on special status bat species.

Impact 3.4-5: The proposed Project has the potential for direct or indirect effects on candidate, sensitive, or special-status plant species. (Less than Significant)

According to the CNDDB, there are 19 special-status plant species that are documented within the nine-quadrangle region for the Project site, including: alkali-sink goldfields (*Lasthenia chrysantha*), big tarplant (*Blepharizonia plumosa*), caper-fruited tropidocarpum (*Tropidocarpum capparideum*), Delta button-celery (*Eryngium racemosum*), diamond-petaled California poppy (*Eschscholzia rhombipetala*), large-flowered fiddleneck (*Amsinckia grandiflora*), lesser saltscale (*Atriplex minuscula*), Mason's lilaeopsis (*Lilaeopsis masonii*), palmate-bracted bird's-beak (*Chloropyron palmatum*), showy golden madia (*Madia radiata*), slough thistle (*Cirsium crassicaule*), recurved larkspur (*Delphinium recurvatum*), saline clover (*Trifolium hydrophilum*), San Joaquin spearscale (*Extriplex joaquinana*), Sanford's arrowhead (*Sagittaria sanfordii*), Suisun Marsh aster (*Symphyotrichum lentum*), woolly rose-mallow (*Hibiscus lasiocarpos var. occidentalis*), Wright's trichocoronis (*Trichocoronis wrightii var. wrightii*), and watershield (*Brasenia schreberi*). The following six plant species are not protected by the SJMSCP: alkali-sink goldfields, big tarplant, lesser saltscale, saline clover, woolly rose-mallow, and watershield. The remaining plant species are protected by the SJMSCP.

Of the nineteen (19) documented plant species, two (2) are federally listed species (large-flowered fiddleneck and palmate-bracted bird's-beak, both endangered) and four (4) are State listed species (Delta button-celery, large-flowered fiddleneck, and palmate-bracted bird's-beak are endangered, while Mason's lilaeopsis is rare). Additionally, seventeen (17) are CNPS 1B listed species and two (2) are CNPS 2 listed species.

A field survey/habitat evaluation was performed on July 27 and November 17, 2021. The field survey did not coincided with the blooming period for special status plants known to occur within the region; however, it was determined during the field survey the that the agricultural disturbance on the project site precludes the existence of special status plants unless agricultural operations were to cease. The conditions of the Project site are highly disturbed due to the active agricultural operations and active urban operations. Implementation of the individual phases, and the proposed Project as a whole, will have a ***less than significant*** impact on special status plants.

Impact 3.4-6: The proposed Project has the potential to effect protected wetlands and jurisdictional waters. (No Impact)

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. Absent any wetlands or jurisdictional waters, implementation of the proposed Project would have ***no impact*** relative to this topic.

Impact 3.4-7: The proposed Project has the potential to result in adverse effects on riparian habitat or a sensitive natural community. (Less than Significant)

The CNDDB record search revealed documented occurrences of five sensitive habitats within the nine-quadrangle region for the Project site, including: Great Valley Cottonwood Riparian Forest, Great Valley Mixed Riparian Forest, Great Valley Valley Oak Riparian Forest, Coastal and Valley Freshwater Marsh, and Elderberry Savanna. 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.

Impact 3.4-8: The proposed Project has the potential to result in interference with the movement of native fish or wildlife species or with established wildlife corridors, or impede the use of native wildlife nursery sites. (Less than Significant)

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 approximately 4.3 miles to the west of the Project site. There are also SSJID irrigation canals that run through Manteca that are known to have native fish enter the canal system approximately 7 miles

north of the Project site at the French Camp Slough. Specifically, Central Valley fall- /late fall-run Chinook salmon (Oncorhynchus tshawytscha) and known to exist in the SSJID canals.

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 is discharges in the SSJID system and ultimately 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.

Impact 3.4-9: The proposed Project has the potential to conflict with an adopted Habitat Conservation Plan. (Less than Significant)

The proposed Project is subject to the 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. Mitigation Measure 3.4-1 requires participation in the SJMSCP.

Impact 3.4-10: The proposed Project has the potential to conflict with local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance. (Less than Significant)

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

Resource Conservation Element Policies (General Plan 2023)

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

- ***Consistent****: This EIR 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 require the removal of orchard trees. While the existing orchard is actively producing, it is a mix of age groups. The Stagecoach at M&E Project Area (Subdivision 2) is estimated to have been planted prior to 1990 making it an over 30-year-old orchard. The orchard trees are almonds, which hit a plateau for yield at around 15 years and then slowly decline until they reach the end of their productive life at between 25 and 30 years. This orchard is nearing the end of its productive life. Within the Union Ranch North Project Area (Subdivision 1) has several different age classes of orchard. The eastern half of the area is estimated to have been planted around 2012, making it a nine-year-old orchard. About 25 percent of the western half was planted in the early 90s making it close to the end of its productive life. The other 25 percent was planted around 2007, making it at peak production. Removing he orchard at this late stage of its cycle is not considered premature removal. The orchards will continue to be managed for productive harvest until development were to occur. For some of the orchards, this is anticipated to be past its productive cycle. For others, it will be in the later stages of its productive cycle. This area is planned for development, and is a logical extension of the development.*

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

- ***Consistent****: This EIR 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 largely 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 Project does not include new drainage channels.*

Resource Conservation Element Policies (2040 General Plan)

RC-1.5: Where feasible, require development projects adjacent to creeks and streams to include opportunities for beneficial uses, such as flood control, ecological restoration, public access trails, and walkways.

- ***Consistent****: The land uses within the Project site would not have any direct disturbance to the San Joaquin River or its tributaries. There are no creeks or streams located on or adjacent to the Project site.*

RC-7.2: Conserve open space for conservation, recreation, and agricultural uses. Conversion of open space, as described under Policy RC-7.1, to developed residential, commercial, industrial, or other similar types of uses, shall be strongly discouraged. Undeveloped land that is designated for urban uses may be developed if needed to support economic development, improve the City's housing stock and range of housing types, and if the proposed development is consistent with the General Plan Land Use Map.

- ***Consistent:*** *The proposed Project site contains undeveloped agricultural land and rural residential land that is designated for urban uses by the General Plan Land Use Map. The proposed Project would require a General Plan Land Use Amendment to adjust the exact location and shape of the Park land use designation within Development Area. No changes are proposed for the Non-development Area 1. It is noted that the General Plan Update proposed changes to the land use in Non-development Area 2, and the proposed Land Uses under this General Plan Amendment are consistent with the General Plan Update. As such, the Project is generally consistent with the General Plan Land Use Map.*

RCP-8.1: Support the continuation of agricultural uses on lands designated for urban use, until urban development is imminent.

- ***Consistent****: As noted above in the discussion for Policy RC-7.2, the Project site contains undeveloped agricultural land and rural residential land that is designated for urban uses by the General Plan Land Use Map. The proposed Project would require a General Plan Land Use Amendment to adjust the land uses to LDR and HDR for the Development Area. Additionally, the proposed Project includes a proposed General Plan Land Use Amendment to adjust the land uses in Annexation SubArea 1, 2, and 3 to be consistent with the proposed General Plan Update. Because the Annexation SubAreas are not proposed for development, establishment of the land uses under this proposed General Plan Amendment is not necessary, and as an alternative they may be left as currently designated. It is noted that the proposed General Plan Update is anticipated to change the land uses in the Annexation SubAreas, although the exact timing of that change is not defined. It is also noted that development of the Project site is likely imminent due to the planned future growth near regional roadways and highways, particularly in the southern portion of the City of Manteca.*

RC-8.2: Provide an orderly and phased development pattern, encouraging the development of vacant lands within City boundaries prior to conversion of agricultural lands, so that farmland is not subjected to premature development pressure.

- ***Consistent****: The Project site is located in the northern portion of the City of Manteca directly adjacent to the to the city limits. Although the Project site is not currently within the City limits, the Project would establish a logical phasing plan designed to ensure that each phase of development would include necessary public improvements required to meet City standards. The proposed Project would also provide an orderly and phased development pattern on a site currently used for agricultural and rural residential uses. The Project site is located within an area of the City planned for urban uses. The Project site is located along a major roadway, Union Road, and west of State Route 99. Uses immediately adjacent to the north of the Project site*

include agricultural uses. Uses immediately to the south and southwest of the Project site include residential uses such as the Union Ranch Subdivision and an agribusiness. Uses to the south and east of the Project site include agricultural and residential uses, including ranchettes and large estates lots (to the south and east) and a residential subdivision (to the east).

RC-9.4: Conserve existing native vegetation, where possible, and integrate regionally native plant species into development and infrastructure projects where appropriate.

- ***Consistent**: Vegetation on the Project site consists of agricultural, ruderal, and landscaping. Because of the active agricultural use over the majority of the Project site, there is very limited natural vegetation on the Project site with the exception of the perimeter of the agricultural fields and near the existing residential uses along Union Road. As discussed in Impact 3.4-5, no special-status plants were observed within the Project site during field survey/habitat evaluation.*

RC-9.5: Condition new development in the vicinity of the San Joaquin River and Walthall Slough to protect riparian habitat, wetlands, and other native vegetation and wildlife communities and habitats.

- ***Consistent**: The Project site is not located in the vicinity of the San Joaquin River or Walthall Slough. There are no creeks, streams, or sensitive natural communities located on or adjacent to the Project site.*

RC-12.4: Support regional efforts to address issues related to urban development, habitat conservation and agricultural protection through participating in the San Joaquin County Multi-Species Habitat Conservation and Open Space Plan (SJMSCP).

- ***Consistent**: The proposed Project is subject to the SJMSCP. The proposed Project does not conflict with the SJMSCP. Mitigation Measure 3.4-1 requires participation in the SJMSCP.*

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.

The proposed project requires the removal of several ornamental trees associated with the residences in the Development Area. None of the trees in the Development Area are heritage trees. There are also a variety of trees located in the non-development areas. One property owner noted that he has a 200-foot-tall Cypress tree that he would like to remain. There are not detailed improvement plans showing a need to remove this tree. No trees are proposed for removal, as this area is not proposed for development. If the property owners within the non-development area decide to develop their property at some future time, they will be subject to the City's Municipal Code Section 17.61.030.

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

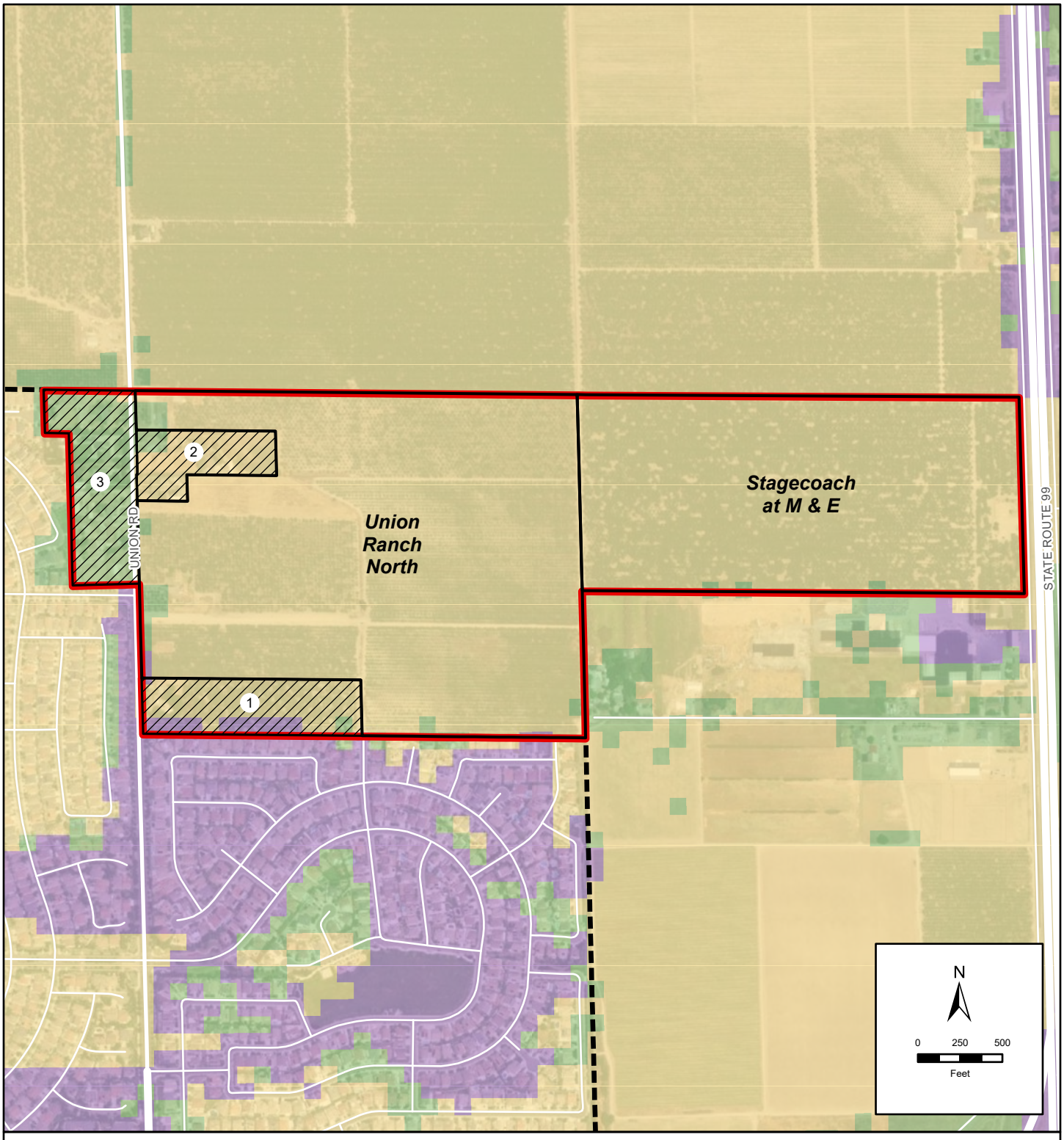
planned construction or grade changes within the proximity of existing mature trees. Existing trees must be protected from construction equipment, machinery, grade changes, and excavation for utilities, paving, and footers. Replacement of existing trees is subject to approval from the planning director 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.

Any trees that cannot remain in the final design as shown in the improvement plans must be replaced in accordance with the *Manteca Municipal Code (17.19.060)* if deemed applicable at the time of removal.

The City would require compliance with the Manteca Municipal Code for removal and replacement of trees as a Condition of Approval. Specifically, the Project Proponent would be required to 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 would be planted on-site at a location that is agreeable to the City. Therefore, the proposed Project would have a ***less than significant*** impact relative to this topic.

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LEGEND

- Annexation #1 Overall Project Boundary
- Project Area
- Annexation Sub-Area
- City Limits

Cover Type

- Agriculture
- Herbaceous
- Urban

MANTECA ANNEXATION #1

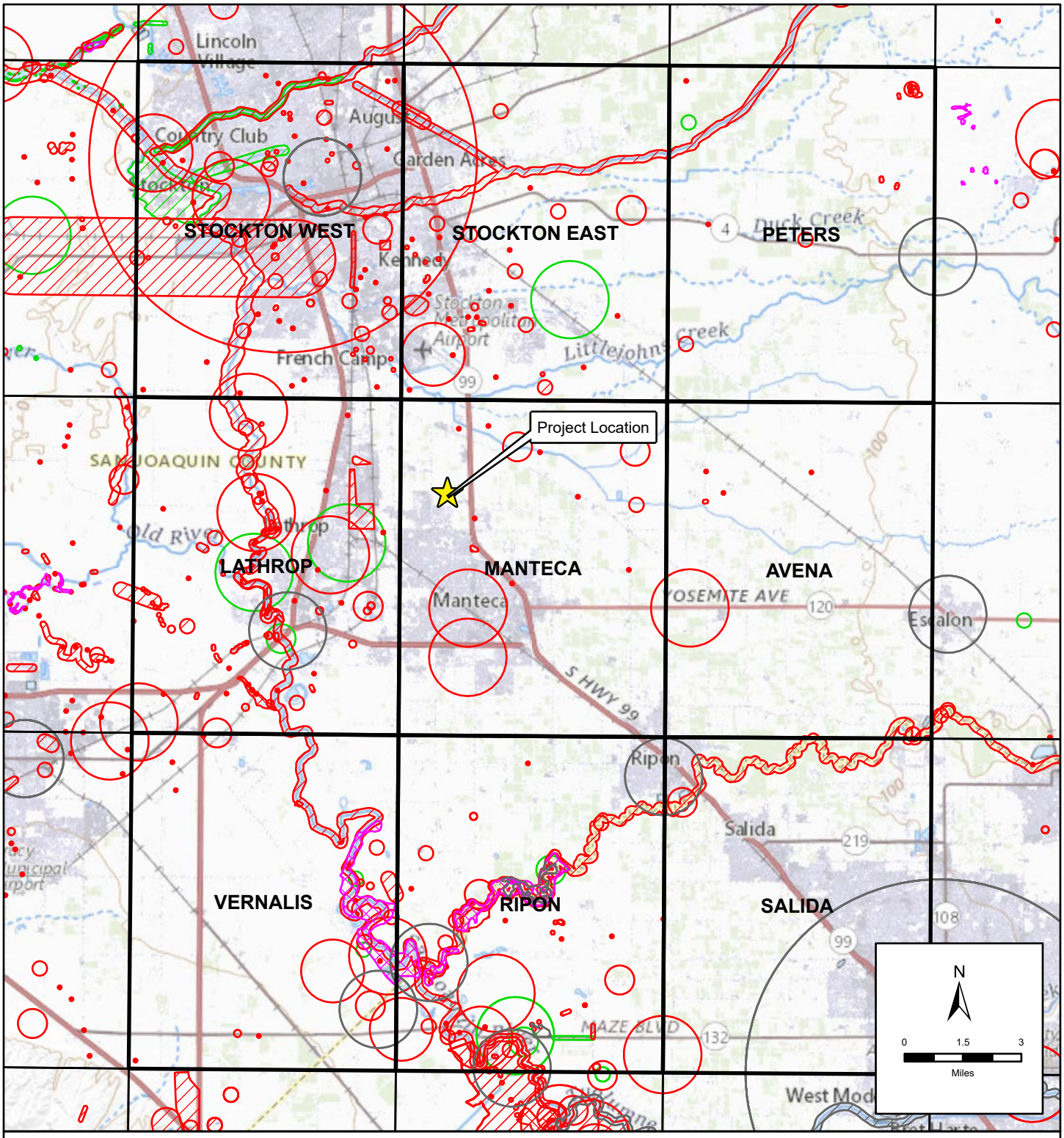
Figure 3.4-1 Land Cover Types

Sources: CalFire FRAP fveg_2015; San Joaquin County GIS; ArcGIS Online World Imagery Map Service. Map date: October 23, 2021.

De Novo Planning Group
A Land Use Planning, Design, and Environmental Firm

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LEGEND

- Plant (80m)
- Plant (specific)
- Plant (non-specific)
- Plant (circular)
- Animal (80m)
- Animal (specific)
- Animal (non-specific)
- Animal (circular)
- Terrestrial Comm. (specific)
- Terrestrial Comm. (circular)
- Multiple (non-specific)
- Multiple (circular)

MANTECA ANNEXATION #1

Figure 3.4-2: California Natural Diversity Database
9-Quad Search

Sources: ArcGIS Online USGS Topo Map Service; CNDDB version 10/1/2021.Note: the occurrences shown on this map represent the known locations of the species listed here as of the date of this version. There may be additional occurrences or additional species within this area which have not been surveyed and/or mapped. Lack of information in the CNDDB about a species or an area can never be used as proof that no special status species occur in an area. Map date: October 23, 2021.

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This section provides a discussion of the prehistoric period background, ethnographic background, and historic period background, known cultural and tribal resources in the region, the regulatory setting, an impact analysis, and mitigation measures. Information in this section is derived primarily from the *Cultural Resource Assessment for the Manteca Annexation 1 Site, City of Manteca, San Joaquin County, California* (Peak & Associates, Inc., December 2021).

The Notice of Preparation (NOP) for the proposed Project was sent to the Native American Heritage Commission (NAHC) for review and comment on October 22, 2021. The NAHC provided comments on the proposed Project and a list of Native American contacts for consultation by the City of Manteca. There were no comments received during the public review period for the NOP related to cultural resources.

KEY TERMS

The following key terms are used throughout this section to describe cultural and tribal resources and the framework that regulates them:

Archaeology. The study of historic or prehistoric peoples and their cultures by analysis of their artifacts and monuments.

Complex. A patterned grouping of similar artifact assemblages from two or more sites, presumed to represent an archaeological culture.

Ethnography. The study of contemporary human cultures.

Midden. A deposit marking a former habitation site and containing such materials as discarded artifacts, bone and shell fragments, food refuse, charcoal, ash, rock, human remains, structural remnants, and other cultural leavings.

3.5.1 ENVIRONMENTAL SETTING

CULTURAL AND HISTORICAL SETTING

Prehistory

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 charmstones, 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” charmstones, 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.

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.

Ethnography

The Project site lies within the northern portion of the ethnographic territory of the Yokuts people. The Yokuts are 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 differ from other ethnographic groups in California as they have true tribal divisions with group names (Kroeber 1925; Latta 1949). Each tribe speaks a particular dialect, common to its members, but similar enough to other Yokuts that they were mutually intelligible (Kroeber 1925).

The Yokuts once held portions of the San Joaquin Valley from the Tehachapis 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 of 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 largescale 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.

PROJECT SETTING

Project Site

The Project site is in the northern portion of the City of Manteca directly adjacent to the Union Ranch development. The Project site is immediately northwest of the intersection of Brunswick Road and 99 Frontage Road. The Project site is bounded on the north by the existing agricultural lands, on the east by State Highway 99, on the south by the Union Ranch development and existing agricultural fields, and on the west by the existing single-family subdivisions. The Project site encompasses approximately 175-acres, including 148.99-acres of single-family and multi-family housing units, 13.34 acres for the development of park, open space, and trail, including 9.89 acres of park/basin and open space and 3.45 acres of the continuation of the Tide Water Bike Trail.

The Development Area is bordered on the north by agricultural lands occupied by orchards, on the east by State Route 99, on the south by the Union Ranch Subdivision and large lot residential housing, and on the west by the Union Ranch Subdivision and Union Rd. The current uses on the Development Area are predominantly agricultural. There are four existing residential units containing outbuildings and one large barn within the western edge of the Union Ranch North portion of the Development Area. An additional residential unit and a single outbuilding also exists on the eastern edge within the Stagecoach at M&E portion of the Development Area along State Route 99. One large gravel road runs north to south and bisects the Union Ranch North and Stagecoach at M&E sections of the Development Area. Four smaller gravel roads used to service the surrounding orchards run east to west within the Union Ranch North section of the Development Area. A South San Joaquin Irrigation District (SSJID) pipeline exists within the Union Ranch North section of the Development Area. The pipeline generally runs northwest to southeast until paralleling the gravel road bisecting the two portions of the proposed annexation. Irrigation structures are also found running north to south on the eastern edge of the Stagecoach at M&E portion of the Development Area.

Non-development Area 1 (Annexation Subarea 1) includes a single ranchette style residential unit with three large and one small outbuilding just to the southwest of the Development Area along Union Rd. The rest of the area consists of almond orchards.

Non-development Area 2 (Annexation Subarea 2) includes two ranchette style residential units with seven outbuildings east of Union Rd. Orchards border the southern boundary of the area and a large lot residential unit and additional orchards border the northern boundary.

Non-development Area 3 (Annexation Subarea 3) encompasses the western boundary of the project area and parallels Union Rd. Approximately seven ranchette style residential units are within Non-development Area 3. Undeveloped portions of the Union Ranch Subdivision are located to the west and south of the area, orchards are located to the north, and Union Rd. to the east.

The Project site is located in a portion of the northwest ¼ of Section 20, Township 1 South, Range 7 East Mount Diablo Base and Meridian (MDBM), and located on the USGS Lathrop, California, 7.5-minute series quadrangle map.

The Project site is relatively flat with natural gentle slope from south to north. The Project site topography ranges in elevation from approximately 29 to 36' feet above sea level.

Surrounding Uses

The Project site is surrounded by a variety of agricultural and residential land uses. Uses immediately north and east of the Project site include agricultural and residential uses, including ranchettes and large estates lots. Residential subdivisions are adjacent to the Project site, including the Union Ranch Subdivision which borders the Development Area on the west-southwest. Existing uses to the east of the Project site include single-family homes and ranchettes along State Highway 99.

KNOWN CULTURAL RESOURCES

A summary of the record search, field survey, and Native American consultation that was performed for the Project site is included below.

Records Search

On October 8, 2021, records of previously recorded cultural resources and cultural resource investigations were examined by the Central California Information Center (CCIC) of the California Historical Resources Information System (CHRIS) for the Project site and a one-eighth mile radius (CCIC File # 11938L, Appendix 2). The Project site was previously part of a report done for the Windmiller and Napoli in 2002 (Report# SJ-04786). surveyed in 2007 by Jones & Stokes Associates (Report #SJ - 7769). In addition, a water line along the northern boundary of the Project site was surveyed in 1998 by ASI Archaeology (SJ-006625). No resources have been recorded in the Project site of within the ¼-mile radius search area according to the CCIC records.

Field Survey

As part of the Cultural Resources Assessment, the property was surveyed in November 2021. The Project site appeared flat and leveled for agricultural purpose, particularly for almond orchards. Each block is divided by elevated dirt roads and/or irrigation pipe covered by dirt. The soil was observed to be light tan to medium brown in color and sandy loam in texture. Inspection of the irrigation ditch showed some areas of mostly sandy soils relative to the soils at the surface. Soil visibility was excellent during the time of the survey.

While no evidence of prehistoric period use or occupancy of the property was identified, two residential complexes in the northwest corner of the Non-development Area could not be accessed during the field survey. These complexes appear to contain older buildings with both areas shown having buildings on the 2914 USGS topographic quadrangle.

On the eastern edge of the Development Area (APN 197-020-02), the 1914 USGS quadrangle shows a residence but the site had limited access during the field survey. The residence appears to have been completely demolished in 2017 or 2018 according to a Google Earth aerial photo search. Older artifacts such as sun-colored amethyst, amber, and olive glass from late 1800s to 1920, a

cast iron window sash weight, cut nails and spikes, horseshoe fragments, and a brick with "Richmond" stamped on the face remain on the ground near the former building pad.

Recorded Resources

No resources were recorded. However, before building impacts occur, the two building complexes should be checked for historic period buildings. Any older buildings should be recorded and evaluated under the criteria of the California Register of Historic Resources (CRHR).

NATIVE AMERICAN CONSULTATION

As discussed in Chapter 2.0, Project Description, the Project may require a minor amendment to the General Plan, triggering the need for tribal consultation pursuant to Senate Bill (SB) 18. It is noted that no tribes have requested notification of projects pursuant to Assembly Bill (AB) 52. Peak & Associates requested a search of the Sacred Lands files for the Project Area through the Native American Heritage Commission, and the response from November 7, 2021, failed to reveal any properties listed as Sacred Lands on the Project site.

On November 3, 2021, Pursuant to SB 18, consultation letters were sent via certified mail by the City of Manteca, requesting information related to cultural resources or heritage sites within the Project area. The letters were sent to the thirteen tribal representatives listed in the NAHC response, including: Rhonda Morningstar Pope, Chairperson of the Buena Vista Rancheria of Me-Wuk Indians; the California Valley Miwok Tribe; Lloyd Methiesen, Chairperson of the Chicken Ranch Rancheria of Me-Wuk Indians; Sara A. Dutschke, Chairperson of the Ione Band of Miwok Indians; Monica Arellano, Vice Chairwomen of the Muwekma Ohlone Indian Tribe of the SF Bay Area; Cosme A. Valdez, Chairperson of the Nashville Enterprise Miwok-Maidu-Nishinam Tribe; Katherine Perez, Chairperson of the North Valley Yokuts Tribe; Timothy Perez, contact of the North Valley Yokuts Tribe; Neil Peyron, Chairperson of the Tule River Indian Tribe; and Corrina Gould, Chairperson of the Confederated Villages of Lisjan; Jesus G. Tarango, Jr., Chairperson of the Wilton Rancheria; Steven Hutchason, THPO of the Wilton Rancheria; Kenneth Woodrow, Chairperson of the Wuksache Indian Tribe/Eshom Valley Band of Foothill Yokuts. All consultation correspondence and a contact log are provided in Appendix C.

3.5.2 REGULATORY SETTING

FEDERAL

National Historic Preservation Act

The National Historic Preservation Act was enacted in 1966 as a means to protect cultural resources that are eligible to be listed on the National Register of Historic Places (NRHP). The law sets forth criterion that is used to evaluate the eligibility of cultural resources. The NRHP is composed of districts, sites, buildings, structures, objects, architecture, archaeology, engineering, and culture that are significant to American History.

Virtually any physical evidence of past human activity can be considered a cultural resource. Although not all such resources are considered to be significant and eligible for listing, they often provide the only means of reconstructing the human history of a given site or region, particularly where there is no written history of that area or that period. Consequently, their significance is judged largely in terms of their historical or archaeological interpretive values. Along with research values, cultural resources can be significant, in part, for their aesthetic, educational, cultural and religious values.

National Register of Historic Places

The eligibility criteria for the NRHP are as follows (36 CFR 60.4):

> *The quality of significance in American history, architecture, archaeology, and culture is present in districts, sites, buildings, structures, and objects of state and local importance that possess aspects of integrity of location, design, setting, materials, workmanship, feeling, association, and*
>
> *(A) that are associated with events that have made a significant contribution to the broad patterns of our history and cultural heritage; or*
> *(B) that are associated with the lives of persons significant in our past; or*
> *(C) that embody the distinctive characteristics of a type, period, region, or method of construction, or that represent the work of a master, or that possess high artistic values or that represent a significant and distinguishable entity whose components may lack individual distinction; or*
> *(D) that have yielded, or may be likely to yield, information important in prehistory or history.*

American Indian Religious Freedom Act and Native American Graves and Repatriation Act

The American Indian Religious Freedom Act recognizes that Native American religious practices, sacred sites, and sacred objects have not been properly protected under other statutes. It establishes as national policy that traditional practices and beliefs, sites (including right of access), and the use of sacred objects shall be protected and preserved. Additionally, Native American remains are protected by the Native American Graves and Repatriation Act of 1990.

Other Federal Legislation

Historic preservation legislation was initiated by the Antiquities Act of 1966, which aimed to protect important historic and archaeological sites. It established a system of permits for conducting archaeological studies on federal land, as well as setting penalties for noncompliance. This permit process controls the disturbance of archaeological sites on federal land. New permits are currently issued under the Archaeological Resources Protection Act (ARPA) of 1979. The purpose of ARPA is to enhance preservation and protection of archaeological resources on public and Native American lands. The Historic Sites Act of 1935 declared that it is national policy to "Preserve for public use historic sites, buildings, and objects of national significance."

STATE

California Register of Historic Resources

The California Register of Historical Resources (CRHR) was established in 1992 and codified in the Public Resource Code §5020, 5024 and 21085. The law creates several categories of properties that may be eligible for the CRHR. Certain properties are included in the program automatically, including: properties listed in the NRHP; properties eligible for listing in the NRHP; and certain classes of State Historical Landmarks. Determining the CRHR eligibility of historic and prehistoric properties is guided by CCR §§15064.5(b) and Public Resources Code (PRC) §§21083.2 and 21084.1.

Cultural resources, under CRHR guidelines, are defined as buildings, sites, structures, or objects that may have historical, architectural, archaeological, cultural, or scientific importance. A cultural resource may be eligible for listing on the CRHR if it:

- is associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage;
- is associated with the lives of persons important in our past;
- 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
- has yielded, or may be likely to yield, information important in prehistory or history.

California Environmental Quality Act

CEQA Guidelines §15064.5 provides guidance for determining the significance of impacts to archaeological and historical resources. Demolition or material alteration of a historical resource, including archaeological sites, is generally considered a significant impact. Determining the CRHR eligibility of historic and prehistoric properties is guided by CCR §§15064.5(b) and Public Resources Code (PRC) §§21083.2 and 21084.1.

CEQA also provides for the protection of Native American human remains (CCR §15064.5[d]). Native American human remains are also protected under the Native American Graves Protection and Repatriation Act of 1990 (25 USC 3001 et seq.), which requires federal agencies and certain recipients of federal funds to document Native American human remains and cultural items within their collections, notify Native American groups of their holdings, and provide an opportunity for repatriation of these materials. This act also requires plans for dealing with potential future collections of Native American human remains and associated funerary objects, sacred objects, and objects of cultural patrimony that might be uncovered as a result of development projects overseen or funded by the federal government.

If a prehistoric or historic period cultural resource does not meet any of the four CRHR criteria, but does meet the definition of a "unique" site as outlined in PRC §21083.2, it may still be treated as a significant resource if it is: an archaeological artifact, object or site about which it can be clearly demonstrated that, without merely adding to the current body of knowledge, there is a high probability that it meets any of the following criteria:

- it contains information needed to answer important scientific research questions and that there is a demonstrable public interest in that information,
- it has a special and particular quality such as being the oldest of its type or the best available example of its type, or
- it is directly associated with a scientifically recognized important prehistoric or historic event.

California Health and Safety Code

§§7050.5 of the California Health and Safety Code requires that construction or excavation be stopped in the vicinity of discovered human remains until the county coroner can determine whether the remains are those of a Native American. If the remains are determined to be Native American, the coroner must contact the California Native American Heritage Commission. The CEQA Guidelines (§§15064.5) specify the procedures to be followed in case of the discovery of human remains on non-federal land. The disposition of Native American burials falls within the jurisdiction of the NAHC.

Senate Bill 18 (Burton, Chapter 905, Statutes 2004)

SB 18, authored by Senator John Burton and signed into law by Governor Arnold Schwarzenegger in September 2004, 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 to include in the General Plan Guidelines advice to local governments for 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 978

In 2001, Assembly Bill (AB) 978 expanded the reach of Native American Graves Protection and Repatriation Act of 1990 and established a state commission with statutory powers to assure that federal and state laws regarding the repatriation of Native American human remains and items of patrimony are fully complied with. In addition, AB 978 also included non-federally recognized tribes for repatriation.

Assembly Bill 52

AB 52, approved in September 2014, creates a formal role for California Native American tribes by creating a formal consultation process and establishing that a substantial adverse change to a tribal cultural resource has a significant effect on the environment. Tribal cultural resources are defined as:

1) Sites, features, places, cultural landscapes, sacred places, and objects with cultural value to a California Native American tribe that are either of the following:
    A) Included or determined to be eligible for inclusion in the CRHR;
    B) Included in a local register of historical resources as defined in PRC §§5020.1(k).
2) A resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in PRC §§5024.1 (c). In applying the criteria set forth in PRC §§5024.1 (c) the lead agency shall consider the significance of the resource to a California Native American tribe.

A cultural landscape that meets the criteria above is also a tribal cultural resource to the extent that the landscape is geographically defined in terms of the size and scope of the landscape. In addition, a historical resource described in PRC §§21084.1, a unique archaeological resource as defined in PRC §§21083.2(g), or a "non-unique archaeological resource" as defined in PRC §§21083.2(h) may also be a tribal cultural resource if it conforms with above criteria.

AB 52 requires a lead agency, prior to the release of a negative declaration, mitigated negative declaration, or environmental impact report for a project, to begin consultation with a California Native American tribe that is traditionally and culturally affiliated with the geographic area of the proposed project if: (1) the California Native American tribe requested to the lead agency, in writing, to be informed by the lead agency through formal notification of proposed projects in the geographic area that is traditionally and culturally affiliated with the tribe, and (2) the California Native American tribe responds, in writing, within 30 days of receipt of the formal notification, and requests the consultation.

LOCAL

City of Manteca General Plan

The General Plan includes several policies relevant to cultural and tribal resources. 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 existing 2023 General Plan policies and proposed General Plan Update polices applicable to the Project are identified below:

2023 GENERAL PLAN

Policies: Resource Conservation Element

- RC-P-37. The City shall not knowingly approve any public or private project that may adversely affect an archaeological site without consulting the California Archaeological Inventory at Stanislaus State University, conducting a site evaluation as may be indicated, and attempting to mitigate any adverse impacts according to the recommendation of a qualified archaeologist. City implementation of this policy shall be guided by the California Environmental Quality Act (CEQA) and the National Historic Preservation Act (NHPA).

- RC-P-38. The City shall require that the proponent of any development proposal in an area with potential archaeological resources, and specifically near the San Joaquin River and Walthall Slough, and on the east side of State Highway 99 at the Louise Avenue crossing, shall consult with the California Archaeological Inventory, Stanislaus State University to

determine the potential for discovery of cultural resources, conduct a site evaluation as may be indicated, and mitigate any adverse impacts according to the recommendation of a qualified archaeologist. The survey and mitigation shall be developer funded.

- RC-P-39. The City shall set as a priority the protection and enhancement of Manteca's historically and architecturally significant buildings.

GENERAL PLAN UPDATE (PROPOSED)

Policies: Resource Conservation Element

- RC-11.1. Protect important historic resources and use these resources to promote a sense of place and history in Manteca.

- RC-11.2. Encourage historic resources to remain in their original use whenever possible. The adaptive use of historic resources is preferred, particularly as museums, educational facilities, or visitor-serving uses, when the original use can no longer be sustained. Older residences may be converted to office/retail use in commercial areas and to tourist or business use, so long as their historical authenticity is maintained or enhanced.

- RC-11.3. Do not approve any public or private project that may adversely affect an archaeological site without consulting the California Archaeological Inventory at Stanislaus State University, conducting a site evaluation as may be indicated, and attempting to mitigate any adverse impacts according to the recommendation of a qualified archaeologist. City implementation of this policy shall be guided by CEQA and the National Historic Preservation Act.

- RC-11.4. Require that the proponent of any development proposal in an area with potential archaeological resources, and specifically near the San Joaquin River and Walthall Slough, and on the east side of State Highway 99 at the Louise Avenue crossing, shall consult with the California Archaeological Inventory, Stanislaus State University to determine the potential for discovery of cultural resources, conduct a site evaluation as may be indicated, and mitigate any adverse impacts according to the recommendation of a qualified archaeologist. The survey and mitigation shall be developer funded.

- RC-11.9. Review new development projects and work in conjunction with the California Historical Resources Information System to determine whether project areas contain known archaeological resources, either prehistoric and/or historic-era, or have the potential for such resources.

- RC-11.10. Ensure that human remains are treated with sensitivity and dignity, and ensure compliance with the provisions of California Health and Safety Code Section 7050.5 and California Public Resources Code Section 5097.98.

- RC-11.11. Consistent with State, local, and tribal intergovernmental consultation requirements such as SB 18, consult as necessary with Native American tribes that may be interested in proposed new development and land use policy changes.

Implementation: Resource Conservation Element

- RC-11a. Require a records search for any proposed development project, to determine whether the site contains known archaeological, historic, or cultural resources and/or to

determine the potential for discovery of additional cultural resources. This requirement may be waived if determined by the City that the proposed project area is already sufficiently surveyed.

- RC-11b. Require a cultural and archaeological survey prior to approval of any project which would require excavation in an area that is sensitive for cultural or archaeological resources. If significant cultural or archaeological resources, including historic and prehistoric resources, are identified, appropriate measures shall be implemented, such as documentation and conservation, to reduce adverse impacts to the resource.

- RC-11c. Require all City permits for reconstruction or modification of existing buildings to include the submittal of a photograph of the existing structure or site. The intent is to create a record of the buildings in the City over time. A photograph will also be required for vacant sites that will be modified with new construction of new buildings or other above ground improvements.

- RC-11d. Incorporate significant archaeological sites, where feasible, into open space areas.

- RC-11e. Continue to inventory historic sites throughout the City. The inventory should contain a narrative of the significant facts regarding the historic events or persons associated with the site, and pictures of the site.

- RC-11f. Continue to support the local historical society in their efforts to:
    - Archive historic information, including photographs, publications, oral histories and other materials, and
    - make the information available to the public for viewing and research.

- RC-11g. Encourage the placement of monuments or plaques that recognize and celebrate historic sites, structures, and events.

- RC-11j. Require all new development, infrastructure, and other ground-disturbing projects to comply with the following conditions in the event of an inadvertent discovery of cultural resources or human remains:
    - If construction or grading activities result in the discovery of significant historic or prehistoric archaeological artifacts or unique paleontological resources, all work within 100 feet of the discovery shall cease, the Community Development Director shall be notified, the resources shall be examined by a qualified archaeologist, paleontologist, or historian for appropriate protection and preservation measures; and work may only resume when appropriate protections are in place and have been approved by the Community Development Director; and
    - If human remains are discovered during any ground disturbing activity, work shall stop until the Community Development Director and the San Joaquin County Coroner have been contacted; if the human remains are determined to be of Native American origin, the Native American Heritage Commission and the most likely descendants have been consulted; and work may only resume when appropriate measures have been taken and approved by the Community Development Director.

3.5.3 IMPACTS AND MITIGATION MEASURES

THRESHOLDS OF SIGNIFICANCE

Consistent with Appendix G of the CEQA Guidelines, the proposed project is considered to have a significant impact on cultural or tribal cultural resources if it will:

- Cause a substantial adverse change in the significance of a historical resource pursuant to Section15064.5;
- Cause a substantial adverse change in the significance of an archaeological resource pursuant to Section 15064.5;
- Disturb any human remains, including those interred outside of formal cemeteries;
- 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:
    - 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);
    - 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.

IMPACTS AND MITIGATION MEASURES

Impact 3.5-1 Project implementation has the potential to cause a substantial adverse change to a significant historical or archaeological resource, as defined in CEQA Guidelines §15064.5 (Less than Significant with Mitigation)

The Project site encompasses 202.81 acres, including a 175.67-acre Development Area, a 27.14-acre Non-development Area consisting of exiting rights-of-way owned by San Joaquin County and parcels not entitled for subdivision. The proposed Project involves the annexation of the 175.67-acre site into the City of Manteca to allow for the development of residential and park uses on the Development Area and improvement of the existing right-of-way area on Union Road to City of Manteca standards. No development or improvements are proposed within the Non-development Area, which is developed with existing single-family residential homes.

The Development Area is primarily active farmland with four existing houses with associated outbuildings and associated equipment. A single existing house is located on the eastern portion of the Project site and the three additional houses are located along the western edge of the Development Area.

The Project site is not located in an area known to have historical and archaeological resources. However, as with most projects in the region that involve ground-disturbing activities, there is the potential for discovery of a previously unknown historical and archaeological resources. Implementation of the following Mitigation Measures would ensure that this potential impact is **less than significant**.

MITIGATION MEASURE(S)

Mitigation Measure 3.5-1: *Prior to the initiation of construction activities, a training session for all workers shall be conducted at the site by a qualified archeologist. 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 3.5-2: *In concurrence with initial grading, contractors shall stop work in case of accidental discovery of buried archeological resources if buried cultural resources, such as chipped or ground stone, historic debris, building foundations, or human bone, are inadvertently discovered during ground-disturbing activities. In such instances, work shall stop within 100 feet of the discovery, until a qualified archaeologist can assess the significance of the find and, if necessary, develop appropriate treatment measures in consultation with the city and other appropriate agencies. See implementation measure RC-1-46 of the city of Manteca General Plan 2023 policy document for further detail.*

Mitigation Measure 3.5-3: *If any historical resources, cultural resources, including prehistoric or historic artifacts, or other indications of archaeological or paleontological resources, are found during grading and construction activities during any phase of the Project, all work shall be halted immediately within a 200-foot radius of the discovery until an archaeologist meeting the Secretary of the Interior's Professional Qualifications Standards in prehistoric or historical archaeology, as appropriate, has evaluated the find(s).*

Work shall not continue at the discovery site until the archaeologist conducts sufficient research and data collection to make a determination that the resource is either 1) not cultural in origin; or 2) not potentially significant or eligible for listing on the NRHP or CRHR; or 3) not a significant Public Trust Resource.

If 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 Project applicant's expense.

Impact 3.5-2: Project implementation has the potential to disturb human remains, including those interred outside of formal cemeteries. (Less than Significant with Mitigation)

Indications suggest that humans have occupied San Joaquin County for over 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 Project implementation.

While no human remains were found during field surveys of the Project site, implementation of the following mitigation measure would ensure that all construction activities which inadvertently discover human remains implement state-required consultation methods to determine the disposition and historical significance of any discovered human remains. The following mitigation measure would reduce this impact to a **less than significant** level.

MITIGATION MEASURE(S)

Mitigation Measure 3.5-4: *If human remains are discovered during the course of construction during any phase of the Project, work shall be halted at the site and at any nearby area reasonably suspected to overlie adjacent human remains until the San Joaquin County Coroner has been informed and has determined that no investigation of the cause of death is required. If the remains are of Native American origin, either of the following steps will be taken:*

- *The coroner shall contact the Native American Heritage Commission in order to ascertain the proper descendants from the deceased individual. The coroner shall make a recommendation to the landowner or the person responsible for the excavation work, for means of treating or disposing of, with appropriate dignity, the human remains and any associated grave goods, which may include obtaining a qualified archaeologist or team of archaeologists to properly excavate the human remains.*
- *The landowner shall retain a Native American monitor, and an archaeologist, if recommended by the Native American monitor, and rebury the Native American human remains and any associated grave goods, with appropriate dignity, on the property and in a location that is not subject to further subsurface disturbance when any of the following conditions occurs:*
    - *The Native American Heritage Commission is unable to identify a descendent.*
    - *The descendant identified fails to make a recommendation.*
    - *The City of Manteca or its authorized representative rejects the recommendation of the descendant, and the mediation by the Native American Heritage Commission fails to provide measures acceptable to the landowner.*

Impact 3.5-3: Cause a substantial adverse change in the significance of a tribal cultural resource, defined in Public Resources Code Section 21074, and that is: Listed or eligible for listing in the California Register of Historical Resources, or in a local register of historical resources as defined in Public Resources Code Section 5020.1(k), or a resource determined by the lead agency (Less than Significant)

The Project site is located in an area known to have historical, archaeological, and tribal cultural resources. A Sacred Lands File (SLF) search was requested from the NAHC and found no known

sacred lands within the Development Area as of November 7, 2021. As described under the Consultation heading above, the City of Manteca sent outreach letters to the thirteen tribal representatives listed in the NAHC response, including: Rhonda Morningstar Pope, Chairperson of the Buena Vista Rancheria of Me-Wuk Indians; the California Valley Miwok Tribe; Lloyd Methiesen, Chairperson of the Chicken Ranch Rancheria of Me-Wuk Indians; Sara A. Dutschke, Chairperson of the Ione Band of Miwok Indians; Monica Arellano, Vice Chairwomen of the Muwekma Ohlone Indian Tribe of the SF Bay Area; Cosme A. Valdez, Chairperson of the Nashville Enterprise Miwok-Maidu-Nishinam Tribe; Katherine Perez, Chairperson of the North Valley Yokuts Tribe; Timothy Perez, contact of the North Valley Yokuts Tribe; Neil Peyron, Chairperson of the Tule River Indian Tribe; and Corrina Gould, Chairperson of the Confederated Villages of Lisjan; Jesus G. Tarango, Jr., Chairperson of the Wilton Rancheria; Steven Hutchason, THPO of the Wilton Rancheria; Kenneth Woodrow, Chairperson of the Wuksache Indian Tribe/Eshom Valley Band of Foothill Yokuts. To date, no responses have been received.

While no specific resources have been identified through consultation with affiliated tribes, it is possible that unknown tribal cultural resources may be present within the Development Area. The Proposed Project would be required to follow development requirements, including compliance with local policies, ordinances, and applicable permitting procedures related to protection of tribal resources.

As discussed under Impacts 3.5-1 through 3.5-2, development of the proposed project could impact unknown archaeological resources including Native American artifacts and human remains. Implementation of Mitigation Measures 3.5-1 through 3.5-3 would ensure that the potential impact to archaeological, cultural, and tribal resources, including human remains, would be **less than significant**.

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The purpose of this section is to disclose and analyze the potential impacts associated with the geology of the Project site and regional vicinity, and to analyze issues such as the potential exposure of people and property to geologic hazards, landform alteration, and erosion. This section is based in part on the following:

- *City of Manteca General Plan 2023* (City of Manteca, as amended through 2013);
- *Manteca General Plan 2023 Draft Environmental Impact Report* (City of Manteca, 2003);
- *Custom Soils Report for San Joaquin County, California* (NRCS, 2012);
- *Natural Resources Conservation Service (NRCS) Web Soil Survey* (NRCS, 2019), and
- *Interactive Fault Map provided by the U.S. Geological Survey* (USGS, 2019).

It is noted that there are no significant deposits of mineral resources located on the Project site, as delineated by the Mineral Resources and Mineral Hazards Mapping Program (MRMHMP). Additionally, the Project site is not designated as a Mineral Resource Zone (MRZ). As such, this CEQA topic will not be discussed further.

There were no comments received during the NOP scoping process related to this environmental topic.

3.6.1 ENVIRONMENTAL SETTING

GEOLOGIC SETTING

Geomorphic Province

The City of Manteca, including the Project site, is located in the central 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.

Regional Geology

The Project site lies in the San Joaquin Valley in central California. The San Joaquin Valley is located in the central portion of the Great Valley Geomorphic Province. The Great Valley, also known as the Central Valley, is a topographically flat, northwest-trending, structural trough (or basin) about 50 miles wide and 450 miles long. It is bordered by the Tehachapi Mountains on the south, the Klamath Mountains on the north, the Sierra Nevada on the east, and the Coast Ranges on the west.

The San Joaquin Valley is filled with thick sedimentary rock sequences that were deposited as much as 130 million years ago. Large alluvial fans have developed on each side of the Valley. The larger and more gently sloping fans are on the east side of the San Joaquin Valley and overlie metamorphic and igneous basement rocks. These basement rocks are exposed in the Sierra Nevada foothills and consist of meta-sedimentary, volcanic, and granitic rocks.

Local Setting

The Project site is located in the northern portion of the City of Manteca directly adjacent to the Union Ranch development and the City of Manteca city limits. The Project site is immediately northwest of the intersection of Brunswick Road and 99 Frontage Road. The Project site is bounded on the north by the existing agricultural lands, on the east by State Highway 99, on the south by the Union Ranch development and existing agricultural fields, and on the west by the existing single-family subdivisions. The Project site encompasses approximately 175. acres, including a 148.99-acres of single-family and multi-family housing units, 13.34 acres for the development of park, open space, and trail, including 9.89 acres of park/basin and open space and 3.45 acres of the continuation of the Tide Water Bike Trail. Figures 2.0-1 and 2.0-2 in Chapter 2.0, Project Description, show the Project's regional location and vicinity.

The Development Area is bordered on the north by agricultural lands occupied by orchards, on the east by State Route 99, on the south by the Union Ranch Subdivision and large lot residential housing, and on the west by the Union Ranch Subdivision and Union Rd. The current uses on the Development Area are predominantly agricultural. There are two existing residential units containing outbuildings and two large barns within the western edge of the Union Ranch North portion of the Development Area. One large gravel runs north to south and bisects the Union Ranch North and Stagecoach at M&E sections of the Development Area. Four smaller gravel roads used to service the surrounding orchards run east to west within the Union Ranch North section of the Development Area. A South San Joaquin Irrigation District (SSJID) pipeline exists within the Union Ranch North section of the Development Area. The pipeline generally runs northwest to southeast until paralleling the gravel road bisecting the two portions of the proposed annexation. Irrigation structures are also found running north to south on the eastern edge of the Stagecoach at M&E portion of the Development Area.

Non-development Area 1 (Annexation Subarea 1) includes a single ranchette style residential unit with three large and one small outbuilding just to the southwest of the Development Area along Union Rd. The rest of the area consists of almond orchards.

Non-development Area 2 (Annexation Subarea 2) includes two ranchette style residential units with seven outbuildings east of Union Rd. Orchards border the southern boundary of the area and a large lot residential unit and additional orchards border the northern boundary.

Non-development Area 3 (Annexation Subarea 3) encompasses the western boundary of the project area and parallels Union Rd. Approximately seven ranchette style residential units are within Non-development Area 3. Undeveloped portions of the Union Ranch Subdivision are located to the west and south of the area, orchards are located to the north, and Union Rd. to the east.

The Project site is located in a portion of the northwest ¼ of Section 20, Township 1 South, Range 7 East Mount Diablo Base and Meridian (MDBM), and located on the USGS Lathrop, California, 7.5-minute series quadrangle map. The Project site is relatively flat with natural gentle slope from south to north with an elevation ranging from approximately 29 to 36 feet above sea level.

A Custom Soil Survey was completed for the Project site using the NRCS Web Soil Survey program. The NRCS Soils Map is provided in Figure 3.2-2 in Section 3.2 Agricultural Resources. Table 3.6-1 identifies the type and range of soils found in the Project site.

TABLE 3.6-1: PROJECT SITE SOILS

UNIT SYMBOL	*NAME*	*ACRES IN AOI*	*PERCENT OF AOI*	*CAPABILITY CLASSIFICATION**
254	Timor loamy sand	6.44	3.2%	III-IV
255	Tinnin loamy coarse sand	166.81	82.2%	III-IV
266	Veritas fine sandy loam	29.56	14.6%	III-IV

** DEPICTS IRRIGATED VS NON IRRIGATED CAPABILITY RATING*

SOURCE: NRCS CUSTOM SOIL SURVEY 2021.

Timor loamy sand. The Timor series consists of deed to hardpan, moderately well drained soils formed in granitic alluvium. Slopes are nearly level, typically ranging from 0 to 1 percent at an elevation of 20-feet. Common uses are for irrigated cropland growing primarily almonds, alfalfa, onions, tomatoes, small grains, grapes, and pasture. Vegetation consists of red brome, filaree, soft chess, wildoats, ripgut brome, and scattered California White Oaks.

Tinnin loamy coarse sand. This series consists of well drained soils on low fan terraces and alluvial fans. These soils are very deep, and form in alluvium derived from granitic rock sources. Slopes range from 0 to 2 percent. This series is characterized as well draining, slow runoff, and rapid permeability. Common uses for this series are irrigated cropland growing primarily almonds, alfalfa, onions, tomatoes, small grains, grapes and pasture. Vegetation consists of red brome, filaree, soft chess, wildoats, ripgut brome and scattered valley oaks.

Veritas fine sandy loam. This series consists of deep to duripan, moderately well drained soils. They formed in alluvium derived from mixed rock sources. Veritas soils are on low fan terraces. They have slow runoff and moderately rapid permeability. Common uses for this series include irrigated cropland. Alfalfa, barley and corn are the principal crops. Vegetation is annual grasses, forbs and scattered valley oaks.

FAULTS AND SEISMICITY

Faults

A fault is a fracture in the crust of the earth along which rocks on one side have moved relative to those on the other side. A fault trace is the line on the earth's surface defining the fault. Displacement of the earth's crust along faults releases energy in the form of earthquakes and in some cases results in fault creep. Most faults are the result of repeated displacements over a long period of time.

The State of California designates faults as active, potentially active, and inactive depending on how recent the movement that can be substantiated for a fault. Table 3.6-2 presents the California fault activity rating system.

TABLE 3.6-2: FAULT ACTIVITY RATING

FAULT ACTIVITY RATING	*GEOLOGIC PERIOD OF LAST RUPTURE*	*TIME INTERVAL (YEARS)*
Active (A)	Holocene	Within last 11,000 years
Potentially Active (PA)	Quaternary	11,000-1.6 Million Years
Inactive (I)	Pre-Quaternary	Greater than 1.6 Million

SOURCE: CALIFORNIA GEOLOGICAL SURVEY

Figure 3.6-1 provides a map of known nearby faults in relation to the Project site. While no faults cross the Project site, relatively large earthquakes have historically occurred in the Bay Area and along the margins of the Central Valley. The U.S. Geological Survey identifies potential seismic sources within 32.2 kilometers (20 miles) of the Project site. Two of the closest known faults classified as active by the U.S. Geological Survey are the Vernalis Fault east of the City of Tracy, located approximately seven miles to the west, and the San Joaquin fault, located approximately 15 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.

Seismicity

The amount of energy available to a fault is determined by considering the slip-rate of the fault, its area (fault length multiplied by down-dip width), maximum magnitude, and the rigidity of the displaced rocks. These factors are combined to calculate the moment (energy) release on a fault. The total seismic energy release for a fault source is sometimes partitioned between two different recurrence models, the characteristic and truncated Gutenberg-Richter (G-R) magnitude-frequency distributions. These models incorporate our knowledge of the range of magnitudes and relative frequency of different magnitudes for a particular fault.

Earthquakes are generally expressed in terms of intensity and magnitude. Intensity is based on the observed effects of ground shaking on people, buildings, and natural features. By comparison, magnitude is based on the amplitude of the earthquake waves recorded on instruments, which have a common calibration. The Richter scale, a logarithmic scale ranging from 0.1 to 9.0, with 9.0 being the strongest, measures the magnitude of an earthquake relative to ground shaking. Table 3.6-3 provides a description and a comparison of intensity and magnitude.

TABLE 3.6-3: MODIFIED MERCALLI INTENSITY SCALE FOR EARTHQUAKES

RICHTER MAGNITUDE	*MODIFIED MERCALLI*	*EFFECTS OF INTENSITY*
0.1 – 0.9	I	Earthquake shaking not felt
1.0 – 2.9	II	Shaking felt by those at rest.
3.0 – 3.9	III	Felt by most people indoors, some can estimate duration of shaking.
4.0 – 4.5	IV	Felt by most people indoors. Hanging objects rattle, wooden walls and frames creak.
4.6 – 4.9	V	Felt by everyone indoors, many can estimate duration of shaking. Standing autos rock. Crockery clashes, dishes rattle and glasses clink. Doors open, close and swing.
5.0 – 5.5	VI	Felt by all who estimate duration of shaking. Sleepers awaken, liquids spill, objects are displaced, and weak materials crack.
5.6 – 6.4	VII	People frightened and walls unsteady. Pictures and books thrown, dishes and glass are broken. Weak chimneys break. Plaster, loose bricks and parapets fall.

RICHTER MAGNITUDE	*MODIFIED MERCALLI*	*EFFECTS OF INTENSITY*
6.5 – 6.9	VIII	Difficult to stand. Waves on ponds, cohesionless soils slump. Stucco and masonry walls fall. Chimneys, stacks, towers, and elevated tanks twist and fall.
7.0 – 7.4	IX	General fright as people are thrown down, hard to drive. Trees broken, damage to foundations and frames. Reservoirs damaged, underground pipes broken.
7.5 – 7.9	X	General panic. Ground cracks, masonry and frame buildings destroyed. Bridges destroyed, railroads bent slightly. Dams, dikes and embankments damaged.
8.0 – 8.4	XI	Large landslides, water thrown, general destruction of buildings. Pipelines destroyed, railroads bent.
8.5 +	XII	Total nearby damage, rock masses displaced. Lines of sight/level distorted. Objects thrown into air.

SOURCE: UNITED STATES GEOLOGICAL SURVEY

According to the California Geological Survey's Probabilistic Seismic Hazard Assessment Program, San Joaquin County 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. The Uniform Building Code places all of California in the zone of greatest earthquake severity because recent studies indicate high potential for severe ground shaking.

Alquist-Priolo Special Study Zone

An active earthquake fault, per California's Alquist-Priolo Act, is one that has ruptured within the Holocene Epoch (≈11,000 years). Based on this criterion, the California Geological Survey identifies Earthquake Fault Zones. These Earthquake Fault Zones are identified in Special Publication 42 (SP42), which is updated as new fault data become available. The SP42 lists all counties and cities within California that are affected by designated Earthquake Fault Zones. The Fault Zones are delineated on maps within SP42 (Earthquake Fault Zone Maps).

The California legislature passed the Alquist-Priolo Special Studies Zone Act in 1972 to address seismic hazards associated with faults and to establish criteria for developments for areas with identified seismic hazard zones. The California Geologic Survey (CGS) evaluates faults with available geologic and seismologic data and determines if a fault should be zoned as active, potentially active, or inactive. If CGS determines a fault to be active, then it is typically incorporated into a Special Studies Zone in accordance with the Alquist-Priolo Earthquake Hazard Act. Alquist-Priolo Special Study Zones are usually one-quarter mile or less in width and require site-specific evaluation of fault location and require a structure setback if the fault is found traversing a project site.

As shown in Figure 3.6-1, the Project site is not within an Alquist-Priolo Special Study Zone. The nearest Alquist-Priolo fault zone, the Greenville fault zone, is located approximately 25 miles southwest of the Project site.

SEISMIC HAZARDS

Seismic Ground Shaking

The potential for seismic ground shaking in California is expected. As a result of the foreseeable seismicity in California, the State requires special design considerations for all structural improvements in accordance with the seismic design provisions in the California Building Code. These seismic design provisions require enhanced structural integrity based on several risk parameters. Seismic ground shaking in the Project site is expected during the life of the proposed Project. All structures will be built in accordance with the California Building Code's seismic design standards.

Fault Rupture

A fault rupture occurs when the surface of the earth breaks as a result of an earthquake, although this does not happen with all earthquakes. Surface ruptures have been known to extend up to 50 miles with displacements of an inch to 20 feet. Fault rupture almost always follows preexisting faults, which are zones of weakness. These ruptures generally occur in a weak area of an existing fault. Ruptures can be sudden (i.e. earthquake) or slow (i.e. fault creep). Sudden displacements are more damaging to structures because they are accompanied by shaking. The Alquist-Priolo Fault Zoning Act requires active earthquake fault zones to be mapped and it provides special development considerations within these zones. The Project site does not have surface expression of active faults and fault rupture is not anticipated. Figure 3.6-1 shows the regional faults in relation to Manteca.

Liquefaction

Liquefaction typically requires a significant sudden decrease of shearing resistance in cohesionless soils and a sudden increase in water pressure, which is typically associated with an earthquake of high magnitude. Under certain circumstances, the ground shaking can temporarily transform an otherwise solid material to a fluid state. Liquefaction is a serious hazard because buildings in areas that experience liquefaction may subside and suffer major structural damage. Liquefaction is most often triggered by seismic shaking, but it can also be caused by improper grading, landslides, or other factors. The potential for liquefaction is highest when groundwater levels are high, and loose, fine, sandy soils occur at depths of less than 50 feet.

The potential for liquefaction is greater in certain geologic and hydrologic environments that may be characterized by loosely consolidated, silty sediments together with shallow groundwater. In the vicinity of the Project area, the sediments most susceptible to liquefaction include Holocene (less than 10,000-year-old) delta, river channel, flood plain, and aeolian deposits, and poorly compacted fills. By contrast, dense soils, including well-compacted fills, are less susceptible to liquefaction.

To date, the Seismic Hazards Zonation Program of the CGS has not identified any seismically-induced liquefaction zones in the City of Manteca or in the Project site. However, soil data from the NRCS Web Soil Survey suggests that the potential for liquefaction is moderate given that the soils are moderate to high in sand and the water table is moderately high.

Lateral Spreading

Lateral spreading typically results when ground shaking moves soil toward an area where the soil integrity is weak or unsupported, and it typically occurs on the surface of a slope, although it does not occur strictly on steep slopes. Oftentimes, lateral spreading is directly associated with areas of liquefaction. Since the potential for liquefaction is moderate, the potential for lateral spreading is present; however, because the City of Manteca is essentially flat, lateral spreading of soils has not been observed.

Landslides

The California Geological Survey classifies landslides with a two-part designation based on Varnes (1978) and Cruden and Varnes (1996). The designation captures both the type of material that failed and the type of movement that the failed material exhibited. Material types are broadly categorized as either rock or soil, or a combination of the two for complex movements. Landslide movements are categorized as falls, topples, spreads, slides, or flows.

Landslide potential is influenced by physical factors, such as slope, soil, vegetation, and precipitation. Landslides require a slope, and can occur naturally from seismic activity, excessive saturation, and wildfires, or from human-made conditions such as construction disturbance, vegetation removal, wildfires, etc.

The Project site is essentially flat; therefore, the potential for a landslide in the Project site is low to non-existent.

NON-SEISMIC HAZARDS

Expansive Soils

The NRCS delineates soil units and compiles soils data as part of the National Cooperative Soil Survey. The following description of linear extensibility (also known as shrink-swell potential or expansive potential) is provided by the NRCS Physical Properties Descriptions:

> "Linear extensibility" refers to the change in length of an unconfined clod as moisture content is decreased from a moist to a dry state. It is an expression of the volume change between the water content of the clod at 1/3- or 1/10-bar tension (33kPa or 10kPa tension) and oven dryness. The volume change is reported in the table as percent change for the whole soil. The amount and type of clay minerals in the soil influence volume change.

The shrink-swell potential is low if the soil has a linear extensibility of less than 3 percent; moderate if 3 to 6 percent; high if 6 to 9 percent; and very high if more than 9 percent. If the linear extensibility is more than 3, shrinking and swelling can cause damage to buildings, roads, and other structures and to plant roots. Special design commonly is needed.

Expansive soils can undergo significant volume change with changes in moisture content. They shrink and harden when dried and expand and soften when wet. If structures are underlain by expansive soils, it is important that foundation systems be capable of tolerating or resisting any

potentially damaging soil movements. In addition, it is important to limit moisture changes in the surficial soils by using positive drainage away from buildings as well as limiting landscape watering. According to the NRCS Web Soil Survey, the soils in the Project site have a low shrink-swell potential, with the highest potential occurring on the western half of the development area. The NRCS Web Soil Survey indicated that near surface soils within the Project site have low linear extensibility, and the expansion potential of the soils would respond to fluctuations in moisture content.

Erosion

Erosion naturally occurs on the surface of the earth as surface materials (i.e. rock, soil, debris, etc.) is loosened, dissolved, or worn away, and transported from one place to another by gravity. Two common types of soil erosion include wind erosion and water erosion. The steepness of a slope is an important factor that affects soil erosion. Erosion potential in soils is influenced primarily by loose soil texture and steep slopes. Loose soils can be eroded by water or wind forces, whereas soils with high clay content are generally susceptible only to water erosion. The potential for erosion generally increases as a result of human activity, primarily through the development of facilities and impervious surfaces and the removal of vegetative cover.

The *Custom Soils Report* identified the erosion potential for the soils in the Project site. This report summarizes those soil attributes used by the Revised Universal Soil Loss Equation Version 2 (RUSLE2) for the map units in the selected area. Soil property data for each map unit component includes the hydrologic soil group, erosion factors Kf for the surface horizon, erosion factor T, and the representative percentage of sand, silt, and clay in the surface horizon.

Erosion factor K indicates the susceptibility of a soil to sheet and rill erosion by water. Values of K range from 0.02 to 0.69. Other factors being equal, the higher the value, the more susceptible the soil is to sheet and rill erosion by water. Within the Project site, the erosion factor Kf varies from 0.02 to 0.28, which is considered a low to moderate potential for erosion. Furthermore, because the Project site is essentially flat, the erosion potential is slight.

Collapsible Soils

Collapsible soils undergo a rearrangement of their grains and a loss of cementation, resulting in substantial and rapid settlement under relatively low loads. Collapsible soils occur predominantly at the base of mountain ranges, where Holocene-age alluvial fan and wash sediments have been deposited during rapid run-off events. Soils prone to collapse are commonly associated with manmade fill, wind-laid sands and silts, and alluvial fan and mudflow sediments deposited during flash floods. During an earthquake, even slight settlement of fill materials can lead to a differentially settled structure and significant repair costs. Differential settlement of structures typically occurs when heavily irrigated landscape areas are near a building foundation. Examples of common problems associated with collapsible soils include tilting floors, cracking or separation in structures, sagging floors, and nonfunctional windows and doors. Collapsible soils have not been identified in the Manteca General Plan as an issue in the Manteca area. However, in areas subject to potential liquefaction, the potential for liquefaction induced settlement is present.

Subsidence

Land subsidence is the gradual settling or sinking of an area with little or no horizontal motion due to changes taking place underground. It is a natural process, although it can also occur (and is greatly accelerated) as a result of human activities. Common causes of land subsidence from human activity include: pumping water, oil, and gas from underground reservoirs; dissolution of limestone aquifers (sinkholes); collapse of underground mines; drainage of organic soils; and initial wetting of dry soils. Subsidence has not been identified in the Manteca General Plan as an issue in the Manteca area.

PALEONTOLOGICAL RESOURCES

Among the natural resources deserving conservation and preservation, and existing within the City, are the often-unseen records of past life buried in the sediments and rocks below the pavement, buildings, soils, and vegetation which now cover most of the area. These records – fossils and their geologic context – undoubtedly exist in large quantities below the surface in many areas in and near the City of Manteca, and span millions of years in age of origin. Fossils constitute a non-renewable resource; once lost or destroyed, the exact information they contained can never be reproduced.

Paleontologists consider all vertebrate fossils to be of significance. Fossils of other types are considered significant if they represent a new record, new species, an oldest occurring species, the most complete specimen of its kind, a rare species worldwide, or a species helpful in the dating of formations. However, even a previously designated low potential site may yield significant fossils. Paleontological resources consist of the fossilized remains of plants and animals, including vertebrates (animals with backbones) and invertebrates (e.g., starfish, clams, ammonites, and coral). Fossils of microscopic plants and animals, or microfossils, are also considered in this analysis. The age and abundance of fossils depend on the location, topographic setting, and particular geologic formation in which they are found.

Regional Paleontological Setting

SAN JOAQUIN VALLEY

The following summary of the geological evolution of San Joaquin County and the potential for paleontological resources is based on the San Joaquin County General Plan Draft EIR. During the Mesozoic Era (208–65 million years ago), the Sierra Nevada formed, but the region that would become the San Joaquin Valley lay several thousand feet below the surface of the Pacific Ocean. During the Late Cretaceous Period (75–65 million years ago [mya]), flowering plants, early dinosaurs, and the first birds and mammals appeared. The basic form of the Great Central Valley took shape during the Cenozoic period, first as islands, then as mountains. During the late Cenozoic Era (65–2 mya), the Sierra Nevada eroded to mere hills compared to their earlier appearance, the Coast Ranges rose, and the San Joaquin Valley began to form.

During the Paleocene Epoch (65–53 mya), dinosaurs became extinct and mammals gradually evolved as the dominant group of animal life. During the Eocene Epoch (53–39 mya), the western edges of the San Joaquin Valley rose above sea level. Sedimentation and tectonic uplift of geological formations continued until two million years ago. In the subsequent Oligocene Epoch (39–23 mya), sedimentation continued, and during the Miocene Epoch (23–5 mya) the Diablo Range was uplifted.

The Pliocene Epoch (5–2 mya) was a time of tremendous uplift, and great quantities of sediment eroded from the nearby mountain ranges accumulated in the valley, eventually forming a deposit thousands of feet thick. In the Pleistocene Epoch (2 million to 10,000 years ago), the Sierra Nevada range was increasingly elevated and glaciated, resulting in the formation of spectacular features such as Yosemite Valley. During the Holocene Epoch (10,000 years ago to the present), the San Joaquin Valley was above sea level and achieved its present appearance, 466 miles long and 19 to 50 miles wide, enclosed by the Siskiyou, Sierra Nevada, Tehachapi, and Coast Ranges on the north, east, south, and west, respectively. The valley contained fresh water lakes and rivers attractive to herds of prehistoric grazing animals, including Columbian Mammoth, camel, bison, and native horse. The fossil remains of these creatures have been found in San Joaquin County and adjacent areas. The vast majority of paleontological specimens from San Joaquin County have been found in rock formations in the foothills of the Diablo Mountain Range. However, remains of extinct animals such as mammoth, could be found virtually anywhere in the county, especially along watercourses such as the San Joaquin River and its tributaries.

CITY OF MANTECA

The Geologic Map of California, prepared by the California Department of Conservation California Geological Survey, identifies the generalized rock types in the City of Manteca as Quaternary Alluvium "Q" which is younger alluvium that consists of marine and nonmarine (continental) sedimentary rocks from the Pleistocene through Holocene Epochs that are composed of alluvium, lake, playa, and terrace deposits, both unconsolidated and semi-consolidated. This type is mostly nonmarine deposits but does include marine deposits near the coast.

According to a records search of the University of California Museum of Paleontology (UCMP) Collections Date, eighty fossils have been found and recorded within San Joaquin County. Over half of them are dated to the tertiary period, with quaternary being the second most frequent period. These are the first and second periods of the Cenozoic Era respectively, during which modern flora, apes, large mammals, and eventually humans developed. The majority of fossils found within the Manteca area have been vertebrate in nature. These fossils include mammoth/mastodon, horse, pocket gopher, and other unspecified rodents, and unidentified artiodactyl (hoofed mammal) bone.

According to the Cultural Resource Assessment prepared by Peak & Associates, the Development Area was surveyed in November 2021 and no paleontological resources were observed or encountered.

3.6.2 REGULATORY SETTING

FEDERAL

Earthquake Hazards Reduction Act

The Earthquake Hazards Reduction Act of 1977 (42 USC, 7701 et seq.) requires the establishment and maintenance of an earthquake hazards reduction program by the Federal government.

Executive Order 12699

Signed in January 1990, this executive order of the President implements provisions of the Earthquake Hazards Reduction Act for "federal, federally assisted or federally regulated new building construction" and requires the development and implementation of seismic safety programs by Federal agencies.

International Building Code (IBC)

The purpose of the International Building Code (IBC) is to provide minimum standards to preserve the public peace, health, and safety by regulating the design, construction, quality of materials, certain equipment, location, grading, use, occupancy, and maintenance of all buildings and structures. IBC standards address foundation design, shear wall strength, and other structurally related conditions.

STATE

California Building Standards Code

Title 24 of the California Code of Regulations, known as the California Building Standards Code (CBSC) or simply "Title 24," contains the regulations that govern the construction of buildings in California. The CBSC includes 12 parts: California Building Standards Administrative Code, California Building Code, California Residential Building Code, California Electrical Code, California Mechanical Code, California Plumbing Code, California Energy Code, California Historical Building Code, California Fire Code, California Existing Building Code, California Green Building Standards Code (CAL Green Code), and the California Reference Standards Code. Through the CBSC, the State provides a minimum standard for building design and construction. The CBSC contains specific requirements for seismic safety, excavation, foundations, retaining walls, and site demolition. It also regulates grading activities, including drainage and erosion control.

California Health and Safety Code

Section 19100 et seq. of the California Health and Safety Code establishes the State's regulations for earthquake protection. This section of the code requires structural designs to be capable of resisting likely stresses produced by phenomena such as strong winds and earthquakes.

Alquist-Priolo Earthquake Fault Zoning Act

The Alquist-Priolo Earthquake Fault Zoning Act of 1972 sets forth the policies and criteria of the State Mining and Geology Board, which governs the exercise of governments' responsibilities to prohibit the location of developments and structures for human occupancy across the trace of active faults. The policies and criteria are limited to potential hazards resulting from surface faulting or fault creep within Earthquake Fault Zones, as delineated on maps officially issued by the State Geologist. Working definitions include:

- Fault – a fracture or zone of closely associated fractures along which rocks on one side have been displaced with respect to those on the other side;

- Fault Zone – a zone of related faults, which commonly are braided and sub parallel, but may be branching and divergent. A fault zone has a significant width (with respect to the scale at which the fault is being considered, portrayed, or investigated), ranging from a few feet to several miles;
- Sufficiently Active Fault – a fault that has evidence of Holocene surface displacement along one or more of its segments or branches (last 11,000 years); and
- Well-Defined Fault – a fault whose trace is clearly detectable by a trained geologist as a physical feature at or just below the ground surface. The geologist should be able to locate the fault in the field with sufficient precision and confidence to indicate that the required site-specific investigations would meet with some success.

"Sufficiently Active" and "Well Defined" are the two criteria used by the State to determine if a fault should be zoned under the Alquist-Priolo Act.

Seismic Hazards Mapping Act

The Seismic Hazards Mapping Act, passed in 1990, addresses non-surface fault rupture earthquake hazards, including liquefaction and seismically-induced landslides. Under the Act, seismic hazard zones are to be mapped by the State Geologist to assist local governments in land use planning. The program and actions mandated by the Seismic Hazards Mapping Act closely resemble those of the Alquist-Priolo Earthquake Fault Zoning Act (which addresses only surface fault-rupture hazards) and are outlined below:

The State Geologist is required to delineate the various "seismic hazard zones."

- Cities and counties, or other local permitting authority, must regulate certain development "projects" within the zones. They must withhold the development permits for a site within a zone until the geologic and soil conditions of the site are investigated and appropriate mitigation measures, if any, are incorporated into development plans.
- The State Mining and Geology Board provides additional regulations, policies, and criteria to guide cities and counties in their implementation of the law. The Board also provides guidelines for preparation of the Seismic Hazard Zone Maps and for evaluating and mitigating seismic hazards.
- Sellers (and their agents) of real property within a mapped hazard zone must disclose that the property lies within such a zone at the time of sale.

Division of Mines and Geology

The California Division of Mines and Geology (DMG) operates within the Department of Conservation. The DMG is responsible for assisting in the utilization of mineral deposits and the identification of geological hazards.

State Geological Survey

Similar to the DMG, the California Geological Survey is responsible for assisting in the identification and proper utilization of mineral deposits, as well as the identification of fault locations and other geological hazards.

LOCAL

City of Manteca General Plan

The City of Manteca General Plan includes several policies that are relevant to geological hazards and soils. 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 the 2023 General Plan policies and the proposed General Plan Update policies applicable to the Project are identified below:

2023 GENERAL PLAN (EXISTING)

Policies: Safety Element

- S-P-1. The City shall require preparation of geological reports and/or geological engineering reports for proposed new development located in areas of potentially significant geological hazards, including potential subsidence (collapsible surface soils) due to groundwater extraction.
- S-P-2. The City shall require new development to mitigate the potential impacts of geologic hazards through Building Plan review.
- S-P-3. The City shall require new development to mitigate the potential impacts of seismic induced settlement of uncompacted fill and liquefaction (water-saturated soil) due to the presence of a high water table.
- S-P-5. The City shall ensure that all public facilities, such as buildings, water tanks, and reservoirs, are structurally sound and able to withstand seismic shaking and the effects of seismically induced ground failure.

Implementation: Safety Element

- S-I-1. All new development shall comply with the current Uniform Building Code (UBC) requirements that stipulate building structural material and reinforcement.

  S-I-2. All new development shall comply with California Health and Safety Code Section 19100 et seq. (Earthquake Protection Law), which requires that buildings be designed to resist stresses produced by natural forces such as earthquakes and wind.

GENERAL PLAN UPDATE (PROPOSED)

Policies: Safety Element

- S-2.1. Enforce adopted regulations to identify and address potential hazards relating to seismic, geologic, and soils conditions.
- S-2.2. Regulate development in areas of seismic and geologic hazards to reduce risks to life and property associated with earthquakes, liquefaction, erosion, and expansive soils.
- S-2.3. Require new development to mitigate the potential impacts of geologic and seismic hazards, including uncompacted fill, liquefaction, and subsidence, through the development review process.

- S-2.6. Continue to require professional inspection of foundation, excavation, earthwork, and other geotechnical aspects of site development during construction on those sites specified in geotechnical studies as being prone to moderate or greater levels of seismic or geologic hazard.

- S-2.8. Ensure that all public facilities, including buildings, water tanks, and reservoirs, are structurally sound and able to withstand seismic shaking and the effects of seismically-induced ground failure, consistent with the California Building Standards Codes and other applicable standards.

Implementation: Safety Element

- S-2a. Continue to require preparation of geotechnical reports for proposed development projects, public projects, and all critical structures. The reports should include, but not be limited to: evaluation of and recommendations to mitigate the effects of fault displacement, ground shaking, uncompacted fill, expansive soils, liquefaction, subsidence, and settlement. Recommendations from the report shall be incorporated into the development project to address seismic and geologic risks identified in the report.

- S-2b. Review development proposals to ensure compliance with the current State building standards.

- S-2c. Review development proposals to ensure compliance with California Health and Safety Code Section 19100 et seq. (Earthquake Protection Law), which requires that buildings be designed to resist stresses produced by natural forces such as earthquakes and wind.

City of Manteca Municipal Code

Chapter 15.04 of the Manteca Municipal Code adopts the 2019 CBSC, with amendments to address administrative provisions and additional requirements to address connection of existing slabs to new construction, as the building code of the City.

The City of Manteca Municipal Code includes Chapter 17.48 that requires a soil management report in order to reduce runoff and encourage healthy plant growth as part of the Landscape Documentation Package.

3.6.3 IMPACTS AND MITIGATION MEASURES

THRESHOLDS OF SIGNIFICANCE

Consistent with Appendix G of the CEQA Guidelines, the proposed Project will have a significant impact on geology and soils if it will:

- Directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving:

    - 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;

  - Strong seismic ground shaking;
  - Seismic-related ground failure, including liquefaction; or
  - Landslides.
- Result in substantial soil erosion or the loss of topsoil;
- 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;
- 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;
- 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; or
- Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature.

IMPACTS AND MITIGATION MEASURES

Impact 3.6-1: The proposed Project may expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving rupture of a known earthquake fault, strong seismic ground shaking, seismic-related ground failure, including liquefaction, or landslides. (Less than Significant with Mitigation)

Development of the proposed Project could result in the exposure of people and structures to conditions that have the potential for adverse effects associated with rupture of a known earthquake fault, strong seismic ground shaking, and seismic-related ground failure, including liquefaction, or landslides. Each are discussed below:

GROUND RUPTURE

The California Geologic Survey (CGS) evaluates faults and determines if a fault should be zoned as active, potentially active, or inactive. All active faults are incorporated into a Special Studies Zone, also referred to as an Alquist-Priolo Special Study Zone. The Project site is not within an Alquist-Priolo Special Study Zone.

The U.S. Geological Survey identifies potential seismic sources within 32.2 kilometers (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 10 miles to the southwest, and the San Joaquin fault, located approximately 16 miles to the southwest. Therefore, because no faults are located on the Project sites, the potential for ground rupture (cracking or breaking of the ground during an earthquake) would be less than significant.

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. The Uniform Building Code places all of California in the zone of greatest earthquake severity because recent studies indicate high potential for severe ground shaking.

To reduce the impact of seismic ground shaking on the development, the Project would be required to be constructed using standard engineering and seismic safety design techniques of the California Building Code, as required by Section 15.04.010 of the City's Municipal Code. Seismic design provisions of current building codes generally prescribe minimum lateral forces, applied statically to the structure, combined with the gravity forces of dead-and-live loads. The code-prescribed lateral forces are generally considered to be substantially smaller than the comparable forces that would be associated with a major earthquake. Therefore, structures would be able to: (1) resist minor earthquakes without damage, (2) resist moderate earthquakes without structural damage but with some nonstructural damage, and (3) resist major earthquakes without collapse but with some structural as well as nonstructural damage. Design in accordance with these standards and policies would reduce any potential impact to a less than significant level.

LIQUEFICATION

To date, the Seismic Hazards Zonation Program of the CGS has not identified any seismically-induced liquefaction zones in the City of Manteca or in the Project site. However, soil data from the NRCS Web Soil Survey suggests that the potential for liquefaction is moderate given that the soils are high in sand and the water table is moderately high. Therefore, this is a potentially significant impact.

LANDSLIDES

The Project site is essentially flat; therefore, the potential for a landslide in the Project site is low to non-existent. Some limited potential for slope instability risk could arise during grading and construction activities, where slopes could be over-steepened. However, this risk is mitigated by adhering to relevant California Building Code requirements. Additionally, according to the CGS Information Warehouse: Regulatory Maps, the site is not located within a Landslide and Liquefication Zone. As a result, the probability of landslides causing substantial adverse effects on people or structures is less than significant.

CONCLUSION

The Project site is subject to potential ground shaking caused by seismic activity. Seismic activity could come from a known active fault such as the Greenville fault, or any number of other faults in the region. 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. As discussed under Section 3.6.2 Regulatory Setting, the

California Building Code, Title 24, Part 2, Chapter 16 addresses structural design and Chapter 18 addresses soils and foundations. Collectively, these requirements, which have been adopted by the City of Manteca (Municipal Code Section 15.04.010), 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.

The Project site has a moderate risk of seismic-related ground failure as a result of liquefication. Mitigation Measure 3.6-1 requires the preparation of a final geotechnical evaluation of soils at a design-level, consistent with Sections 1803.1.1.2, 1803.5.11. and 1803.5.12 of the CBC. Implementation of this mitigation measure would ensure that all on-site fill soils are properly compacted and comply with the applicable safety requirements established by the CBC to reduce risks associated with unstable soils and excavations and fills, and that any issues associated with unstable soils are addressed at the design level. Therefore, implementation of Mitigation Measure 3.6-1 would ensure the proposed Project would have a **less than significant** impact relative to this topic.

MITIGATION MEASURE(S)

Mitigation Measure 3.6-1*: Prior to issuance of a Grading Permit, a certified geotechnical engineer, or equivalent, shall be retained to perform a final geotechnical evaluation of the soils at a design-level as required by the requirements of the California Building Code Title 24, Part 2, Chapter 18, Section 1803.1.1.2 related to expansive soils and other soil conditions. The evaluation shall be prepared in accordance with the standards and requirements outlined in California Building Code, Title 24, Part 2, Chapter 16, Chapter 17, and Chapter 18, which addresses structural design, tests and inspections, and soils and foundation standards. The final geotechnical evaluation shall include design recommendations to ensure that soil conditions do not pose a threat to the health and safety of people or structures, including threats from liquefaction or lateral spreading. The grading and improvement plans, as well as the storm drainage and building plans for each phase of the Project shall be designed in accordance with the recommendations provided in the final geotechnical evaluation.*

Impact 3.6-2: Implementation and construction of the proposed Project may result in substantial soil erosion or the loss of topsoil. (Less than Significant with Mitigation)

According to the United States Environmental Protection Agency, polluted stormwater runoff is a leading cause of impairment to the nearly 40 percent of surveyed U.S. water bodies which do not meet water quality standards. Over land or via storm sewer systems, polluted runoff is discharged, often untreated, directly into local water bodies. Soil erosion and the loss of topsoil is one of the most common sources of polluted stormwater runoff during construction activities. When left uncontrolled, stormwater runoff can erode soil and cause sedimentation in waterways, which collectively result in the destruction of fish, wildlife, and aquatic life habitats; a loss in aesthetic value; and threats to public health due to contaminated food, drinking water supplies, and recreational waterways.

Mandated by Congress under the Clean Water Act, the NPDES Stormwater Program is a comprehensive two-phased national program for addressing the non-agricultural sources of stormwater discharges which adversely affect the quality of our nation's waters. The program uses the National Pollutant Discharge Elimination System (NPDES) permitting mechanism to require the implementation of controls designed to prevent harmful pollutants, including soil erosion, from being washed by stormwater runoff into local water bodies. The construction activities for the proposed Project would be governed by the General Permit 2009-0009-DWQ (amended by 2010-0014-DWQ & 2012-0006-DWQ), which states:

> *"…Particular attention must be paid to large, mass graded sites where the potential for soil exposure to the erosive effects of rainfall and wind is great and where there is potential for significant sediment discharge from the site to surface waters. Until permanent vegetation is established, soil cover is the most cost-effective and expeditious method to protect soil particles from detachment and transport by rainfall. Temporary soil stabilization can be the single most important factor in reducing erosion at construction sites. The discharger is required to consider measures such as: covering disturbed areas with mulch, temporary seeding, soil stabilizers, binders, fiber rolls or blankets, temporary vegetation, and permanent seeding. These erosion control measures are only examples of what should be considered and should not preclude new or innovative approaches currently available or being developed. Erosion control BMPs should be the primary means of preventing stormwater contamination, and sediment control techniques should be used to capture any soil that becomes eroded…"*

General Permit 2009-0009-DWQ (amended by 2010-0014-DWQ & 2012-0006-DWQ) further states that:

> *"Sediment control BMPs should be the secondary means of preventing stormwater contamination. When erosion control techniques are ineffective, sediment control techniques should be used to capture any soil that becomes eroded. The discharger is required to consider perimeter control measures such as: installing silt fences or placing straw wattles below slopes. These sediment control measures are only examples of what should be considered and should not preclude new or innovative approaches currently available or being developed…Inappropriate management of run-on and runoff can result in excessive physical impacts to receiving waters from sediment and increased flows. The discharger is required to manage all run-on and runoff from a project site. Examples include: installing berms and other temporary run-on and runoff diversions…All measures must be periodically inspected, maintained and repaired to ensure that receiving water quality is protected. Frequent inspections coupled with thorough documentation and timely repair is necessary to ensure that all measures are functioning as intended…"*

To ensure that construction activities are covered under General Permit 2009-0009-DWQ (amended by 2010-0014-DWQ & 2012-0006-DWQ), projects in California must prepare a Stormwater Pollution Prevention Plan (SWPPP) containing Best Management Practices (BMPs) to reduce erosion and sediments to meet water quality standards. Such BMPs may 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. The BMPs and overall SWPPP is reviewed by the Regional Water Quality Control Board as part of the permitting process. The SWPPP, once approved, is kept on site and implemented during construction activities and must be made available upon request to representatives of the RWQCB and/or the lead agency.

The Custom Soils Report identified the erosion potential for the soils in the Project site as low to moderate. Furthermore, because the Project site is essentially flat, the erosion potential is considered slight. Regardless of the potential for erosion, there is always the potential for human caused erosion associated with construction activities or through the operational phase of a project. Grading, excavation, removal of vegetation cover, and loading activities associated with construction activities temporarily expose soils and increase the potential for soil erosion and sedimentation during rail events. Construction activities can also result in soil compaction and wind erosion effects that can adversely affect soils and reduce the revegetation potential at construction sites and staging areas.

In accordance with the NPDES Stormwater Program, Mitigation Measure 3.9-1 in the Hydrology and Water Quality Section of this EIR requires an approved SWPPP designed to control erosion and the loss of topsoil to the extent practicable using BMPs that the RWQCB has deemed effective in controlling erosion, sedimentation, runoff during construction activities. The RWQCB has stated that these erosion control measures are only examples of what should be considered and should not preclude new or innovative approaches currently available or being developed. The specific controls are subject to the review and approval by the RWQCB and are existing regulatory requirements. Implementation of Mitigation Measures 3.9-1 would ensure that the proposed Project would have a ***less than significant*** impact relative to this topic.

MITIGATION MEASURE(S)

*Implement **Mitigation Measure 3.9-1**.*

Impact 3.6-3: The proposed Project has the potential to be located on a geologic unit or soil that is unstable, or that would become unstable as a result of Project implementation, and potentially result in landslide, lateral spreading, subsidence, liquefaction or collapse. (Less than Significant with Mitigation)

Development of the proposed Project could result in the exposure of people and structures to conditions that have the potential for adverse effects associated with ground instability or failure. Soils and geologic conditions in the Project site have the potential for landslides, lateral spreading, subsidence, liquefaction, or collapse. Each are discussed below:

LIQUEFACTION

As discussed in Impact 3.6-1, the Seismic Hazards Zonation Program of the CGS has not identified any seismically-induced liquefaction zones in the City of Manteca, including the Project site.

However, soil data from the NRCS Web Soil Survey (NRCS, 2021) suggests that the potential for liquefaction is moderate given that the soils are high in sand and the water table is moderately high.

LATERAL SPREADING

Lateral spreading generally is a phenomenon where blocks of intact, non-liquefied soil move down slope on a liquefied substrate of large areal extent. The potential for liquefaction at the Project site is moderate; therefore, the potential for lateral spreading of soils is also present.

LANDSLIDES

As discussed in Impact 3.6-1, the Project site is essentially flat and, to date, the Seismic Hazards Zonation Program of the CGS has not identified any seismically-induced landslide zones in the City of Manteca or in the Project site. Therefore, the potential for a landslide in the Project site is low to non-existent.

COLLAPSIBLE SOILS

Collapsible soils occur predominantly at the base of mountain ranges, where Holocene-age alluvial fan and wash sediments have been deposited during rapid run-off events. Differential settlement of structures typically occurs when heavily irrigated landscape areas are near a building foundation. Collapsible soils have not been identified in the City of Manteca as an issue. However, in areas subject to potential liquefaction, the potential for liquefaction induced settlement is present.

SUBSIDENCE

Land subsidence is the gradual settling or sinking of an area with little or no horizontal motion due to changes taking place underground. It is a natural process, although it can also occur (and is greatly accelerated) as a result of human activities. Subsidence has not been identified in the Manteca General Plan.

CONCLUSION

The Project site does not have a significant risk of becoming unstable as a result landslide, subsidence, or soil collapse. There is a potential for liquefaction, liquefaction induced settlement, and lateral spreading. However, through the implementation of Mitigation Measure 3.6-1 and compliance with section 15.04.010 of the City's Municipal Code, the proposed Project would have a ***less than significant*** impact relative to this topic.

MITIGATION MEASURE(S)

*Implement **Mitigation Measure 3.6-1***

Impact 3.6-4: The proposed Project has the potential to result in development 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. (Less than Significant with Mitigation)

Expansive soils are those that undergo volume changes as moisture content fluctuates; swelling substantially when wet or shrinking when dry. According to the NRCS Web Soil Survey, the soils in the Project site have a low shrink-swell potential. The NRCS Web Soil Survey indicated that near surface soils within the Project site have low linear extensibility, Redundant; delete.

The California Building Code Title 24, Part 2, Chapter 18, Section 1803.1.1.2 requires specific geotechnical evaluation when a preliminary geotechnical evaluation determines that expansive or other special soil conditions are present, which, if not corrected, would lead to structural defects. The City of Manteca also requires a final geotechnical evaluation to be performed at a design-level to ensure that the foundations, structures, roadway sections, sidewalks, and other improvements can accommodate the specific soils, including expansive soils, at those locations. Mitigation Measure 3.6-2, presented above, provides the requirement for a final geotechnical evaluation in accordance with the standards and requirements outlined in the California Building Code, Title 24, Part 2, Chapter 16, Chapter 17, and Chapter 18, which addresses structural design, tests and inspections, and soils and foundation standards. The final geotechnical evaluation would include design recommendations to ensure that soil conditions do not pose a threat to the health and safety of people or structures. The grading and improvement plans, as well as the storm drainage and building plans, are required to be designed in accordance with the recommendations provided in the final geotechnical evaluation. With the implementation of Mitigation Measure 3.6-1 (requiring a final Geotechnical Evaluation, and site recommendations) the proposed Project would have a ***less than significant*** impact relative to this topic.

MITIGATION MEASURE(S)

*Implement **Mitigation Measure 3.6-1**.*

Impact 3.6-5: The proposed Project does not have the potential to 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 (Less than Significant)

The proposed Project involves the annexation of 202.81 acres into the City of Manteca, including the proposed 175.97-acre Development Area, 26.84-acre Non-development Area, and existing right-of-way, to develop 715 single family detached units, 200 multi-family units, parks and trails totaling 14.55-acres, and associated roadway improvements.

The proposed residential and park development would occur only on the 175.97-acre Development Area. As discussed in Chapter 2.0, Project Description, septic tanks or septic systems are not proposed as part of the Project. The Development Area would be served by a new wastewater distribution system. The proposed wastewater conveyance facilities would connect to the existing

sewer main(s) along nearby roadway(s) as part of the City of Manteca collection and treatment system. Further, the Project does not propose new septic systems or alternative waste water disposal. Following annexation into the City of Manteca, the Non-development Area residences would be required to connect to the City of Manteca wastewater collection and treatment system. Upon connection to the City's wastewater collection, conveyance and treatment system there will be no new septic tanks or alternative wastewater disposal systems utilized for the proposed Project, this impact is considered ***less than significant*** and no mitigation is required.

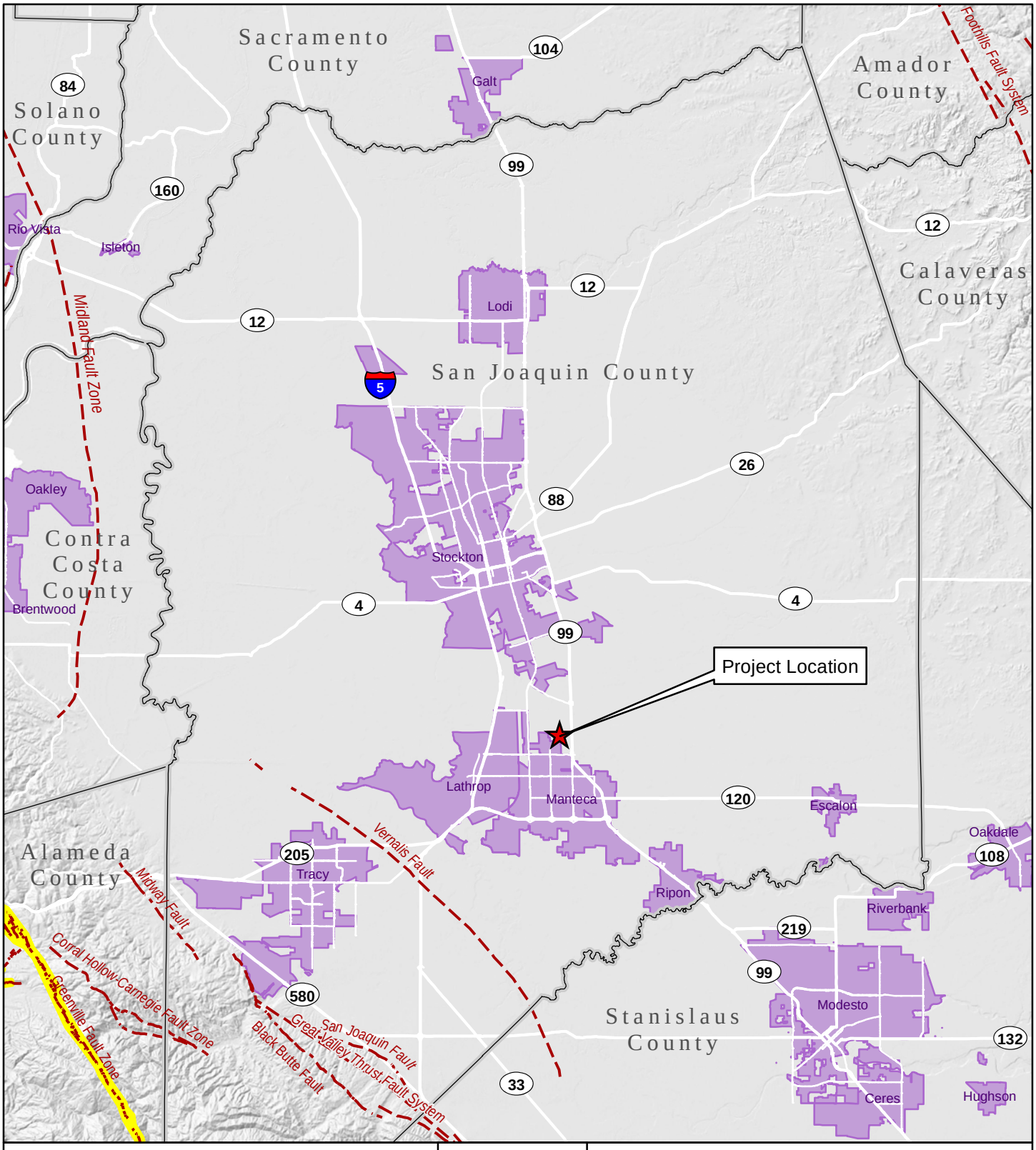
Impact 3.6-6: The proposed Project has the potential to directly or indirectly destroy a unique paleontological resource or site or unique geologic feature (Less than Significant with Mitigation)

Although the Project site is not expected to contain subsurface paleontological resources, the Project site is in an area known to have these resources and it is possible that undiscovered paleontological resources could be encountered during ground-disturbing activities. Damage to or destruction of a paleontological resource would be considered a potentially significant impact under local, state, or federal criteria. Implementation of Mitigation Measure 3.6-2 would ensure steps would be taken to reduce impacts to paleontological resources in the event that they are discovered during construction, including stopping work in the event potential resources are found, evaluation of the resource by a qualified paleontologist and appropriate handling of any potential resource. This mitigation measure would reduce this impact to a ***less than significant*** level.

MITIGATION MEASURE(S)

Mitigation Measure 3.6-2: *If any paleontological resources are found during grading and construction activities of the Project, all work shall be halted immediately within a 200-foot radius of the discovery until a qualified paleontologist has evaluated the find.*

Work shall not continue at the discovery site until the paleontologist evaluates the find and makes a determination regarding the significance of the resource and identifies recommendations for conservation of the resource, including preserving in place or relocating on the Project site, if feasible, or collecting the resource to the extent feasible and documenting the find with the University of California Museum of Paleontology.



LEGEND

- Quaternary Fault
- Alquist Priolo Fault Zone
- Incorporated Area
- County Area

Source: San Joaquin County GIS; USGS; CGS; California State GeoPortal. Map date: October 19, 2021.

N

0 2½ 5

Miles

MANTECA ANNEXATION #1

Figure 3.6-1. Earthquake Fault Map

De Novo Planning Group
A Land Use Planning, Design, and Environmental Firm

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The purpose of this section is to disclose and analyze the potential impacts associated with hazards and hazardous materials related to the Project site and general vicinity, and to analyze the potential for exposure of people to hazards and hazardous materials as the Project is built and operated in the future. Information in this section is derived primarily from:

- *City of Manteca General Plan 2023* (City of Manteca as amended through 2016);
- *Manteca General Plan 2023 Draft Environmental Impact Report* (City of Manteca, 2003);
- *City of Manteca General Plan Update* (City of Manteca, 2021);
- City of *Manteca General Plan Update Draft Environmental Impact Report* (City of Manteca, 2021);

There were no comments received during the NOP scoping process related to this environmental topic.

3.8.1 ENVIRONMENTAL SETTING

PHYSICAL SETTING

Project Location

The Project site is located in a portion of the northwest ¼ of Section 20, Township 1 South, Range 7 East Mount Diablo Base and Meridian (MDBM), and located on the USGS Lathrop, California, 7.5-minute series quadrangle map. This places the project site in the northern portion of the City of Manteca directly adjacent to the Union Ranch development. The Project site is immediately northwest of the intersection of Brunswick Road and 99 Frontage Road. The Project site is bounded on the north by the existing agricultural lands, on the east by State Highway 99, on the south by the Union Ranch development and existing agricultural fields, and on the west by the existing single-family subdivisions. The Project site encompasses approximately 175-acres, including 148.99-acres of single-family and multi-family housing units, 13.34 acres for the development of park, open space, and trail, including 9.89 acres of park/basin and open space and 3.45 acres of the continuation of the Tide Water Bike Trail. Figures 2.0-1 and 2.0-2 in Chapter 2.0, Project Description, show the Project's regional location and vicinity.

Existing Site Uses

The Development Area is bordered on the north by agricultural lands occupied by orchards, on the east by State Route 99, on the south by the Union Ranch Subdivision and large lot residential housing, and on the west by the Union Ranch Subdivision and Union Rd. The current uses on the Development Area are predominantly agricultural. There are two existing residential units containing outbuildings and one large barn within the western edge of the Union Ranch North portion of the Development Area. One large gravel runs north to south and bisects the Union Ranch North and Stagecoach at M&E sections of the Development Area. Four smaller gravel roads used to service the surrounding orchards run east to west within the Union Ranch North section of the Development Area. A South San Joaquin Irrigation District (SSJID) pipeline exists within the Union Ranch North section of the Development Area. The pipeline generally runs northwest to southeast

until paralleling the gravel road bisecting the two portions of the proposed annexation. Irrigation structures are also found running north to south on the eastern edge of the Stagecoach at M&E portion of the Development Area.

Non-development Area 1 (Annexation Subarea 1) includes a single ranchette style residential unit with three large and one small outbuilding just to the southwest of the Development Area along Union Rd. The rest of the area consists of almond orchards.

Non-development Area 2 (Annexation Subarea 2) includes two ranchette style residential units with seven outbuildings east of Union Rd. Orchards border the southern boundary of the area and a large lot residential unit and additional orchards border the northern boundary.

Non-development Area 3 (Annexation Subarea 3) encompasses the western boundary of the project area and parallels Union Rd. Approximately seven ranchette style residential units are within Non-development Area 3. Undeveloped portions of the Union Ranch Subdivision are located to the west and south of the area, orchards are located to the north, and Union Rd. to the east.

Existing Surrounding Uses

The Project site is surrounded by a variety of agricultural and residential land uses. Uses immediately north and east of the Project site include agricultural and residential uses, including ranchettes and large estates lots. Residential subdivisions are adjacent to the Project site, including the Union Ranch Subdivision which borders the Development Area on the west-southwest. Existing uses to the east of the Project site include single-family homes and ranchettes along State Highway 99.

Site Topography

The Project site is relatively flat with natural gentle slope from south to north with an elevation ranging from approximately 29 to 36 feet above sea level as shown in Figure 2.0-3.

HAZARDS ASSESSMENT

For the purposes of this EIR, "hazardous material" is defined as provided in California Health & Safety Code, Section 25501:

- Any material that, because of its quantity, concentration, or physical or chemical characteristics, poses a significant present or potential hazard to human health and safety or to the environment if released into the workplace or the environment.

"Hazardous materials" include, but are not limited to, hazardous substances, hazardous waste, and any material that a handler or the administering agency has a reasonable basis for believing that it would be injurious to the health and safety of persons or harmful to the environment if released into the workplace or the environment.

"Hazardous waste" is a subset of hazardous materials. For the purposes of this EIR, the definition of hazardous waste is essentially the same as that in the California Health & Safety Code, Section 25517, and in the California Code of Regulations (CCR), Title 22, Section 66261.2:

- Hazardous wastes are wastes that, because of their quantity, concentration, physical, chemical, or infectious characteristics, may either cause, or significantly contribute to, an increase in mortality or an increase in serious illness, or pose a substantial present or potential hazard to human health or the environment when improperly treated, stored, transported, disposed of, or otherwise managed.

CCR Title 22 categorizes hazardous waste into hazard classes according to specific characteristics of ignitibility, corrosivity, reactivity, or toxicity. Hazardous waste with any of these characteristics is also known as a Resource Conservation and Recovery Act (RCRA) waste.

Hazardous materials can be categorized as hazardous non-radioactive chemical materials, radioactive materials, toxic materials, and biohazardous materials. The previous definitions are adequate for non-radioactive hazardous chemicals. Radioactive and biohazardous materials are further defined as follows:

- Radioactive materials contain atoms with unstable nuclei that spontaneously emit ionizing radiation to increase their stability.
- Radioactive wastes are radioactive materials that are discarded (including wastes in storage) or abandoned.
- Toxic wastes are harmful or fatal when ingested or absorbed (e.g., containing mercury, lead). When toxic wastes are land disposed, contaminated liquid may leach from the waste and pollute groundwater.
- Biohazardous materials include materials containing certain infectious agents (microorganisms, bacteria, molds, parasites, and viruses) that cause or significantly contribute to increased human mortality or organisms capable of being communicated by invading and multiplying in body tissues.
- Medical wastes include both biohazardous wastes (byproducts of biohazardous materials) and sharps (devices capable of cutting or piercing, such as hypodermic needles, razor blades, and broken glass) resulting from the diagnosis, treatment, or immunization of human beings, or research pertaining to these activities.

There are a number of hazardous materials and hazardous wastes that could be found on any given property based on past uses. Some common examples include agrichemicals (chlorinated herbicides, organophosphate pesticides, and organochlorine pesticides, such as such as Mecoprop (MCPP), Dinoseb, chlordane, dichloro-diphenyltrichloroethane (DDT), and dichloro-diphenyl-dichloroethylene (DDE)), petroleum based products (oil, gasoline, diesel fuel), a variety of chemicals including paints, cleaners, and solvents, and asbestos-containing or lead-containing materials (e.g., paint, sealants, pipe solder).

Adjoining Properties

The Project site is bounded on the north by the existing agricultural lands, on the east by State Highway 99, on the south by the Union Ranch development and existing agricultural fields, and on the west by the existing single-family subdivisions.

ENVIRONMENTAL RECORDS

A search of local, State, and federal agency databases for the Project site and known contaminated sites in the vicinity was performed. None of the parcels in the Project site were found to contain any known contamination.

The U.S. Environmental Protection Agency (EPA) Toxic Release Inventory (TRI) does not identify data on disposal or other releases of toxic chemicals in the Project site (USEPA, 2021). There are no TRI sites in the City of Manteca. The nearest TRI site is located at 16777 Howland Road in Lathrop, approximately 2.52 miles northwest of the Project site.

The California Department of Toxic Substances Control (DTSC) maintains the *Envirostor Data Management System*, which provides information on hazardous waste facilities (both permitted and corrective action) as well as any available site cleanup information. There are no sites listed in the Envirostor database within the Project site. The nearest site listed on the Envirostor database is located at 21164 S Airport Way, approximately 0.25 miles southwest of the Project site. This site, the proposed elementary school, was investigated for potential contaminants of concern. The investigation concluded that there are no contaminants of concern at the proposed elementary school site and the site received a "No Further Action" cleanup status on February 20, 2020.

GeoTracker is the State Water Resources Control Board's (SWRCB's) Internet-accessible database system used by the SWRCB, regional boards, and local agencies to track and archive compliance data from authorized or unauthorized discharges of waste to land, or unauthorized releases of hazardous substances from underground storage tanks (USTs). No unauthorized discharges of waste or USTs are located within the Project site.

TABLE 3.8-1: GEOTRACKER HAZARDOUS MATERIAL RELEASE SITES WITHIN 0.5 MILES OF PROJECT SITE

SITE NAME	*TYPE*	*CLEANUP STATUS*	*ADDRESS*
San Joaquin Delta College Farm	Cleanup Program Site	Completed – Case Closed 4/24/1996	5298 Brunswick Rd.

SOURCE: SWRCB, GEOTRACKER, 2021.

The State of California Hazardous Waste and Substances Site List (also known as the "Cortese List") is a planning document used by the State, local agencies, and developers to comply with the California Environmental Quality Act (CEQA) requirements for providing information about the location of hazardous materials sites. Government Code Section 65962.5 requires the Cal EPA to annually update the Cortese List. The DTSC is responsible for preparing a portion of the information that comprises the Cortese List. Other State and local government agencies are required to provide additional hazardous material release information that is part of the complete list.

GeoTracker is a geographic information system (GIS) that provides online access to environmental data and is the interface to the Geographic Environmental Information Management System (GEIMS), a data warehouse which tracks regulatory data about underground fuel tanks, fuel pipelines, and public drinking water supplies. Searches of the above resources and records identified three hazardous material sites within 0.5 miles of the Project site known to handle and store hazardous materials that are associated with a hazardous material related release or occurrence.

The terms "release" or “occurrence” include any means by which a substance could harm the environment: by spilling, leaking, discharging, dumping, injecting, or escaping. Table 3.8-1 displays the hazardous material sites within 0.5 miles of the Project site with a description of the hazards provided. Additionally, Table 3.8-2 displays the known hazardous material sites within 1.0 mile of the Project site with a description of the hazards provided. As noted previously, none of the parcels in the Project site were found to contain any known contamination. No open cleanup sites exist within a one-mile radius of the Project site.

In addition to sites listed below, the Project site and the surrounding areas do not contain identified oil and gas monitoring wells.

TABLE 3.8-2: GEOTRACKER HAZARDOUS MATERIAL RELEASE SITES WITHIN 1.0 MILE OF PROJECT SITE

SITE NAME	*TYPE*	*CLEANUP STATUS*	*ADDRESS*
San Joaquin Delta College Farm	LUST Cleanup Site	Completed – Case Closed	5298 Brunswick Rd.
Frank’s Exxon #4	LUST Cleanup Site	Completed – Case Closed	14800 Frontage Rd.
Center Plumbing	LUST Cleanup Site	Completed – Case Closed	2001 Main St. N

NOTE: LUST = LEAKING UNDERGROUND STORAGE TANK.

SOURCE: SWRCB, GEOTRACKER, 2021.

DATABASES

There is a broad list of federal and State databases that provide information for sites with varying potential for risk from the possible existence of hazardous materials. There are numerous redundancies among these various database listings. Below is a brief summary of each.

National Priorities List: The National Priorities List (NPL) of Superfund Sites and Proposed NPL Sites is EPA’s database of more than 1,200 sites designated or proposed for priority cleanup under the Superfund program. NPL sites may encompass relatively large areas. The Project site is not listed in this database.

RCRIS System: The Resource Conservation and Recovery Information System (RCRIS) is an EPA database that includes selective information on sites that generate, transport, store, treat, and/or dispose of hazardous waste as defined by RCRA. Identification on this list does not indicate that there has been an impact on the environment. The Project site is not listed in this database.

CERCLIS Data: Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS) is an EPA database that contains information on potential hazardous waste sites that have been reported to the EPA by states, municipalities, private companies, and individuals, pursuant to Section 103 of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). CERCLIS contains sites that are either proposed for or on the NPL, as well as sites that are in the screening and assessment phase for possible inclusion on the NPL. The Project site is not listed in this database.

CORRACTS: Corrective Action Report (CORRACTS) is an EPA database that identifies hazardous waste handlers with RCRA corrective action activity. The Project site is not listed in this database.

Cortese Database: The Cortese database identifies public drinking water wells with detectable levels of contamination, hazardous substance sites selected for remedial action, sites with known toxic material identified through the abandoned site assessment program, sites with USTs having a reportable release, and all solid waste disposal facilities from which there is known hazardous substance migration. The source of this database is the California Environmental Protection Agency (Cal-EPA) and are found in the GeoTracker database. The Project site is not listed in this database.

GeoTracker has replaced past databases, such as the Leaking Underground Storage Tank Information System (LUSTIS) and the Underground Storage Tank (UST) database. Permitted USTs are not located in the Project site.

Solid Waste Information System (SWIS): The Solid Waste Information System (SWIS) is a database of solid waste facilities that is maintained by the California Integrated Waste Management Board (CIWMB). The SWIS data identifies active, planned and closed sites. The Project site does not have any active or planned solid waste facilities listed in the database. The nearest active facility, Lovelace Materials Recovery Facility, is located approximately one-mile northwest of the Project site.

None of the records reviewed for the Project site indicate that a Recognized Environmental Condition is associated with the Project site.

Transportation of Hazardous Materials

The transportation of hazardous materials within the City of Manteca Planning Area is subject to various federal, State, and local regulations. The following provisions are included in the California Vehicle Code (CVC) and pertain to the transportation of hazardous related materials.

- The Highway Patrol designates the routes in California which are to be used for the transportation of explosives. (Section 31616)
- The CVC applies when the explosives are transported as a delivery service for hire or in quantities in excess of 1,000 pounds. The transportation of explosives in quantities of 1,000 pounds or less, or other than on a public highway, is subject to the California Health and Safety Code. (Section 31601(a))
- It is illegal to transport explosives or inhalation hazards on any public highway not designated for that purpose, unless the use of the highway is required to permit delivery of, or the loading of, such materials. (Section 31602(b) and Section 32104(a))
- When transporting explosives through or into a city for which a route has not been designated by the Highway Patrol, drivers must follow routes as may be prescribed or established by local authorities. (Section 31614(a))
- Inhalation hazards and poison gases are subject to additional safeguards. These materials are highly toxic, spread rapidly, and require rapid and widespread evacuation if there is loss of containment or a fire. The Highway Patrol designates through routes to be used for the transportation of inhalation hazards. It may also designate separate through routes for the transportation of inhalation hazards composed of any chemical rocket propellant. (Section 32100 and Section 32102(b))

In addition to area roadways, hazardous materials are routinely transported on Union Pacific Railroad lines that are roughly two-miles west of the Project boundary. The risk of accidents, and more specifically accidents involving hazardous materials, is relatively low. The U.S. Department of Transportation Federal Railroad Administration found the UPRR company train accident rate to be 4.18 train accidents per one million train miles traveled, resulting in a less than 0.001% chance of an accident. Risk of a railroad accident containing hazardous materials is considered much lower, as only an average of eight accidents involving hazardous material spills occur annually in California.

The Union Pacific Railroad Company implements a security plan in compliance with the Department of Transportation Final Rule 49 CFR Part 172 Hazardous Materials (HM 232): Security Requirements for Offerors and Transporters of Hazardous Materials. The plan includes requirements to enhance the security of transported hazardous materials and ensures proper cleanup procedures in the instance of an accidental release.

FIRE HAZARDS

Wild fires are a major hazard in the State of California. Wild fires burn natural vegetation on developed and undeveloped lands and include timber, brush, woodland, and grass fires. While low intensity wild fires have a role in the County's ecosystem, wild fires put human health and safety, structures (e.g., homes, schools, businesses, etc.), air quality, recreation areas, water quality, wildlife habitat and ecosystem health, and forest resources at risk.

Wildland fire hazards exist in varying degrees in the foothill portion of the County located to the east and southwest of the Project site. The Project site is located in the valley floor, which is predominantly under agricultural or urban use. This area has a low fire hazard risk.

Fuel Rank

Fuel rank is a ranking system developed by the California Department of Forestry and Fire Protection (CalFire) that incorporates four wildfire factors: fuel model, slope, ladder index, and crown index.

The U.S. Forest Service has developed a series of fuel models, which categorize fuels based on burn characteristics. These fuel models help predict fire behavior. In addition to fuel characteristics, slope is an important contributor to fire hazard levels. A surface ranking system has been developed by CalFire, which incorporates the applicable fuel models and slope data. The model categorizes slope into six ranges: 0-10 percent, 11-25 percent, 26-40 percent, 41-55 percent, 56-75 percent, and over 75 percent. The combined fuel model and slope data are organized into three categories, referred to as surface rank. Thus, surface rank is a reflection of the quantity and burn characteristics of the fuels and the topography in a given area.

The ladder index is a reflection of the distance from the ground to the lowest leafy vegetation for tree and plant species. The crown index is a reflection of the quantity of leafy vegetation present within individual specimens of a given species.

The surface rank, ladder index, and crown index for a given area are combined in order to establish fuel rank of medium, high, or very high. Fuel rank is used by CalFire to identify areas in the California Fire Plan where large, catastrophic fires are most likely.

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 city also include "moderate" and "non-wildland fuel" ranks. Areas west of Interstate 5, approximately 15 miles or further southwest of the city, are designated as "moderate" and "high" fuel ranks. The Project site is located within an area considered "low" and "moderate" fuel rank.

Fire Hazard Severity Zones

The State has charged CalFire with the identification of Fire Hazard Severity Zones (FHSZ) within State Responsibility Areas. In addition, CalFire must recommend Very High Fire Hazard Severity Zones (VHFHSZ) identified within any Local Responsibility Areas. The FHSZ maps are used by the State Fire Marshall as a basis for the adoption of applicable building code standards.

LOCAL RESPONSIBILITY AREAS

The Project site is not located within a Local Responsibility Area (LRA). The Project site is not categorized as a "Very High" FHSZ by CalFire.

STATE RESPONSIBILITY AREAS

There are no State Responsibility Areas (SRAs) within the vicinity of the Project site.

FEDERAL RESPONSIBILITY AREAS

There are no Federal Responsibility Areas (FRAs) within the vicinity of the Project site.

3.8.2 REGULATORY SETTING

FEDERAL

Aviation Act of 1958

The Federal Aviation Act resulted in the creation of the Federal Aviation Administration (FAA). The FAA is charged with the creation and maintenance of a National Airspace System.

Federal Aviation Regulations (CFR, Title 14)

The Federal Aviation Regulation (FAR) establishes regulations related to aircraft, aeronautics, and inspection and permitting.

Clean Air Act

The Federal Clean Air Act (FCAA) was first signed into law in 1970. In 1977, and again in 1990, the law was substantially amended. The FCAA is the foundation for a national air pollution control effort,

and it is composed of the following basic elements: NAAQS for criteria air pollutants, hazardous air pollutant standards, State attainment plans, motor vehicle emissions standards, stationary source emissions standards and permits, acid rain control measures, stratospheric ozone protection, and enforcement provisions.

Clean Water Act

The Clean Water Act (CWA), which amended the Water Pollution Control Act (WPCA) of 1972, sets forth the §404 program to regulate the discharge of dredged and fill material into Waters of the U.S. and the §402 National Pollutant Discharge Elimination System (NPDES) to regulate the discharge of pollutants into Waters of the U.S. The §401 Water Quality Certification program establishes a framework of water quality protection for activities requiring a variety of Federal permits and approvals (including CWA §404, CWA §402, FERC Hydropower and §10 Rivers and Harbors).

Comprehensive Environmental Response, Compensation, and Liability Act

The Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) introduced active Federal involvement to emergency response, site remediation, and spill prevention, most notably the Superfund program. The Act was intended to be comprehensive in encompassing both the prevention of, and response to, uncontrolled hazardous material releases. CERCLA deals with environmental response, providing mechanisms for reacting to emergencies and to chronic hazardous material releases. In addition to establishing procedures to prevent and remedy problems, it establishes a system for compensating appropriate individuals and assigning appropriate liability. It is designed to plan for and respond to failure in other regulatory programs and to remedy problems resulting from action taken before the era of comprehensive regulatory protection.

Environmental Protection Agency

The primary regulator of hazards and hazardous materials is the EPA, whose mission is to protect human health and the environment. The City of Manteca is located within EPA Region 9, which includes Arizona, California, Hawaii, and New Mexico.

FY 2001 Appropriations Act

Title IV of the Appropriations Act required the identification of “Urban Wildland Interface Communities in the Vicinity of Federal Lands that are at High Risk from Wildfire” by the U.S. Departments of the Interior and Agriculture.

Hazardous Materials Transportation Act

The Hazardous Materials Transportation Act, as amended, is the basic statute regulating hazardous materials transportation in the United States. The purpose of the law is to provide adequate protection against the risks to life and property inherent in transporting hazardous materials in interstate commerce. This law gives the U.S. Department of Transportation (USDOT) and other agencies the authority to issue and enforce rules and regulations governing the safe transportation of hazardous materials (DOE 2002).

Natural Gas Pipeline Safety Act

The Natural Gas Pipeline Safety Act authorizes the U.S. Department of Transportation Office of Pipeline Safety to regulate pipeline transportation of natural (flammable, toxic, or corrosive) gas and other gases as well as the transportation and storage of liquefied natural gas. The Office of Pipeline Safety regulates the design, construction, inspection, testing, operation, and maintenance of pipeline facilities. While the federal government is primarily responsible for developing, issuing, and enforcing pipeline safety regulations, the pipeline safety statutes provide for State assumption of the intrastate regulatory, inspection, and enforcement responsibilities under an annual certification. To qualify for certification, a state must adopt the minimum federal regulations and may adopt additional or more stringent regulations as long as they are not incompatible.

Resource Conservation and Recovery Act

The 1976 Federal Resource Conservation and Recovery Act (RCRA) and the 1984 RCRA Amendments regulate the treatment, storage, and disposal of hazardous and non-hazardous wastes. The legislation mandated that hazardous wastes be tracked from the point of generation to their ultimate fate in the environment. This includes detailed tracking of hazardous materials during transport and permitting of hazardous material handling facilities.

The 1984 RCRA amendments provided the framework for a regulatory program designed to prevent releases from USTs. The program established tank and leak detection standards, including spill and overflow protection devices for new tanks. The tanks must also meet performance standards to ensure that the stored material will not corrode the tanks. The RCRA was further amended in 1988 to set additional standards for USTs.

In July 2015, the EPA revised the federal UST regulation, which strengthened the 1988 federal UST regulations by increasing emphasis on properly operating and maintaining UST equipment. The revision added new operation and maintenance requirements and addressed UST systems deferred in the 1988 UST regulation. The purpose of the revision was to help prevent and detect UST releases, which are a leading source of groundwater contamination. To ensure compliance performance measures reflect the 2015 UST regulation, the Environmental Protection Agency (EPA) and the Association of State and Territorial Solid Waste Management Officials coordinated to update existing compliance performance measures and add new measures. The measures required states to switch from tracking compliance against significant operational compliance measures to the more stringent technical compliance rate (TCR) measures. As of June 2020, only 45.6 percent of USTs were in compliance with all TCR categories[1].

Comprehensive Environmental Response, Compensation, and Liability Act

CERCLA introduced active federal involvement to emergency response, site remediation, and spill prevention, most notably the Superfund program. CERCLA was intended to be comprehensive in encompassing both the prevention of, and response to, uncontrolled hazardous substances

[1] EPA. *Semiannual Report of UST Performance Measures Mid Fiscal Year 2020*. June 2020. Access: https://www.epa.gov/sites/production/files/2020-06/documents/ca-20-12.pdf

releases. CERCLA deals with environmental response, providing mechanisms for reacting to emergencies and to chronic hazardous material releases. In addition to establishing procedures to prevent and remedy problems, it establishes a system for compensating appropriate individuals and assigning appropriate liability. It is designed to plan for and respond to failure in other regulatory programs and to remedy problems resulting from action taken before the era of comprehensive regulatory protection.

STATE

Aeronautics Act (Public Utilities Code §21001)

The Caltrans Division of Aeronautics bases the majority of its aviation policies on the Aeronautics Act. Policies include permits and annual inspections for public airports and hospital heliports and recommendations for schools proposed within two miles of airport runways.

Airport Land Use Commission Law (Public Utilities Code §21670 et seq.)

The law, passed in 1967, authorized the creation of Airport Land Use Commissions (ALUC) in California. Per the Public Utilities Code, the purpose of an ALUC is to protect *public health, safety, and welfare by encouraging orderly expansion of airports and the adoption of land use measures that minimizes exposure to excessive noise and safety hazards within areas around public airports to the extent that these areas are not already devoted to incompatible uses* (Pub. Util. Code §21670). Furthermore, each ALUC must prepare an ALUCP. Each ALUCP, which must be based on a twenty-year planning horizon, should focus on broadly defined noise and safety impacts.

Assembly Bill 337

Per AB 337, local fire prevention authorities and CalFire are required to identify Very High Fire Hazard Severity Zones (VHFHSZ) in LRAs. Standards related to brush clearance and the use of fire-resistant materials in fire hazard severity zones are also established.

California Code of Regulations

Title 3 of the California Code of Regulations (CCR) pertains to the application of pesticides and related chemicals. Parties applying regulated substances must continuously evaluate application equipment, the weather, the treated lands and all surrounding properties. Title 3 prohibits any application that would:

- Contaminate persons not involved in the application;
- Damage non-target crops or animals or any other public or private property; and
- Contaminate public or private property or create health hazards on said property.

Title 8 of the CCR establishes California Occupational Safety and Health Administration (Cal OSHA) requirements related to public and worker protection. Topics addressed in Title 8 include materials exposure limits, equipment requirements, protective clothing, hazardous materials, and accident prevention. Construction safety and exposure standards for lead and asbestos are set forth in Title 8.

Title 14 of the CCR establishes minimum standards for solid waste handling and disposal.

Title 17 of the CCR establishes regulations relating to the use and disturbance of materials containing naturally occurring asbestos.

Title 19 of the CCR establishes a variety of emergency fire response, fire prevention, and construction and construction materials standards.

Title 22 of the CCR sets forth definitions of hazardous waste and special waste. The section also identifies hazardous waste criteria and establishes regulations pertaining to the storage, transport, and disposal of hazardous waste.

Title 26 of the CCR is a medley of State regulations pertaining to hazardous materials and waste that are presented in other regulatory sections. Title 26 mandates specific management criteria related to hazardous materials identification, packaging, and disposal. In addition, Title 26 establishes requirements for hazardous materials transport, containment, treatment, and disposal. Finally, staff training standards are set forth in Title 26.

Title 27 of the CCR sets forth a variety of regulations relating to the construction, operation, and maintenance of the state's landfills. The title establishes a landfill classification system and categories of waste. Each class of landfill is constructed to contain specific types of waste (household, inert, special, and hazardous).

California Government Code Section 65302

This section, which establishes standards for developing and updating General Plans, includes fire hazard assessment and Safety Element content requirements.

California Health and Safety Code

Division 11 of the Health and Safety Code establishes regulations related to a variety of explosive substances and devices, including high explosives and fireworks. Section 12000 et seq. establishes regulations related to explosives and explosive devices, including permitting, handling, storage, and transport (in quantities greater than 1,000 pounds).

Division 12 establishes requirements for buildings used by the public, including essential services buildings, earthquake hazard mitigation technologies, school buildings, and postsecondary buildings.

Division 20 establishes DTSC authority and sets forth hazardous waste and underground storage tank regulations. In addition, the division creates a State superfund framework that mirrors the Federal program.

Division 26 establishes California Air Resources Board (CARB) authority. The division designates CARB as the air pollution control agency per Federal regulations and charges the Board with meeting Clean Air Act requirements.

California Health and Safety Code and Uniform Building Code Section 13000 et seq.

State fire regulations are set forth in §13000 *et seq*. of the California Health and Safety Code, which is divided into "Fires and Fire Protection" and "Buildings Used by the Public." The regulations provide for the enforcement of the Uniform Building Code and mandate the abatement of fire hazards.

The code establishes broadly applicable regulations, such as standards for buildings and fire protection devices, in addition to regulations for specific land uses, such as childcare facilities and high-rise structures.

California Vehicle Code §31600 (Transportation of Explosives)

This code establishes requirements related to the transportation of explosives in quantities greater than 1,000 pounds, including licensing and route identification.

California Public Resources Code

The State's Fire Safety Regulations are set forth in Public Resources Code §4290, which include the establishment of SRAs.

Public Resources Code §4291 sets forth defensible space requirements, which are applicable to anyone who "*…owns, leases, controls, operates, or maintains a building or structure in, upon, or adjoining a mountainous area, forest-covered lands, brush-covered lands, grass-covered lands, or land that is covered with flammable material"* (§4291(a)).

Food and Agriculture Code

Division 6 of the California Food and Agriculture Code (FAC) establishes pesticide application regulations. The division establishes training standards for pilots conducting aerial applications as well as permitting and certification requirements.

State Oversight of Hazards and Hazardous Materials

The DTSC is chiefly responsible for regulating the handling, use, and disposal of toxic materials. The State Water Resources Control Board (SWRCB) regulates discharge of potentially hazardous materials to waterways and aquifers and administers the basin plans for groundwater resources in the various regions of the state. The RWQCB oversees surface and groundwater. Programs intended to protect workers from exposure to hazardous materials and from accidental upset are covered under OSHA at the Federal and California Division of Occupational Safety and Health (Cal/OSHA) and the California Department of Health Services (DHS) at the state level. Air quality is regulated through the CARB and San Joaquin Valley Air Pollution Control District. The State Fire Marshal is responsible for the protection of life and property through the development and application of fire prevention engineering, education, and enforcement; CalFire provides fire protection services for State and privately-owned wildlands.

Water Code

Division 7 of the California Water Code, commonly referred to as the Porter-Cologne Water Quality Control Act, created the SWRCB and the RWQCB. In addition, water quality responsibilities are established for the SWRCB and RWQCBs.

LOCAL

CITY OF MANTECA GENERAL PLAN

Policies: Hazardous Materials Safety

- S-P-15. The City shall maintain an awareness of hazardous materials throughout the Manteca region.
- S-P-16. City approvals of all new development shall consider the potential for the production, use, storage, and transport of hazardous materials and provide for reasonable controls on such hazardous materials.
- S-P-17. Within its authority, the City shall regulate the production, use, storage, and transport of hazardous materials to protect the health of Manteca residents.

Implementation: Hazardous Materials Safety

- S-I-9. The City shall require businesses that manufacture, store, use, or transport significant quantities of hazardous materials to identify annually such materials and their quantities.
- S-I-10. The City shall require the submittal of lists of hazardous materials used in existing and proposed industrial and commercial businesses within the City of Manteca. The list shall be maintained through the Manteca Fire Department and updated through periodic review.
- S-I-11. The City shall work with San Joaquin County and other public agencies to inform consumers about household use and disposal of hazardous materials.
- S-I-12. Cooperate fully with Union Pacific Railroad and other agencies, such as the CHP, in the event of a hazardous material emergency.
- S-I-13. Continue the City hazardous waste pick-up program for household hazardous materials.

Policies: Emergency Procedures

- S-P-19. The City shall maintain and periodically update the City's Emergency Plan.

Implementation Policies: Emergency Procedures

- S-I-15. The City shall conduct periodic emergency response exercises to test the effectiveness of City emergency response procedures.
- S-I-16. The City shall review County and State emergency response procedures that must be coordinated with City procedures.

GENERAL PLAN UPDATE (PROPOSED)

Policies: Safety Element

- S-1.1. Maintain and periodically update the City's Emergency Plan.
- S-1.2. Ensure the availability and functionality of critical facilities during flooding events.
- S-1.3. Locate new critical City facilities, and promote the location of non-City critical facilities, including hospitals, emergency shelters, emergency response centers, and emergency communications facilities, outside of flood hazard zones and geologic hazard areas where feasible. Critical facilities that are, or must be, located within flood hazard zones or areas with geologic hazards should incorporate feasible site design or building construction features to mitigate potential risks, including those associated with geologic, seismic, and flood events, to ensure accessibility, operation, and structural integrity, during an emergency and to minimize damage to the facility.
- S-1.4. Encourage community awareness of seismic, flooding, and other disaster safety issues, including building safety, emergency response plans, and understanding steps to take for safety during and after a disaster, including identified evacuation routes.
- S-1.5. Continue to cooperate with San Joaquin County and other public agencies in implementing the Countywide Emergency Preparedness Plan and Local Hazard Mitigation Plan.
- S-4.1. Maintain an awareness of hazardous materials throughout the Manteca region.
- S-4.2. Strictly regulate the production, use, storage, transport, and disposal of hazardous materials to protect the health and safety of Manteca residents.
- S-4.3. As part of the development review process, consider the potential for the production, use, storage, transport, and/or disposal of hazardous materials and provide for appropriate controls on such hazardous materials consistent with federal, state, and local standards.
- S-4.4. Use the environmental review process to comment on Hazardous Waste Transportation, Storage and Disposal Facilities proposed in the Manteca Planning Area and throughout the County to request a risk assessment and ensure that potentially significant, widespread, and long-term impacts on public health and safety of these facilities are identified and mitigated, as such impacts do not respect jurisdictional boundaries.

Implementation: Safety Element

- S-1a. Regularly conduct periodic emergency response exercises to test the effectiveness of City emergency response procedures.
- S-1b. Regularly review County and State emergency response procedures that must be coordinated with City procedures.
- S-1c. Cooperate with San Joaquin County OES, Manteca Fire Department, Lathrop Manteca Fire District, Manteca Police Services, the reclamation districts, and other agencies with responsibility for emergency management in emergency response planning, training and provision of logistical support.
- S-4a. As part of the development review process, require projects that result in significant

risks associated with hazardous materials to include measures to address the risks and reduce the risks to an acceptable level.

- S-4b. Review development proposals to address proximity of users and transporters of significant amounts of hazardous materials relative to sensitive uses, such as schools and residential neighborhoods.
- S-4c. Continue to require the submittal of information regarding hazardous materials manufacturing, storage, use, transport, and/or disposal by existing and proposed businesses and developments to the Manteca Fire Department.
- S-4d. Annually coordinate with the Manteca Fire Department and 911 dispatch center to ensure that the City maintains a current database of hazardous materials.
- S-4e. Coordinate with the Manteca Fire Department, other local agencies, and Union Pacific Railroad to strictly regulate and enforce the use, storage, transport, and/or disposal of hazardous materials under California Administrative Code Title 19 requirements.
- S-4f. Continue to work with San Joaquin County and other public agencies to inform consumers about household use and disposal of hazardous materials.
- S-4g. Cooperate fully with Union Pacific Railroad and other agencies, such as the California Highway Patrol, in the event of a hazardous material emergency.
- S-4h. Continue the City hazardous waste pick-up program for household hazardous materials.

Certified Unified Program Agency (CUPA)

The California Environmental Protection Agency designates specific local agencies as Certified Unified Program Agencies (CUPA), typically at the county level. The San Joaquin County Department of Environmental Health is the CUPA designated for San Joaquin County. The San Joaquin County Department of Environmental Health is responsible for the implementation of statewide programs within its jurisdiction, including Underground storage of hazardous substances (USTs), Hazardous Materials Business Plan (HMP) requirements, California Accidental Release Prevention (Cal-ARP) program, etc. Implementation of these programs involves permitting, inspecting, providing education/guidance, investigations, and enforcement.

San Joaquin Valley Air Pollution Control District

San Joaquin Valley Air Pollution Control District (SJVAPCD) has jurisdiction over the City of Manteca and deals with pollutants that get into the air from stationary (including fumes, dust and smoke, some asbestos) and mobile sources. SJVAPCD's mission is to improve the health and quality of life for all Valley residents through efficient, effective and entrepreneurial air quality management strategies. SJVAPCD responds to complaints about smells, answers questions about air quality management permits, and reviews development projects for compliance with air quality and greenhouse gas significance thresholds. The SJVAPCD and air quality are addressed in detail in Section 3.3, Air Quality, of this EIR.

San Joaquin County

Hazardous waste programs are managed and implemented locally through the County of San Joaquin CUPA. The County hosts a variety of hazardous waste collection events throughout the County in an effort to deter improper disposal of hazardous wastes.

Household Hazardous Waste (HHW) Collection Facilities receive hazardous waste that comes from homes and, in some cases, from small business hazardous waste generators. Household wastes include pesticides, batteries, old paint, solvents, used oil, antifreeze, and other chemicals that should not go into a regular municipal landfill.

San Joaquin County Public Health Services monitors the possible groundwater and soil contamination from underground tanks. Its funding mechanism is a billing contract with the State Water Quality Control Board. Public Health Services clean-up enforcement falls under Title 23, California Code of Regulations. Case workers monitor site-specific development and must be contacted prior to development.

The City of Manteca and San Joaquin County Public Works Department deal with illegal discharges to sanitary or industrial sewers, and sometimes collect household hazardous waste. They also help to guard against illegal discharges to storm sewers (releases to the street, etc.).

Households Hazardous Waste

HHWs include pesticides, batteries, old paint, solvents, used oil, antifreeze, and other chemicals that should not go into a regular municipal landfill. HHW programs focus on removing dangerous substances from homes and preventing their release into the environment through landfills, sewer systems and illegal dumping. The City of Manteca and San Joaquin County Public Works Solid Waste Division host a variety of hazardous waste collection events throughout the year to assist in the elimination of household hazardous waste. HHW Collection Facilities receive hazardous waste that comes from homes and, in some cases, from small business hazardous waste generators.

3.8.3 IMPACTS AND MITIGATION MEASURES

THRESHOLDS OF SIGNIFICANCE

Consistent with Appendix G of the CEQA Guidelines, the proposed Project will have a significant impact from hazards and hazardous materials if it will:

- Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials;
- 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;
- Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school;

- 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;
- For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard for people residing or working in the project area;
- Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan; or
- Expose people or structures, either directly or indirectly, to a significant risk of loss, injury or death involving wildland fires.

IMPACTS AND MITIGATION MEASURES

Impact 3.8-1: Potential to create a significant hazard through the routine transport, use, or disposal of hazardous materials or through the reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment. (Less than Significant with Mitigation)

CONSTRUCTION PHASE IMPACTS

Construction workers and the general public could be exposed to hazards and hazardous materials as a result of improper handling or use during construction activities (particularly by untrained personnel); transportation accidents; or fires, or other emergencies. Construction workers could also be exposed to hazards associated with accidental releases of hazardous materials, which could result in significant impacts to the health and welfare of people and/or wildlife. Additionally, an accidental release into the environment could result in the contamination of water, habitat, and countless resources. Mitigation Measure 3.9-1 contained in Section 3.9, Hydrology and Water Quality, ensures compliance with existing regulatory requirements of the Regional Water Quality Control Board, which require the preparation of a project specific Stormwater Pollution Prevention Plan (SWPPP). The SWPPP is required to include project specific best management measures that are designed to control erosion and the loss of topsoil to the extent practicable using best management practices (BMPs) that the RWQCB has deemed effective in controlling erosion, sedimentation, and runoff during construction activities.

The proposed Project would also be required to comply with regulations on the transportation of hazardous materials codified in 49 CFR 173 and 49 CFR 177 and CCR Title 26, Division 6. These regulations, which are under the jurisdiction of Caltrans and the CHP, provide specific packaging requirements, define unacceptable hazardous materials shipments, and prescribe safe-transit practices by carriers of hazardous materials. Compliance with these regulations would reduce the risk of exposure to humans and the environment related to the transportation of hazardous materials.

Hazardous materials regulations, which are codified in CCR Titles 8 and 22, and their enabling legislation set forth in Chapter 6.5 (Section 25100 et seq.) of the California Health and Safety Code, were established at the State level to ensure compliance with federal regulations to reduce the risk to human health and the environment from the routine use of hazardous substances. Construction specifications would include the following requirements in compliance with applicable regulations and codes, including, but not limited to CCR Titles 8 and 22, Uniform Fire Code, and Division 20 of the California Health and Safety Code: all reserve fuel supplies and hazardous materials must be stored within the confines of a designated construction area; equipment refueling and maintenance must take place only within the staging area; and construction vehicles shall be inspected daily for leaks. Off-site activities (e.g., utility construction) would also be required to comply with these regulations. These regulations and codes must be implemented, as appropriate, and are monitored by the State and/or local jurisdictions, including the San Joaquin County Department of Environmental Health and the South San Joaquin County Fire Authority (SSJCFA).

Contractors would be required to comply with Cal-EPA's Unified Program; regulated activities would be managed by San Joaquin County Department of Environmental Health, the designated Certified Unified Program Agency for San Joaquin County, in accordance with the regulations included in the Unified Program (e.g., hazardous materials release response plans and inventories, California UFC hazardous material management plans and inventories). Additionally, in the event that hazardous materials are discovered during construction, a Soils Management Plan (SMP) will need to be submitted and approved by the San Joaquin County Department of Environmental Health, as required by Mitigation Measure 3.8-1. The SMP will establish management practices for handling hazardous materials, including fuels, paints, cleaners, solvents, etc., during construction. Such compliance would reduce the potential for accidental release of hazardous materials during construction of the proposed Project. As a result, it would lessen the risk of exposure of construction workers and the public to accidental release of hazardous materials, as well as the demand for incident emergency response.

Development of the Project would involve site grading, excavation for utilities, trenching, backfilling, and the construction of proposed facilities that could result in the exposure of construction workers and the general public to hazardous materials. Like most agricultural and farming operations in the Central Valley, agricultural practices in the area have used agricultural chemicals including pesticides and herbicides as a standard practice. Continuous spraying of crops over many years can potentially result in a residual buildup of pesticides, in farm soils. Of highest concern relative to agrichemicals are chlorinated herbicides, organophosphate pesticides, and organochlorine pesticides (OCPs), such as such as Mecoprop (MCPP), Dinoseb, chlordane, dichloro-diphenyltrichloroethane (DDT), and dichloro-diphenyl-dichloroethylene (DDE). Historic use of the Site for agricultural purposes has the potential to have introduced persistent agricultural chemicals such as herbicides and/or pesticides into the surface soils. In addition to soil contamination due to past agricultural use.

Overall, consistency with federal, State, and local laws and regulations related to the handling of hazardous materials discussed above and implementation of Mitigation Measures 3.8-1, 3.8-2, and 3.8-3, as well as Mitigation Measure 3.9-1 from Section 3.9, Hydrology and Water Quality, would ensure that these potential impacts are reduced to a **less than significant** level.

MITIGATION MEASURE(S)

Mitigation Measure 3.8-1*: Prior to the issuance of a Grading Permit, a Soils Management Plan (SMP) shall be submitted and approved by the San Joaquin County Department of Environmental Health. The SMP shall establish management practices for handling hazardous materials, including fuels, paints, cleaners, solvents, etc., during construction. The approved SMP shall be posted and maintained onsite during construction activities and all construction personnel shall acknowledge that they have reviewed and understand the plan.*

Mitigation Measure 3.8-2*: Prior to the acceptance of improvements, the 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.*

Mitigation Measure 3.8-3: *The applicant shall hire a qualified consultant to perform additional testing prior to the issuance of grading permits or demolition permits for construction activities in the following areas that have been deemed to have potentially hazardous conditions present:*

- *The residential units and adjoining structures.*
- *The soils in the area where farming equipment and above ground tanks have been used.*

The intent of the additional testing is to investigate whether any of the buildings, facilities, or soils contain hazardous materials. If asbestos-containing materials and/or lead are found in the buildings, a Cal-OSHA certified ACBM and lead based paint contractor shall be retained to remove the asbestos-containing materials and lead in accordance with EPA and California Occupational Safety and Health Administration (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. If surface staining is found on the Project site, a hazardous waste specialist shall be engaged to further assess the stained area.

OPERATIONAL PHASE IMPACTS

The operational phase of the proposed Project will occur after construction is completed and business operators/employees, and residents move in to occupy the structures and facilities on a day-to-day basis.

The proposed Project includes the development of residential structures. Each of these uses will likely use a variety of hazardous materials commonly found in urban areas including: paints, cleaners, and cleaning solvents. If handled appropriately, these materials do not pose a significant risk. These facilities will store and use these materials. There will be a risk of release of these materials into the environment if they are not stored and handled in accordance with best management practices approved by San Joaquin County Environmental Health Division and the Manteca Fire Department. Implementation of the following mitigation measure will ensure that the proposed Project would have a **less than significant** impact relative to this issue.

Impact 3.8-2: Potential to emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school. (Less than Significant)

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 nearest school to the Project site is the East Union High School, located approximately 0.90 miles south of the Project site. Other schools near the Project site include: George McParland Elementary School (1.0 miles south), and Golden West School (1.82 miles southeast). There are a variety of other schools located beyond three miles from the Project site.

The proposed Project includes the development of 715 residential units. Household wastes generated from residential uses include pesticides, batteries, old paint, solvents, used oil, antifreeze, and other chemicals that typically do not pose a significant threat of emitting hazardous emissions or materials with proper disposal. Household Hazardous Waste (HHW) Collection Facilities receive hazardous waste that comes from homes and, in some cases, from small business hazardous waste generators. Therefore, implementation of the proposed Project would have a **less than significant** impact with regards to this environmental issue.

Impact 3.8-3: Potential to result in impacts from being included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5. (Less than Significant)

The hazards assessment included a site reconnaissance, interviews, historical land use research, and database research. The assessment revealed no evidence of historical or existing Recognized Environmental Conditions in connection with the Project site. The Project site is not on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5. Implementation of the proposed Project would have a **less than significant** impact with regards to this environmental issue.

Impact 3.8-4: The Project is not located within an airport land use plan, two miles of a public airport or public use airport, and would not result in a safety hazard for people residing or working in the project area (Less than Significant)

There are no documented public airports or public use airports within close proximity to the Project site. The nearest airport facilities within the vicinity of the Project site are the Stockton Metropolitan Airport, located approximately three miles north, and the New Jerusalem Airport, located approximately 11 miles southwest. The Project site is not located within the airport influence area or within the Airport's noise exposure contours for the New Jerusalem Airport or Stockton Metropolitan Airport as identified in either Airport Land Use Compatibility Plan (ALUCP). Implementation of the proposed Project would have a **less than significant** impact with regards to this environmental issue.

Impact 3.8-5: Potential to impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan. (Less than Significant)

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.

Impact 3.8-6: Potential to expose people or structures to a risk of loss, injury or death from wildland fires. (Less than Significant)

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 portions of the County.

Wildfires are a potential hazard to development, including land uses located in the foothill and forested areas of the city. The severity of wildfire problems depends on a combination of vegetation,

climate, slope, and people. The vegetation and topography found in the eastern portions of the city, coupled with hot, dry summers, present fire hazards during critical fire periods for much of the county. In addition to natural factors such as lightning, human activity is a primary factor contributing to the incidence of wildfires. Campfires, smoking, debris burning, arson, public utility infrastructure, and equipment use are common human-related causes of wildfires.

The Project site is not categorized as a "Very High" FHSZ by CalFire. The Project site is not located within an LRA and is categorized as Urban Unzoned or Non-Wildland/Non-Urban.

The Project site is located in an area that is predominately agricultural uses and single-family residential uses, which do not pose a significant risk of wildfire. The proposed Project would have a **less than significant** impact with regards to this environmental issue.

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This section describes the regulatory setting, regional hydrology and water quality, impacts that are likely to result from project implementation, and measures to reduce potential impacts to water quality. This section is based in part on the following documents, reports and studies:

- *City of Manteca General Plan 2023* (City of Manteca as amended through 2016);
- *Manteca General Plan 2023 Draft Environmental Impact Report* (City of Manteca 2003); *California Water Plan Update 2013* (DWR 2013);
- *Manteca Storm Drain Master Plan* (City of Manteca 2013);
- *California's Groundwater Bulletin 118, San Joaquin Valley Groundwater Basin, Eastern San Joaquin Subbasin* (DWR 2006);
- *California's Groundwater* (DWR 2003);
- *Eastern San Joaquin Groundwater Basin Groundwater Management Plan* (SJRGA 2013);
- Eastern San Joaquin Groundwater Subbasin Groundwater Sustainability Plan (Eastern San Joaquin Groundwater Authority, November 2019);
- *Eastern San Joaquin Integrated Regional Water Management Plan Update* (Eastern San Joaquin County Groundwater Basin Authority, June 2014);
- *Spring 2018 Groundwater Report* (San Joaquin County Flood Control and Water Conservation District, 2018);
- *Custom Soils Report for San Joaquin County, California* (NRCS 2016);
- *Web Soil Survey* (NRCS 2021), and the Annexation #1 Water Supply Assessment (West Yost, 2022).

There were no comments received during the NOP scoping process related to this environmental topic.

3.9.1 ENVIRONMENTAL SETTING

REGIONAL HYDROLOGY

San Joaquin County is located in the San Joaquin River watershed. The San Joaquin River is about 300 miles long. It begins in the Sierra Nevada mountain range on California's eastern border. The river runs down the western slope of the Sierra and flows roughly northwest through the Central Valley, to where it meets the Sacramento River at the Sacramento-San Joaquin Delta. Once a great marsh, the Sacramento-San Joaquin Delta is now a network of channels and sunken "islands" that cover—together with Suisun Marsh—about 1,300 square miles. Laid over those islands and channels is infrastructure: water supply conduits; major arteries of the state's electrical grid; natural gas fields, storage facilities, and pipelines; highways and railways; and shipping channels, all surrounded by an increasingly urban landscape. This maze of channels and islands drains more than 40 percent of the state's lands and carries about half of the state's total annual runoff (Delta Stewardship Council, as amended July 2019).

Because the Central Valley receives relatively little rainfall (12 to 17 inches a year, falling mostly October through March), snowmelt runoff from the mountains is the main source of fresh water in

the San Joaquin River. Over its 300-mile length, the San Joaquin River is fed by many other streams and rivers, most notably the Stanislaus, Tuolumne and Merced rivers.

Most of the surface water in the upper San Joaquin River is stored and diverted at Millerton Lakes' Friant Dam, near Fresno. From Friant Dam, water is pumped north through the Madera Canal and south through the Friant-Kern canal to irrigation districts and other water retailers, which then deliver the water directly to the end users in the southern portion of the watershed.

In the central and northern portions of the watershed, many agricultural and municipal users receive water from irrigation districts, such as the Modesto, Merced, Oakdale, South San Joaquin and Turlock Irrigation Districts. That water is provided through diversions from rivers that are tributary to the San Joaquin, such as the Mokelumne, Stanislaus, Tuolumne and Merced rivers.

In an average year, about 1.5 million acre-feet of water is diverted from the San Joaquin River at Friant Dam, leaving little flow in the river until the Merced River joins the San Joaquin northwest of the City of Merced. Additional water also reaches the river via flows returning to the river from municipal wastewater treatment plants, as well as urban and agricultural runoff. The rest of the area's water supply needs are met by importing water from northern California (via the Central Valley Project) and by pumping water from the groundwater basin (Delta Stewardship Council, as amended July 2019).

Climate

Summers in the region are warm and dry ranging from an average high in July of 93°F to an average low of approximately 59°F. Winters are cool and mild, with an average high of 53°F and a low of 37°F in January. 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.

Watersheds

A watershed is a region that is bound by a divide that drains to a common watercourse or body of water. Watersheds serve an important biological function, oftentimes supporting an abundance of aquatic and terrestrial wildlife including special-status species and anadromous and native local fisheries. Watersheds provide conditions necessary for riparian habitat.

The State of California uses a hierarchical naming and numbering convention to define watershed areas for management purposes. This means that boundaries are defined according to size and topography, with multiple sub-watersheds within larger watersheds. Table 3.9-1 shows the primary watershed classification levels used by the State of California. The second column indicates the approximate size that a watershed area may be within a particular classification level, although variation in size is common.

TABLE 3.9-1. STATE OF CALIFORNIA WATERSHED HIERARCHY NAMING CONVENTION

WATERSHED LEVEL	*APPROXIMATE SQUARE MILES (ACRES)*	*DESCRIPTION*
Hydrologic Region (HR)	12,735 (8,150,000)	Defined by large-scale topographic and geologic considerations. The State of California is divided into ten HRs.
Hydrologic Unit (HU)	672 (430,000)	Defined by surface drainage; may include a major river watershed, groundwater basin, or closed drainage, among others.
Hydrologic Area (HA)	244 (156,000)	Major subdivisions of hydrologic units, such as by major tributaries, groundwater attributes, or stream components.
Hydrologic Sub-Area (HSA)	195 (125,000)	A major segment of an HA with significant geographical characteristics or hydrological homogeneity.

SOURCE: CALIFORNIA DEPARTMENT OF WATER RESOURCES, 2012.

Hydrologic Region

San Joaquin County is located in the San Joaquin River Hydrological Region. The San Joaquin River is the principal river of the region, and all other streams of the region are tributary to it. The Mokelumne River and its tributary the Cosumnes River originate in the central Sierra Nevada, along with the more southerly Stanislaus and Tuolumne rivers. The Merced River flows from the south-central Sierra Nevada and enters the San Joaquin near the City of Newman. The Chowchilla and Fresno rivers also originate in the Sierra south of the Merced River and trend westward toward the San Joaquin River. Creeks originating in the Coast Range and draining eastward into the San Joaquin River include Del Puerto Creek, Orestimba Creek, and Panoche Creek. Del Puerto Creek enters the San Joaquin near the City of Patterson, and Orestimba Creek enters north of the City of Newman. During flood years, Panoche Creek may enter the San Joaquin River or the Fresno Slough near the town of Mendota. The Kings River is a stream of the Tulare Lake Hydrologic Region, but in flood years it may contribute to the San Joaquin River, flowing northward through the James Bypass and Fresno Slough to enter near the City of Mendota. The Mud, Salt, Berrenda, and Ash sloughs also add to the San Joaquin River, and numerous lesser streams and creeks also enter the system, originating in both the Sierra Nevada and the Coast Range. The entire San Joaquin river system drains northwesterly through the Delta to Suisun Bay (DWR 2013, pg. SJR-5).

As shown in Figure 3.9-1, the Project site is located in the Town of French Camp - San Joaquin River watershed.

Groundwater

The San Joaquin Valley Groundwater Basin lies within the San Joaquin River and Tulare Lake Hydrologic Regions. The San Joaquin River Hydrologic Region portion of the basin covers approximately 3.73 million acres while the Tulare Lake Hydrologic Region portion of the basin covers approximately 5.15 million acres. Groundwater is extensively used in the San Joaquin Valley Groundwater Basin by agricultural and urban entities and accounts for approximately 48% of the groundwater used in the State (DWR 2003).

The northern portion of the basin is within the San Joaquin River Hydrologic Region and consists of nine subbasins. These subbasins are the Cosumnes, Eastern San Joaquin, Tracy, Modesto, Turlock, Merced, Delta-Mendota, Chowchilla, and Madera (DWR, 2003). The City of Manteca is located in the Eastern San Joaquin River Groundwater Basin (ESJRGB).

LOCAL SETTING

The Project site is located in the northern portion of the City of Manteca directly adjacent to the Union Ranch development and the City of Manteca city limits. The Project site is immediately northwest of the intersection of Brunswick Road and 99 Frontage Road. The Project site is bounded on the north by the existing agricultural lands, on the east by State Highway 99, on the south by the Union Ranch development and existing agricultural fields, and on the west by the existing single-family subdivisions. The Project site encompasses approximately 175. acres, including a 148.99-acres of single-family and multi-family housing units, 13.34 acres for the development of park, open space, and trail, including 9.89 acres of park/basin and open space and 3.45 acres of the continuation of the Tide Water Bike Trail. Figures 2.0-1 and 2.0-2 in Chapter 2.0, Project Description, show the Project's regional location and vicinity.

The Development Area is bordered on the north by agricultural lands occupied by orchards, on the east by State Route 99, on the south by the Union Ranch Subdivision and large lot residential housing, and on the west by the Union Ranch Subdivision and Union Rd. The current uses on the Development Area are predominantly agricultural. There are two existing residential units containing outbuildings and two large barns within the western edge of the Union Ranch North portion of the Development Area. One large gravel road runs north to south and bisects the Union Ranch North and Stagecoach at M&E sections of the Development Area. Four smaller gravel roads used to service the surrounding orchards run east to west within the Union Ranch North section of the Development Area. A South San Joaquin Irrigation District (SSJID) pipeline exists within the Union Ranch North section of the Development Area. The pipeline generally runs northwest to southeast until paralleling the gravel road bisecting the two portions of the proposed annexation. Irrigation structures are also found running north to south on the eastern edge of the Stagecoach at M&E portion of the Development Area.

The Non-development Area is located north and east of the City of Manteca city limits, adjacent to the Union Ranch Subdivision. The Non-development Area contains 10 parcels each developed with a single-family residence aside from a single parcel containing 2 residential units. Nine of the existing residential units (Non-development Subarea 3) are located just west of the Development Area and Union Road in the northwest corner of the Project site, two residential units are located east of Union Road (Non-development Subarea 2), and the remaining single residential unit (Non-development Subarea 1) is east of Union Road in the southeast corner of the Project site.

Drainage

The City of Manteca operates and maintains its storm drainage system, which consists of approximately 170 miles of pipeline, 36 pump stations, and 35 detention basins. The runoff flows through this system, into South San Joaquin Irrigation District (SSJID) drains and laterals, and

eventually into the San Joaquin River. Additionally, the City enforces storm drain regulations established by the US Environmental Protection Agency (EPA) and the State of California.

The SSJID owns a complex network of irrigation Laterals and Drains that run throughout the City limits. These facilities deliver irrigation water to various farming operations in the region, and they convey excess irrigation water and field runoff to downstream receiving waters, specifically the San Joaquin River. The City relies on SSJID's facilities to convey its storm water runoff to the San Joaquin River.

The City and SSJID have a long-standing agreement that authorizes the City to discharge its storm water runoff into SSJID facilities for ultimate disposal to the San Joaquin River. In 1975 the City first entered into a storm drainage agreement with SSJID, and in 2006 the City renewed its drainage agreement with SSJID. Of the many requirements in the 2006 Agreement, the two most significant new requirements are that all storm water discharges into SSJID facilities must be monitored and controlled such that the capacity of SSJID's facilities is not exceeded, and that storm water quality must be controlled such that it complies with all applicable laws.

The City meets the first requirement by requiring all new development to attenuate its runoff in a storage facility before pumping it into SSJID's facilities. In addition, the City uses real-time water level monitoring stations at critical low points in the conveyance system complete with SCADA (Supervisory Control and Data Acquisition) facilities. Regarding the water quality requirement, the City is classified as a Phase II city by the State Water Resources Control Board. As such, the City, and consequently new development, is required to comply with the State Board's storm water National Pollution Discharge Elimination System (NPDES) permit for Phase II cities. Per the City/SSJID Master Drainage Agreement, SSJID prohibits the direct discharge of storm water runoffs into its facilities. Accordingly, the City requires all new developments to attenuate its runoff in a storage facility before pumping it into SSJID's facilities. For surface attenuation facilities, there are two allowable basin types that may be used: Interim Retention Basin or a Permanent Detention Basin.

INTERIM RETENTION BASIN: RESIDENTIAL AND NON-RESIDENTIAL APPLICATIONS

Retention basins may be used as an interim measure for retention and disposal of storm water runoff in those areas that will not receive storm drainage service from a major storm drain system by the time development occurs. When discharge capability to a major storm drain system becomes available, the basins are to be exchanged for or converted to detention basins with pumped discharge facilities. Interim retention basins are to be sized to store two, 10-year, 48-hour duration storm runoff volumes over the entire contributing area.

PERMANENT DETENTION BASIN: RESIDENTIAL APPLICATIONS

Permanent detention basins in residential areas are designed as multi-purpose facilities, when practical, and are sized to hold a 10-year, 48-hour duration storm runoff volume resulting from 3.56 inches of rainfall occurring over the entire contributing area. Regional detention basins are preferred over smaller, individual basins, as they are designed to serve several developments. All basins are required to have positive shut-off controls and treat stormwater to meet NPDES permit

requirements. The Volume of proposed detention basins are determined with no allowance for percolation or outlet facilities.

LATERALS FOR STORM WATER CONVEYANCE

As previously described, SSJID owns a complex network of irrigation Laterals and Drains that run throughout the City's limits. The hydraulic connectivity of SSJID's system is as follows: 1) irrigation water is conveyed to farming operations via a vast network of Laterals; 2) the Laterals carry excess irrigation water and field runoff to several Drains; 3) the Drains convey water to a large central drain called the French Camp Outlet Canal (FCOC); and 4) the FCOC conveys water to the San Joaquin River.

A fundamental goal of previous storm drain master plans was to minimize the use of SSJID's Laterals for conveyance of storm water runoff to SSJID's Drains. Accordingly, previous master plans specified the construction of a separate storm water conveyance network that by-passed the Laterals and transported storm drainage directly to the Drains. Once the City's storm water reached the Drains, the Drains would continue to provide conveyance to the FCOC and to the San Joaquin River. In the 2013 Storm Drain Master Plan (2013 SDMP), however, the City recognizes the opportunity to minimize infrastructure costs for all parties by abandoning the concept of separate conveyance systems and instead expanding the use of SSJID's Laterals. Laterals that are targeted to convey both storm water and irrigation water to Drains are called dual-use facilities.

FUTURE STORM WATER DRAINAGE DEMAND AND SYSTEM IMPROVEMENTS

The City's 2013 Storm Drain Master Plan (SDMP) provides a comprehensive planning document to guide improvement and expansion of the City's storm drainage system to meet current and future needs in a safe and reliable manner while maintaining compliance with all applicable regulations. Five planning zones have been identified to define the capital improvements needed to serve future growth: Zones 30, 32, 34, 36 and 39. With the exception of drainage Zone 39, all drainage zones are located in the SSJID service area. The Project site is located in Zone 30 and is currently served by the SSJID.

Groundwater

The Project site is located above the Eastern San Joaquin River Groundwater Subbasin. The Eastern San Joaquin River Subbasin covers approximately 1,105 square miles and extends from the Mokelumne River on the north and northwest; San Joaquin River on the west; Stanislaus River on the south; and consolidated bedrock on the east. The Eastern San Joaquin Subbasin is bounded on the south, southwest, and west by the Modesto, Delta-Mendota, and Tracy Subbasins, respectively and on the northwest and north by the Solano, South American, and Cosumnes Subbasins. (DWR 2006, pg. 1).

The Eastern San Joaquin River Groundwater Subbasin is not adjudicated; however, a basin management plan has been created. The Eastern San Joaquin Groundwater Subbasin Groundwater Sustainability Plan (ESJGS-GSP) (Eastern San Joaquin Groundwater Authority, 2019) was prepared in November 2019. The purpose of the ESJGS-GSP is "to meet the regulatory requirements set forth in

the three-bill legislative package consisting of Assembly Bill (AB) 1739 (Dickinson), Senate Bill (SB) 1168 (Pavley), and SB 1319 (Pavley), collectively known as the Sustainable Groundwater Management Act (SGMA). SGMA." According to Department of Water Resources (DWR) Bulletin 118 (DWR, 2016), the Eastern San Joaquin River Groundwater Basin is in a critical condition of overdraft.

Most of the fresh groundwater is encountered at depths of 700 to 1,900 feet, and most of this shallow groundwater is unconfined. A discussion of basin hydrogeology is provided in the ESJGS-GSP.

The Eastern San Joaquin Subbasin includes lands south of Dry Creek between the San Joaquin River on the west and the crystalline basement rock of the Sierra Nevada foothills on the east. The Eastern San Joaquin Subbasin boundary to the south stretches along the San Joaquin County line and continues along the Stanislaus River into Calaveras County to the east. Geologic units in the Eastern San Joaquin Subbasin consist of consolidated rocks and unconsolidated deposits.

The Eastern San Joaquin Subbasin Hydrogeologic Conceptual Model has one principal aquifer that provides water for domestic, irrigation, and municipal water supply and is composed of three water production zones. The zones have favorable aquifer characteristics that deliver a reliable water resource because of their basin location and sand thickness. The zones are:

- **Shallow Zone** that consists of the alluvial sands and gravels of the Modesto, Riverbank, and Upper Turlock Lake Formations;
- **Intermediate Zone** that consists of the Lower Turlock Lake and Laguna Formations;
- **Deep Zone** that consists of the consolidated sands and gravels of the Mehrten Formation.

According to the 2014 Eastern San Joaquin Integrated Regional Water Management Plan, the subbasin has been historically in a critical condition of overdraft with the historic hydrologic record estimating net groundwater overdraft to be approximately 150,000 to 160,000 acre-feet per year (af/yr). Average groundwater use in the Eastern San Joaquin Subbasin is about 809,321 acre-feet per year (afy), of which approximately 95 percent is for agricultural uses and 5 percent for municipal and industrial uses. Historically, groundwater elevations have declined about 40 to 60 feet, averaging approximately 1.7 feet per year.

The San Joaquin County Flood Control and Water Conservation District (District) monitors groundwater levels and groundwater quality throughout San Joaquin County to identify the condition of the Eastern San Joaquin Subbasin. According to the Spring 2018 Groundwater Report, of the 135 wells able to be compared, 70 showed decreases in groundwater levels, 58 showed increases in groundwater levels, and 7 showed no change in groundwater elevations. The Eastern San Joaquin Subbasin is recharged by water from sources including streams, percolation of rainfall and irrigation water, inflow from other groundwater basins, and intentional recharge at numerous facilities. Intentional recharge is conducted in recharge ponds and on some farm fields with compensation to landowners.

GROUNDWATER RESOURCES

The City currently (2021) owns and operates 17 potable water wells and 31 irrigation wells. The City's annual potable groundwater production has steadily increased historically, reaching a peak of 14,900 acre-feet (AF) in 2004. Commissioning of the surface water treatment plant in 2005 decreased groundwater use considerably and currently supplies an average of 52 percent of the City's annual potable water supply. Since 2005, the City has constructed dedicated irrigation wells at many parks in an effort to reduce potable demand, which requires wellhead treatment at many wells for arsenic and other constituents to meet drinking water standards. In 2000, the City pumped about 1.2 AFY/acre, but has since decreased pumping to about 0.7 AFY/acre in 2010 and to about 0.5 AFY/acre in 2015. When the City annexes new areas, the safe yield remains unchanged; however, the volume of available groundwater increases with the annexation of land into the City. However, the 1 AFY/acre does not provide sufficient water supply for most projects.

Because there are numerous wells not owned by the City that are drawing from the ESJ Subbasin, this pumping could affect the amount of groundwater available to the City within the groundwater basin safe yield. Wells currently in operation not owned by the City include private domestic wells, agricultural wells, wells for school irrigation owned by the Manteca Unified School District (MUSD), and irrigation wells owned by SSJID, among others. Well completion reports obtained from DWR suggest that approximately 1,000 water wells have been constructed within the General Plan area since record keeping began in the 1960s; however, many may not have been registered as abandoned. It is anticipated that most domestic wells are no longer in use, though further investigation would be needed to verify this assumption.

It is known that MUSD and others own and operate wells within the City and its planning area. It is also assumed that pumping by MUSD and other known pumpers within the City and its planning area should be included in the groundwater safe yield accounting for purposes of this evaluation. Groundwater pumping by others may also be included in future updates of this initial estimate.

Metered pumping records for MUSD have not been provided. The MUSD is assumed to irrigate 25 percent of its parcels at 4 AFY/acre. According to the City's 2015 UWMP, the groundwater pumping from other ESJ entities were estimated as follows:

- Given that the MUSD has approximately 500 total acres, the total annual water use is estimated at approximately 500 AFY.
- According to SSJID pumping records for 2010 through 2015, an average of 4,860 AFY groundwater was pumped from SSJID-leased wells. Of this, an average of 2,860 AFY was pumped within the City of Manteca and the City's Planning Area. Therefore, groundwater pumping from SSJID-leased wells is projected to be 2,860 AFY.
- Other known industrial groundwater pumpers include Eckerts Cold Storage. The City treats over 130 AF of wastewater produced by Eckerts each year. Based upon this average, groundwater pumping is estimated at 150 AFY assuming a return-to-sewer ratio of approximately 85 percent.

Flooding

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 Project site lies within the larger area known as the Delta Basin, which historically was a tidal marsh formed in an overflow area of the Sacramento and San Joaquin Rivers. During the early part of the 20th century, over 80 percent of the Delta was reclaimed through construction of levees. There are over 1,100 miles of man-made levees protecting land in the Delta from flooding. The RD-17 levee system is designed to a 100-year flood protection standard. The Project site is currently located in Zone X, protected by levee, which by definition indicates an area protected by levees from the 1% annual chance flood. It is noted that a small portion of the southern boundary of the Development Area south of the RD 2094 dry levee is within the 100-year flood zone. Figure 3.9-2 shows the 100- and 500-year flood boundaries. The Project site is located in an area designated to have a minimal flood hazard.

Dam Failure

The Project site is located within dam failure inundation areas. Potential inundation from the New Melones Lake, San Luis Reservoir, and Tulloch Reservoir are shown in Figure 3.9-3. 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.

Stormwater Quality

Surface water quality is affected by point source and non-point source pollutants. Point source pollutants are those emitted at a specific point, such as a pipe, while non-point source pollutants are typically generated by surface runoff from diffuse sources, such as streets, paved areas, and landscaped areas. Point source pollutants are controlled with pollutant discharge regulations or waste discharge requirements (WDRs). Non-point source pollutants are more difficult to monitor and control, although they are important contributors to surface water quality in urban areas.

Stormwater runoff pollutants vary based on land use, topography, the amount of impervious surface, and the amount and frequency of rainfall and irrigation practices. Runoff in developed areas typically contains oil, grease, and metals accumulated in streets, driveways, parking lots, and rooftops, as well as pesticides, herbicides, particulate matter, nutrients, animal waste, and other

oxygen-demanding substances from landscaped areas. The highest pollutant concentrations usually occur at the beginning of the wet season during the “first flush.”

303(d) Impaired Water Bodies

Water quality in the City is governed by the Central Valley Regional Water Quality Control Board (CVRWQCB), which sets water quality standards in their Water Quality Control Plan for the respective basins (Basin Plans). The Basin Plans identify beneficial uses for surface water and groundwater and establish water quality objectives to attain those beneficial uses.

Section 303(d) of the federal CWA requires States to identify waters that do not meet water quality standards or objectives and thus, are considered "impaired." Once listed, Section 303(d) mandates prioritization and development of a Total Maximum Daily Load (TMDL). The TMDL is a tool that establishes the allowable loadings or other quantifiable parameters for a waterbody and thereby the basis for the States to establish water quality-based controls. The purpose of TMDLs is to ensure that beneficial uses are restored and that water quality objectives are achieved.

According to the California Water Quality Control Monitoring Council, which is part of California Environmental Protection Agency, Natural Resources, there are many areas within the San Joaquin County which are considered Section 303(d) impaired waterbodies. Those areas in the regional vicinity of Manteca that are impaired are referred as Delta Waterways (Southern Portion) by the Water Quality Control Monitoring Council. This includes 3,125 acres listed as early as 1996 for Chlorpyrifos (Agriculture, Urban Runoff/Storm Sewers), DDT (Agriculture), Diazinon (Agriculture, Urban Runoff/Storm Sewers), Electrical Conductivity (Agriculture), Group A Pesticides (Agriculture), Invasive Species (Source Unknown), Mercury (Resource Extraction), and Unknown Toxicity (Source Unknown).

Storm water runoff may play a role in the water quality impairments described above. Runoff that occurs as overland flow across yards, driveways, and public streets is intercepted by the storm water drainage system and conveyed to local drainages before eventually being routed to the Pacific. This storm water can carry pollutants that can enter the local waterways and result in the types of water quality impairments described above. Common sources of storm water pollution in the City include litter, trash, pet waste, paint residue, organic material (yard waste), fertilizers, pesticides, sediments, construction debris, metals from automobile brake pad dust, air pollutants that settle on the ground or attach to rainwater, cooking grease, illegally dumped motor oil, and other harmful fluids.

Potential hazards to surface water quality include the following nonpoint pollution problems: high turbidity from sediment resulting from erosion of improperly graded construction projects, concentration of nitrates and dissolved solids from agriculture or surfacing septic tank failures, contaminated street and lawn run-off from urban areas, and warm water drainage discharges into cold water streams.

The most critical period for surface water quality is following a rainstorm which produces significant amounts of drainage runoff into streams at low flow, resulting in poor dilution of contaminates in the low flowing stream. Such conditions are most frequent during the fall at the beginning of the rainy season when stream flows are near their lowest annual levels. Besides the greases, oils,

pesticides, litter, and organic matter associated with such runoff, heavy metals such as copper, zinc, and cadmium can cause considerable harm to aquatic organisms when introduced to streams in low flow conditions.

Urban stormwater runoff was managed as a non-point discharge (a source not readily identifiable) under the Federal Water Pollution Control Amendments of 1972 (PL 92-500, Section 208) until the mid-1980s. However, since then, the Federal Environmental Protection Agency has continued to develop implementing rules which categorize urban runoff as a point source (an identifiable source) subject to NPDES permits. Rules now affect medium and large urban areas, and further rulemaking is expected as programs are developed to meet requirements of Federal water pollution control laws.

Surface water pollution is also caused by erosion. Excessive and improperly managed grading, vegetation removal, quarrying, logging, and agricultural practices all lead to increased erosion of exposed earth and sedimentation of watercourses during rainy periods. In slower moving water bodies these same factors often cause a buildup of siltation, which ultimately reduces the capacity of the water system to percolate and recharge groundwater basins, as well as adversely affecting both aquatic resources and flood control efforts.

3.9.2 REGULATORY SETTING

There are a number of regulatory agencies whose responsibility includes the oversight of the water resources of the state and nation including the Federal Emergency Management Agency, the US Environmental Protection Agency, the State Water Resources Board, and the Regional Water Quality Control Board. The following is an overview of the federal, state and local regulations that are applicable to the proposed Project.

FEDERAL

Clean Water Act

The CWA, initially passed in 1972, regulates the discharge of pollutants into watersheds throughout the nation. Section 402(p) of the act establishes a framework for regulating municipal and industrial stormwater discharges under the National Pollutant Discharge Elimination System (NPDES) Program. Section 402(p) requires that stormwater associated with industrial activity that discharges either directly to surface waters or indirectly through municipal separate storm sewers must be regulated by an NPDES permit.

The CWA establishes the basic structure for regulating the discharges of pollutants into the waters of the United States and gives the US Environmental Protection Agency (EPA) the authority to implement pollution control programs. The statute's goal is to regulate all discharges into the nation's waters and to restore, maintain, and preserve the integrity of those waters. The CWA sets water quality standards for all contaminants in surface waters and mandates permits for wastewater and stormwater discharges.

The CWA also requires states to establish site-specific water quality standards for navigable bodies of water and regulates other activities that affect water quality, such as dredging and the filling of wetlands. The following CWA sections assist in ensuring water quality for the water of the United States:

CWA Section 208 requires the use of best management practices (BMPs) to control the discharge of pollutants in stormwater during construction CWA Section 303(d) requires the creation of a list of impaired water bodies by states, territories, and authorized tribes; evaluation of lawful activities that may impact impaired water bodies, and preparation of plans to improve the quality of these water bodies. CWA Section 303(d) also establishes TMDLs, which is the maximum amount of a pollutant that a water body can receive and still safely meet water quality standards. CWA Section 404 authorizes the US Army Corps of Engineers to require permits that will discharge dredge or fill materials into waters in the US, including wetlands.

In California, the EPA has designated the State Water Resources Control Board (SWRCB) and its nine Regional Water Quality Control Boards (RWQCBs) with the authority to identify beneficial uses and adopt applicable water quality objectives.

The SWRCB is responsible for implementing the CWA and does so through issuing NPDES permits to cities and counties through regional water quality control boards. Federal regulations allow two permitting options for storm water discharges (individual permits and general permits).

Federal Emergency Management Agency

FEMA operates the National Flood Insurance Program (NFIP). Participants in the NFIP must satisfy certain mandated floodplain management criteria. The National Flood Insurance Act of 1968 has adopted as a desired level of protection, an expectation that developments should be protected from floodwater damage of the Intermediate Regional Flood (IRF). The IRF is defined as a flood that has an average frequency of occurrence on the order of once in 100 years, although such a flood may occur in any given year. Communities are occasionally audited by the California Department of Water Resources to insure the proper implementation of FEMA floodplain management regulations.

Flood Control Act

The Flood Control Act (1917) established survey and cost estimate requirements for flood hazards in the Sacramento Valley. All levees and structures constructed per the Act were to be maintained locally but controlled federally. All rights of way necessary for the construction of flood control infrastructure were to be provided to the Federal government at no cost.

Federal involvement in the construction of flood control infrastructure, primarily dams and levees, became more pronounced upon passage of the Flood Control Act of 1936.

Flood Disaster Protection Act (FDPA)

The FDPA of 1973 was a response to the shortcomings of the NFIP, which were experienced during the flood season of 1972. The FDPA prohibited Federal assistance, including acquisition, construction, and financial assistance, within delineated floodplains in non-participating NFIP

communities. Furthermore, all Federal agencies and/or federally insured and federally regulated lenders must require flood insurance for all acquisitions or developments in designated Special Flood Hazard Areas (SFHAs) in communities that participate in the NFIP.

Improvements, construction, and developments within SFHAs are generally subject to the following standards:

- All new construction and substantial improvements of residential buildings must have the lowest floor (including basement) elevated to or above the base flood elevation (BFE).
- All new construction and substantial improvements of non-residential buildings must either have the lowest floor (including basement) elevated to or above the BFE or dry-floodproofed to the BFE.
- Buildings can be elevated to or above the BFE using fill, or they can be elevated on extended foundation walls or other enclosure walls, on piles, or on columns.
- Extended foundation or other enclosure walls must be designed and constructed to withstand hydrostatic pressure and be constructed with flood-resistant materials and contain openings that will permit the automatic entry and exit of floodwaters. Any enclosed area below the BFE can only be used for the parking of vehicles, building access, or storage.

National Flood Insurance Program (NFIP)

Per the National Flood Insurance Act of 1968, the NFIP has three fundamental purposes: *Better indemnify individuals for flood losses through insurance; Reduce future flood damages through State and community floodplain management regulations; and Reduce Federal expenditures for disaster assistance and flood control.*

While the Act provided for subsidized flood insurance for existing structures, the provision of flood insurance by FEMA became contingent on the adoption of floodplain regulations at the local level.

National Pollutant Discharge Elimination System

NPDES permits are required for discharges to navigable waters of the United States, which includes any discharge to surface waters, including lakes, rivers, streams, bays, oceans, dry stream beds, wetlands, and storm sewers that are tributary to any surface water body. NPDES permits are issued under the Federal CWA, Title IV, Permits and Licenses, Section 402 (33 USC 466 et seq.)

The RWQCB issues these permits in lieu of direct issuance by the Environmental Protection Agency, subject to review and approval by the EPA Regional Administrator (EPA Region 9). The terms of these NPDES permits implement pertinent provisions of the Federal CWA and the Act's implementing regulations, including pre-treatment, sludge management, effluent limitations for specific industries, and anti-degradation. In general, the discharge of pollutants is to be eliminated or reduced as much as practicable so as to achieve the CWA's goal of "fishable and swimmable" navigable (surface) waters. Technically, all NPDES permits issued by the RWQCB are also Waste Discharge Requirements issued under the authority of the CWA.

These NPDES permits regulate discharges from publicly owned treatment works, industrial discharges, stormwater runoff, dewatering operations, and groundwater cleanup discharges. NPDES permits are issued for five years or less, and are therefore to be updated regularly. The rapid and dramatic population and urban growth in the Central Valley Region has caused a significant increase in NPDES permit applications for new waste discharges. To expedite the permit issuance process, the SWRCB has adopted several general NPDES permits, each of which regulates numerous discharges of similar types of wastes. The SWRCB has issued general permits for stormwater runoff from industrial and construction sites statewide. Stormwater discharges from industrial and construction activities in the Central Valley Region can be covered under these general permits, which are administered jointly by the SWRCB and RWQCB.

Individual projects in the City that disturb more than one acre would be required to obtain NPDES coverage under the California General Permit for Storm Water Discharges Associated with Construction and Land Disturbance Activities (Construction General Permit). The Construction General Permit requires the development and implementation of a Storm Water Pollution Prevention Plan (SWPPP) describing Best Management Practices (BMP) the discharger would use to prevent and retain storm water runoff. The SWPPP must contain a visual monitoring program; a chemical monitoring program for "non-visible" pollutants to be implemented if there is a failure of BMPs; and a sediment monitoring plan if the site discharges directly to a waterbody listed on the 303(d) list for sediment.

Rivers and Harbors Appropriation Act of 1899

One of the country's first environmental laws, this Act established a regulatory program to address activities that could affect navigation in Waters of the United States.

Water Pollution Control Act of 1972

The Water Pollution Control Act (WPCA) established a program to regulate activities that result in the discharge of pollutants to waters of the United States

STATE

California Fish and Wildlife Code

The California Department of Fish and Wildlife (CDFW) protects streams, water bodies, and riparian corridors through the streambed alteration agreement process under Section 1600 to 1616 of the California Fish and Game Code. The California Fish and Game Code establishes that "an entity may not substantially divert or obstruct the natural flow or substantially change the bed, channel or bank of any river, stream or lake, or deposit or dispose of debris, waste, or other material containing crumbled, flaked, or ground pavement where it may pass into any river stream, or lake" (Fish and Game Code Section 1602(a)) without notifying the CDFW, incorporating necessary mitigation and obtaining a streambed alteration agreement. The CDFWs jurisdiction extends to the top of banks and often includes the outer edge of riparian vegetation canopy cover.

California Code of Regulations

California Code of Regulations (CCR) Title 22, Chapter 15, Article 20 requires all public water systems to prepare a Consumer Confidence Report for distribution to its customers and to the Department of Health Services. The Consumer Confidence Report provides information regarding the quality of potable water provided by the water system. It includes information on the sources of the water, any detected contaminants in the water, the maximum contaminants levels set by regulation, violations and actions taken to correct them, and opportunities for public participation in decisions that may affect the quality of the water provided.

California Government Code

Relevant sections of the California Government Code are identified below.

SECTION 65302

Revised safety elements must include maps of any 200-year flood plains and levee protection zones within the Planning Area.

SECTION 65584.04

Any land having inadequate flood protection, as determined by FEMA or DWR, must be excluded from land identified as suitable for urban development within the planning area.

SECTION 8589.4

California Government Code §8589.4, commonly referred to as the Potential Flooding-Dam Inundation Act, requires owners of dams to prepare maps showing potential inundation areas in the event of dam failure. A dam failure inundation zone is different from a flood hazard zone under the National Flood Insurance Program (NFIP). NFIP flood zones are areas along streams or coasts where storm flooding is possible from a "100-year flood." In contrast, a dam failure inundation zone is the area downstream from a dam that could be flooded in the event of dam failure due to an earthquake or other catastrophe. Dam failure inundation maps are reviewed and approved by the California Office of Emergency Services (OES). Sellers of real estate within inundation zones are required to disclose this information to prospective buyers.

California Department of Health Services

The Department of Health Services, Division of Drinking Water and Environmental Management, oversees the Drinking Water Program. The Drinking Water Program regulates public water systems and certifies drinking water treatment and distribution operators. It provides support for small water systems and for improving their technical, managerial, and financial capacity. It provides subsidized funding for water system improvements under the State Revolving Fund ("SRF") and Proposition 50 programs. The Drinking Water Program also oversees water recycling projects, permits water treatment devices, supports and promotes water system security, and oversees the Drinking Water Treatment and Research Fund for MTBE and other oxygenates.

Consumer Confidence Report Requirements

The preparation of Consumer Confidence Reports (CCRs) is required by Health & Safety Code §116470 and California Code of Regulations, Title 22, Article 20. Health & Safety Code §116470(b) also requires public water systems with more than 10,000 service connections that detect contaminants above their public health goals (PHGs) to provide PHG exceedance reports every three years and to hold public hearings regarding their reports.

California Water Code

California's primary statute governing water quality and water pollution issues with respect to both surface waters and groundwater is the Porter-Cologne Water Quality Control Act of 1970 (Division 7 of the California Water Code) (Porter-Cologne Act). The Porter-Cologne Act grants the SWRCB and each of the RWQCBs power to protect water quality, and is the primary vehicle for implementation of California's responsibilities under the Federal CWA. The Porter-Cologne Act grants the SWRCB and the RWQCBs authority and responsibility to adopt plans and policies, to regulate discharges to surface and groundwater, to regulate waste disposal sites, and to require cleanup of discharges of hazardous materials and other pollutants. The Porter-Cologne Act also establishes reporting requirements for unintended discharges of any hazardous substance, sewage, or oil or petroleum product.

Each RWQCB must formulate and adopt a Water Quality Control Plan (Basin Plan) for its region. The regional plans are to conform to the policies set forth in the Porter-Cologne Act and established by the SWRCB in its State water policy. The Porter-Cologne Act also provides that a RWQCB may include within its regional plan water discharge prohibitions applicable to particular conditions, areas, or types of waste.

Assembly Bill 162

Assembly Bill (AB) 162 requires a general plan's land use element to identify and annually review those areas covered by the general plan that are subject to flooding as identified by flood plain mapping prepared by FEMA or DWR. The bill also requires, upon the next revision of the housing element, on or after January 1, 2009, the conservation element of the general plan to identify rivers, creeks, streams, flood corridors, riparian habitat, and land that may accommodate floodwater for purposes of groundwater recharge and stormwater management. By imposing new duties on local public officials, the bill creates a State-mandated local program.

This bill also requires, upon the next revision of the housing element, on or after January 1, 2009, the safety element to identify, among other things, information regarding flood hazards and to establish a set of comprehensive goals, policies, and objectives, based on specified information for the protection of the community from, among other things, the unreasonable risks of flooding.

Assembly Bill 70

AB 70 provides that a city or county may be required to contribute its fair and reasonable share of the property damage caused by a flood to the extent that it has increased the State's exposure to liability for property damage by unreasonably approving, as defined, new development in a

previously undeveloped area, as defined, that is protected by a State flood control project, unless the city or county meets specified requirements.

Senate Bill 610 and Assembly Bill 901

The State Legislature passed SB 610 and AB 901 in 2001. Both measures modified the Urban Water Management Planning Act.

SB 610 requires additional information in an urban water management plan if groundwater is identified as a source of water available to an urban water supplier. It also requires that the plan include a description of all water supply projects and programs that may be undertaken to meet total projected water use. SB 610 requires a city or county that determines a project is subject to CEQA to identify any public water system that may supply water to the project and to request identified public water systems to prepare a specified water supply assessment. The assessment must include, among other information, an identification of existing water supply entitlements, water rights, or water service contracts relevant to the identified water supply for the proposed Project, and water received in prior years pursuant to these entitlements, rights, and contracts.

AB 901 requires an urban water management plan to include information, to the extent practicable, relating to the quality of existing sources of water available to an urban water supplier over given time periods. AB 901 also requires information on the manner in which water quality affects water management strategies and supply reliability. The bill requires a plan to describe plans to supplement a water source that may not be available at a consistent level of use, to the extent practicable. Additional findings and declarations relating to water quality are required.

Senate Bill 221

SB 221 adds Government Code Section 66455.3, requiring that the local water agency be sent a copy of any proposed residential subdivision of more than 500 dwelling units within five days of the subdivision application being accepted as complete for processing by the city or county. It also adds Government Code Section 66473.7, establishing detailed requirements for establishing whether a "sufficient water supply" exists to support any proposed residential subdivisions of more than 500 dwellings, including any such subdivision involving a development agreement. When approving a qualifying subdivision tentative map, the city or county must include a condition requiring availability of a sufficient water supply. The applicable public water system must provide proof of availability. If there is no public water system, the city or county must undertake the analysis described in Government Code Section 66473.7. The analysis must include consideration of effects on other users of water and groundwater.

200-Year Flood Protection in the Central Valley

Both State policy and recently enacted State legislation (Senate Bill 5) call for 200-year (0.5% annual chance) flood protection to be the minimum level of protection for urban and urbanizing areas in the Central Valley. Senate Bill 5 (SB5) requires that the 200-year protection be consistent with criteria used or developed by the Department of Water Resources. SB 5 requires all urban and urbanizing areas in the Sacramento and San Joaquin Valleys to achieve 200-year flood protection in

order to approve development. The new law restricts approval of development after 2016 if "adequate progress" towards achieving this standard is not met. Urban and urbanizing areas protected by State-Federal project levees cannot use "adequate progress" as a condition to approve development after 2028. Adequate progress is defined as meeting all of the following:

1. The project scope, cost and schedule have been developed;
2. In any given year, at least 90% of the revenues scheduled for that year have been appropriated and expended consistent with the schedule;
3. Construction of critical features is progressing as indicated by the actual expenditure of budget funds;
4. The city or county has not been responsible for any significant delay in completion of the system; and
5. The above information has been provided to the DWR and the Central Valley Flood Protection Board and the local flood management agency shall annually report on the efforts to complete the project.

State Updated Model Landscape Ordinance

Under AB 1881, the updated Model Landscape Ordinance requires cities and counties to adopt landscape water conservation ordinances by January 31, 2010 or to adopt a different ordinance that is at least as effective in conserving water as the updated Model Ordinance. Manteca Municipal Code Chapter 17.48, Landscaping, includes landscaping water use standards.

Water Quality Control Basin Plan

The Water Quality Control Plan for the Sacramento-San Joaquin River Basins (Basin Plan), amended by the CVRWQCB in 2018, identifies the beneficial uses of water bodies and provides water quality objectives and standards for waters of the Sacramento River and SJR basins, including the Delta.

State and federal laws mandate the protection of designated "beneficial uses" of water bodies. State law defines beneficial uses as "domestic; municipal; agricultural and industrial supply; power generation; recreation; aesthetic enjoyment; navigation; and preservation and enhancement of fish, wildlife, and other aquatic resources or preserves" (Water Code Section 13050[f]). Additional protected beneficial uses of the SJR include groundwater recharge and freshwater replenishment.

State Water Resources Control Board Storm Water Strategy

The Storm Water Strategy is founded on the results of the Storm Water Strategic Initiative, which served to direct the State Water Board's role in storm water resources management and evolve the Storm Water Program by a) developing guiding principles to serve as the foundation of the storm water program, b) identifying issues that support or inhibit the program from aligning with the guiding principles, and c) proposing and prioritizing projects that the Water Boards could implement to address those issues.

The State Water Board staff created a strategy-based document called the Strategy to Optimize Management of Storm Water (STORMS). STORMS includes a program vision, missions, goals, objectives, projects, timelines, and consideration of the most effective integration of project outcomes into the Water Board's Storm Water Program.

LOCAL

City of Manteca General Plan

The City of Manteca General Plan includes several policies relevant to hydrology and water quality. General Plan policies and implementation measures applicable to the Project are identified below:

2023 GENERAL PLAN (EXISTING)

Policies: Domestic Water

- PF-P-4. Secure sufficient sources of water to meet the needs of the existing community and planned residential and commercial growth.
- PF-P-5. City will continue to rely principally on groundwater resources for its municipal water in the near term, will participate in the regional improvements to deliver surface water to augment the City's groundwater supply.
- PF-P-6. The City shall develop new water sources as necessary to serve new development.
- PF-P-7. The City shall develop new water storage facilities and major distribution lines as necessary to serve new development.
- PF-P-8. The City will provide water for future development to maintain a balance of jobs and housing.
- PF-P-9. City water services shall not be extended to unincorporated areas except in extraordinary circumstances. Existing commitments for City water service outside the City limits shall continue to be honored.
- PF-P-11. The City will develop and implement water conservation measures as necessary elements of the water system.
- PF-P-12. The City shall continue to assess a water development fee on all new commercial, industrial, and residential development sufficient to fund system-wide capacity improvements. The water development fee schedule shall be periodically reviewed and revised as necessary.
- PF-P-13. Ensure that all new development provides for and funds a fair share of the costs for adequate water distribution, including line extensions, easements, and plant expansions.
- PF-P-14. The City shall continuously monitor water flows through the City's water system to identify areas of potential water loss and cases of under billing for water service and shall make improvements in the systems as necessary.
- PF-P-15. The City shall monitor water quality regularly and take necessary measures to prevent contamination.
- PF-P-17. The City of Manteca shall consider incremental increases in the demands on groundwater supply and water quality when reviewing development applications.

Policies: Major Drainage

- PF-P-26. The City shall continue to complete gaps in the drainage system in areas of existing development.
- PF-P-27. The City shall require the dedication and improvement of drainage detention basins as a condition of development approval according to the standards of the Drainage Master Plan. The responsibility for the dedication and improvement of detention basins shall be based on the prorated share of stormwater runoff resulting from each development.
- PF-P-28. Storm drainage systems within new development areas shall include open drainage corridors where feasible to supplement or replace an underground piped drainage system. The drainage systems would provide for short-term storm water detention, storm water conveyance for storm waters exceeding a 10-year event, storm water quality treatment, bike and pedestrian paths, and visual open space within neighborhoods. The width and length of the corridors would be determined by the stormwater management requirements. The drainage systems would provide a pedestrian connection between parks and access to open space from residential neighborhoods. The neighborhoods would be designed with homes oriented to, rather than backing on the open space corridor.

Policies: Flood Safety

- S-P-9. The City shall require evaluation of potential flood hazards prior to approval of development projects to determine whether the proposed development is reasonably safe from flooding and consistent with California Department of Water Resources (DWR) Urban Level of Flood Protection Criteria. The City shall not approve the execution of a development agreement, a tentative map, or a parcel map for which a tentative map is not required, or a discretionary permit or other discretionary entitlement that would result in the construction of a new building, or construction that would result in an increase in allowed occupancy for an existing building, or issuance of a ministerial permit that would result in the construction of a new residence for property that is located within a 200-year flood hazard zone, unless the adequacy of flood protection as described in Government Code §65865.5(a), 65962(a), or 66474.5(a), has been demonstrated.
- S-P-10. The City may permit new development in areas not identified as "urban" or "urbanizing" provided that they are protected from 100-year flooding by FEMA-accredited levees or equivalent flood protection as shown on an adopted FEMA FIRM, a FEMA-approved Letter of Map Revision (LOMR) or a Conditional Letter of Map Revision (CLOMR), subject to conditions specified in the CLOMR.
- S-P-11. The City may permit new development in areas not protected by FEMA-accredited 100-year levees subject to all applicable requirements of Manteca Municipal Code Chapter 8.30 (Floodplain Management), the California Building Standards Code as adopted by the City, and the latest promulgated FEMA standards for development in the 100-year floodplain, provided that new development approval will not cause the project site or area to be defined as "urban" or "urbanizing."
- S-P-16. Provide technical assistance and encourage landowners within the FEMA Special Flood Hazard Area (100-year floodplain) to purchase and maintain flood insurance.

- S-P-17. Ensure that the impacts of potential flooding are adequately analyzed when considering areas for future urban expansion.
- S-P-18. Provide opportunities for review of and comment by the reclamation districts, Manteca Police Services, Manteca Fire Department, the Lathrop Manteca Fire District for comment during new development project review.
- S-P-19. Consider the risks of catastrophic dam failure in the planning and environmental review of new development projects.
- S-P-20. Incorporate riparian habitat protection, mitigation or enhancement into flood protection improvements to maintain existing floodwater capacity where feasible.
- S-P-21. Combine flood control, recreation, water quality, and open space functions where feasible.
- S-P-22. Discourage large continuous paved areas unless provided with engineered drainage facilities, and where feasible, require the use of pervious paving materials.
- S-P-24. The City shall require, for areas protected by levees, all new developments to include a notice within the deed that the property is protected from flooding by a levee and that the property can be subject to flooding if the levee fails or is overwhelmed by floodwater flow.

Policies: Water Conservation

- RC-P-1. The City shall continue to implement water conservation standards for all commercial and industrial development, and for all existing and new residential development.
- RC-P-3. The City shall protect the quantity of Manteca's groundwater.
- RC-P-4. The City shall require water conservation in both City operations and private development to minimize the need for the development of new water sources.

Policies: Soils and Erosion Control

- RC-P-10. Minimize soil erosion and loss of topsoil from land development activities, wind, and water flow.

Policies: Water Quality

- RC-P-11. Minimize sedimentation and loss of topsoil from soil erosion.
- RC-P-12. Minimize pollution of waterways and other surface water bodies from urban runoff.
- RC-P-13. Protect the quality of Manteca's groundwater.
- RC-P-15. Once sewer service has been extended to incorporated areas, new septic tanks shall not be permitted.

GENERAL PLAN UPDATE (PROPOSED)

Policies: Safety Element

- S-3.3 Require evaluation of potential flood hazards prior to approval of development

projects to determine whether the proposed development is reasonably safe from flooding and consistent with California Department of Water Resources Urban Level of Flood Protection Criteria (ULOP). The City shall not approve the execution of a development agreement, a tentative map, or a parcel map for which a tentative map is not required, or a discretionary permit or other discretionary entitlement that would result in the construction of a new building, or construction that would result in an increase in allowed occupancy for an existing building, or issuance of a ministerial permit that would result in the construction of a new residence for property that is located within a 200-year flood hazard zone, unless the adequacy of flood protection as described in Government Code §65865.5(a), 65962(a), or 66474.5(a), has been demonstrated.

- S-3.4 New development may be permitted in areas not identified as "urban" or "urbanizing" provided that:
    - Such areas are protected from 100-year flooding by FEMA-accredited levees or equivalent flood protection as shown on an adopted FEMA Flood Insurance Rate Map, a FEMA-approved Letter of Map Revision or a Conditional Letter of Map Revision, subject to conditions specified in the letter; or
    - Where not protected by FEMA-accredited 100-year levees, such areas are subject to all applicable requirements of Municipal Code Chapter 8.30 (Floodplain Management), the California Building Standards Code as adopted by the City, and the latest promulgated FEMA standards for development in the 100-year floodplain, provided that new development approval will not cause the project site or area to be defined as "urban" or "urbanizing."

Policies: Resource Conservation Element

- RC-1.1 Where feasible, protect and enhance surface water resources in creeks, streams, channels, seasonal and permanent marshland, wetlands, sloughs, riparian habitat, and vernal pools through sound land use planning, community design, and site planning.
- RC-1.2 Require water conservation in both City operations and private development to minimize the need for the development of new water sources.
- RC-1.3 Require use of recycled water and treated wastewater to the extent allowable and feasible, including use for irrigation, agriculture, industrial, and groundwater recharge purposes, when such opportunities become available.
- RC-1.4 Encourage the rehabilitation of culverted or open existing channelized waterways to a more natural condition, as feasible, to remove concrete linings and allow for a connection between the stream channel and the natural water table. Avoid creating additional culverted or open channelized waterways, unless no other alternative is available to protect human health, safety, and welfare.
- RC-1.7 Maximize stormwater filtration and/or infiltration in areas that are not subject to high groundwater by maximizing the natural drainage patterns and the retention of natural vegetation and other pervious surfaces.
- RC-1.8 Minimize pollution of water resources, including the San Joaquin River, other

waterways, and the groundwater basin, from urban runoff, soil erosion, and sedimentation.

- RC-1.9 Require discretionary projects and flood control and storm water conveyance projects to consider effects on storm water quality and to integrate best management practices, including the integration of natural features such as bioswales, vegetation, and retention ponds to remove surface water pollutants to the greatest extent feasible, while ensuring that these features adequately convey and control storm water to protect human health, safety, and welfare.

- RC-1.10 Where feasible, encourage and support multipurpose detention basins that provide water quality protection, storm water detention, open space amenities, and recreational amenities.

- RC-22 Prohibit new septic tanks where sewer service has been extended to incorporated areas.

- RC-2.1 Protect the quantity and quality of Manteca's groundwater.

- RC-2.2 Manage groundwater as part of a broader integrated approach that includes surface water, conservation, water quality, reuse, environmental stewardship, and other water management strategies.

- RC-2.3 Operate the City's well system in such a manner as to not exceed the sustainable yield of the local groundwater aquifer.

- RC-2.4 Recognize the importance of open space lands, including agricultural lands, parks, greenways, lakes.

- RC-2.5 Conserve groundwater recharge features, encourage new groundwater recharge opportunities, and protect aquifers from degradation of water quality and reduction of recharge.

- RC-2.6 Promote the use of permeable surface materials and provide for ample areas of open space, including agricultural land, parks and greenways, and naturalized land, in order to decrease surface runoff and promote groundwater recharge.

- RC-2.9 Consider the effects of development on groundwater quality, and implement measures to reduce water contamination.

Implementation: Resource Conservation Element

- RC-2a Participate in regional groundwater management efforts with the Eastern San Joaquin County Groundwater Basin Authority and other local agencies to implement the Integrated Regional Water Management Plan and to review and update the plan as necessary to meet the federal and state requirements.

- RC-2b Coordinate with water purveyors and water users to manage supplies to avoid long-term overdraft, water quality degradation, land subsidence, and other potential problems.

- RC-2c Continue to monitor City wells to track local groundwater levels and monitor water quality. Share data with state and regional agencies and the public to ensure that regional

groundwater sustainability planning efforts include the most complete and comprehensive data available.

- RC-2d Investigate opportunities to utilize recycled water supplies to assist with groundwater recharge.
- RC-2e Monitor groundwater resources and consider locating required detention basins where recharge potential is determined to be high.
- RC-2f Initiate and support a range of educational and public outreach programs to inform residents, agriculture, businesses and other groundwater users of best management practices in the areas of efficient water use, water conservation, and increasing groundwater recharge. Make these resources available to the public through the City's website.
- RC-2h Require development projects and infrastructure projects to implement low impact development practices, when appropriate, such as techniques that increase surface infiltration in landscaped, turf, and undeveloped areas.

City of Manteca Municipal Code

TITLE 17 CHAPTER 17.30 200-YEAR FLOODPLAIN OVERLAY ZONE

Section 17.30.040, 200-Year Floodplain (F-200) Overlay Zone, of Chapter 17.30 of the Municipal Code delineates the extents of the 200-Year Floodplain and is intended to comprise all known land subject to 200-year flooding within the City. All lands within the F-200 Overlay Zone shall be required to comply with all provisions of subsection C. The purpose of the 200-Year Floodplain (F-200) Overlay Zone is to comply with provisions of State law that require the City to make specific findings prior to approving certain projects located within a 200-year flood hazard area. The F-200 Zone establishes a process for the consideration and regulation of areas subject to 200-year flooding that require special planning to provide for appropriate development.

Subsection C of Section 17.30.040 states that:

> *The review authority shall not approve the execution of a development agreement, a tentative map, or a parcel map for which a tentative map is not required, or a discretionary permit or other discretionary entitlement that would result in the construction of a new building, or construction that would result in an increase in allowed occupancy for an existing building, or issuance of a ministerial permit that would result in the construction of a new residence for property that is located within the F-200 Zone unless the review authority finds, based on substantial evidence in the record, one of the following:*
>
> 1. *The facilities of the State Plan of Flood Control or other flood management facilities protect the property to the urban level of flood protection in urban and urbanizing areas;*

2. *The City has imposed conditions on a development agreement, map, permit, or entitlement that will protect the property to the urban level of flood protection in urban and urbanizing areas;*

3. *The local flood management agency has made adequate progress (as defined in California Government Code Section 65007) on the construction of a flood protection system that will result in flood protection equal to or greater than the urban level of flood protection in urban or urbanizing areas; or*

4. *The property is located in an area of potential flooding of three feet or less from a storm event that has a one in two hundred chance of occurring in any given year, from sources other than local drainage, in urban and urbanizing areas.*

TITLE 13 CHAPTER 13.28 STORM WATER MANAGEMENT DISCHARGES

The purpose of this chapter 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. This chapter seeks to meet that purpose through the following objectives:

A. Minimize increases in storm water runoff from any development in order to reduce flooding, siltation and stream bank erosion and maintain the integrity of drainage channels;
B. Minimize increases in non-point source pollution caused by storm water runoff from development that would otherwise degrade local water quality;
C. Minimize the total annual volume of surface water runoff that flows from any specific site during and following development to not exceed the pre-development hydrologic regime to the maximum extent practicable; and
D. Reduce storm water runoff rates and volumes, soil erosion and non-point source pollution wherever possible, through storm water management controls and to ensure that these management controls are properly maintained and pose no threat to public safety. (Ord. 1253 § 1, 2004)

TITLE 13 CHAPTER 13.28 SECTION 13.28.060 DISCHARGES IN VIOLATION OF INDUSTRIAL OR CONSTRUCTION ACTIVITY NPDES STORM WATER DISCHARGE PERMIT.

A. Any person subject to an industrial NPDES storm water discharge permit shall comply with all provisions of such permit. Proof of compliance with said permit may be required in a form acceptable to the director upon inspection of the facility, during any enforcement proceeding or action or for any other reasonable cause.
B. Any person subject to a construction activity NPDES storm water discharge permit shall comply with all provisions of such permit. Proof of compliance with said permit may be required in a form acceptable to the director prior to or as a condition of a subdivision map, site plan, building permit or development or improvement plan; upon inspection of the facility; during any enforcement proceeding or action; or for any other reasonable cause. Prior to issuance of a construction permit a copy of the Notice of Intent (NOI) and the Storm

Water Pollution Prevention Plan (SWPPP) shall be submitted to the city. (Ord. 1253 § 1, 2004).

Utility Master Plans

The City of Manteca maintains a variety of Master Plan documents that guide the design, development, and maintenance of the utilities within the city limits. This includes the City's *Storm Drain Master Plan* (2013).

Municipal Storm Water Program

The discharge of storm water within the City of Manteca is regulated by the SWRCB Water Quality Order No. 2013-0001-DWQ NPDES General Permit, WDRs for Storm Water Discharges from Small Municipal Separate Storm Sewer Systems (MS4), collectively referred to as the Phase II Small MS4 General Permit. The City of Manteca is a Phase II MS4 permittee under the NPDES General Permit.

The City's Engineering Department oversees the Municipal Storm Water Program and works in conjunction with the Planning and Public Works Departments to implement requirements of the Phase II Small MS4 General Permit. Engineering and Planning Department staff review new and re-development projects for compliance with State and Regional Water Board requirements for storm water management and control. The Cities of Lathrop, Lodi, Manteca, Patterson, and Tracy, and County of San Joaquin collaborated to prepare the Multi-Agency Post-Construction Stormwater Standards Manual (Stormwater Standards Manual), dated June 2015. The Stormwater Standards Manual establishes post-construction standards to address stormwater quality for regulated new development and redevelopment projects in compliance with the requirements of Order No. 2013-0001-DWQ.

NPDES Waste Discharge Requirements – Wastewater Quality Control Facility

On April 17, 2015, the Regional Water Quality Control Board, Central Valley Region, adopted Waste Discharge Requirements Order No. R5-2015-0026, (Order) NPDES No. CA0081558, prescribing waste discharge requirements for the City of Manteca Wastewater Quality Control Facility.

3.9.3 IMPACTS AND MITIGATION MEASURES

THRESHOLDS OF SIGNIFICANCE

Consistent with Appendix G of the CEQA Guidelines, the proposed Project will have a significant impact on the environment associated with hydrology and water quality if it will:

- Violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or ground water quality.
- Substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin.

- 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:
    - Result in substantial erosion or siltation on- or off-site;
    - Substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or offsite;
    - 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
    - Impede or redirect flood flows.
- In flood hazard, tsunami, or seiche zones, risk release of pollutants due to project inundation.
- Conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan.

IMPACTS AND MITIGATION

Impact 3.9-1: The proposed Project has the potential to violate water quality standards or waste discharge requirements during construction. (Less than Significant with Mitigation)

According to the United States Environmental Protection Agency, polluted stormwater runoff is a leading cause of impairment to the nearly 40 percent of surveyed U.S. water bodies which do not meet water quality standards. Over land or via storm sewer systems, polluted runoff is discharged, often untreated, directly into local water bodies. Soil erosion is one of the most common sources of polluted stormwater runoff during construction activities. When left uncontrolled, storm water runoff can erode soil and cause sedimentation in waterways, which collectively result in the destruction of fish, wildlife, and aquatic life habitats; a loss in aesthetic value; and threats to public health due to contaminated food, drinking water supplies, and recreational waterways.

Mandated by Congress under the Clean Water Act, the NPDES Stormwater Program is a comprehensive two-phased national program for addressing the non-agricultural sources of stormwater discharges which adversely affect the quality of our nation's waters. The program uses the National Pollutant Discharge Elimination System (NPDES) permitting mechanism to require the implementation of controls designed to prevent harmful pollutants, including soil erosion, from being washed by stormwater runoff into local water bodies. The construction activities for the proposed Project would be governed by the General Permit 2009-0009-DWQ (amended by 2010-0014-DWQ & 2012-0006-DWQ), which states:

> *"…Particular attention must be paid to large, mass graded sites where the potential for soil exposure to the erosive effects of rainfall and wind is great and where there is potential for significant sediment discharge from the site to surface waters. Until permanent vegetation is established, soil cover is the most cost-effective and expeditious*

method to protect soil particles from detachment and transport by rainfall. Temporary soil stabilization can be the single most important factor in reducing erosion at construction sites. The discharger is required to consider measures such as: covering disturbed areas with mulch, temporary seeding, soil stabilizers, binders, fiber rolls or blankets, temporary vegetation, and permanent seeding. These erosion control measures are only examples of what should be considered and should not preclude new or innovative approaches currently available or being developed. Erosion control BMPs should be the primary means of preventing storm water contamination, and sediment control techniques should be used to capture any soil that becomes eroded…"

General Permit 2009-0009-DWQ (amended by 2010-0014-DWQ & 2012-0006-DWQ) further states that:

"Sediment control BMPs should be the secondary means of preventing storm water contamination. When erosion control techniques are ineffective, sediment control techniques should be used to capture any soil that becomes eroded. The discharger is required to consider perimeter control measures such as: installing silt fences or placing straw wattles below slopes. These sediment control measures are only examples of what should be considered and should not preclude new or innovative approaches currently available or being developed…Inappropriate management of run-on and runoff can result in excessive physical impacts to receiving waters from sediment and increased flows. The discharger is required to manage all run-on and runoff from a project site. Examples include: installing berms and other temporary run-on and runoff diversions…All measures must be periodically inspected, maintained and repaired to ensure that receiving water quality is protected. Frequent inspections coupled with thorough documentation and timely repair is necessary to ensure that all measures are functioning as intended…"

Grading, excavation, removal of vegetation cover, and loading activities associated with construction activities could temporarily increase runoff, erosion, and sedimentation. Construction activities could also result in soil compaction and wind erosion effects that could adversely affect soils and reduce the revegetation potential at construction sites and staging areas. To ensure that construction activities are covered under General Permit 2009-0009-DWQ (amended by 2010-0014-DWQ & 2012-0006-DWQ), projects in California must prepare a Stormwater Pollution Prevention Plan (SWPPP) containing Best Management Practices (BMPs) to reduce erosion and sediments to meet water quality standards. Such BMPs may 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. The BMPs and overall SWPPP is reviewed by the RWQCB as part of the permitting process. The SWPPP, once approved, is kept on site and implemented during construction activities and must be made available upon request to representatives of the RWQCB and/or the lead agency.

In accordance with the NPDES Stormwater Program, Mitigation Measure 3.9-1 requires an approved SWPPP designed to control erosion and the loss of topsoil to the extent practicable using BMPs that the RWQCB has deemed effective in controlling erosion, sedimentation, runoff during construction activities. The RWQCB has stated that these erosion control measures are only examples of what

should be considered and should not preclude new or innovative approaches currently available or being developed. The specific controls are subject to the review and approval by the RWQCB and are existing regulatory requirements. Implementation of Mitigation Measures 3.9-1 would ensure that the proposed Project would have a **less than significant** impact relative to this topic.

MITIGATION MEASURE(S)

Mitigation Measure 3.9-1: *Prior to clearing, grading, and disturbances to the ground such as stockpiling, or excavation for each phase of the Project, the Project proponent shall submit a Notice of Intent (NOI) and Storm Water Pollution Prevention Plan (SWPPP) to the RWQCB to obtain coverage under the General Permit for Discharges of Storm Water Associated with Construction Activity (Construction General Permit Order 2009-0009-DWQ amended by 2010-0014-DWQ & 2012-0006-DWQ). The SWPPP shall be designed with Best Management Practices (BMPs) that the RWQCB has deemed as effective at reducing erosion, controlling sediment, and managing runoff. These include: covering disturbed areas with mulch, temporary seeding, soil stabilizers, binders, fiber rolls or blankets, temporary vegetation, and permanent seeding. Sediment control BMPs, installing silt fences or placing straw wattles below slopes, installing berms and other temporary run-on and runoff diversions. These BMPs are only examples of what should be considered and should not preclude new or innovative approaches currently available or being developed. Final selection of BMPs will be subject to approval by 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.*

Impact 3.9-2: The proposed Project has the potential to violate water quality standards or waste discharge requirements during operation. (Less than Significant with Mitigation)

The long-term operations of the proposed Project (all phases) could result in long-term impacts to surface water quality from urban stormwater runoff. The proposed Project would result in new impervious areas associated with roadways, driveways, and residential structures. Normal activities in residentially developed areas include the use of various automotive petroleum products (i.e. oil, grease, and fuel), common household hazardous materials, heavy metals, pesticides, herbicides, fertilizers, and sediment. Within urban areas, these pollutants are generally called nonpoint source pollutants. The pollutant levels vary based on factors such as time between storm events, volume of storm event, type of uses, and density of people.

The drainage collection system within the City of Manteca consists of gravity pipes, retention/detention/surge basins, pump station, force mains, outfalls, and irrigation canals/ditches. The collection system for the proposed Project will be designed to contain the 10-year storm event within the pipe system and basins while maintaining one foot of freeboard. The streets will be designed in combination with the pipe system to convey the 100-year storm event to the basins and pump station in accordance with City standards. The final design of all onsite and offsite storm drain infrastructure improvements is subject to the review and approval of the City of Manteca.

As discussed in Section 2.0, development of the proposed Project would include construction of a new storm drainage system, including a drainage collection system, and detention basins. The

proposed public storm drainage and water quality system is planned to function independently from surrounding developments. An internal layout of stormwater collection pipes with various sizes, as necessary, will be installed within the Project site. It is noted that the locations of the proposed detention basins are conceptual and will be finalized during the design of Improvement Plans. A system of drainage swales may be included to treat and convey collected stormwater. All on-site storm drainage runoff will be collected through drain inlets in the landscaped areas and catch basins along the streets and within properties, and conveyed via surface swales and underground trunk lines to detention and water quality basins. The conveyance systems and detention basins may include facilities designed to address water quality standards and requirements. 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. The duration of the discharge will comply with City of Manteca standards. The water quality detention basins will be designed to comply with SWRCB and City of Manteca specifications and standards.

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.

The ongoing operational phase of the proposed Project requires the final discharge of stormwater into the on-site detention basins. The discharge of stormwater must be treated through BMPs prior to its discharge. The City of Manteca implements best management practices to the extent they are technologically achievable to prevent and reduce pollutants.

Additionally, there are various non-structural and structural stormwater BMPs that can be implemented to reduce water pollution. Non-structural BMPs are typically aimed at prevention of pollution through public education and outreach. Non-structural BMPs include: school educational programs, newsletters, website information, commercial, billboards/advertisements, river cleanups, and storm drain stenciling. Structural BMPS are aimed at the physical collection, filtering, and detaining of stormwater. Structural BMPs include items such as drop inlet filters, vault filters, hydrodynamic separators, surface detention basins, and underground detention facilities.

The following Mitigation Measures would ensure that BMPs are implemented to reduce the amount of pollution in stormwater discharged from the Project site. Therefore, Implementation of the proposed Project would have a **less than significant** impact relative to this topic.

MITIGATION MEASURE(S)

Mitigation Measure 3.9-2*: The Project applicant shall implement the following nonstructural BMPs that focus on preventing pollutants from entering stormwater:*

- *Pollution Prevention/Good Housekeeping*

- *Prior to clearing, grading, and disturbances to the ground such as stockpiling, or excavation in each phase of the Project, the Project proponent shall develop a spill response and prevention plan as a component of (1) SWPPPs prepared for construction activities, (2) SWPPPs for facilities subject to the NPDES Stormwater Permit, and (3) spill prevention control and countermeasure plans for qualifying facilities. The spill response and prevention plan shall be implemented during all construction activities.*
- *Streets and parking lots in all non-residential portions, including the right-of-way, of the Project site shall be swept at least once every two weeks.*

- *Operation and Maintenance (O&M) of Treatment Controls*
  - *Prior to clearing, grading, and disturbances to the ground such as stockpiling, or excavation in each phase of the Project, the Project proponent shall develop an Operation and Maintenance (O&M) Plan for the storm drainage facilities to ensure long-term performance. The O&M plan shall incorporate the manufacturers' recommended maintenance procedures and include (1) provisions for debris removal, (2) guidance for addressing public health or safety issues, and (3) methods and criteria for assessing the efficacy of the storm drainage system. An annual report shall be submitted to the City certifying that maintenance of the facilities was conducted according to the O&M plan.*

Mitigation Measure 3.9-3*: The Project applicant shall implement the following structural BMPs that focus on preventing pollutants from entering stormwater, or alternative BMPs approved by the City of Manteca. Implementation of BMPs apply to all non-residential parcels, including the right-of-way, as appropriate.*

- *Extended Detention Facilities: Extended detention refers to the facilities proposed for the Project site that would detain and temporarily store stormwater runoff to reduce the peak rates of discharge to the storm drainage system. Detention of stormwater allows particles and other pollutants to settle and thereby potentially reduce concentrations and mass loading of contaminants in the discharge.*
- *Grassed Swales: A swale is a vegetated, open channel management practice designed to treat and attenuate stormwater runoff for a specified water quality volume. Stormwater runoff flowing through these channels is treated by being filtered through vegetation in the channel, through a subsoil matrix, and/or through infiltration into the underlying soils. Swales can be used throughout the proposed Project area where feasible in the landscape design to treat parking lot runoff.*
- *Proprietary Devices: There are a variety of commercially available stormwater treatment devices designed to remove contaminants from drainage once flows enter the conveyance systems. StormFilter™ units, or equivalent filtration-type systems, and Bioswales are recommended for streets and parking areas. Drop inlet filters should also be used to control drainage runoff water quality.*

Impact 3.9-3: The proposed Project has the potential to substantially deplete groundwater supplies or interfere substantially with groundwater recharge. (Less than Significant)

The proposed Project would result in new impervious surfaces and could reduce rainwater infiltration and groundwater recharge. Infiltration rates vary depending on the overlying soil types. In general, sandy soils have higher infiltration rates and can contribute to significant amounts of ground water recharge; clay soils tend to have lower percolation potential; and impervious surfaces such as pavement, significantly reduce infiltration capacity and increase surface water runoff.

Table 3.9-2 identifies the soils in the Project site and the soils infiltration rate. All of the soils contained on the Project site have a hydrologic rating of "A", which is indicative of soils having a high infiltration rate (low runoff potential) when thoroughly wet. Figure 3.2-2 identifies project site soils.

TABLE 3.9-2: SOILS HYDROLOGIC RATING

UNIT SYMBOL	*NAME*	*SOURCE MATERIAL*	*RATING*
254	Timor loamy sand	Alluvium derived from granitic rock sources	A
255	Tinnin loamy coarse sand	Alluvium derived from granitic rock sources	A
266	Veritas fine sandy loam	Alluvium derived from mixed rock sources	A

SOURCE: NCRS 2021

The infiltration rate of the soils on the Project site is primarily considered high. Development of the Project site with impervious surfaces could reduce rainwater infiltration and groundwater recharge when compared to existing conditions. The park and trail areas totaling approximately 14.55 acres will remain largely pervious. The collection of rainwater for those areas of impervious surfaces will be routed into the proposed Project's storm drainage system and eventually flow into the San Joaquin River. The exact design of the drainage basin in not known at this time; therefore, it is not known whether the drainage basin will percolate or not (i.e. unlined or lined).

The project site is located in the Eastern San Joaquin County Groundwater Basin. Most of the fresh groundwater is encountered at depths of less than 1,000 feet, and most of this shallow groundwater is unconfined. The Victor formation is the uppermost formation and extends from the ground surface to a maximum depth of about 150 feet. Compared to the underlying formations, the Victor formation is generally more permeable and the groundwater is typically unconfined. The underlying Laguna formation includes discontinuous lenses of unconsolidated to semi-consolidated sands and silts interspersed with lesser amounts of clay and gravel. The Laguna formation is hydraulically connected to the Victor formation and is estimated to be 750 to 1,000 feet thick. Moderate permeability has been reported within the Laguna formation with some highly permeable coarse-grained beds. Most of the municipal and industrial wells in the Manteca area penetrate through the Victor formation into the Laguna formation.

As previously stated, the Eastern San Joaquin Subbasin is recharged by water from sources including streams, percolation of rainfall and irrigation water, inflow from other groundwater basins, and

intentional recharge at numerous facilities. Intentional recharge is conducted in recharge ponds and on some farm fields with compensation to landowners. While the Project site's soils have a high infiltration rate based on the relative percentage of sands, the Project site is not considered an intentional recharge facility. While the proposed Project would reduce the amount of impervious surfaces within the project site, it is not anticipated that the proposed development would interfere with groundwater recharge, as much of the groundwater recharge in the basin occurs in the sand and gravels along the San Joaquin River from Sierra snowmelt flowing downstream.

As discussed in Section 3.14, Utilities and Service Systems, the City's projected future water demands and supplies through 2045. Water supplies to meet future demands include surface water purchased from SSJID, City produced groundwater and recycled water. The City's water supply is projected to increase through 2045, primarily due to implementation of Phase 2 of the SCWSP, which is anticipated to occur around 2040. Future City groundwater pumping is estimated based on the safe yield for all groundwater pumping within the City's planning area, less estimated groundwater pumping by other users. Recycled water demand projections assumed decreased use over time of water for crop irrigation, and implementation of a tertiary-treated irrigation supply in the future.

For the reasons mentioned above, the proposed Project would not cause the substantial depletion of groundwater supplies or interfere substantially with groundwater recharge. As such, implementation of the proposed Project would have a **less than significant** impact relative to this topic.

Impact 3.9-4: The proposed Project has the potential to alter the existing drainage pattern in a manner which would result in substantial erosion, siltation, flooding, or polluted runoff. (Less than Significant)

Currently, runoff from within the Project site is collected in a system of shallow agricultural and roadside ditches. Public storm drain facilities are not currently installed in the agricultural fields.

Planned urbanization of the Project site would result in changes to land use, natural vegetation, and infiltration characteristics, and would introduce new sources of water pollutants, producing "urban runoff." Pollutants contained within urban runoff may include, but are not limited to sediment, oxygen-demanding substances (e.g., organic matter), nutrients (primarily nitrogen and phosphorus), heavy metals, bacteria, oil and grease, and toxic chemicals that can degrade receiving waters. Urban runoff pollutants may stem from erosion of disturbed areas, deposition of atmospheric particles derived from automobile or industrial sources, corrosion or decay of building materials, rainfall contact with toxic substances, decomposing plant materials, animal excrement, and spills of toxic materials on surfaces which receive rainfall and generate runoff. New residential uses within the Project site may also generate urban runoff from streets and driveways. Yard areas may produce fertilizer wastes and/or bacterial contamination from animal excrement.

As previously stated, the 2013 Storm Drain Master Plan (SDMP 2013) provides a comprehensive planning document to guide improvement and expansion of the City's storm drainage system to meet current and future needs in a safe and reliable manner while maintaining compliance with all

applicable regulations. Five planning zones have been identified to define the capital improvements needed to serve future growth: Zones 30, 32, 34, 36 and 39. With the exception of drainage Zone 39, all drainage zones are located in the SSJID service area. The Project site is located in Zone 30 and is currently served by the SSJID.

The proposed stormwater collection system functions through storm drainage collection, treatment, detention, and discharge. The exact sizing of the underground piping and basin will be engineered during the preparation of the improvement plans. The project proposes an on-site drainage system to collect the developed condition runoff in a combination of underground pipes and surface vegetated swales and then discharge the runoff into the four proposed dual use detention ponds. The dual use detention ponds have been designed with surface areas and volumes in compliance with City 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. The collected runoff will be treated prior to discharge. The proposed storm drainage collection and detention system will be subject to the State Water Resources Control Board Requirements (SWRCB) and City of Manteca regulations, including: Manteca Storm Drain Master Plan, 2013; Phase II, National Pollutant Discharge Elimination System (NPDES) Permit Requirements; NPDES-MS4 Permit Requirements; and LID Guidelines.

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 San Joaquin Irrigation District (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.

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. The proposed detention basins are joint-use facilities providing recreation and other uses when not being used for stormwater detention.

With the design and construction of flood control improvements included in the proposed storm drainage system, the proposed Project would have a **less than significant** impact relative to this topic.

Impact 3.9-5 The proposed Project has the potential to otherwise substantially degrade water quality. (Less than Significant)

Water Quality Impacts from Discharges to 303(d) Listed Water Bodies: Section 303(d) of the federal Clean Water Act (CWA) requires States to identify waters that do not meet water quality standards or objectives and thus, are considered "impaired." Once listed, Section 303(d) mandates prioritization and development of a Total Maximum Daily Load (TMDL). The TMDL is a tool that establishes the allowable loadings or other quantifiable parameters for a waterbody and thereby the basis for the States to establish water quality-based controls. The purpose of TMDLs is to ensure that beneficial uses are restored and that water quality objectives are achieved.

According to the California Water Quality Control Monitoring Council, which is part of California Environmental Protection Agency, Natural Resources, there are many areas within the San Joaquin County which are considered Section 303(d) impaired waterbodies. Those areas in the regional vicinity of the Project site that are impaired are referred as Delta Waterways (Southern Portion) by the Water Quality Control Monitoring Council. This includes 3,125 acres listed as early as 1996 for Chlorpyrifos (Agriculture, Urban Runoff/Storm Sewers), DDT (Agriculture), Diazinon (Agriculture, Urban Runoff/Storm Sewers), Electrical Conductivity (Agriculture), Group A Pesticides (Agriculture), Invasive Species (Source Unknown), Mercury (Resource Extraction), and Unknown Toxicity (Source Unknown).

The San Joaquin River is specifically listed by the Central Valley Regional Water Quality Control Board (CVRWQCB) as an impaired water body due to mercury under the Clean Water Act. Mercury is a sediment-based pollutant that can be released into the water column during various in-water construction activities (e.g., construction of the storm drain outfall) that may disturb the sediment and cause turbidity. As a result, such activities may increase the likelihood of mercury exposure to the public and wildlife that utilize the San Joaquin River.

In accordance with the NPDES Stormwater Program, Mitigation Measure 3.6-1 contained in Section 3.6 Geology and Soils requires an approved SWPPP designed to control erosion and the loss of topsoil to the extent practicable using BMPs that the RWQCB has deemed effective in controlling erosion, sedimentation, runoff during construction activities. Such BMPs may 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. The BMPs and overall SWPPP is reviewed by the RWQCB as part of the permitting process. The SWPPP, once approved, is kept on site and implemented during construction activities and must be made available upon request to representatives of the RWQCB and/or the lead agency. The RWQCB has stated that these erosion control measures are only examples of what should be considered and should not preclude new or innovative approaches currently available or being developed. The specific controls are subject to the review and approval by the RWQCB.

The ongoing operational phase of the proposed Project (all phases) requires discharge of stormwater into the on-site detention basins, which would ultimately flow into SSJID system and exit into the Delta. The discharge of stormwater must be treated through BMPs prior to its discharge. Mitigation Measures contained above would ensure that BMPs are implemented to reduce the amount of pollution in stormwater discharged from the Project site into the on-site detention basins, which would ultimately flow into the Delta during the operational phase of the project. 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 BMPs 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 violate water quality standards.

The use of BMPs are intended to treat runoff close to the source during the construction and long term operational phase of the Project to reduce stormwater quality impacts. The mitigation measures listed below are existing regulatory requirements. Implementation of proposed Project would have a **less than significant** impact relative to this topic.

MITIGATION MEASURE(S)

Implement **Mitigation Measure 3.6-1** (from Section 3.6 Geology and Soils) and **Mitigation Measures 3.9-1 and 3.9-2** (from Section 3.9 Hydrology and Water Quality).

Impact 3.9-6 Place housing or structures that would impede/redirect flows within a 100-year, or 200-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map. (No Impact)

As shown on Figure 3.9-2, the Project site is not within a 100-year flood zone as delineated by FEMA, the 200-year flood zone, or the 500-year flood zone. The project site is located in an area that is designated to have minimal flooding hazard. Since the Project site does not fall within a 100-year, 200-year, or 500-year floodplain there is little to no risk of flooding to the Project site. The flood zone designation of the site is also not due to a reduced risk from a levee nor is it located within a regulatory floodway. The greatest risk of flooding on the Project site is limited to local drainage which is addressed in Impact 3.9-2 and 3.9-4 respectively. Since the Project site does not fall within a flood hazard zone this project would have **no impact** related to placing structures within a flood hazard zone.

Impact 3.9-7 The proposed Project has the potential to expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam, seiche, tsunami, or mudflow. (Less than Significant)

A tsunami is a sea wave caused by a submarine earthquake, landslide, or volcanic eruption. A tsunami can cause catastrophic damage to shallow or exposed shorelines. The Project site is approximately 50 miles from San Francisco Bay and 70 miles from the coast, which is sufficiently distant to preclude effects from a tsunami.

Seiches are changes or oscillations of water levels within a confined water body. Seiches are caused by fluctuation in the atmosphere, tidal currents or earthquakes. The effect of this phenomenon is a standing wave that would occur when influences by the external causes. The Project site is not adjacent to any lakes that pose a significant risk from a seiche event.

A mudflow is a type of mass wasting or landslide, where earth and surface materials are rapidly transported downhill under the force of gravity. Mudflow events are caused by a combination of factors, including soil type, soil profile, precipitation, and slope. Mudflow may be triggered by heavy rainfall that the soil is not able to sufficiently drain or absorb. As a result of this super-saturation, soil and rock materials become unstable and eventually slide away from their existing location. Soils

most susceptible to mudflow are saturated, loose, non-plastic, uniformly graded, and fine-grained sand deposits. The Project site is relatively flat making the potential of mudflows low.

The Project site is subject to flood inundation as a result of dam failure. Figure 3.9-3 shows areas that are susceptible to dam inundation. 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. As discussed previously, 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, 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.

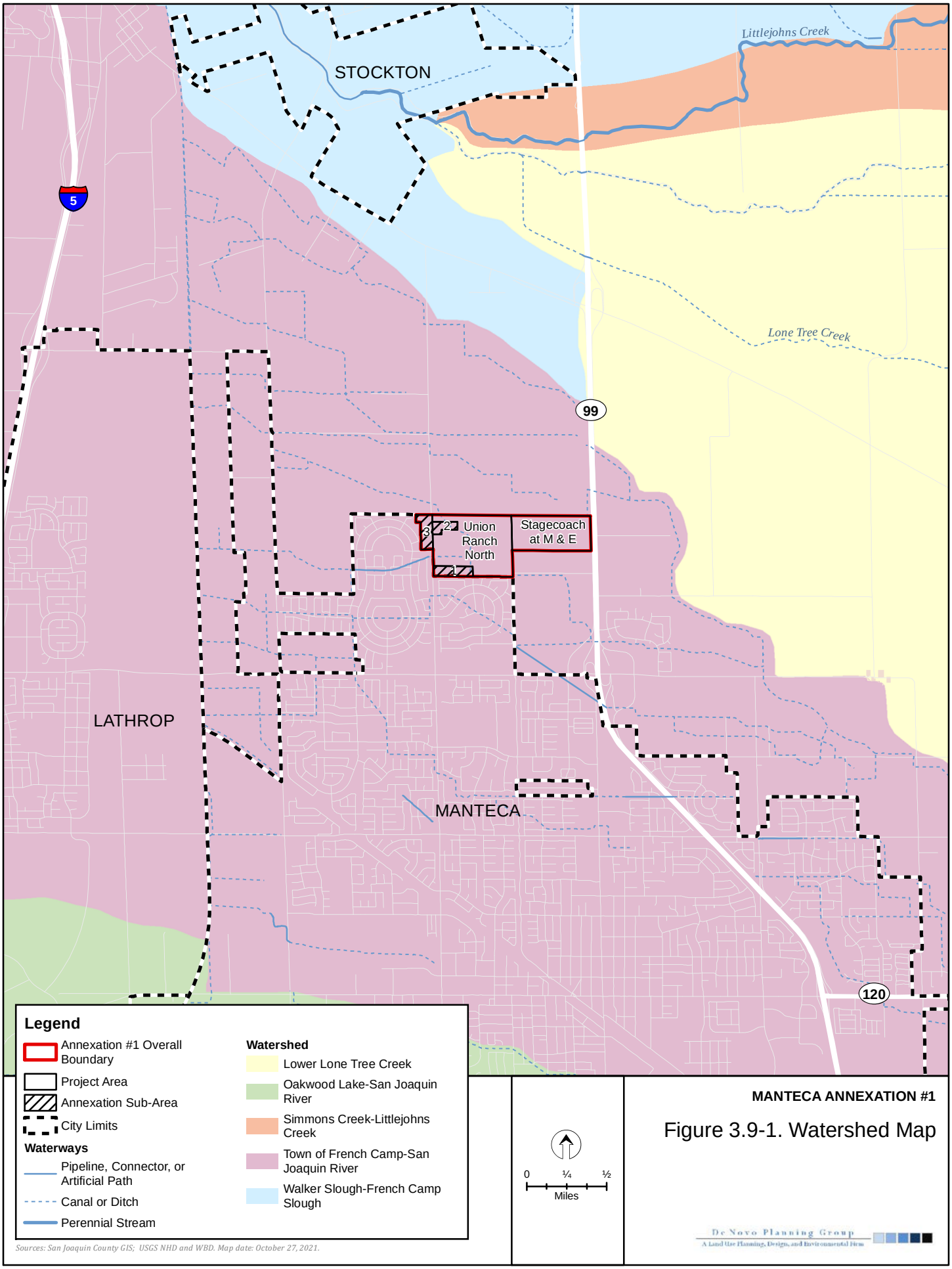
Regular inspection by DSD and maintenance by the dam owners ensure that the dams are kept in safe operating conditions. As such, failure of these dams is considered to have an extremely low probability of occurring and is not considered to be a reasonably foreseeable event.

The Project site is subject to flood inundation as a result of levee failure. The levees protected the project site are maintained by Reclamation District 0017 (RD 17). The RD 17 levee system was originally constructed in the 1960s and substantially upgraded in 1988. In 1990 the RD 17 levee was accredited by FEMA, which removed large areas of Stockton, Lathrop, Manteca and the County from the 100-year floodplain.

Following the accreditation in 1990, standards for flood protection have been changing and in May 2007 FEMA extended an offer of a Provisionally Accredited Levee (PAL) Agreement for the RD 17 levee system. A PAL is a levee that meets the FEMA requirements for flood protection but requires additional supporting documentation. Since August 2007, RD 17 has been implementing improvements to the levee system and constructed a seepage berm (a bank of earth placed against the existing levee) along the east levee of the San Joaquin River with the RD 17 area. The purpose of these improvements is to meet the flood protection requirements of FEMA and maintain the levee accreditation. FEMA has determined based on the current condition of the levee and the additional supporting documentation, that the RD 17 levee will maintain its accreditation. Regular inspection and maintenance by RD 17 further ensures that the levees are kept in safe operating conditions. As such, failure of the levee is considered to have an extremely low probability of occurring and is not considered to be a reasonably foreseeable event.

The proposed Project is not anticipated to result in the exposure of people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam, seiche, tsunami, or mudflow. This impact is considered **less than significant**.

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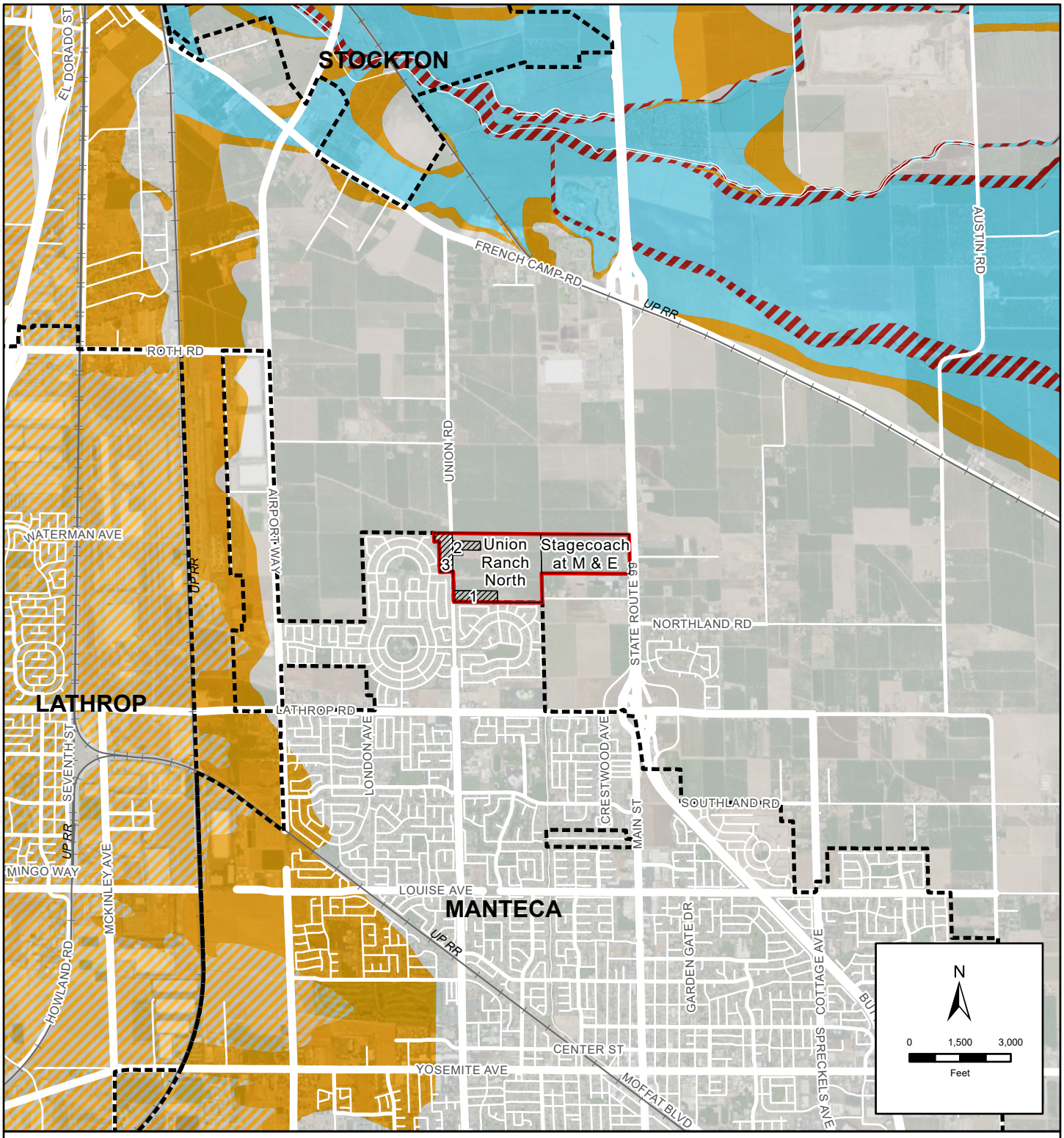
Sources: San Joaquin County GIS; USGS NHD and WBD. Map date: October 27, 2021.

MANTECA ANNEXATION #1

Figure 3.9-1. Watershed Map

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LEGEND

- Annexation #1 Overall Project Boundary
- Project Area
- Annexation Sub-Area
- City Limits

FEMA Designation

- 500-Year Flood Zone
- Area of Minimal Flood Hazard
- Area with Reduced Flood Risk due to Levee
- Regulatory Floodway
- 100-Year Flood Zone

MANTECA ANNEXATION #1

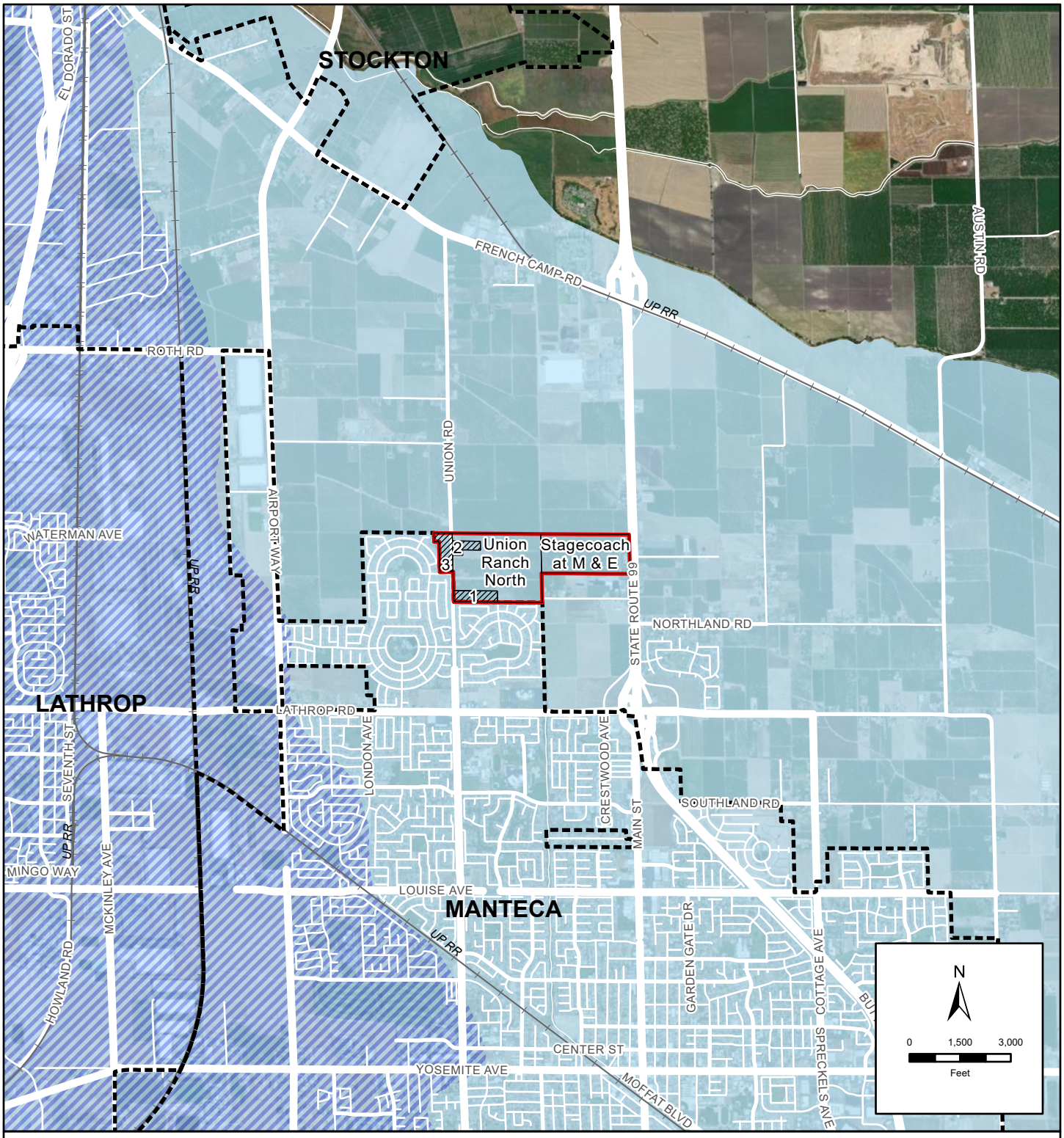
Figure 3.9-2: FEMA Flood Zone Designations

Sources: San Joaquin County GIS; FEMA. Map date: October 23, 2021.

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LEGEND

- Annexation #1 Overall Project Boundary
- Project Area
- Annexation Sub-Area
- City Limits
- San Luis Dam Inundation
- New Melones Dam Inundation

MANTECA ANNEXATION #1

Figure 3.9-3: Dam Inundation Areas

Sources: San Joaquin County GIS; FEMA; DWR. Map date: October 23, 2021.

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This section describes the existing land uses on the Project site and in the surrounding area, describes the applicable land use regulations, and evaluates the environmental effects of implementation of the proposed Project related to land use, population, and housing. Information in this section is based on information provided in the proposed Project materials, site surveys conducted by De Novo Planning Group in 2022 and the following reference documents:

- *City of Manteca General Plan 2023 (City of Manteca as amended through 2016);*
- *Manteca General Plan 2023 Draft Environmental Impact Report (City of Manteca, 2003);*
- *City of Manteca Municipal Code, Title 17 - Zoning (City of Manteca, 2011);*
- *San Joaquin County General Plan (County of San Joaquin, 1992);*

Comments were received during the public review period or scoping meetings for the Notice of Preparation regarding this topic from neighboring landowners, Brian Bergerson and Larissa Founts-Bergerson. Each of the comments related to this topic are addressed within this section. Full comments received are included in Appendix A.

3.10.1 ENVIRONMENTAL SETTING

EXISTING PHYSICAL ENVIRONMENT

The City of Manteca is located in southern San Joaquin County, approximately 15 miles from Stockton and Tracy and 18 miles from Modesto. State Route 99 travels through Manteca near the eastern edge of the city and State Route 120 travels through the city near the southern edge of the city. Manteca occupies an area of just under 16 square miles.

Project Site

The project site is directly north of the City of Manteca's limit line adjacent to the Union Ranch development. The Project site is immediately west of State Route 99 (SR 99) and east of the Union Ranch Specific Plan Area. The Project site is bounded on the north by farmland, on the east by SR 99, on the south by existing residences and agricultural fields, and on the west by Union Road and the Union Ranch Specific Plan. The Project site encompasses 201.81 acres, including the 106.04-acre Union Ranch North Development Area and the 69.93-acre Stagecoach at M&E Development Area. An additional 27.14-acres of Non-Development Area consisting of ten parcels is also included in North Manteca Annexation #1.

The current use within the Development Area is agricultural. Additionally, two dirt/gravel roadways bisect the Development Area, including one roadway running north to south down the center of the Development Area from East Brunswick Road to the northern boundary and another running east to west from North Union Road connecting to the dirt/gravel roadway in the center of the Development Area. A South San Joaquin Irrigation District (SSJID) pipeline exists within the Development Area.

The Non-development Area is located north and east of the City of Manteca city limits and lie along North Union Road. The Non-development Area contains 10 parcels each developed with a single-

family residence. Six of the existing residential homes (Annexation Subarea #3) are located just west of the Development Area and North Union Road in the northwest corner of the Project site while the Annexation Subareas #1 and #2 are location east of North Union Road along the northwest and southwest portions of the Project Site.

Figure 2.0-5 shows aerial imagery of the existing site uses within the Project site.

Surrounding Land Uses

The Project site is surrounded by a variety of agricultural and residential land uses. Uses immediately adjacent to the north of the Project site include agricultural uses. Uses immediately to the south and southwest of the Project site include residential uses and an agribusiness. Uses to the south and east of the Project site include agricultural and residential uses, including ranchettes and large estates lots (to the south and east) and a residential subdivision (to the east).

DEMOGRAPHICS

Population Trends

The City experienced a population increase from 2000 to 2010 of 17,841 persons (36.2%) as shown in Table 3.10-1. During the period from 2010 to 2020, population continued to increase in the City, resulting in a total population of 84,800 in 2020.

TABLE 3.10-1: POPULATION GROWTH

YEAR	POPULATION	CHANGE	PERCENT CHANGE
2000	49,255	--	--
2010	67,096	17,841	36.2%
2020	84,800	17,704	26.4%

SOURCES: US ACS CENSUS 2000, 2010, AND 2015; DOF, 2020.

Housing Stock

Table 3.10-2 summarizes the growth of the City's housing stock between 2000 and 2020. The number of housing units increased from 16,936 in 2000 to 23,132 in 2010. This represents 36.6 percent growth in the City's housing stock. The City's housing stock totaled 27,667 units in 2020.

TABLE 3.10-2: HOUSING UNIT GROWTH

YEAR	HOUSING UNITS	CHANGE	PERCENT CHANGE
2000	16,936	--	--
2010	23,132	6,196	36.6%
2020	27,667	4,535	19.6%

SOURCES: US ACS CENSUS 2000, 2010, AND 2015; DOF, 2020.

Persons Per Dwelling Unit

According to the most recent U.S. Census (2019) and Department of Finance (2020) estimates, the average number of persons residing in a dwelling unit in the City of Manteca is 3.18.

3.10.2 REGULATORY SETTING

STATE

Government Code

California Government Code Section 65300 et seq. establishes the obligation of cities and counties to adopt and implement general plans. The general plan is a comprehensive, long-term, and general document that describes plans for the physical development of a jurisdiction and of any land outside its boundaries that, in the jurisdiction's judgment, bears relation to its planning. The general plan addresses a broad range of topics, including, at a minimum, land use, circulation, housing, conservation, open space, noise, and safety. In addressing these topics, the general plan identifies the goals, objectives, policies, principles, standards, and plan proposals that support the jurisdiction's vision for the area. The general plan is a long-range document that typically addresses the physical character of an area over a 20-year period. Although the general plan serves as a blueprint for future development and identifies the overall vision for the planning area, it remains general enough to allow for flexibility in the approach taken to achieve the plan's goals.

The State Zoning Law (California Government Code Section 65800 et seq.) establishes that zoning ordinances, which are laws that define allowable land uses within a specific district, are required to be consistent with the general plan and any applicable specific plans. When amendments to the general plan are made, corresponding changes in the zoning ordinance may be required within a reasonable time to ensure the land uses designated in the general plan would also be allowable by the zoning ordinance (Government Code, Section 65860, subd. [c]).

LOCAL

City of Manteca General Plan

As noted above, General Plans are prepared under a mandate from the State of California, which requires each city and county to prepare and adopt a comprehensive, long-term general plan for its jurisdiction and any adjacent related lands. State law requires General Plans to address seven mandated components: circulation, conservation, housing, land use, noise, open space, and safety. In addition to those components required by State law, the Manteca GP also contains optional elements, including Community Design, Economic Development, Public Facilities and Services, and Air Quality.

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. The following will provide an overview of the structure of both the 2023 General Plan and General Plan Update, as well as discuss the respective General Plan Land Use Map and policies relevant to land use and population.

2023 GENERAL PLAN

The Manteca 2023 General Plan includes an introduction, a description of the City's land use planning framework, and 11 separate chapters that establish goals, policies, and actions for each

given set of topics. The chapters cover all of the topics required by California State Government Code Section 65302 as well as topics of particular interest to Manteca. The General Plan structure is summarized as follows:

- **General Plan Context and Vision:** Describes the required elements of the General Plan and its planning context, and provides an overview of the Plan's organization and key land use issues and development concepts.
- **Land Use Element:** establishes land use designations with types and intensities of use and sets policies and programs regarding future development of the City.
- **Community Design Element:** establishes urban design guidelines to ensure that new development is attractive and contributes to the sense of Manteca as a location.
- **Circulation Element:** contains policies for the City's roadway system, transit, pedestrian and bicycle circulation, and methods of managing transportation demand, accounting for the relationship between land use and circulation.
- **Economic Development Element:** addresses the need for Manteca to broaden its employment base to maintain the high quality of life currently enjoyed and implementing an economic development strategy.
- **Public Facilities and Services Element:** discusses public facilities including domestic water, sewer, storm drainage, electricity services, solid waste, education, police protection, fire protection, and parks and recreation.
- **Safety Element:** contains policies and programs to protect the community from injury, loss of life, and property damage resulting from natural disasters and hazardous conditions.
- **Resource Conservation Element:** emphasizes the accommodation of population growth while conserving and protecting the area's natural resources and quality of life.
- **Noise Element:** identifies policies that will protect the community from noise hazards.
- **Air Quality Element:** addresses the community's need to cooperate regionally so that increased development does not further degrade the air quality.
- **Administration and Implementation Element:** provides a tool to City staff and elected officials to administer and implement the General Plan. This Element is the framework for review of individual actions and programs (implementation measures) and review of the comprehensive General Plan.
- **Housing Element:** includes policies and programs to increase the variety and types of housing in the City, emphasizing infill sites, increased density, and mixed uses downtown,

and also includes a discussion of housing needs and programs to provide additional housing for special needs populations.

2023 General Plan Land Use Map

The General Plan Land Use Map portrays the ultimate uses of land in the City of Manteca through land use designations. The Land Use Map designates the Project site as Agriculture and Ver Low Density Residential. Figure 2.0-6a in Chapter 2.0 depicts the Manteca General Plan land use designations for the Project site and the surrounding areas.

VLDR (Low Density Residential): The VLDR land use category will provide for residences on larger lots and small, quasi-agricultural activities, including raising and boarding livestock. Residential units shall be permitted to deviate from standard lot dimensions within agricultural areas in order to cluster dwellings together and thereby allow for continued agricultural use. The agricultural use areas that remain on the residential parcel shall be subject to an easement dedicated to the City that allow continued agricultural use, but prohibits any further non-agricultural related development.

AG (Agriculture): This designation provides for agricultural uses (such as vineyards, orchards, and row crops), single family homes directly related to the agricultural use of the property, limited industrial uses directly related to agriculture, and similar and compatible uses.

2023 General Plan Policies

The following policies of the 2023 General Plan related to land use and population are applicable to the proposed Project:

- LU-P-1. Growth shall mitigate its own impacts and shall provide a positive benefit to the City of Manteca.
- LU-P-2. Growth must contribute to a strong diversified economic base and an effective balance between employment and housing opportunities for all income levels.
- LU-P-3. The City shall encourage a pattern of development that promotes the efficient and timely development of public services and facilities.
- LU-P-4. The City shall encourage a development pattern that is contiguous with the boundary of the City.
- LU-P-14. The City shall promote the development of a variety of housing types and prices to meet the needs of all households, including very low-, low-, and moderate-income households.
- LU-P-16. The City shall promote the preservation and integrity of existing stable residential neighborhoods.
- LU-P-17. The City shall encourage neighborhood revitalization and improvement including replacement, renovation or conversion to alternative use of buildings in serious disrepair.

LU-P-18. The City shall seek funding to undertake neighborhood improvement programs designed to stabilize and enhance the quality of existing neighborhoods. Such improvements may include, but are not limited to sidewalk upgrade and repair, street tree programs, street lighting, signage, trash collectors, bus stop shelters and benches and similar improvements to the public areas.

GENERAL PLAN UPDATE

The proposed General Plan Update will include a comprehensive set of goals, policies, and actions (implementation measures), as well as a revised Land Use Map. The State requires that the General Plan contain seven mandatory elements: Land Use, Circulation, Housing, Open Space, Noise, Safety, and Conservation, as well as address issues related to climate adaptation and resiliency planning and environmental justice, either as separate Elements or as components of the required Element framework. The Plan includes all of the State-mandated elements, including Land Use (addresses Environmental Justice), Circulation, Resource Conservation (combines Open Space, Conservation, and Air Quality topics), and Safety (also addresses Climate Adaptation and Noise) as well as optional elements, including Growth Management, Community Design, Economic Development, and Community Facilities and Services. It is noted that the Housing Element was adopted in 2016 and is not anticipated to be significantly revised by the General Plan Update. The General Plan structure is summarized as follows:

- **Land Use Element:** The Land Use element ensures that Manteca has sufficient capacity to support a diverse mix of land uses essential to the community's ability to thrive and be sustainable over time. The goals, policies, and measures in this element address the proposed general distribution and general location and extent of the uses of the land for housing, business, industry, education, public buildings and grounds, waste disposal, and open space, including agriculture, natural resources, recreation, scenic areas, and greenways.

- **Growth Management Element:** This element provides a framework for pacing growth in the context of ensuring a high-quality life for the community's residents and on-going provision of community services and infrastructure that meet the community's existing needs as well as increasing capacity necessary to accommodate growth.

- **Circulation Element:** This element correlates closely with the Land Use Element and identifies the general locations and extent of existing and proposed major thoroughfares, transportation routes, terminals, military airports and ports, and other public utilities and facilities necessary to support a multi-modal transportation system. This element provides the framework for decisions concerning the City's multi-modal transportation system, which includes automobile, truck, transit, bicycle, and pedestrian modes of travel.

- **Economic Development Element:** This element addresses providing appropriate and adequate sites and programs to support existing businesses as well as to encourage diverse economic growth, efforts to ensure that the City's labor force is skilled and provided a broad

range of employment opportunities, ensuring that the City's housing and quality of life are of a caliber to attract employers, ensure that infrastructure is in place or planned to support a successful commercial and industrial base, including telecommunications and emerging technologies, and providing a sustainable fiscal base for the City.

- **Community Facilities and Services Element:** This element includes goals, policies, and actions that seek to ensure that community facilities and services are provided, maintained, and expanded, so that Manteca can continue to grow and thrive. This element addresses General Service, Police, Fire, Parks and Recreation, Education, Domestic Water, Sewer, Major Drainage, Telecommunications, Electricity and Natural Gas, and Solid Waste.

- **Resource Conservation Element:** This element establishes Manteca's approach to the conservation and enhancement of Manteca's natural resources: water, land/soils, open space, and ecosystem, approach to addressing air quality, energy conservation, and climate adaptation, conservation of agricultural and mineral resources, and preservation of the City's cultural and historic heritage.

- **Safety Element:** This element addresses emergency preparedness and critical facilities, geologic and seismic hazards, flood hazards, hazardous materials, and noise.

- **Implementation Element:** This element addresses the administration and implementation of the General Plan, including and Implementation Plan that prioritizes and tracks the actions identified in the General Plan.

- **Housing Element:** (add the housing element description from the previous GP)

General Plan Update Land Use Map (Proposed)

The General Plan Update Land Use Map portrays the ultimate uses of land in the City of Manteca through land use designations. The Land Use Map designates the Project site as Low Density Residential, Commercial Mixed Use, Commercial, and Park. Figure 2.0-6b in Chapter 2.0 depicts the Manteca General Plan Update land use designations for the Project site and the surrounding areas.

LDR (Low Density Residential): This designation provides for a mix of single-family housing, including small lots, clustered lots, attached homes, and conventional large lot detached residences. Density ranges from 2.1 to 8 dwelling units per acre.

C (Commercial): This designation provides for neighborhood, community, and regional-serving retail and service uses; offices; restaurants; service stations; highway-oriented and visitor commercial and lodging; auto-serving and heavy commercial uses; wholesale; warehousing; public and quasi-public uses; commercial recreation and public gathering facilities, such as amphitheaters or public gardens; and similar and compatible uses. Uses that are incompatible with residential uses due to noise, vibration, or other characteristics are not permitted in locations that may impact existing or future residential development.

P (Park): This designation provides for neighborhood, community and regional parks, golf courses, and other outdoor recreational facilities within urban development. Specific uses include public recreation sites, including ball fields, tot lots and play apparatus, adult softball and soccer playing fields, swimming pools, community center buildings, meeting facilities, libraries, art centers, after school care facilities, art in public places, facilities for night-time recreation, trails benches, interpretive markers, picnic areas, barbecue facilities, landscaping, irrigation, city wells, trees and natural habitat areas.

General Plan Update Policies

The following policies of the General Plan Update related to land use and population are applicable to the proposed Project:

Policies: Land Use Element

- LU-3.1 Provide for the development of a variety of housing types and at a range of prices to meet the needs of all segments of the city's population, including individuals and families who qualify for affordable housing assistance in accordance with the housing element.

- LU-3.2. Require the design of new residential development to be consistent with any applicable design guidelines, to ensure harmony with Manteca's unique character and compatibility with existing surrounding land uses.

- LU-3.3. Encourage residential development to occur in a balanced and efficient pattern that reduces sprawl, preserves open space, and creates convenient connections to other land uses.

- LU-3.4. Prioritize the location of higher density housing in close proximity to employment areas, services, schools, retail, transit stops, near community destinations, and near major streets with high access to transit and non-vehicle transportation modes.

- LU-3.6. Encourage new neighborhoods to include a mix and distribution of land uses, including schools, parks, shopping, restaurants, and services, that reduce auto trips and support walking, biking, and transit use.

- LU-3.10. Encourage the development of additional executive housing units and neighborhoods.

- LU-3.12. Encourage and support development patterns at the highest limits permitted within each General Plan land use designation consistent with the policies of all other General Plan elements.

General Plan Update Implementation Programs

The following implementation measures of the General Plan Update related to land use and population are applicable to the proposed Project:

- LU-3a. Through the development review and permit process, screen development proposals for land use compatibility, including conformance with existing development or neighborhoods.

- LU-3b. Through the development review and permit process, ensure that residential developments meet the minimum density requirement stipulated on the Land Use Map in order to ensure that Manteca has an ample number of housing units to meet all of its housing needs.

- LU-3d. Require proposed residential subdivisions of 10 or more units with an average lot size less than one acre that are within 500 feet of an existing industrial, commercial, agricultural industrial, or agricultural processing use or a designated truck route to submit a Site Analysis Plan to ensure compliance with standards of Chapter 17.58 of the Zoning Code, as amended.

    - The Site Analysis Plan will quantify existing conditions of the site relative to compliance with Chapter 17.58 of the Zoning Code as amended, and how new development will meet these standards. The Site Analysis Plan shall incorporate a written narrative explaining how the project design has responded to the existing conditions and how new development will ensure that new residents will have an environment that is in compliance with the standards of Chapter 17.58, as amended. Such a statement, to form part of the material required for an application, is intended to assist the City's design and evaluation processes, and result in residential projects that meet quantifiable performance standards.

- LU-3e. Develop and periodically update design and performance standards that update and complement Chapter 17.58 of the Zoning Code to provide recommended design solutions available to proposed development projects to reduce impacts associated with aesthetics, noise, safety, odor, glare, and lighting, including land use conflicts between residential uses and nearby industrial and agricultural uses, in compliance with Chapter 17.58 of the Zoning Ordinance, as amended.

- LU-3f. Implement the policies and actions in the Housing Element in order to enhance opportunities to provide affordable housing within the community and to accommodate a range of household types, special need populations, and income levels.

- LU-3g. Explore and encourage creative approaches to providing affordable housing, including market rate housing affordable to moderate income households, within the community. Such approaches may include public/private partnerships, land trusts, housing cooperatives, co-housing, and/or inclusionary housing.

- LU-3h. Continue to fund existing and provide assistance to additional neighborhood improvement programs designed to stabilize and enhance the quality of existing neighborhoods. Such improvements may include, but are not limited to sidewalk upgrade and repair, street tree programs, street lighting, signage, trash collectors, bus stop shelters and benches and similar improvements to the public areas.

- LU-3k. Upgrade and provide infrastructure in existing neighborhoods as funding is available.

- LU-3o. Evaluate, in cooperation with the Building Industry Association, fiscal alternatives that will encourage development at the highest levels permitted by general plan land use designations such as Public Facilities Implementation Plan fees collected at the per acre basis compared to the per dwelling unit basis.

Municipal Code, Title 17 - Zoning

The purpose of Title 17, Zoning, of the City's Municipal Code is to protect and promote public health, safety, peace, comfort, convenience, prosperity, and general welfare and to regulate land use and development in accordance with the Manteca GP.

ZONING MAP

The Zoning Map identifies zoning districts within the City at the parcel level. The Zoning Map does not designate the Project site because the site is not located within the City limits.

San Joaquin County General Plan

As noted above, state law requires General Plans to address seven mandated components: circulation, conservation, housing, land use, noise, open space, and safety.

The San Joaquin County General Plan is comprehensive, long-range, and general. The San Joaquin County General Plan has the following purposes:

- To identify the community's land use, transportation, environmental, economic and social goals and policies as they relate to land use, conservation and development;
- To enable the County Board of Supervisors and the Planning Commission to establish long-range conservation and development policies;
- To provide a basis for judging whether specific private development proposals and public projects are in harmony with these policies; and
- To inform citizens, developers, decision makers, and other jurisdictions of the policies that will guide development and conservation within the County.

GENERAL PLAN LAND USE MAP (2010)

The San Joaquin County General Plan Land Use Map portrays the ultimate uses of land in the County through land use designations. The Land Use Map designates the Project site as General Agriculture (A/G). Figure 2.0-7 in Chapter 2.0, Project Description, identifies the land use designations depicts the San Joaquin County General Plan Land Use Map for the Project site and the surrounding areas Below is a general description of County Designated land uses within the Project site.

General Agriculture (A/G): This designation applies to areas suitable for agriculture outside areas planned for urban development where the soils are capable of producing a wide variety of crops and/or supporting grazing; parcel sizes are generally large enough to support commercial agricultural activities; and there exists a commitment to commercial agriculture in the form of Williamson Act contracts and/or capital investments.

Typical uses include crop production, feed and grain storage and sales, crop spraying, and animal raising and sales. The density is a maximum of one primary residence per 20 acres.

San Joaquin County Municipal Code, Title 9 – Development Title

The purpose of Title 19, Development Title, of the County's Municipal Code is to replace the Planning Title and contain information on zones, development application requirements, and standards and regulations relating to such issues as infrastructure, natural resources, safety, and signs.

ZONING MAP

The Zoning Map identifies zoning districts within the County at the parcel level. The Zoning Map designates the Project site as General Agriculture (AG-40). Figure 2.0-7 in Chapter 2.0, Project Description, identifies the San Joaquin County Zoning Map for the Project site and the surrounding areas. Below is a general description of County zoning within the Project site.

AG Zone (General Agriculture): This zone is established to preserve agricultural lands for the continuation of commercial agriculture enterprises. Minimum parcel sizes within the AG Zone are 20, 40, 80 or 160 acres, as specified by the precise zoning.

San Joaquin Local Agency Formation Commission (LAFCo)

The San Joaquin LAFCo is responsible for coordinating orderly reorganization to local jurisdictional boundaries, including annexations. Annexation of the Plan Area to the City of Manteca is subject to LAFCo approval, and LAFCo will review the proposed annexation for consistency with LAFCo's Annexation Policies and Procedures. An annexation can only be approved if the applicable Municipal Services Review (MSR) and Plan for Services demonstrate that adequate services can be provided to the annexed area. An MSR, produced as part of a LAFCo's regular review of municipal services, consists of a written statement of its determinations regarding infrastructure, growth and population projections, financing, cost avoidance, rate restructuring, shared facilities, government structure options, management efficiency, and local accountability and governance. An annexation proposal must include a Plan for Services consistent with the applicable MSR and must demonstrate that the City is capable of providing the required services. The City must pre-zone the lands to be annexed and subsequent changes to the General Plan land use designation and zoning are prohibited for two years.

San Joaquin LAFCo has adopted Policies and Procedures for Annexation and Detachment to and from all agencies within their jurisdiction. LAFCo has also adopted Procedures for the California Environmental Quality Act in accordance with the California Code of Regulations (Chapter 3, Title 14 Section 15022), which requires that each public agency adopt objectives, criteria, and specific procedures for administering its responsibilities under CEQA. Below is a brief discussion of San Joaquin LAFCo Policies and Procedures.

LAFCO CHANGE OF ORGANIZATION POLICIES AND PROCEDURES (INCLUDING ANNEXATIONS AND REORGANIZATIONS) (AS AMENDED 12/14/12)

General Standards for Annexation and Detachment

These standards govern San Joaquin LAFCo determinations regarding annexations and detachments to and from all agencies. The annexations or detachments must be consistent with the general policies set forth in these Policies and Procedures.

1. Spheres and Municipal Service Reviews

   The annexation or detachment must be consistent with the internal planning horizon of the sphere of influence. The land subject to annexation shall normally lie within the first planning increment (5 to 10 year) boundary. The annexation must also consider the applicable Municipal Service Review. An annexation shall be approved only if the Municipal Services Review and the Sphere of Influence Plan demonstrates that adequate services can be provided with the timeframe needed by the inhabitants of the annexed area. If detachment occurs, the sphere will be modified. LAFCo generally will not allow spheres of influence to be amended concurrently with annexation proposals.

   Proposed annexations of land that lie outside of the first planning horizon (5 to 10 year) are presumed to be inconsistent with the Sphere Plan. In such a case the agency must first request LAFCo to consider a sphere amendment pursuant to the above policies. If the amendment is approved, the agency may then proceed with the annexation proposal. A change of organization or reorganization will not be approved solely because an area falls within the SOI of any agency.

   As an exception to the presumed inconsistency mentioned above, Master Plan and Specific Plan developments may span several planning horizons of the sphere of influence. Annexation of the entire Project area may be desirable in order to comprehensively plan and finance infrastructure and provide for amenity-based improvements. In these cases, no amendment of the planning horizon is necessary provided Project phasing is recognized in the Sphere of Influence Plan.

2. Plan for Services

   Every proposal must include a Plan for Services that addresses the items identified in Section 56653 of the Government Code. The Plan for Services must be consistent with the Municipal Service Review of the Agency. Proponents must demonstrate that the city or special district is capable of meeting the need for services.

3. Contiguity

   Territory proposed to be annexed to a city must be contiguous to the annexing city or district unless specifically allowed by statute. Territory is not contiguous if the only connection is a strip of land more than 300 feet long and less than 200 wide, that width to be exclusive of highways. The boundaries of a proposed annexation or reorganization must not create or result in areas that are difficult to serve.

4. Development within Jurisdiction

Development of existing vacant or non-prime agricultural lands for urban uses within the existing jurisdiction or within the sphere of influence should be encouraged before any proposal is approved which would allow for or lead to the development of existing open space lands for non-open space uses which are outside of the existing jurisdiction of the local agency or outside of the existing sphere of influence of the local agency. (Section 56377)

5. Progressive Urban Pattern

   Annexations to agencies providing urban services shall be progressive steps toward filling in the territory designated by the affected agency's adopted sphere of influence. Proposed growth shall be from inner toward outer areas.

6. Piecemeal Annexation Prohibited

   LAFCo requires annexations and detachments to be consistent with the schedule for annexation that is contained in the agency's Sphere of Influence Plan. LAFCo will modify small piece-meal or irregular annexations, to include additional territory in order to promote orderly annexation and logical boundaries, while maintaining a viable proposal. In such cases, detailed development plans may not be required for those additional areas but compliance with CEQA is required.

7. Annexations to Eliminate Islands

   Proposals to annex islands or to otherwise correct illogical distortion of boundaries will normally be approved unless they would violate another provision of these standards. In order to avoid the creation of an island or to encourage the elimination an existing island, detailed development plans may not be required for the remnant areas.

8. Annexations that Create Islands

   An annexation will not be approved if it will result in the creation of an island of unincorporated territory or otherwise cause or further the distortion of existing boundaries. The Commission may nevertheless approve such an annexation where it finds that the application of this policy would be detrimental to the orderly development of the community and that a reasonable effort has been made to include the island in the annexation but that inclusion is not feasible at this time.

9. Substantially Surrounded

   For the purpose of applying the provisions of the Cortese-Knox-Hertzberg Act regarding island annexation without protest hearings (Section 56375.5), the subject territory of an annexation proposal shall be deemed "substantially surrounded" if it is within the sphere of influence of the affected city and two-thirds of its boundary is surrounded by the affected city.

10. Definite and Certain Boundaries

All boundaries shall be definite and certain and conform to lines of assessment or ownership. The Commission's approval of boundary change proposals containing split parcels will typically be subject to a condition requiring the recordation of a parcel map, lot line adjustment or other instrument to avoid creating remnants of legal lots.

11. Service Requirements

    An annexation shall not be approved merely to facilitate the delivery of one or a few services to the determent of the delivery of a larger number of services or service more basic to public health and welfare.

12. Adverse Impact of Annexation on the Other Agencies

    LAFCo will consider any significant adverse effects upon other service recipients or other agencies serving the area and may condition any approval to mitigate such impacts. Significant adverse effects shall include the effect of proposals that negatively impact special districts' budgets or services or require the continuation of services without the provision of adequate funding. LAFCo will not approve detachments from special districts or annexations that fail to provide adequate mitigation of the adverse impact on the district. LAFCo may determine an appropriate temporary mitigation, if any, and impose that temporary mitigation to the extent it is within its powers. If the needed mitigation is not within LAFCo's authority and approval would, in the opinion of the Commission, seriously impair the District's operation, the Commission may choose to deny the application.

13. District's Proposal to Provide new, different, or Divestiture of a Particular Function or Class of Services

    In addition to the plan for services specified in Section 2 of these Policies and Procedures any application for a new, different, or divestiture of a service shall also include the requirements outlined in Section 56824.12 of the Government Code. Applications for such request will be considered a change of organization and shall follow the requirements of such an application as outlined in the Cortese-Knox-Hertzberg Act and within these policies and procedures. The factors enumerated in Sections 56668 and 56824.14 of the Government Code shall be considered by the Commission at the time of consideration of the application for such functions.

14. Disadvantaged Unincorporated Communities

    Disadvantaged Unincorporated Communities (DUCs) are those territories shown in Exhibit A or as may be shown in a city municipal service review and sphere of influence plan.

    The Commission shall not approve an annexation to a city or any territory greater than 10 acres where there exists a disadvantaged unincorporated community (DUC) that is contiguous to the area of proposed annexation, unless a concurrent application to annex all or a portion of the DUC to the subject city has been filed. An application to annex a DUC shall not be required if either of the following applies:

1. A prior application for annexation of the territory has been made in the preceding five years.

2. The Commission finds, based upon written evidence, that a majority of the registered voters within the DUC are opposed to annexation.

   Written evidence can be a scientific survey conducted by an academic institution or professional polling company.

15. Protest Procedures

    The Commission delegates the conducting authority functions and responsibilities to the LAFCo Executive Officer pursuant to Government Code Section 57000.

City Annexations

1. Annexation of Streets

   Annexations shall reflect the logical allocation of streets and rights of way as follows:

   - Territory should be included within the annexation to assure that the city reasonably assumes the burden of providing adequate roads to the property to be annexed. LAFCo will require cities to annex streets where adjacent lands that are in the city will generate additional traffic or where the annexation will isolate sections of county road. Cities shall include all contiguous public roads that can be included without fragmenting governmental responsibility by alternating city and county road jurisdiction over short section of the same roadway.

   - When a street is a boundary line between two cities the centerline of the street may be used as the boundary or may follow a boundary reached by agreement of the affected cities.

2. Pre-zoning Required

   The Cortese-Knox-Hertzberg Act requires the city to pre-zone territory to be annexed, and prohibits subsequent changes to the General Plan and /or pre-zoning designations for a period of two years after completion of the annexation, unless the city council makes a finding at a public hearing consistent with the provisions of Governments Code Section 56375(e). In instances where LAFCo amends a proposal to include additional territory, the Commission's approval of the annexation will be conditioned upon the pre-zoning of the new territory.

San Joaquin County Multi-Species Habitat Conservation and Open Space Plan (SJMCP)

The San Joaquin County Multi-Species Habitat Conservation and Open Space Plan (SJMSCP) provides comprehensive measures for compensation and avoidance of impacts on various biological resources, including agricultural land. One of the primary goals of the SJMSCP is to preserve

productive agriculture where that goal is compatible with protecting and preserving lands with biological resources and habitat. The SJMSCP is administered by the San Joaquin Council of Governments (SJCOG). The Project applicant will pay fees to SJCOG on a per-acre basis for designated agricultural lands and habitat that are converted to urban use. SJCOG will then use these funds to purchase conservation easements on agricultural and habitat lands in the region. The purchase of conservation easements allows the landowners to retain ownership of the land and continue agricultural operations, essentially preserving such lands in perpetuity. The Project site is designated as Category B/Pay Zone A. This zone consists of "Other Open Spaces", as described in Chapter 2.2 of the SJMSCP.

The City of Manteca is a permit holder and is responsible for local implementation responsibilities including collection of fees, maintenance of implementing ordinances/resolutions and coordinating with the JPA for annual reporting requirements.

3.10.3 IMPACTS AND MITIGATION MEASURES

THRESHOLDS OF SIGNIFICANCE

Consistent with Appendix G of the CEQA Guidelines, the proposed Project will have a significant impact on land use and planning if it will:

- Physically divide an established community;
- 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;
- 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); or
- Displace substantial numbers of existing people or housing, necessitating the construction of replacement housing elsewhere.

IMPACTS AND MITIGATION MEASURES

Impact 3.10-1: The proposed Project would not physically divide an established community. (No Impact)

The Project site is located at the northern edge of the City of Manteca Sphere of Influence (SOI) and is adjacent primarily to undeveloped agricultural land to the north, to low density residential areas and an agribusiness to the east and south, and an existing subdivision to the west. The Project site would result in an extension of developed uses within an area of the city that currently has approved development plans within the vicinity of the Project site. The Project would provide roadways and pedestrian pathways to connect the Project site to the existing circulation system and to allow access to and from the site. Development of the Project site would not result in physical barriers, such as a highway, wall, or other division, that would divide an existing community, but would serve

as an orderly extension of existing and planned development. The proposed Project would have **no impact** in regards to the physical division of an established community.

Impact 3.10-2: The proposed Project would not conflict with an applicable land use plan, policy, or regulation of an agency with jurisdiction over the Project adopted to avoid or mitigate an environmental effect. (Less than Significant)

Land use plans, policies, and regulations that govern the land uses on the Project site and have jurisdiction over the Project include the San Joaquin County General Plan, San Joaquin County Municipal Code, Manteca General Plan, Manteca Municipal Code, the SJCMSCP, and the San Joaquin LAFCo Policies and Procedures Document. Consistency with the SJMPSCP is discussed in Impact 3.10-3.

SAN JOAQUIN COUNTY GENERAL PLAN AND SAN JOAQUIN COUNTY MUNICIPAL CODE

As noted previously, the Project site is currently within San Joaquin County, and within the City of Manteca's Sphere of Influence. The San Joaquin County General Plan and San Joaquin County Municipal Code are the current governing documents for the Project site.

The proposed Project includes an Annexation of eighteen (18) APNs totaling 201.81 acres. This includes the 175.67-acre Development Area (APNs 197-020-02, 197-020-21, 197-020-22, 197-020-23, 197-020-35. 197-020-39, 197-020-41, 197-020-46, 197-020-47), Non-development Subarea 1 (a parcel with a ranchette style development and orchard), Non-development Subarea 2 (an inhabited annexation of 3 parcels on 6.04 acres), and Non-development Subarea 3 (an inhabited annexation of 6 parcels on 11.28 acres. Figure 2.0-5 illustrates the Annexation Area. Upon annexation of the Project site, the San Joaquin County General Plan and San Joaquin County Municipal Code would not apply to the Project.

MANTECA GENERAL PLAN

Since general plans often contain numerous policies emphasizing differing legislative goals, a development project may be "consistent" with a general plan, taken as a whole, even though the project appears to be inconsistent or arguably inconsistent with some individual policies. (Sequoyah Hills Homeowners Association v. City of Oakland (1993) 23 Cal.App.4th 704, 719.) The Project is consistent with the key land use issues and development concepts of the Manteca GP which provide for logical growth of the City, emphasize community form, scale, and identify, encourage attractive, sustainable neighborhoods, support public transit and bicycle and pedestrian circulation, encourage housing opportunity, promote employment and economic development, encourage a mix of land uses that balance public services and fiscal sustainability, and promote access to open space. The Project is located adjacent to the City limits, is located within the City's SOI, and will provide for housing opportunities. The proposed Project is consistent with the General Plan land use policies that encourage an orderly pattern of development that is contiguous with the City boundary, require

growth to contribute to a diversified economic base and balance between employment and housing opportunities, and allowing for recreation uses.

When land uses are not consistent with a General Plan there are two courses of action: 1) the uses are not allowed due to the inconsistency, or 2) the land uses are changed through an amendment to the General Plan to create consistency. The proposed Project would require a General Plan Land Use Amendment to adjust the lands uses to LDR and HDR for the Development Area. In addition, the proposed Project includes a proposed General Plan Land Use Amendment to adjust the land uses in Annexation Subarea 1, 2, and 3 to be consistent with the proposed General Plan Update. Because the Annexation Subareas are not proposed for development, establishment of the land uses under this proposed General Plan Amendment is not necessary, and as an alternative they may be left as currently designated. A public comment received by homeowners located in Annexation Subarea 3 stated that they prefer to maintain the current zoning of General Agriculture (AG-40) as opposed to being rezoned under a General Plan Land Use Amendment. It is noted that the proposed General Plan Update is anticipated to change the land uses in the Annexation SubAreas, although the exact timing of that change is not defined. Figures 2.0-8a and 2.0-8b in Chapter 2.0, Project Description, shows the proposed boundary modification to the General Plan land use designations for the Development and Non-development areas. Approval of the General Plan amendment would ensure that the proposed Project would be substantially consistent with the Manteca GP land use requirements.

Additionally, the proposed Project is generally consistent with the vast majority of the applicable 2023 General Plan policies which aim to avoid or mitigate an environmental effect. As shown in Table 3.10-3, the Project is consistent with the City's existing General Plan policies and would not conflict with policies adopted to avoid or mitigate an environmental effect.

TABLE 3.10-3: 2023 GENERAL PLAN EXISTING POLICY CONSISTENCY

GENERAL PLAN POLICY	*PROJECT CONSISTENCY*
LAND USE ELEMENT	
LU-P-1: Growth shall mitigate its own impacts and shall provide a positive benefit to the City of Manteca.	**Consistent.** The proposed Project is subject to CEQA Review. The CEQA review process enables interested parties to evaluate the proposed Project in terms of its environmental consequences, to examine and recommend methods to eliminate or reduce potential adverse impacts. Chapters 3.1 through 3.15 includes a description of project-related impacts associated with each environmental topic, identification of appropriate mitigation measures, and a conclusion as to the significance of each impact. Implementation of project-specific mitigation measures would reduce impacts to the greatest extent feasible, consistent with this policy. Additionally, the proposed development would provide a range of housing and provide additional park and recreational areas for existing residents of Manteca to utilize.
LU-P-3: The City shall encourage a pattern of development that promotes the efficient and timely development of public services and facilities	**Consistent.** Impacts on utilities infrastructure (sewer, water, storm drainage, and solid waste) are discussed in Section 3.14, Utilities. Impacts on public services infrastructure (fire stations, police stations, and libraries) are discussed in Section 3.12, Public Services. The proposed Project includes development of the utility infrastructure required to support the development and the City has adequate existing facilities to provide public services to the proposed Project.

GENERAL PLAN POLICY	*PROJECT CONSISTENCY*
LU-P-4: The City shall encourage a development pattern that is contiguous with the boundary of the City.	**Consistent.** As discussed in Chapter 2.0, Project Description, The City limits run conterminous with the northern and western boundary of the Project site, as well as portions of the eastern boundary. The Project proposes the annexation of the Development Area for the proposed residential development, as well as the annexation of the Non-development Area and existing right-of-way owned by San Joaquin County to ensure implementation of the Project would not result in the creation of an unincorporated island.
LU-P-40: Development shall be managed to ensure that adequate public facilities and services, as defined in the Public Services and Facilities Element, are planned and provided.	**Consistent.** Impacts on utilities infrastructure (sewer, water, storm drainage, and solid waste) are discussed in Section 3.14, Utilities. Impacts on public services infrastructure (fire stations, police stations, and libraries) are discussed in Section 3.12, Public Services. The proposed Project includes development of the utility infrastructure required to support the development and the City has adequate existing facilities to provide public services to the proposed Project.
LU-P-41: The City shall encourage the continuation of agricultural uses on lands within the Primary and Secondary Urban Services Boundary lines pending their development as urban uses consistent with the General Plan	**Consistent.** The Project site is located in the Primary Urban Services Boundary and is currently active farmland. Impacts to agricultural resources, including the conversion of farmland, is discussed in Chapter 3.2, Agricultural Resources. The proposed development would result in the conversion of farmland into a residential neighborhood with park and recreational areas, consistent with the General Plan.
LU-P-42: The City will encourage the continuation of small, specialty agricultural operations and demonstration or educational agricultural operations that are compatible with the adjacent urban uses	**Consistent.** Impacts to agricultural resources, including the potential to result in conflicts with adjacent agricultural lands or indirectly cause conversion of agricultural lands, is discussed in Chapter 3.2, Agricultural Resources. However, the City's Right-to-Farm Ordinance reduces the potential for conflict between existing agricultural lands and adjacent uses. The notification procedures in the ordinance serves to inform landowners and developers of non-agricultural uses of what the expectations are in the area with regard to agricultural activities and to reduce complaints.
PUBLIC FACILITIES AND SERVICES ELEMENT	
PF-P-1. Facilitate development in the in-fill areas by extending infrastructure.	**Consistent.** Impacts on utilities infrastructure (sewer, water, storm drainage, and solid waste) are discussed in Section 3.14, Utilities and Service Systems. The proposed Project includes development of the utility infrastructure required to support the development. The Development Project will connect to the existing water and sewer main lines in Union Road. Onsite storm drainage would be installed to serve the proposed Project. As discussed in Chapter 2.0, Project Description, 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. 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 also noted that utilities (water and sewer service) will be brought to the property line of the Non-Development Areas.
PF-P-12. The City shall continue to assess a water development fee on all new commercial, industrial, and residential development sufficient to fund systemwide capacity improvements. The water development fee schedule shall be periodically reviewed and revised as necessary.	**Consistent.** The Project would be subject to Chapter VI Development Fees, of the Municipal Code. These development fees would be used by the City to finance public facility design, construction, operation, and maintenance.
PF-P-18. Ensure wastewater collection and treatment for all development in the City and the safe disposal of wastes.	**Consistent.** Impacts on utilities infrastructure, including wastewater, are discussed in Section 3.14, Utilities and Service Systems. The proposed Project includes development of the utility infrastructure required to support the development.

GENERAL PLAN POLICY	*PROJECT CONSISTENCY*
PF-P-19. The City will maintain capacity to process combined residential, commercial, and industrial flow.	**Consistent.** As noted in response to Policy PF-P-1, impacts on utilities infrastructure, including wastewater, are discussed in Section 3.14, Utilities and Service Systems. The Project would provide all necessary infrastructure required to serve the Project site. The infrastructure improvements are consistent with City infrastructure plans.
PF-P-20. The City shall develop new sewage treatment and trunk line capacity as necessary to serve new development.	**Consistent.** As noted in response to Policy PF-P-1, impacts on utilities infrastructure, including wastewater, are discussed in Section 3.14, Utilities and Service Systems. The Project would provide all necessary infrastructure required to serve the Project site. The infrastructure improvements are consistent with City infrastructure plans.
PF-I-9. The City will require all sewage generators within its service area to connect to the City's system, except those areas where on-site treatment and disposal facilities are deemed appropriate.	**Consistent.** As noted in response to Policy PF-P-1, impacts on utilities infrastructure (sewer, water, storm drainage, and solid waste) are discussed in Section 3.14, Utilities and Service Systems. The Project would provide all necessary infrastructure required to serve the Project site. The infrastructure improvements are consistent with City infrastructure plans
PF-P-28. Storm drainage systems within new development areas shall include open drainage corridors where feasible to supplement or replace an underground piped drainage system. The drainage systems would provide for short-term storm water detention, storm water conveyance for storm waters exceeding a 10-year event, storm water quality treatment, bike and pedestrian paths, and visual open space within neighborhoods. The width and length of the corridors would be determined by the stormwater management requirements. The drainage systems would provide a pedestrian connection between parks and access to open space from residential neighborhoods. The neighborhoods would be designed with homes oriented to, rather than backing on the open space corridor.	**Consistent.** As noted in response to Policy PF-P-1, impacts on utilities infrastructure (sewer, water, storm drainage, and solid waste) are discussed in Section 3.14, Utilities and Service Systems. The Project would provide all necessary infrastructure required to serve the Project site. The infrastructure improvements are consistent with City infrastructure plans.
PF-P-46. The City shall expand the community and neighborhood park system with the goal of providing neighborhood park facilities within reasonable walking distance of all city residential areas.	**Consistent.** As discussed in Chapter 2.0, Project Description, approximately 10.87 acres of a centralized park plus 1.28 acres of levee access and pocket park are proposed within the Development Area. In addition, the Project would be subject to Chapter 1 General Fees, including the Park Acquisition and Improvements Fees and Neighborhood Park-in-Lieu Fee, of the Municipal Code. These impact fees would be used by the City to finance public facility design, construction, operation, and maintenance.
PF-P-47. The City shall use joint development of park and drainage detention basins in the development of neighborhood parks.	**Consistent.** As discussed in Chapter 2.0, Project Description, 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.
PF-P-53. All new residential development will be required to pay a park acquisition and improvement fee, based on providing 5 acres per 1,000 residents, to fund system-wide improvements.	**Consistent.** As discussed in Chapter 2.0, Project Description, approximately 10.87 acres of a centralized park plus 1.28 acres of levee access and pocket park are proposed within the Development Area. In addition, the Project would be subject to Chapter 1 General Fees, including the Park Acquisition and Improvements Fees and Neighborhood Park-in-Lieu Fee, of the Municipal Code. These impact fees would be used by the City to finance public facility design, construction, operation, and maintenance.

GENERAL PLAN POLICY	*PROJECT CONSISTENCY*
SAFETY ELEMENT	
S-P-2. The City shall require new development to mitigate the potential impacts of geologic hazards through Building Plan review.	**Consistent.** Project design would be subject to the California Building Code (CBC), which includes applicable safety and design standards related to Geologic Hazards. Additionally, as required by Mitigation Measure 3.6-1 in Section 3.6, the Project would be required to prepare a final geotechnical evaluation of soils at a design-level, consistent with Sections 1803.1.1.2, 1803.5.11. and 1803.5.12 of the CBC.
S-P-3. The City shall require new development to mitigate the potential impacts of seismic induced settlement of uncompacted fill and liquefaction (water-saturated soil) due to the presence of a high water table.	**Consistent.** Project design would be subject to the California Building Code (CBC), which includes applicable safety and design standards related to Geologic Hazards. Additionally, as required by Mitigation Measure 3.6-1 in Section 3.6, the Project would be required to prepare a final geotechnical evaluation of soils at a design-level, consistent with Sections 1803.1.1.2, 1803.5.11. and 1803.5.12 of the CBC.
S-P-5. The City shall ensure that all public facilities, such as buildings, water tanks, and reservoirs, are structurally sound and able to withstand seismic shaking and the effects of seismically induced ground failure.	**Consistent.** Project design would be subject to the California Building Code (CBC), which includes applicable safety and design standards related to Geologic Hazards. Additionally, as required by Mitigation Measure 3.6-1 in Section 3.6, the Project would be required to prepare a final geotechnical evaluation of soils at a design-level, consistent with Sections 1803.1.1.2, 1803.5.11. and 1803.5.12 of the CBC.
S-P-10. Ensure that any existing structures subject to the 200-year flood provide adequate protection from flood hazards.	**Consistent**: Impacts associated with potential flood events are discussed in Section 3.9, Hydrology and Water Quality, of this EIR. As discussed, the Project site is currently located in Zone X, protected by levee, which by definition indicates an area protected by levees from the 1% annual chance flood. The Project site is not located within the 200-year floodplain as delineated on the most recent 200-year flood plain maps for Manteca.
S-P-12. New residential development, including mobile homes, shall be constructed so that the lowest floor is at least one foot above the 200-year flood level.	**Consistent**: See Response to Policy S-P-10 above.
S-P-11. Ensure that the impacts of potential flooding are adequately analyzed when considering areas for future urban expansion.	**Consistent:** See Response to Policy S-P-10 above.

SOURCE: DE NOVO PLANNING GROUP, 2022.

As previously stated, the City is currently undergoing an update to the General Plan. For informational purposes, Table 3.10-4 provides an analysis of the proposed Project's consistency with the Manteca General Plan Update policies. As shown in Table 3.10-4, the proposed Project is consistent with the City's proposed General Plan Update policies and would not conflict with policies adopted to avoid or mitigate an environmental effect.

TABLE 3.10-4: GENERAL PLAN UPDATE PROPOSED POLICY CONSISTENCY

GENERAL PLAN POLICY	*PROJECT CONSISTENCY*
LAND USE	
LU-2.7: Review public and private development proposals and land use changes within the City's Sphere of Influence (SOI) and Planning Area for consistency within the General Plan.	**Consistent.** The Annexation Area of the Project includes the Non-development Area and existing right-of-way owned by San Joaquin County as part of the annexation application to ensure implementation of the Project would not result in the creation of an unincorporated island (Non-development Areas and existing right-of-way). Additionally, the Project includes the existing right-of-way (Union Road) as part of the annexation application consistent with San Joaquin County LAFCo standards, as Union

GENERAL PLAN POLICY	*PROJECT CONSISTENCY*
	Road will serve as main access points to the proposed residential subdivision and generate additional traffic.
LU-3.2: Require the design of new residential development to be consistent with any applicable design guidelines, to ensure harmony with Manteca's unique character and compatibility with existing surrounding land uses.	**Consistent.** Consistency with applicable design guidelines and community character are discussed in Section 3.1, Aesthetics. As discussed in the section, Additionally, the proposed Project would result in a land use consistent with the planned development of the Project area, resulting in a residential subdivision development aesthetically similar to the surrounding uses.
LU-3.3: Encourage residential development to occur in a balanced and efficient pattern that reduces sprawl, preserves open space, and creates convenient connections to other land uses	**Consistent.** As discussed in Chapter 2.0, Project Description, The City limits run conterminous with the northern and western boundary of the Project site, as well as portions of the eastern boundary. The Project proposes the annexation of the Development Area for the proposed residential development, as well as the annexation of the Non-development Area and existing right-of-way owned by San Joaquin County to ensure implementation of the Project would not result in the creation of an unincorporated island.
LU-3.9: Locate residences away from areas of excessive noise, smoke, dust, odor, and lighting, and ensure that adequate provisions, including buffers or transitional uses, such as less intensive renewable energy production, light industrial, office, or commercial uses, separate the proposed residential uses from more intensive uses, including industrial, agricultural, or agricultural industrial uses and designated truck routes, to ensure the health and well-being of existing and future residents.	**Consistent.** Impacts to agricultural resources, including the potential to result in conflicts with adjacent agricultural lands is discussed in Chapter 3.2, Agricultural Resources. Impacts related to noise, smoke, odor are discussed in Chapter 3.3 Air Quality and Chapter 3.11 Noise. As discussed in Section 3.3, Air Quality, the SJVAPCD GAMAQI was used to determine air quality impacts resulting from the Project. The proposed Project would comply with pre-existing requisite federal, State, SJVAPCD, and other local regulations and requirements, as well as implement the mitigation measures provided by the SJVAPCD for construction and operations, including mitigation measures identified in Section 3.3. All impacts associated with excessive noise levels were determined to be less than significant or less than significant with mitigation. See Section 3.11, Noise, for the complete discussions.
COMMUNITY FACILITIES & SERVICES ELEMENT	
CF-1.2: Ensure that new growth and development participates in the provision and expansion of essential community services and facilities, including parks, fire and police facilities, schools, utilities, roads, and other needed infrastructure, does not exceed the City's ability to provide services, and does not place an economic burden on existing residents.	**Consistent.** Impacts on utilities infrastructure (sewer, water, storm drainage, and solid waste) are discussed in Section 3.14, Utilities and Service Systems. Impacts on public services infrastructure (fire stations, police stations, and libraries) are discussed in Section 3.12, Public Services. The proposed Project includes development of the utility infrastructure required to support the development. In addition, the City current has existing public services capacity to support the development.
Cf-1.3: Require new development to demonstrate that the City's existing or planned community services and facilities can accommodate the increased demand for said services and facilities prior to or at completion of the project.	**Consistent.** See response to CF-1.2 above.
Cf-1.4: Require new development to offset or mitigate impacts to community services and facilities, including fair share contribution of all costs of required public infrastructure and services, to ensure that service levels for existing users are not degraded or impaired.	**Consistent.** The Project would be subject to Chapter VI Development Fees, of the Municipal Code. These development fees would be used by the City to finance public facility design, construction, operation, and maintenance.
Cf-2.2: Ensure that the Police Department has adequate funding, staff, and equipment to accommodate existing and future growth in Manteca.	**Consistent.** The Project would be subject to Chapter VI Development Fees, of the Municipal Code. These development fees would be used by the City to ensure adequate funding, staff, and equipment to accommodate existing and future growth in Manteca.
Cf-2.7: Emphasize the use of physical site planning as an effective means of preventing crime. Open spaces, landscaping, parking lots, parks, play areas, and other public spaces should be designed with	**Consistent.** Project design would be reviewed by the City and Manteca Police Department for opportunities to use building and site design features as a means for crime prevention and reduction.

GENERAL PLAN POLICY	*PROJECT CONSISTENCY*
maximum feasible visual and aural exposure to community residents.	
Cf-3.2: Provide fire services to serve the existing and projected population	**Consistent.** The Project would be subject to Chapter VI Development Fees, of the Municipal Code. These development fees would be used by the City to ensure adequate funding, staff, and equipment to accommodate existing and future growth in Manteca.
CF-3.5: Ensure that new development is designed, constructed, and equipped consistent with the requirements of the California Fire Code in order to minimize the risk of fire.	Consistent. The proposed Project would be subject to the California Building Code, which requires the California Fire Code. In addition, Project design would be reviewed by the City and Manteca Fire Department for opportunities to use building and site design features as a means for crime prevention and reduction.
Cf-4.2: Expand, renovate, and maintain high quality parks, trails, and recreation facilities, programs, and services to accommodate existing and future needs that address traditional and non-traditional recreation, active and passive recreation, wellness, historical, cultural arts, environmental education, conservation, accessibility, inclusion, diversity, safety, and new technology.	**Consistent.** As discussed in Chapter 2.0, Project Description, park land is proposed within the Development Area. In addition, the Project would be subject to Chapter 1 General Fees, including the Park Acquisition and Improvements Fees and Neighborhood Park-in-Lieu Fee, of the Municipal Code. These impact fees would be used by the City to finance public facility design, construction, operation, and maintenance of parks, trails and recreation facilities.
CF-4.4: Maintain an overall minimum ratio of 5 acres of developed neighborhood and community parkland per 1,000 residents within the city limits, requiring new development to contribute to its fair share of park and recreation needs. The distribution of land between park types and guidelines for park types shall be determined within the Parks and Recreation Master Plan.	**Consistent.** As discussed in Chapter 2.0, Project Description, park land is proposed within the Development Area. In addition, the Project would be subject to Chapter I General Fees, including the Park Acquisition and Improvements Fees and Neighborhood Park-in-Lieu Fee, of the Municipal Code. These impact fees would be used by the City to finance public facility design, construction, operation, and maintenance of parks, trails and recreation facilities.
CF-4.5: Develop new parks, trails, and recreation facilities through developer fees in areas which are accessible and convenient to the community, prioritizing areas that are lacking these facilities.	**Consistent.** As discussed in Chapter 2.0, Project Description, park land is proposed within the Development Area. In addition, the Project would be subject to Chapter I General Fees, including the Park Acquisition and Improvements Fees and Neighborhood Park-in-Lieu Fee, of the Municipal Code. These impact fees would be used by the City to finance public facility design, construction, operation, and maintenance of parks, trails and recreation facilities.
CF-6.1: Ensure the water system and supply is adequate to meet the needs of existing and future development and is utilized in a sustainable manner	**Consistent.** Impacts on utilities infrastructure, including the water system, are discussed in Section 3.14, Utilities and Service Systems. The Project would provide all necessary infrastructure required to serve the Project site. The infrastructure improvements are consistent with City infrastructure plans.
CF-6.7: Ensure that all new development provides for and funds a fair share of the costs for adequate water distribution, including line extensions, easements, and plant expansions.	**Consistent.** The Project would be subject to Chapter VI Development Fees, of the Municipal Code. These development fees would be used by the City to ensure adequate funding, staff, and equipment to accommodate existing and future growth in Manteca.
CF-7.1: Ensure adequate wastewater collection and treatment infrastructure to serve existing and future development and the safe disposal of wastes	**Consistent.** Impacts on utilities infrastructure, including wastewater treatment and collection, are discussed in Section 3.14, Utilities and Service Systems. The Project would provide all necessary infrastructure required to serve the Project site. The infrastructure improvements are consistent with City infrastructure plans

GENERAL PLAN POLICY	*PROJECT CONSISTENCY*
CF-7.2: Develop new sewage treatment and trunk line capacity as necessary to serve new development. The City shall incorporate current technologies into the design and operation of these facilities.	**Consistent.** See response to CF-7.1 above.
CF-8.2: Require all development projects to demonstrate how storm water runoff will be detained or retained on-site and/or conveyed to the nearest drainage facility as part of the development review process and as required by the City's NPDES Municipal Regional Permit. Project applicants shall mitigate any drainage impacts as necessary and shall demonstrate that the project will not result in any increase in off-site runoff during rain and flood events.	**Consistent.** The Project would implement BMPs during construction and operation. Mitigation Measure 3.9-1 in Section 3.9, Hydrology and Water Quality, requires the preparation of a SWPPP, and structural BMPs.
CF-8.3: Continue to allow dual-use detention basins for parks, ball fields, and other uses where appropriate.	**Consistent.** As discussed in Chapter 2.0, Project Description, 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.
SAFETY ELEMENT	
S-2.2: Regulate development in areas of seismic and geologic hazards to reduce risks to life and property associated with earthquakes, liquefaction, erosion, and expansive soils.	**Consistent.** Project design would be subject to the California Building Code (CBC), which includes applicable safety and design standards related to Geologic Hazards. Additionally, as required by Mitigation Measure 3.6-1 in Section 3.6, the Project would be required to prepare a final geotechnical evaluation of soils at a design-level, consistent with Sections 1803.1.1.2, 1803.5.11. and 1803.5.12 of the CBC.
S-2.3: Require new development to mitigate the potential impacts of geologic and seismic hazards, including uncompacted fill, liquefaction, and subsidence, through the development review process.	**Consistent.** Project design would be subject to the California Building Code (CBC), which includes applicable safety and design standards related to Geologic Hazards. Additionally, as required by Mitigation Measure 3.6-1 in Section 3.6, the Project would be required to prepare a final geotechnical evaluation of soils at a design-level, consistent with Sections 1803.1.1.2, 1803.5.11. and 1803.5.12 of the CBC.
S-3.3: Require evaluation of potential flood hazards prior to approval of development projects to determine whether the proposed development is reasonably safe from flooding and consistent with California Department of Water Resources Urban Level of Flood Protection Criteria (ULOP). The City shall not approve the execution of a development agreement, a tentative map, or a parcel map for which a tentative map is not required, or a discretionary permit or other discretionary entitlement that would result in the construction of a new building, or construction that would result in an increase in allowed occupancy for an existing building, or issuance of a ministerial permit that would result in the construction of a new residence for property that is located within a 200-year flood hazard zone, unless the adequacy of flood protection as described in Government Code	**Consistent**: Impacts associated with potential flood events are discussed in Section 3.9, Hydrology and Water Quality, of this EIR. As discussed, the Project site is currently located in Zone X, protected by levee, which by definition indicates an area protected by levees from the 1% annual chance flood. The Project site is not located within the 200-year floodplain as delineated on the most recent 200-year flood plain maps for Manteca.

GENERAL PLAN POLICY	*PROJECT CONSISTENCY*
§65865.5(a), 65962(a), or 66474.5(a), has been demonstrated.	

SOURCE: DE NOVO PLANNING GROUP, 2022.

Overall, the proposed Project would have a ***less than significant*** impact relative to the General Plan.

MANTECA ZONING CODE

The Manteca Zoning Code implements the General Plan. The Project site is currently within the jurisdiction of San Joaquin County. The San Joaquin County 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 will include the following zoning designations: One-Family Dwelling Zoning District (R-1), Limited Multiple-Family Dwelling (R-2), Multiple-Family Dwelling (R-3), General Commercial Zoning District (CG), and Park (P). The pre-zoning would go into effect upon annexation into the City of Manteca. The proposed pre-zoning for the Project site is shown on Figure 2.0-7b. These proposed zone changes would ensure that zoning will be consistent with the proposed General Plan designations within the Project site. The zoning ordinance establishes permitted uses, development densities and intensities, and development standards for each zone to ensure that public health, safety, and general welfare are protected, consistent with the purpose of the Zoning Code. All existing City development standards and zoning requirements for the proposed zoning are applicable to any activities on the Project site. The City will review each component of the proposed Project as plans (improvement plans, building plans, site plans, etc.) are submitted for final approval to ensure that they are consistent with the City's Zoning ordinance. Approval of the pre-zoning will ensure that the proposed Project will be consistent with the Zoning Code and will have a **less than significant** impact relative to this topic.

SAN JOAQUIN LAFCO

The Project site is currently in an unincorporated portion of San Joaquin County adjacent to the City of Manteca's city limits, within the Manteca SOI (as defined in the Manteca General Plan). The proposed Project requires annexation of 202.81 acres of the Project site into the city limits.

LAFCo is serving as a responsible agency for this EIR pursuant to their *LAFCo Procedures for the California Environmental Quality Act (Adopted June 20, 2007).* When LAFCo is a Responsible Agency under CEQA, in order to approve the annexation, the Commission will certify that it has reviewed the Lead Agency's environmental documents and, if required, adopt findings for approval and statements of overriding considerations in accordance with Sections 15091 and 15903 of the CEQA Guidelines. The City of Manteca has consulted LAFCo. The consultation process included sending LAFCo a copy of the Notice of Preparation during the 30-day public review period. LAFCo will also be sent a copy of the Draft EIR during the 45-day public review period and the Final EIR for their use in the annexation process. If the Executive Officer determines that the Draft and Final EIR are adequate for their use, he/she will prepare, or cause to be prepared, "draft" Findings and

Statements, findings for approval, and statements of overriding considerations for LAFCo Commission consideration. If the LAFCo Commission approves the annexation, the Executive Officer will file a Notice of Determination within five working days after deciding to approve the annexation.

The San Joaquin LAFCo will review the proposed annexation for consistency with the *LAFCo Change of Organization Policies and Procedures (Including Annexations and Reorganizations)*. These policies and procedures govern San Joaquin LAFCo determinations regarding annexations to all agencies. The following policies will be reviewed as part of the annexation process by the San Joaquin LAFCo.

General Standards for Annexation and Detachment

1. Spheres and Municipal Service Reviews: This policy requires an annexation to be consistent with the internal planning horizon of the SOI, which means that the land would normally lie within the first planning increment (5 to 10 year) boundary. The annexation must also only be approved if the Municipal Services Review and the SOI Plan demonstrates that adequate services can be provided with the timeframe needed by the annexed area. Proposed annexations that lie outside of the first planning increment (5 to 10 year) boundary are presumed to be inconsistent with the Sphere Plan and must first request a sphere amendment prior to proceeding with the annexation. The City's Sphere of Influence map identifies the Project site as within the SOI and within the 10-year and 20-year frames for potential development; therefore, a sphere amendment prior to proceeding with the annexation would not be required.

2. Plan for Services: This policy states that every proposal must include a Plan for Services that addresses the items identified in Section 56653 of the Government Code. The Plan for Services must be consistent with the Municipal Service Review of the Agency.

   The Draft EIR assesses service capacity and demands for these services. There are not any service deficiencies noted by the City of Manteca, or contained within this EIR that are anticipated to occur after installation of infrastructure. The proposed annexation area is within the Manteca SOI as defined by LAFCo and the City and was assumed for low density residential development in the City's Municipal Service Review.

3. Contiguity: This policy requires the land to be annexed to be contiguous to the city. Territory is not contiguous if the only connection is a strip of land more than 300 feet long and less than 200 wide, that width to be exclusive of highways. The boundaries of a proposed annexation or reorganization must not create or result in areas that are difficult to serve.

   The proposed annexation area is contiguous to the Manteca city limits along the southern and western boundaries of the Project site.

4. Development within Jurisdiction: This policy encourages development of existing vacant or non-prime agricultural lands for urban uses within the existing jurisdiction or SOI before

approval that would lead to the development of existing open space lands for non-open space uses.

The proposed annexation area is within the SOI and lands within the Project area are designated for development under the General Plan. However, the Project site is currently in agricultural operation and agricultural resources are located adjacent to the proposed annexation area. There are no Williamson Act contracts on or adjacent to the Project site. However, the Department of Conservation Farmland Mapping and Monitoring Program (FMMP) delineates important farmland on and adjacent to the Project site. The proposed annexation area is not designated by the City of Manteca for agricultural uses. However, the San Joaquin County General Plan designated the site for agricultural uses. The proposed Project would result in the development of existing open space lands for non-open space uses. The San Joaquin LAFCo does not impose agricultural mitigation requirements for the conversion of agricultural land to urban uses related to annexations or other applications.

Impacts related to the development of existing open space lands were analyzed in the Manteca General Plan EIR. The General Plan EIR determined that impacts would be significant and unavoidable. According to the General Plan EIR, although City and County policies would support continued agricultural uses and would require urban development to fund agricultural conservation easements and other programs, no additional feasible mitigation is available.

5. Progressive Urban Pattern: This policy states that annexations shall be progressive steps toward filling in the territory designated by the SOI. Proposed growth shall be from inner toward outer areas.

   The proposed annexation area is within the SOI and is designated for urban development under the General Plan. The proposed Project would develop the proposed annexation area (adjacent to the Manteca city limits) and would continue the pattern of urbanization, including commercial and residential uses, that occurs within the City limits to the west and south of the proposed annexation area.

6. Piecemeal Annexation Prohibited: This policy requires annexations to be consistent with the schedule for annexation that is contained in the agency's Sphere of Influence Plan. LAFCo will modify small piece-meal or irregular annexations, to include additional territory in order to promote orderly annexation and logical boundaries, while maintaining a viable proposal. In such cases, detailed development plans may not be required for those additional areas but compliance with CEQA is required.

   Annexation of the Project area is contiguous with the city limits.

7. Annexations to Eliminate Islands: This policy states that proposals to annex islands or to otherwise correct illogical distortion of boundaries will normally be approved unless they would violate another provision of these standards. In order to avoid the creation of an

island or to encourage the elimination an existing island, detailed development plans may not be required for the remnant areas.

The proposed annexation includes lands contiguous with the current city limits and parcels within the SOI. Parcels proposed for annexation do not involve the elimination of islands.

8. Annexations that Create Islands: This policy states that an annexation will not be approved if it will result in the creation of an island of unincorporated territory or otherwise cause or further the distortion of existing boundaries. The Commission may nevertheless approve such an annexation where it finds that the application of this policy would be detrimental to the orderly development of the community and that a reasonable effort has been made to include the island in the annexation but that inclusion is not feasible at this time.

   The proposed annexation includes lands contiguous with the current city limits and parcels within the SOI. Parcels proposed for annexation would not involve the creation of an island of unincorporated territory.

9. Substantially Surrounded: This policy states that for the purpose of applying the provisions of the Cortese-Knox-Hertzberg Act regarding island annexation without protest hearings (Section 56375.5), the subject territory of an annexation proposal shall be deemed "substantially surrounded" if it is within the sphere of influence of the affected city and two-thirds of its boundary is surrounded by the affected city.

   As previously stated, the proposed annexation does not involve island annexation. Therefore, this policy is not relevant to the proposed annexation.

10. Definite and Certain Boundaries: This policy states that all boundaries shall be definite and certain and conform to lines of assessment or ownership. The Commission's approval of boundary change proposals containing split parcels will typically be subject to a condition requiring the recordation of a parcel map, lot line adjustment or other instrument to avoid creating remnants of legal lots.

    The proposed annexation boundaries are definite and certain and conform to lines of ownership.

11. Service Requirements: This policy states that an annexation shall not be approved merely to facilitate the delivery of one or a few services to the determent of the delivery of a larger number of services or service more basic to public health and welfare.

    The proposed annexation is not merely to facilitate the delivery of one or a few services to the determent of the delivery of a larger number of services or service more basic to public health and welfare. As stated further in the Section 3.12 (Public Services and Recreation) and Section 3.14 (Utilities), the City has adequate service capacity to serve the proposed

Project without reducing the adequacy of services elsewhere. Therefore, the proposed annexation is consistent with this policy.

12. Adverse Impact of Annexation on the Other Agencies: This policy states that LAFCo will consider any significant adverse effects upon other service recipients or other agencies serving the area and may condition any approval to mitigate such impacts. Significant adverse effects shall include the effect of proposals that negatively impact special districts' budgets or services or require the continuation of services without the provision of adequate funding. LAFCo will not approve annexations that fail to provide adequate mitigation of the adverse impact on the district. LAFCo may determine an appropriate temporary mitigation, if any, and impose that temporary mitigation to the extent it is within its powers. If the needed mitigation is not within LAFCo's authority and approval would, in the opinion of the Commission, seriously impair the District's operation, the Commission may choose to deny the application.

    This EIR includes an assessment of the impacts of the proposed Project and proposed annexation on service agencies. The proposed commercial and residential development and the proposed annexation would not result in any significant, adverse impacts to any of the service agencies such that it would seriously impair operation.

13. District's Proposal to Provide new, different, or Divestiture of a Particular Function or Class of Services: This policy relates to proposals for new, different, or divestiture of services, which is not relevant to the proposed annexation.

14. Disadvantaged Unincorporated Communities: This policy prohibits an annexation where a Disadvantaged Unincorporated Community (DUC) is contiguous to the area of proposed annexation, unless a concurrent application to annex all or a portion of the DUC to the subject city has been filed. The Project area is not within or contiguous to an area designated as a DUC. This policy is not relevant to the proposed annexation.

City Annexations

1. Annexation of Streets: This policy states that annexations shall reflect the logical allocation of streets and rights of way to assure that the city reasonably assumes the burden of providing adequate roads to the property to be annexed. LAFCo will require cities to annex streets where adjacent lands that are in the city will generate additional traffic or where the annexation will isolate sections of county road. Cities shall include all contiguous public roads that can be included without fragmenting governmental responsibility by alternating city and county road jurisdiction over short section of the same roadway. When a street is a boundary line between two cities the centerline of the street may be used as the boundary or may follow a boundary reached by agreement of the affected cities.

2. Pre-zoning Required: This policy states that the Cortese-Knox-Hertzberg Act requires the city to pre-zone territory to be annexed, and prohibits subsequent changes to the General Plan

and /or pre-zoning designations for a period of two years after completion of the annexation.

The proposed Project includes the adoption of pre-zoning for the proposed annexation area, which will serve to regulate the uses of land and structures within the Project area. The City's pre-zoning will include the following zoning designations: P, R1, R2, R3, and GC. The Project will be subject to the development standards as described in the Municipal Code. The Municipal Code is proposed to ensure consistency between land use and zoning designations. The proposed annexation is consistent with this policy.

The policies discussed above are intended to ensure orderly reorganization to local jurisdictional boundaries, including annexations. Ultimately, LAFCo will determine whether the proposed annexation would first require an update to the *Manteca Municipal Service Review* in order to approve the annexation. This LAFCo policy was not specifically adopted to avoid or mitigate an environmental effect, rather it is intended to ensure orderly and logical reorganization to local jurisdiction boundaries, including annexations. The proposed Project is consistent with LAFCo policies adopted to address environmental impacts, with the exception of impacts to agricultural lands. Section 3.2, Agricultural Resources, addresses impacts related to conversion of agricultural land. As such, implementation of the proposed Project will have a **less than significant** impact relative to this topic.

Impact 3.10-3: The proposed Project would not significantly conflict with an applicable habitat conservation plan or natural community conservation plan. (Less than Significant)

SAN JOAQUIN COUNTY MULTI-SPECIES HABITAT CONSERVATION AND OPEN SPACE PLAN

The City's participation in the SJMSCP allows projects within Manteca's jurisdiction to seek coverage under the SJMSCP for impacts to endangered, threatened, and species of special concern. The SJMSCP provides a process to offset impacts to biological resources, conserve open space, maintain the agricultural economy, and allow development within the County. It was also created to obtain the necessary 32 permits from the U.S. Fish and Wildlife Service and the California Department of Fish and Game for the next 50 years in exchange for participating projects paying mitigation fees. Fees are based on the amount and quality of land converted from agricultural or open space uses to urban uses. These fees are used to preserve and create habitats to be managed in perpetuity through the establishment of habitat preserves. Ninety-seven species are covered under the SJMSCP, with the intent to provide comprehensive mitigation pursuant to local, state, and federal regulations for impacts on these species from permitted activities under the Plan. Participation in the SJMSCP confers authorization for activities that result (or may result in) incidental take of covered state-listed species, federally listed species, and other covered.

As described in Section 3.4, Biological Resources, prior to issuance of grading permits, the Project Proponent will be required to coordinate with SJCOG and will be responsible for the appropriate

coverage, permits, compensatory mitigation or fees, and Project-specific avoidance, minimization, and mitigation measures as defined within the SJMSCP. The proposed Project does not conflict with the implementation of the SJMSCP and has appropriate measures to ensure compliance with payment of mitigation fees. Implementation of the Project would have a **less than significant** impact relative to compliance with the SJMSCP.

Impact 3.10-4: The proposed Project has the potential to induce substantial population growth in an area. (Less than Significant)

Section 15126.2(d) of the CEQA Guidelines requires that an EIR evaluate the growth-inducing impacts of a proposed action. A growth-inducing impact is defined by the CEQA Guidelines as:

> *The way in which a proposed Project could foster economic or population growth, or the construction of additional housing, either directly or indirectly, in the surrounding environment. Included in this are projects which would remove obstacles to population growth…It is not assumed that growth in an area is necessarily beneficial, detrimental, or of little significance to the environment.*

Based on the CEQA Guidelines, growth inducement is any growth that exceeds planned growth of an area and results in new development that would not have taken place without implementation of the project. A project can have direct and/or indirect growth inducement potential. Direct growth inducement would result if a project, for example, involved construction of new housing. A project would have indirect growth inducement potential if it established substantial new permanent employment opportunities (e.g., commercial, industrial, or governmental enterprises) or if it would involve a construction effort with substantial short-term employment opportunities that would indirectly stimulate the need for additional housing and services to support the new employment demand (*Napa Citizens for Honest Government v. Napa County Board of Supervisors* (2001) 91 Cal.App.4th 342). Similarly, a project would indirectly induce growth if it would remove an obstacle to additional growth and development, such as removing a constraint on a required public service. A project providing an increased water supply or wastewater treatment/collection in an area where this service historically limited growth could be considered growth-inducing.

The State CEQA Guidelines further explain that the environmental effects of induced growth are considered indirect impacts of the proposed action. These indirect impacts or secondary effects of growth may result in significant, adverse environmental impacts. Potential secondary effects of growth include increased demand on other community and public services and infrastructure, increased traffic and noise, and adverse environmental impacts such as degradation of air and water quality, degradation or loss of plant and animal habitat, and conversion of agricultural and open space land to developed uses.

Growth inducement may constitute an adverse impact if the growth is not consistent with or accommodated by the land use plans and growth management plans and policies for the area affected. Local land use plans provide for land use development patterns and growth policies that

allow for the orderly expansion of urban development supported by adequate urban public services, such as water supply, roadway infrastructure, sewer service, and solid waste service.

Components of Growth: The timing, magnitude, and location of land development and population growth in a region are based on various interrelated land use and economic variables. Key variables include regional economic trends, market demand for residential and non-residential uses, land availability and cost, the availability and quality of transportation facilities and public services, proximity to employment centers, the supply and cost of housing, and regulatory policies or conditions. Since the general plan of a community defines the location, type, and intensity of growth, it is the primary means of regulating development and growth in California.

GROWTH EFFECTS OF THE PROJECT

Direct Population Growth: The proposed Project proposes housing that would result in direct population growth. The proposed Project includes the addition of 915 residential units. Using the most recent U.S. Census (2019) and Department of Finance (2020) estimates for the average number of persons residing in a dwelling unit in the City of Manteca of 3.18, the addition of 915 housing units could increase the population of the city by an estimated 2,910 persons.

The proposed Project would require a General Plan Land Use Amendment to adjust the land uses to LDR and HDR for the Development Area. Additionally, the proposed Project includes a proposed General Plan Land Use Amendment to adjust the land uses in Annexation SubArea 1, 2, and 3 to be consistent with the proposed General Plan Update. Because the Annexation Subareas are not proposed for development, establishment of the land uses under this proposed General Plan Amendment is not necessary, and as an alternative they may be left as currently designated. The proposed General Plan land uses are shown on Figure 2.0-6b.

Indirect Population Growth: Projects that include employment generating uses have the potential to result in indirect population growth through the creation of jobs or the extension of infrastructure into areas that were not previously served. As noted in section 2.0 Project Description, the proposed Project does not include the development of employment generating uses within the Development Area. In addition, the proposed infrastructure improvements would be adequately sized to serve the proposed Project only. The proposed infrastructure would not be oversized to accommodate any growth beyond the Project site into areas that were not previously served.

The Housing Element of the Manteca GP identifies that the City has capacity for 5,782 residential units on vacant and underdeveloped sites. The proposed Project would not result in indirect population growth beyond the City's planned capacity as the proposed project will generate 915 residential units, well below the residential unit capacity identified in the Manteca GP. Therefore, the proposed Project is not anticipated to exceed the planned growth (directly or indirectly) in the area beyond what is anticipated in the City of Manteca General Plan. While the proposed Project will result in growth, it is not anticipated to significantly induce growth. Implementation of the proposed Project will have a **less than significant** impact relative to this topic.

Impact 3.10-5: The proposed Project has the potential to displace substantial numbers of people or existing housing. (Less than Significant)

The Development Area has some existing improvements including two existing houses and barns and/or sheds with associated equipment, dirt and gravel roadways. Development of the Project would add 915 residential units. While the two existing residences within the Development Area would be demolished prior to development of the proposed Project, the existing residential structures in the Non-Development Area would remain. Therefore, the proposed Project would not displace substantial numbers of people or existing housing. The proposed Project will have a **less than significant** impact related to the displacement of substantial numbers of people or existing housing.

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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: Proposed residential developments and farmland border the north side of the overall Project site.

East: Highway 99 and the Highway 99 Frontage road border the eastern boundary.

South: The George Perry and Sons produce warehouse and single-family residences border the southern boundary of the overall Project site.

West: Union Road borders the western boundary of the overall 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 10th –November 11th , 2021. The noise measurement locations are shown on Figure 3.11-1. The noise level measurement survey results are provided in Table 3.11-2. Appendix B of Appendix D 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	Eastern side of Project site, 42 yds to Hwy 99 Median	11/10/2021-11/11/2021	78	74	72	87	71	67	86
LT-2	Southern side of Project site, North of Shipping Yard	11/10/2021-11/11/2021	65	59	57	70	58	55	69
LT-3	Western side of Project site, 12 yds to Union Road Median	11/10/2021-11/11/2021	73	69	59	86	66	48	85

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 noise analysis was conducted for roadways which would affect sensitive receptors within the Project area as well as receptors which lie outside of the overall Project site. Traffic noise level changes are presented by roadway rather than by planning boundary.

Traffic volumes for existing conditions were obtained from the traffic data prepared for the Project (Fehr & Peers, 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 D.

TABLE 3.11-3: EXISTING TRAFFIC NOISE LEVELS

ROADWAY	*SEGMENT*	*EXTERIOR TRAFFIC NOISE LEVEL, DB L_{DN}*
Union Road	South of French Camp Road	60.9
Union Road	South of Lovelace Road	63.4
Union Road	South of Shady Pines Street	56.4
Union Road	North of Shady Pines Street	60.3
Union Road	South of Del Webb Blvd	57.5
Union Road	South of Lathrop Road	61.3
Lathrop Road	East of Union Road	68.0
Lathrop Road	West of Union Road	62.7
Lathrop Road	East of Harlan Road	52.6
Lathrop Road	East of Airport Way	60.2
Airport Way	North of Lathrop Road	62.2
Airport Way	South of Lovelace Road	59.6
Airport Way	North of Roth Road	61.1
Airport Way	South of Roth Road	53.1
NB I-5 Off Ramp	South of Roth Road	49.6
NB I-5 On Ramp	North of Lathrop Road	53.1
French Camp Road	East of Union Road	66.6
Roth Road	East of I-5 NB Ramps	64.3
Hwy 99 & Frontage Road	North of Brunswick Road	76.4
Hwy 99 & Frontage Road	South of French Camp Road	76.2

SOURCE: FHWA-RD-77-108 WITH INPUTS FROM FEHR & PEERS 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 D provides the complete inputs and results of the FHWA traffic noise modeling.

TABLE 3.11-4: EXISTING AND EXISTING PLUS PROJECT TRAFFIC NOISE LEVELS

		NOISE LEVELS (L_{DN}, dB) AT NEAREST SENSITIVE RECEPTORS				
		EXISTING	*EXISTING + PROJECT*	*CHANGE*	*EX. GP CRITERIA*[1]	*SIGNIFICANT UNDER EX. GP?*
ROADWAY	*SEGMENT*				*PROPOSED GP CRITERIA*[2]	*SIGNIFICANT UNDER GP UPDATE?*
Union Road	South of French Camp Road	60.9	61.6	0.7	+5-10 dBA	No
					+3 dBA	No
Union Road	South of Lovelace Road	63.4	65.1	1.7	+5-10 dBA	No
					+ 3 dBA	No
Union Road	South of Shady Pines Street	56.4	58.0	1.6	>60 dBA	No
					+ 5 dBA	No
Union Road	North of Shady Pines Street	60.3	61.2	0.9	+5-10 dBA	No
					+ 3 dBA	No
Union Road	South of Del Webb Blvd	57.5	58.8	1.3	>60 dBA	No
					+ 5 dBA	No
Union Road	South of Lathrop Road	61.3	61.9	0.6	+5-10 dBA	No
					+ 3 dBA	No
Lathrop Road	East of Union Road	68.0	68.4	0.4	+5-10 dBA	No
					+1.5 dBA	No
Lathrop Road	West of Union Road	62.7	62.8	0.1	+5-10 dBA	No
					+ 3 dBA	No
Lathrop Road	East of Harlan Road	52.6	53.1	0.5	>60 dBA	No
					+ 5dBA	No
Lathrop Road	East of Airport Way	60.2	60.6	0.4	+5-10 dBA	No
					+3 dBA	No
Airport Way	North of Lathrop Road	62.2	62.6	0.4	+5-10 dBA	No
					+3 dBA	No
Airport Way	South of Lovelace Road	59.6	60.2	0.6	>60 dBA	No
					+5 dBA	No
Airport Way	North of Roth Road	61.1	61.3	0.2	+5-10 dBA	No
					+3 dBA	No
Airport Way	South of Roth Road	53.1	53.9	0.8	>60 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?
					+ 5 dBA	No
NB I-5 Off Ramp	South of Roth Road	49.6	49.9	0.3	>60 dBA	No
					+ 5 dBA	No
NB I-5 On Ramp	North of Lathrop Road	53.1	53.3	0.2	>60 dBA	No
					+ 5 dBA	No
French Camp Road	East of Union Road	66.6	66.8	0.2	+5-10 dBA	No
					+1.5 dBA	No
Roth Road	East of I-5 NB Ramps	64.3	65.0	0.7	+5-10 dBA	No
					+3 dBA	No
Hwy 99 & Frontage Road	North of Brunswick Road	76.4	76.4	0.0	+5-10 dBA	No
					+1.5 dBA	No
Hwy 99 & Frontage Road	South of French Camp Road	76.2	76.2	0.0	+5-10 dBA	No
					+1.5 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 Fehr & Peers 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]	SIGNIFICANT UNDER EX. GP?
					PROPOSED GP CRITERIA[2]	SIGNIFICANT UNDER GP UPDATE?
Union Road	South of French Camp Road	61.5	62.5	1.0	+5-10 dBA	No
					+3 dBA	No
Union Road	South of Lovelace Road	64.8	66.0	1.2	+5-10 dBA	No
					+ 3 dBA	No
Union Road	South of Shady Pines Street	58.2	59.8	1.6	+5-10 dBA	No
					+5 dBA	No
Union Road	North of Shady Pines Street	61.8	62.9	1.1	+5-10 dBA	No
					+ 3 dBA	No
Union Road	South of Del Webb Blvd	59.5	60.8	1.3	>60 dBA	No
					+ 5 dBA	No
Union Road	South of Lathrop Road	62.3	62.8	0.5	+5-10 dBA	No
					+3 dBA	No
Lathrop Road	East of Union Road	70.9	71.2	0.3	+5-10 dBA	No
					+ 1.5 dBA	No
Lathrop Road	West of Union Road	65.3	65.4	0.1	+5-10 dBA	No
					+ 1.5 dBA	No
Lathrop Road	East of Harlan Road	55.2	55.4	0.2	>60 dBA	No
					+ 5 dBA	No
Lathrop Road	East of Airport Way	63.8	63.8	0.0	+5-10 dBA	No
					+3 dBA	No
Airport Way	North of Lathrop Road	64.9	65.3	0.4	+5-10 dBA	No
					+3 dBA	No
Airport Way	South of Lovelace Road	62.1	62.6	0.5	+5-10 dBA	No
					+3 dBA	No
Airport Way	North of Roth Road	63.7	63.9	0.2	+5-10 dBA	No
					+3 dBA	No
Airport Way	South of Roth Road	55.2	55.4	0.2	>60 dBA	No
					+ 5 dBA	No
NB I-5 Off Ramp	South of Roth Road	51.7	51.7	0.0	>60 dBA	No
					+ 5 dBA	No

Roadway	Segment	Noise Levels (L_{DN}, dB) at Nearest Sensitive Receptors				
		Cumulative	Cumulative + Project	Change	Ex. GP Criteria[1]	Significant Under Ex. GP?
					Proposed GP Criteria[2]	Significant Under GP Update?
NB I-5 On Ramp	North of Lathrop Road	56.8	56.9	0.1	>60 dBA	No
					+ 5 dBA	No
French Camp Road	East of Union Road	67.2	67.6	0.4	+5-10 dBA	No
					+1.5 dBA	No
Roth Road	East of I-5 NB Ramps	66.0	66.3	0.3	+5-10 dBA	No
					+1.5 dBA	No
Hwy 99 & Frontage Road	North of Brunswick Road	77.5	77.5	0.0	>60 dBA	No
					+1.5 dBA	No
Hwy 99 & Frontage Road	South of French Camp Road	77.2	77.2	0.0	>60 dBA	No
					+1.5 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 Fehr & Peers 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 1.7 dB.

EVALUATION OF TRANSPORTATION NOISE ON OVERALL PROJECT SITE

Traffic Noise Levels

Union Road

Cumulative plus Project traffic noise levels are predicted to be 72 dB L_{dn} at a distance of approximately 60 feet from the centerline of Union Road, assuming no shielding from intervening buildings or sound walls. The proposed residential uses are located approximately 60 feet from the centerline of Union Road. Therefore, maximum exterior noise levels of 72 dB L_{dn} are predicted for these uses.

Highway 99

Cumulative plus Project traffic noise levels are predicted to be 79 dB L_{dn} at a distance of 110 feet from the centerline of Highway 99, assuming no shielding from intervening buildings or sound walls. The proposed residential uses are located approximately 110 feet from the centerline Highway 99. Therefore, maximum exterior noise levels of 79 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 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.

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 with Mitigation)

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 Union Road, south of Lovelace Road experience an exterior noise level of approximately 63.4 dB L_{dn}. Under Existing + Project conditions, exterior traffic noise levels are predicted to be approximately 65.1 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 1.7 dB would not exceed the City's increase criteria of 5-10 dB. 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}, or 3.0 dB or more where existing noise levels are between 60-65 dB 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 1.7 dBA L_{dn}. For this segment of Union Road, the existing ambient noise level at the nearest sensitive receptor is 63.4 dBA. Therefore, an increase of 3 dB would be required to be considered a significant impact. All other roadway segments analyzed in the traffic study do not

exceed the Proposed General Plan Standards for significant impacts. Therefore, this would be a **less than significant** impact.

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.). Proposed neighborhood parks are located internal to the Project site and would not impact off-site residential uses. Therefore, operational noise by the proposed Project is not analyzed further.

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 Mitigation Measure 3.11-1, temporary construction noise impacts would be reduced to less than significant.

EXTERIOR TRAFFIC NOISE AT PROPOSED USES

Tables 3.11-11 and 3.11-12 show 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 and 3.11-12, exterior noise levels would exceed the City's 60 dBA L_{dn} normally acceptable exterior noise standard. The 60 dBA L_{dn} noise contours for Union Road and Highway 99 were found to extend to an approximate distance of 159 feet and 2,037 feet from the roadway centerlines, respectively. This would encroach into the outdoor activity areas of proposed residences. Therefore, use of a physical barrier would be the only feasible method to reduce exterior noise levels to within the City's allowable exterior noise standard range.

Tables 3.11-11 and 3.11-12 also indicate the property line noise barrier heights required to achieve compliance with an exterior noise level standard of 60 dB L_{dn}.

TABLE 3.11-11: CUMULATIVE + PROJECT TRANSPORTATION NOISE LEVELS AT PROPOSED RESIDENTIAL USES – UNION RANCH NORTH

SEGMENT	APPROXIMATE RESIDENTIAL SETBACK, FEET[1]	PREDICTED NOISE LEVELS, DB L_{DN}[2]					
		NO BARRIER	6' BARRIER	7' BARRIER	8' BARRIER	9' BARRIER	10' BARRIER
Union Road	60	72	66	64	63	62	60

NOTES:

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

[2] THE MODELED NOISE BARRIERS ASSUME FLAT SITE CONDITIONS WHERE ROADWAY ELEVATIONS, BASE OF WALL ELEVATIONS, AND BUILDING PAD ELEVATIONS ARE APPROXIMATELY EQUIVALENT. SOUND BARRIER HEIGHT MAY BE ACHIEVED THROUGH THE USE A WALL AND EARTHEN BERM TO ACHIEVE THE TOTAL HEIGHT (I.E. 6-FOOT WALL ON 2-FOOT BERM IS EQUIVALENT TO AN 8-FOOT TALL BARRIER).

SOURCE: SAXELBY ACOUSTICS. 2022.

TABLE 3.11-12: CUMULATIVE + PROJECT TRANSPORTATION NOISE LEVELS AT PROPOSED RESIDENTIAL USES – STAGECOACH M&E

SEGMENT	APPROXIMATE RESIDENTIAL SETBACK, FEET[1]	PREDICTED NOISE LEVELS, DB L_{DN}[2]					
		NO BARRIER	12' BARRIER	13' BARRIER	14' BARRIER	15' BARRIER	16' BARRIER
Highway 99	110	79	68	67	66	66	65

NOTES:

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

[2] THE MODELED NOISE BARRIERS ASSUME FLAT SITE CONDITIONS WHERE ROADWAY ELEVATIONS, BASE OF WALL ELEVATIONS, AND BUILDING PAD ELEVATIONS ARE APPROXIMATELY EQUIVALENT. SOUND BARRIER HEIGHT MAY BE ACHIEVED THROUGH THE USE A WALL AND EARTHEN BERM TO ACHIEVE THE TOTAL HEIGHT (I.E. 6-FOOT WALL ON 2-FOOT BERM IS EQUIVALENT TO AN 8-FOOT TALL BARRIER).

SOURCE: SAXELBY ACOUSTICS. 2022.

The modeled noise barriers assume flat site conditions where roadway elevations, base of wall elevations, and building pad elevations are approximately equivalent. Appendix D of Appendix D shows the full barrier height calculations.

Union Ranch North

The data in Table 3.11-11 indicate that a noise barrier 10-feet in height would be required to achieve compliance with the City of Manteca 60 dB L_{dn} exterior noise level standard for the proposed residential uses in the Union Ranch North subdivision. It should be noted that Table 9-1 (Table 3.11-8) of the City's General Plan notes that residential uses are conditionally compatible with exterior noise levels of up to 65 dB L_{dn}, assuming that interior noise levels are in compliance with the City's interior noise level standards. The adjacent residential development to the south employs an 8-foot tall masonry wall for traffic noise protection. Therefore, it is expected that the Union Ranch North subdivision would also include construction of an 8-foot tall masonry wall or a 6-foot tall masonry wall on a 2-foot tall earthen berm, for a total barrier height of 8-feet. Based upon Table 3.11-11, an 8-foot tall barrier would achieve an exterior noise level of 63 dBA L_{dn} which is within the City's conditionally compatible exterior noise standard of up to 65 dB L_{dn}.

Stagecoach M&E

Based upon the data in Table 3.11-12, the Project would need to construct a barrier of a height greater than 16 feet to achieve the City of Manteca 60 dBA L_{dn} outdoor noise level standard. However, the use of a 16-foot-tall barrier may be used to achieve compliance with the City's conditionally acceptable noise level standard of 65 dBA L_{dn}. Therefore, the Stagecoach M&E subdivision would require the construction of a barrier 16 feet in height between the boundary of the proposed residential uses and Highway 99 in order to meet the City's 65 dBA Ldn conditionally acceptable exterior noise level standard.

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}.

It should be noted that noise barriers do not typically reduce exterior noise levels at second floor locations. The proposed residential uses are predicted to be exposed to unmitigated first-floor exterior transportation noise levels up to 72 dBA L_{dn} at the Union Ranch North subdivision and 78 dBA L_{dn} at the Stagecoach M&E subdivision. Mitigated first-floor noise levels of 63-65 dBA L_{dn} are expected after construction of sound barriers. The second floor locations are not expected to receive adequate shielding from the proposed sound walls and may be exposed to noise levels 2-3 dB higher than ground floor receivers. Therefore, noise levels of 74 dB L_{dn} are expected at the second floor facades of the Union Ranch North subdivision residences and 80 dBA L_{dn} at the Stagecoach M&E subdivision residences.

Based upon a 25-dB exterior-to-interior noise level reduction, interior noise levels are predicted to be up to 47-55 dB L_{dn} at second floors and 38-40 dBA L_{dn} at first floors. Accordingly, predicted interior

noise levels along the first row of residential uses along Union Road and Highway 99 are predicted to exceed the City's 45 dB L_{dn} interior noise level standard at second floor locations.

Appendix E of Appendix D of this EIR shows an estimate of the interior noise control measures required to meet the City's interior noise level standards.

EXTERIOR NON-TRANSPORTATION NOISE AT PROPOSED USES

The southeast corner of the Stagecoach at M&E site is adjacent to the George Perry & Sons agricultural use which include a large trucking yard. Saxelby Acoustics estimates that peak hour trucking operations could average approximately 25 trucks trips in a busy hour. A typical truck passby generates a sound exposure level (SEL) of 84 dBA. This would equate to an estimated hourly average noise level of 55.7 dBA at the adjacent proposed residential property line. This would exceed the City of Manteca daytime noise standard of 50 dBA L_{eq} daytime noise standard, as well as the 45 dBA L_{eq} nighttime noise standard. In order to comply with the City's daytime and nighttime noise standards, a 12-foot tall masonry sound wall would be required along the boundary of the proposed residential uses.

Appendix F of Appendix D of this EIR shows the noise barrier calculations for the George Perry & Sons operations.

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 3.11-1a: *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 3.11-1b: *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 3.11-2: *An 8-foot tall barrier shall be constructed along the Union Road Frontage, adjacent to proposed Project residential uses, in order to achieve the City's exterior noise standards. Noise barrier walls shall be constructed of concrete panels, concrete masonry units, earthen berms, or any combination of these materials that achieve the required total height. Wood is not recommended due to eventual warping and degradation of acoustical performance. These requirements shall be included in the improvements plans prior to their approval by the City's Public Works Department. Figure 3.11-2 shows the recommended sound wall locations. It should be noted that this noise control measure could be phased, under the condition that a supplemental analysis were to be conducted that demonstrates that interim phases would meet the City's noise standards without full Project buildout.*

Mitigation Measure 3.11-3: *A 16-foot tall barrier shall be constructed along the boundary of the proposed residential uses and Highway 99 Frontage Road, in order to achieve the City's exterior noise standards. The barriers may gradually transition from the 16-foot height down to a final height of 8-feet for the sections of wall wrapping towards the west, as shown on Figure 3.10-3 of the Noise Report (see Appendix D of this EIR). Noise barrier walls shall be constructed of concrete panels, concrete masonry units, earthen berms, or any combination of these materials that achieve the required total height. Wood is not recommended due to eventual warping and degradation of acoustical performance. These requirements shall be included in the improvements plans prior to their approval by the City's Public Works Department. Figure 3.10-3 of the Noise Report shows the recommended sound wall locations. It should be noted that this noise control measure could be phased, under the condition that a supplemental analysis were to be conducted that demonstrates that interim phases would meet the City's noise standards without full Project buildout.*

Mitigation Measure 3.11-4: *For the first rows of lots on the Union Ranch North subdivision adjacent to the Union Road right of way, second floor exterior facades with a view of Union Road would need the following noise control measures:*

- *Windows shall have a sound transmission class (STC) rating of 34.*
- *Interior gypsum at exterior walls shall be 5/8";*
- *Ceiling gypsum shall be 5/8";*
- *Exterior finish shall be stucco, fiber cement lap siding, or system with equivalent weight per square foot;*
- *Mechanical ventilation shall be installed in all residential uses to allow residents to keep doors and windows closed, as desired for acoustical isolation.*
- *As an alternative to the above-listed interior noise control measures, the applicant may provide a detailed analysis of interior noise control measures once building plans become available. The analysis should be prepared by a qualified noise control engineer and shall outline the specific measures required to meet the City of Manteca 45 dB Ldn interior noise level standard.*

Mitigation Measure 3.11-5: *For the first rows of lots on the Stagecoach M&E subdivision adjacent to the Highway 99 and Highway 99 Frontage Road right of way, second floor exterior facades with a view of Highway 99 would need the following noise control measures:*

- *Windows shall have a sound transmission class (STC) rating of 40.*
- *Interior gypsum at exterior walls shall be 5/8" hung on resilient channels;*
- *Ceiling gypsum shall be 5/8";*

- *Exterior finish shall be stucco with sheathing, fiber cement lap siding with sheathing, or system with equivalent weight per square foot;*
- *Mechanical ventilation shall be installed in all residential uses to allow residents to keep doors and windows closed, as desired for acoustical isolation.*
- *As an alternative to the above-listed interior noise control measures, the applicant may provide a detailed analysis of interior noise control measures once building plans become available. The analysis should be prepared by a qualified noise control engineer and shall outline the specific measures required to meet the City of Manteca 45 dB L_{dn} interior noise level standard.*

Mitigation Measure 3.11-6: *A 12-foot-tall barrier shall be constructed along the south boundary of the Stagecoach at M&E Project site, adjacent to the George Perry & Sons agricultural operations, in order to achieve the City's exterior noise standards. Noise barrier walls shall be constructed of concrete panels, concrete masonry units, earthen berms, or any combination of these materials that achieve the required total height. Wood is not recommended due to eventual warping and degradation of acoustical performance. These requirements shall be included in the improvements plans prior to their approval by the City's Public Works Department. Figure 3.11-3 shows the recommended sound wall locations. It should be noted that this noise control measure could be phased, under the condition that a supplemental analysis were to be conducted that demonstrates that interim phases would meet the City's noise standards without full Project buildout.*

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)

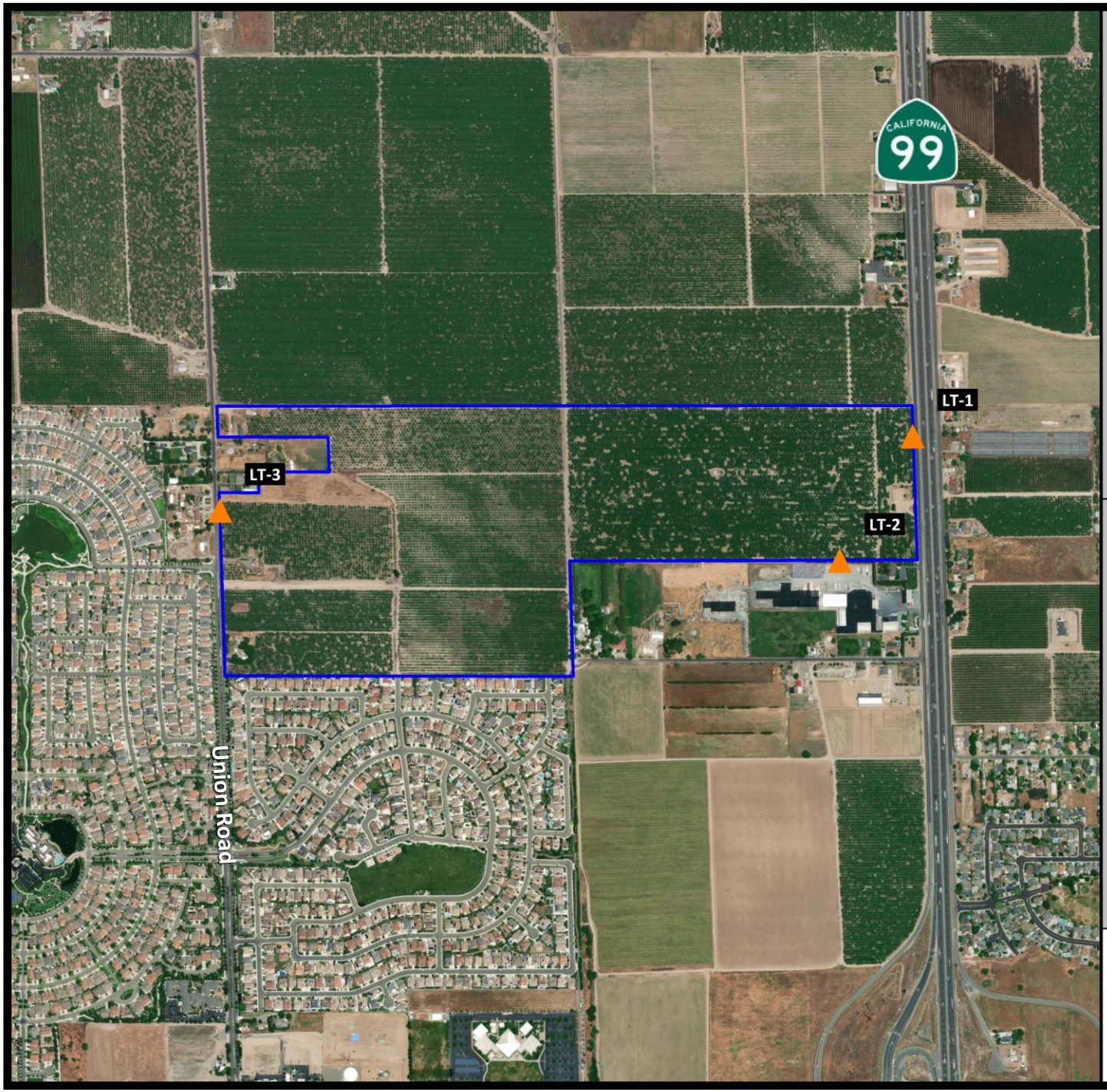
Mitigation Measure 3.11-7: *Any compaction required less than 26 feet from the adjacent residential structures shall be accomplished by using static drum rollers which use weight instead of vibrations*

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.

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N.Manteca Annexation 1

Manteca, California

Figure 3.10-1

Noise Measurement Sites

Legend

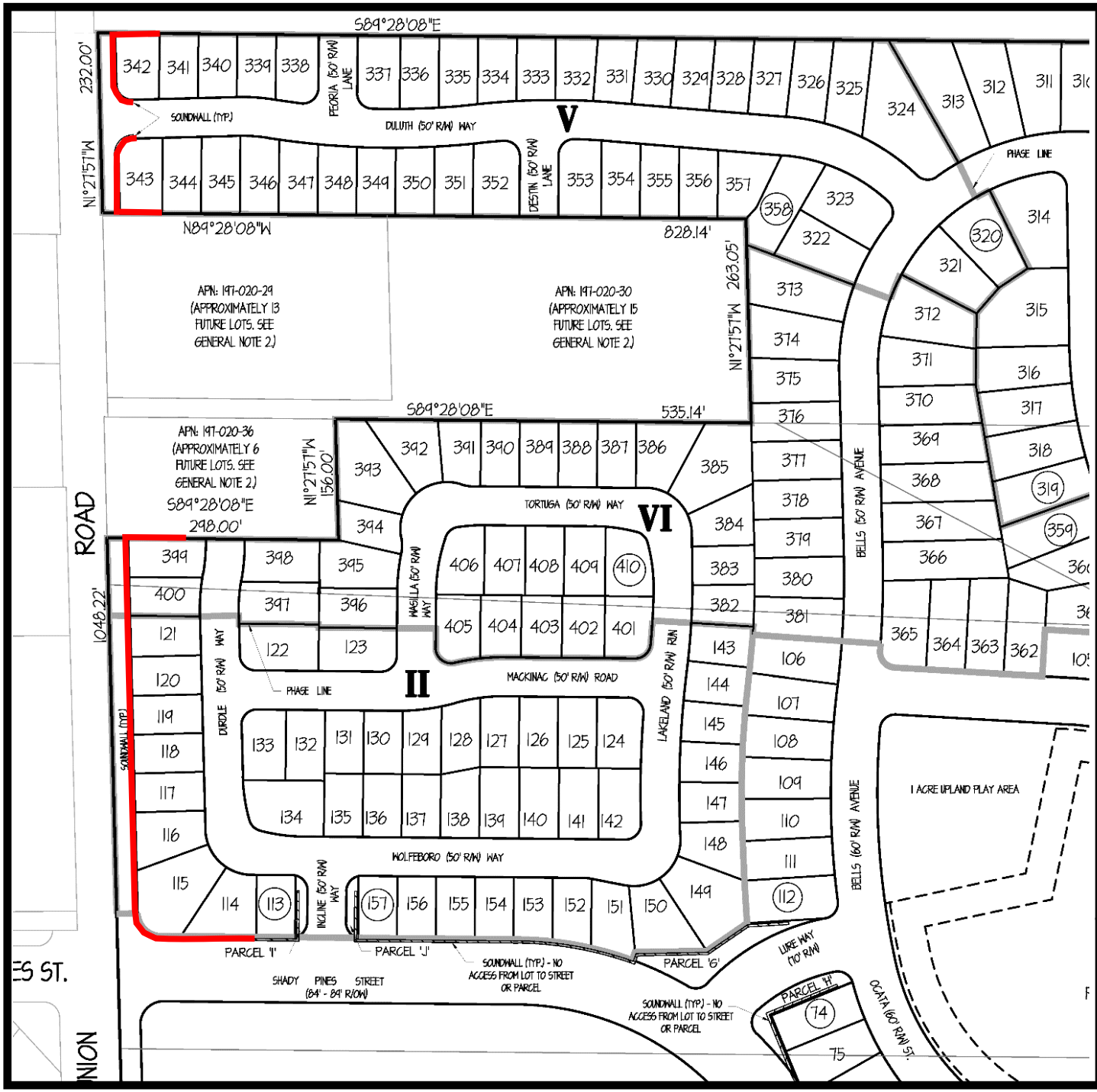
- Project Site
- Noise Measurement Site - Long Term

250 ft 1000 ft 1750 ft

Projection: Mercator / WGS84 / meters
Rev. Date: 11/12/2021

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N. Manteca Annexation 1

City of Manteca, California

Figure 3.10-2

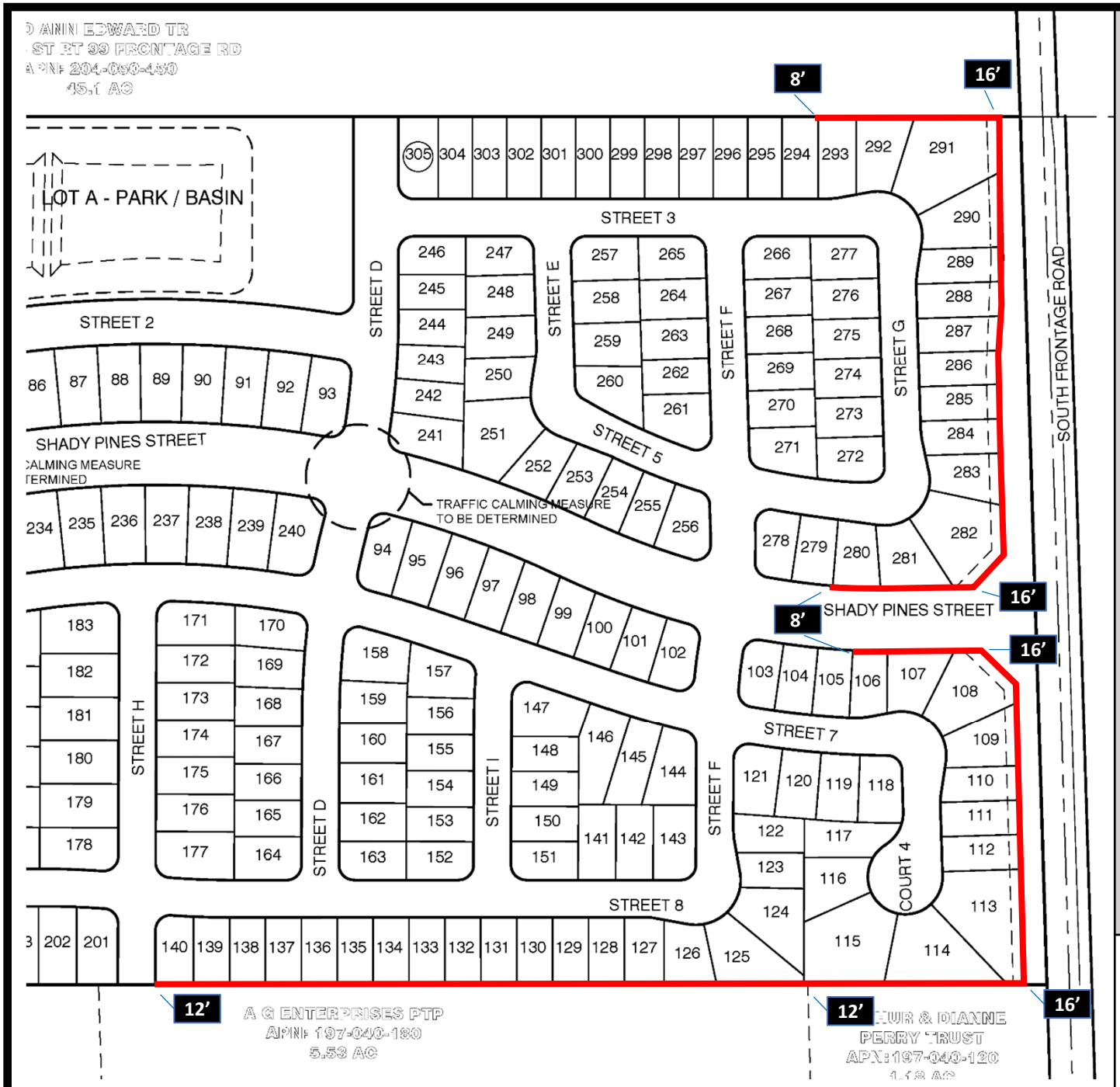
Required Wall Locations - Union Ranch North

Legend

Required 8-Foot Barrier

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N. Manteca Annexation 1

City of Manteca, California

Figure 3.10-3

Required Sound Wall Locations – Stagecoach M&E

Legend

Required Sound Barrier and Height

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This section describes and evaluates potential impacts associated with the provision of police protection, fire protection and emergency services, parks and recreation, schools, and other public facilities for the proposed Project. The information in this section is primarily derived from the:

- *City of Manteca General Plan* (City of Manteca as amended through 2016),
- *Manteca General Plan 2023 Draft Environmental Impact Report* (City of Manteca, 2003), and
- *Manteca Draft Municipal Services Review and Sphere of Influence Plan* (City of Manteca, 2020).

There were no comments received during the NOP scoping process related to this environmental topic.

3.12.1 ENVIRONMENTAL SETTING

CITY OF MANTECA 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, determine the correct level of adjustment required to reverse any deficits, and assure funding for needed infrastructure going forward. The City's Development Services, Public Works, and Finance Departments are responsible for continual oversight to ensure that the fee structures are adequate.

City of Manteca Police Department

Police protection services in the City of Manteca are provided by the Manteca Police Department (MPD). The MPD operates out of its headquarters located at 1001 W. Center Street. Currently the MPD has 74 sworn officers.

The department classifies calls for service as Priority 1, Priority 2 or Priority 3. Priority 1 calls are calls where a threat is posed to life or a crime of violence. Priority 2 calls are calls for service where there is an urgency or suspicious behavior. Priority 3 calls are calls for service where no emergency or serious problem is involved. In 2016, there were 217 Priority 1 calls, 18,080 Priority 2 calls, and 8,551 Priority 3 calls, totaling 26,841 calls. Calls for service increased to 46,256 total calls in 2018. The department's average response times for 2016 for the 3 priorities were as follows:

- Priority 1 calls: 2016, 4 minutes and 27 seconds.
- Priority 2 calls: 2016, 27 minutes and 2 seconds.
- Priority 3 calls: 2016, 50 minutes and 22 seconds.

ORGANIZATION

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

Operations Division

The Operations Division is the largest division of the Department. It includes all uniformed officers and their support teams. The units included in the Operations Division are patrol, traffic, community service officers, SWAT, crisis response team, mounted patrol, canine, and bomb squad.

Services Division

The Services Division includes all the teams and units that support the line police function of the MPD. These teams include Dispatch, Records, Property and Evidence, Crime Analysis, and Animal Services, as well as Detectives, School Resource Officers, Gang Unit, and Manteca's Street Crimes Unit (SCU), which is the department's proactive narcotic and street crime suppression unit.

The MPD also has several very active volunteer groups. The Police Explorers, Citizen's Police Academy graduates, Police Reserves, and the SHARPs allow members of the community of all ages and experience to give back to the community through volunteering.

Public Affairs Unit

The MPD's Public Affairs Officer (PAO) works directly with the Chief of Police on issues that affect the MPD and community. In addition to being a community liaison, the PAO works with the public in providing current information regarding issues effecting Manteca. This is done by working with local news media outlets, issuing information bulletins and conducting neighborhood meetings, and by using the local government channel for a program called StreetBeat. In addition to assisting the Chief of Police, the PAO also coordinates several crime prevention programs to include the Citizen Police Academy, Drug Awareness Education, and various workplace-training programs such as Workplace Violence Prevention. The PAO also coordinates with other city offices special projects and does site plan reviews for new commercial and residential projects using a process called CPTED (Crime Prevention through Environmental Design).

TABLE 3.12-1: MANTECA POLICE DEPARTMENT CRIME STATISTICS (2017-2019)

CATEGORY/CRIME	*2017*	*2018*	*2019*
Total Violent Crimes	**256**	**256**	**199**
Homicide	4	0	3
Rape	18	18	27
Robbery	89	97	66
Assault	145	141	103
Total Property Crimes	**2,240**	**2,288**	**1,848**
Burglary	302	386	239
Motor Vehicle Theft	322	380	282
Larceny	1,616	1,522	1,327
Arson	14	15	18

SOURCE: FBI CRIME STATISTICS; HTTPS://UCR.FBI.GOV/.

As shown in the table, the majority of crimes committed in Manteca consist of property crimes, primarily larceny.

City of Manteca Fire Department

The Manteca Fire Department is responsible for the primary provision of fire service and emergency medical response for the City of Manteca and its residents. The Manteca Fire Department serves approximately 72,000 residents throughout over 17 square miles within the City limits. The Manteca Fire Department operates out of five facilities that are strategically located in the City of Manteca. The Manteca Fire Department is headquartered in Station 242 located at 1154 S. Union Road. This building serves as the Fire Department headquarters and the Fire Prevention Bureau. Fire training and emergency medical services are managed out of Station 241. Apparatus includes three engines, three reserve engines, one ladder truck, one medium rescue unit, one USAR rescue trailer, eight staff vehicles, two pick-up trucks, and a public education trailer.

The Manteca Fire Department maintains a goal for the initial company of three firefighters to arrive on scene for fire and emergency medical service (EMS) incidents within five 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. In 2017, the Department averaged a 4:22 response time City-wide. In 2017, the MFD on an average handled 7,579 emergency calls and 6,737 in 2016. The Department is currently meeting the Response Effectiveness goal.

ISO RATING

The Insurance Services Office (ISO) Public Protection Classification Program currently rates the Fire Department as a 2 on a scale of 1 to 10, with 1 being the highest possible protection rating and 10 being the lowest. The ISO rating measures individual fire protection agencies against a Fire Suppression Rating Schedule, which includes such criteria as facilities and support for handling and dispatching fire alarms, first-alarm response and initial attack, and adequacy of local water supply for fire-suppression purposes. The recent construction and staffing of Fire Station No. 4 and Fire Station No. 5 will have a positive impact on the City's ISO rating. The ISO ratings are used to establish fire insurance premiums. With the completion of Fire Station 5, the City plants to apply for ISO re-classification and the Fire Department will apply for Accreditation through the Commission of Fire Accreditation International (CFAI).

FIRE STATIONS

The Manteca Fire Department currently operates five fire stations within its service area, each are listed below.

- Station 241 - 290 S. Powers Ave. Manteca CA 95336 (operational)
- Station 242 - 1154 S. Union Road Manteca CA 95337 (operational)
- Station 243 - 399 W. Louise Ave. Manteca CA 95336 (operational)
- Station 244 - 1465 W. Lathrop Rd. Manteca CA 95336 (operational)
- Station 245, 1675 E. Woodward Ave. Manteca CA 95337 (operational)

City of Manteca Parks and Recreation Division

The City of Manteca Parks and Recreation Division serves thousands of individuals, including toddlers, youth, teens, and adults throughout the greater Manteca area. The Recreation Division offers programs and services that foster health, wellness, and human development, strengthen families, and provide recreational opportunities for the purpose of positively affecting the quality of life for all involved. The Parks Division oversees more than 600 acres of neighborhood and community parks, maintenance districts, urban forest, the Tidewater Bikeway, skate park, swimming pool, senior center, library services, and an 18-hole golf course.

Types of Parks

COMMUNITY PARKS

Community parks are generally fifteen (15) to twenty-five (25) acres in size and include areas for active sports as well as space for family and group activities, such as picnicking. Community parks are larger in size than neighborhood parks and serve to fulfill the active and passive recreational needs of multiple neighborhoods. The community park serves the needs of local neighborhoods by providing a close to home site for more active recreation that is not typically suitable or physically possible in a neighborhood park (i.e., formal sports fields and courts with night lighting). Community parks and sports parks are where most organized activities provided by the Parks and Recreation Department and various league sports are intended to occur.

The City of Manteca has six developed Community Parks, totaling approximately seventy-eight (78) acres. The closest community park is the Big League Dreams sports complex located approximately 0.5 miles north of the Project site.

NEIGHBORHOOD PARKS

Neighborhood parks serve as the focal point of neighborhood communities, the hub for both physical and social activities in a recreational setting that should be primarily passive. Appropriately designed neighborhood parks act as “pulse points” within the city. They are spaces that develop a sense of place while at the same time evolve to reflect the neighborhood they represent. Neighborhood parks act as critical building blocks of the city’s image and assist in developing an overall sense of community and security. They also serve as critical nodes and access points in the city-wide green space network. Neighborhood parks are generally five (5) to seven (7) acres. Amenities at neighborhood parks may include ball fields, basketball, volleyball, bocce ball, and tennis courts, small picnic areas, playground equipment, restroom facilities, water play features, and barbeques.

The City of Manteca has fifty-five (55) Neighborhood Parks, totaling approximately 251.85 acres. There are six neighborhood parks located within a mile of the Project site. The Racoon Valley Park and the Northgate park are located south of the Plan Area. Additionally, the Stonebridge Park, Maple Valley Park, Chadwick Square Park, and the Doxey Park are located southwest of the Project site.

SPECIAL USE PARKS

The Special Use Parks allow for flexibility in providing recreational resources throughout the city-wide park space network. This classification is intended to accommodate special circumstances, unique site characteristics, etc. in park, trail, and recreation resources. These types of resources add diversity to the park network and accommodate a variety of non-traditional recreation amenities beyond the standard neighborhood, and community, park classifications.

The City of Manteca has ten (10) Special Use Parks/Facilities totaling approximately ninety-one (91) acres, including a major multi-use recreation trail that covers over 3.5 miles of terrain.

City Parks

The City currently manages more than 522 acres of parks, facilities, trails and recreation lands, including approximately 421 acres of community, neighborhood, and special use parks, and the 101-acre Manteca Park Golf Course. Table 3.12-2 summarizes the City's park facilities by category.

TABLE 3.12-2: SUMMARY OF PARKS AND RECREATION FACILITIES

PARK TYPE	*NUMBER*	*ACREAGE*	*GOAL (ACRES PER 1,000 RESIDENTS)*	*CURRENT RATIO (ACRES PER 1,000 RESIDENTS)*
Neighborhood Parks	55 sites	251.9	3	3.02
Community Parks	6 sites	78.5	1	0.94
Special Use Facilities	10 sites	90.9	1	1.09
TOTAL	**71 sites**	**421.3**	**5**	**5.05**

SOURCE: CITY OF MANTECA PARKS AND RECREATION MASTER PLAN, 2016

When the acreage is broken down into functional categories, the City currently has approximately 251.9 acres of Neighborhood Park land which exceeds the City's goal of 3 acres per 1,000 population. In the category of Community Park acreage, the current quantity of approximately 78.5 acres comes close to but does not exceed the city's goal of one acre per 1,000 population. In the category of Special Use Facility/Parks, the City's approximately 90.9 acres of park lands for special uses exceeds the City's goal of one acre per 1,000 population.

In addition, the City's Parks and Recreation Master Plan identified additional facility needs required by year 2035. A cumulative total of approximately 130 acres of Neighborhood Park land development would be required, as well as a total of approximately 38.5 acres of Community Park land, and 26 acres of Special Use Facility/Park lands. This amount is approximate and could be met by a combination of utilizing existing undeveloped parkland and acquiring new parkland to develop.

Parks and Recreation amenities include several baseball and softball diamonds, sports fields, picnic areas, barbecues, playgrounds and tot lots, over 3 miles of Class 1 bike and pedestrian path, lighted tennis courts, a BMX bicycle track, a skate park, an 18-hole municipal golf course, and a public swimming pool (with tot pool).

Existing rental facilities include:

- Northgate: Full Picnic Shelter; Half Picnic Shelter
- Lincoln Picnic Shelter
- Woodward: Full Picnic Shelter; Half Picnic Shelter
- Library Park Gazebo
- Lincoln Pool
- Sports Fields

On a regional scale, the City is located in the Sacramento-San Joaquin Delta (Delta), which contains several recreational areas and facilities, primarily for water-based recreation. Regional County parks near the City include the 9.85-acre Dos Reis Regional Park and the 3.7-acre Mossdale Crossing Regional Park, both located along the San Joaquin River. Mossdale Crossing Park is located on the west side of Interstate 5. Each of these parks includes boat launch ramps, picnic/barbeque areas, and children's play areas. Dos Reis Regional Park also has camping facilities. Also in the vicinity is the Haven Acres Marina, a private marina located on the San Joaquin River north of Dos Reis Regional Park. This facility provides river access to the San Joaquin River and includes parking areas, a boat ramp, and 10 boat berths.

OTHER AGENCY SERVICES

Manteca Unified School District

The Project site is located within the service boundaries of the Manteca Unified School District (MUSD). 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 23,000 students. MUSD operates 14 elementary and middle schools (grades K-8), four high schools (grades 9-12), one community day school (grades 7-12), and one vocational academy (grades 11-12). See Table 3.12-3 for the Manteca school inventory.

TABLE 3.12-3: 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

SCHOOL	*GRADES SERVED*	*ADDRESS*	*ENROLLMENT 2019-2020 SCHOOL YEAR*
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 2019-20.

As shown in Table 3.12-4, 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 have a total enrollment of 23,834 students for the 2019-2020 school year. Table 3.12-4 provides a summary of the public-school enrollment by grade within Manteca.

TABLE 3.12-4: 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.

Library Services

The Manteca Branch Library, a branch library of the Stockton - San Joaquin County Library system, is located at 320 West Center Street. The library offers a circulating collection of books, magazines, CDs, and DVDs in both English and Spanish, and carries a number of local regional and national newspapers.

Computer workstations are available for general and Internet use. Free Wi-Fi is also available for patrons with laptops and mobile devices. The library offers black & white and color printing, as well as a copy machine and typewriter. A microfilm reader/printer is available, which includes an extensive collection of archives from the Manteca Bulletin. A non-circulating collection of reference materials is also available for help with research.

The Manteca Branch Library offers two weekly story time programs beginning at 10:30 AM. On Tuesdays, a program geared for children aged 6 months to 2 years and on Thursdays the library has preschool storytime, primarily for children aged 2 to 4 years.

Manteca Senior Center

The Manteca Senior Center located at 295 Cherry Lane is a 10,000-plus square-foot, multi-purpose Senior Center serving and involving adults and seniors age 50 and above throughout the greater Manteca area. There are no membership fees to participate at the center; however, some classes and activities have nominal fees.

Manteca Hospital and Medical Facilities

Health care facilities within Manteca encompass Doctor's Hospital of Manteca, Kaiser Permanente Manteca Medical Center, residential care facilities, as well as private physicians and other medical practitioners.

Doctor's Hospital of Manteca, provides acute care service for Manteca and the surrounding community. The hospital is located at 1205 east North Street in the City of Manteca. Doctor's Hospital of Manteca offers comprehensive diagnostic and surgical services, intensive care unit, breast healthcare, including mammography, behavioral health care, a 67-bed adult inpatient psychiatric treatment center, expanded imaging services, hip and knee surgery, back pain treatment and surgery, bariatric (weight-loss) surgery. Kaiser Permanente Manteca Medical Center also provides acute care service for Manteca and the surrounding community. The hospital is located at 1777 West Yosemite Avenue. Residents typically travel to other facilities, for certain specialized services including severe trauma and psychiatric care.

The San Joaquin County Public Health Services provides maternal and child health care programming, California Children's Services, child health and disability programs, vaccinations and general public health nursing to the community. Alcohol & drug programs are also organized under the County Health Services and provide residential treatment, out-patient counseling, perinatal programs and community education and information.

3.12.2 REGULATORY SETTING

STATE

Police Protection

There are no federal or state regulations related to police protection services applicable to the proposed Project.

Fire Protection and Emergency Response

CALIFORNIA OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION

In accordance with California Code of Regulations Title 8 Sections 1270 "Fire Prevention" and 6773 "Fire Protection and Fire Equipment" the California Occupational Safety and Health Administration

(Cal/OSHA) has established minimum standards for fire suppression and emergency medical services. The standards include, but are not limited to, guidelines on the handling of highly combustible materials, fire hose sizing requirements, restrictions on the use of compressed air, access roads, and the testing, maintenance, and use of all firefighting and emergency medical equipment.

EMERGENCY RESPONSE/EVACUATION PLANS

The State passed legislation authorizing the Office of Emergency Services (OES) to prepare a Standard Emergency Management System (SEMS) program, which sets forth measures by which a jurisdiction should handle emergency disasters. Non-compliance with SEMS could result in the State withholding disaster relief from the non-complying jurisdiction in the event of an emergency disaster.

FIRE PROTECTION

The California Fire Code contains regulations relating to construction and maintenance of buildings and the use of premises. Topics addressed in the Code include fire department access, fire hydrants, automatic sprinkler systems, fire alarm systems, fire and explosion hazards safety, hazardous materials storage and use, provisions to protect and assist first responders, industrial processes, and many other general and specialized fire safety requirements for new existing buildings and premises.

CALIFORNIA FIRE CODE

The 2019 California Fire Code contains regulations relating to construction, maintenance, and use of buildings. Topics addressed in the California Fire Code include fire department access, fire hydrants, automatic sprinkler systems, fire alarm systems, fire and explosion hazards safety, hazardous materials storage and use, provisions intended to protect and assist fire responders, industrial processes, and many other general and specialized fire-safety requirements for new and existing buildings and the surrounding premises. The Fire Code contains specialized technical regulations related to fire and life safety.

CALIFORNIA HEALTH AND SAFETY CODE

State fire regulations are set forth in Sections 13000 et seq. of the California Health and Safety Code. This includes regulations for building standards (as also set forth in the California Building Code), fire protection and notification systems, fire protection devices such as extinguishers and smoke alarms, high-rise building and childcare facility standards, and fire suppression training.

NFPA 1710

The National Fire Protection Association (NFPA) 1710 Standards are applicable to urban areas and where staffing is comprised of career firefighters. According to these guidelines, a career fire department needs to respond within six minutes, 90 percent of the time with a response time measured from the 911 call to the time of arrival of the first responder.

The standards are divided as follows:

- Dispatch time of one minute or less for at least 90 percent of the alarms;

- Turnout time of one minute or less for EMS calls (80 seconds for fire and special operations response);
- Fire response travel time of four minutes or less for the arrival of the first arriving engine company at a fire incident and eight minutes or less travel time for the deployment of an initial full alarm assignment at a fire incident;
- Eight minutes or less travel time for the arrival of an advanced life support (ALS) (4 minutes or less if provided by the fire department.

Parks/Recreation

QUIMBY ACT

The Quimby Act (California Government Code Section 66477) states that "the legislative body of a city or county may, by ordinance, require the dedication of land or impose a requirement of the payment of fees in lieu thereof, or a combination of both, for park or recreational purposes as a condition to the approval of a tentative or parcel map." Requirements of the Quimby Act apply only to the acquisition of new parkland and do not apply to the physical development of new park facilities or associated operations and maintenance costs. The Quimby Act seeks to preserve open space needed to develop parkland and recreational facilities; however, the actual development of parks and other recreational facilities is subject to discretionary approval and is evaluated on a case-by-case basis with new residential development. The City collects fees imposed by the park and recreation districts impact fees. The impact fees are collected at the time of building permit and include both capital impacts and land acquisition.

Schools

CALIFORNIA CODE OF REGULATIONS

The California Code of Regulations, Chapter 4.9, Payment of Fees, Charges, Dedications, or Other Requirements Against a Development Project. *Section 65995-65998 (h)* The 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 and, if applicable, any amounts specified in Section 65995.5 or 65995.7 are 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, or any change in governmental organization or reorganization as defined in Section 56021 or 56073, on the provision of adequate school facilities.

CALIFORNIA DEPARTMENT OF EDUCATION

The California Department of Education (CDE) School Facilities Planning Division (SFPD) prepared a School Site Selection and Approval Guide that provides criteria for locating appropriate school sites in the State of California. School site and size recommendations were changed by the CDE in 2000 to reflect various changes in educational conditions, such as lowering of class sizes and use of advanced technology. The expanded use of school buildings and grounds for community and agency joint use and concern for the safety of the students and staff members also influenced the modification of the CDE recommendations.

Specific recommendations for school size are provided in the School Site Analysis and Development Guide. This document suggests a ratio of 1:2 between buildings and land. CDE is aware that in a number of cases, primarily in urban settings, smaller sites cannot accommodate this ratio. In such cases, the SFPD may approve an amount of acreage less than the recommended gross site size and building-to-ground ratio.

Certain health and safety requirements for school site selection are governed by state regulations and the policies of the SFPD relating to:

- Proximity to airports, high-voltage power transmission lines, railroads, and major roadways;
- Presence of toxic and hazardous substances;
- Hazardous facilities and hazardous air emissions within one-quarter mile;
- Proximity to high-pressure natural gas lines, propane storage facilities, gasoline lines, pressurized sewer lines, or high-pressure water pipelines;
- Noise;
- Results of geological studies or soil analyses; and
- Traffic and school bus safety issues.

THE KINDERGARTEN-COMMUNITY COLLEGE PUBLIC EDUCATION FACILITIES BOND ACT OF 2016 (PROP 51)

The Kindergarten-Community College Public Education Facilities Bond Act of 2016 was the first education-related bond measure to appear on the ballot since 2006. This act was approved by California voters in November 2016 and provided for a bond issued of $9 billion with $7.0 billion earmarked for K-12 school facilities and $2 billion earmarked for community college facilities. The $7.0 billion for K-12 school facilities was allocated as follows: $3 billion for the construction of new school facilities, $500 million for providing school facilities for charter schools, $3 billion for the modernization of school facilities, and $500 million for providing facilities for career technical education programs. The $2 billion allocated to community college facilities was for acquiring, constructing, renovating, and equipping community college facilities.

LEROY F. GREENE SCHOOL FACILITIES ACT OF 1998 (SB 50)

The "Leroy F. Greene School Facilities Act of 1998," also known as Senate Bill 50 or SB 50 (Chapter 407, Statutes of 1998), governs a school district's authority to levy school impact fees. This comprehensive legislation, together with the $9.2 billion education bond act approved by the voters in November 1998 known as "Proposition 1A", reformed methods of school construction financing in California. SB 50 instituted a new school facility program by which school districts can apply for state construction and modernization funds. It imposed limitations on the power of cities and counties to require mitigation of school facilities impacts as a condition of approving new development and provided the authority for school districts to levy fees at three different levels:

- Level I fees are the current statutory fees allowed under Education Code 17620. This code section provides the basic authority for school districts to levy a fee against residential and commercial construction for the purpose of funding school construction or reconstruction

of facilities. These fees vary by district for residential construction and commercial construction and are increased biannually.

- Level II fees are outlined in Government Code Section 65995.5, allowing school districts to impose a higher fee on residential construction if certain conditions are met. These conditions include having a substantial percentage of students on multi-track year-round scheduling, having an assumed debt equal to 15–30 percent of the district's bonding capacity (percentage is based on revenue sources for repayment), having at least 20 percent of the district's teaching stations housed in relocatable classrooms, and having placed a local bond on the ballot in the past four years which received at least 50 percent plus one of the votes cast. A Facility Needs Assessment must demonstrate the need for new school facilities for unhoused pupils is attributable to projected enrollment growth from the construction of new residential units over the next five years.

Level III fees are outlined in Government Code Section 655995.7. If State funding becomes unavailable, this code section authorizes a school district that has been approved to collect Level II fees to collect a higher fee on residential construction. This fee is equal to twice the amount of Level II fees. However, if a district eventually receives State funding, this excess fee may be reimbursed to the developers or subtracted from the amount of state funding.

LOCAL

City of Manteca Municipal Code

The City of Manteca Municipal Code, Fee Schedule VI *Development Fee* includes development impact fees to fund public facilities, including the San Joaquin County Facilities Fee to fund police services.

Manteca Parks and Recreation Master Plan

The City of Manteca adopted a Parks and Recreation Master Plan in 2016. The Master Plan evaluates the parks and recreation needs of the community and develops strategies, policies, and actions that reflect those needs to create better places to recreate within Manteca. This document provides the City's Parks and Recreation Department with precise direction and serves as a realistic guide for the next ten to twenty years.

City of Manteca General Plan

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: Public Facilities and Services Element

- PF-P-39. The City shall endeavor through adequate staffing and patrol arrangements to maintain the minimum feasible police response times for police calls.
- PF-P-40. The City shall provide police services to serve the existing and projected population.
- PF-P-41. The City will establish the criteria for determining the circumstances under which police service will be enhanced.
- PF-P-42. The City shall endeavor to maintain an overall fire insurance (ISO) rating of 4 or better.
- PF-P-43. The City shall endeavor through adequate staffing and station locations to maintain the minimum feasible response time for fire and emergency calls.
- PF-P-44. The City shall provide fire services to serve the existing and projected population.
- PF-P-45. The City will establish the criteria for determining the circumstances under which fire service will be enhanced.
- PF-P-46. The City shall expand the community and neighborhood park system with the goal of providing neighborhood park facilities within reasonable walking distance of all city residential areas.
- PF-P-47. The City shall use joint development of park and drainage detention basins in the development of neighborhood parks.
- PF-P-49. City park acquisition and development efforts shall be based on a goal of 5 acres of developed neighborhood and community parkland per 1,000 residents within the city limits. The distribution of land between neighborhood and community parks shall be determined within the Parks and Recreation Master Plan.
- PF-P-50. Neighborhood parks shall conform to the following general guidelines (specific details and standards to be determined within the Parks and Recreation Master Plan):
  - The typical minimum size shall be set to support active and passive recreation activities.
  - The typical service area for a neighborhood park is approximately ¼ mile walking distance.
  - Neighborhood parks shall include a turf area above the basin flood line of sufficient area to be used for playgrounds, sports, picnic areas, and other recreational facilities.
- PF-P-52. The City shall endeavor to identify, acquire, and develop one or more community parks as defined in the Parks and Recreation Master Plan.
- PF-P-53. All new residential development will be required to pay a park acquisition and improvement fee, based on providing 5 acres per 1,000 residents, to fund system-wide improvements.
- PF-P-54. The City shall require the provision of private open space and recreational facilities as part of new residential developments.
- PF-P-34. The City shall cooperate with the Manteca Unified School District in their collection of school facility development fees from new development.
- PF-P-35. Financing of new school facilities will be planned concurrent with new development.

GENERAL PLAN UPDATE (PROPOSED)

Policies: Community Facilities Element

- CF-1.1. Encourage the implementation of new techniques and technologies to provide the best available level of community services in a cost-effective manner.
- CF-1.2. Ensure that new growth and development participates in the provision and expansion of essential community services and facilities, including parks, fire and police facilities, schools, utilities, roads, and other needed infrastructure, does not exceed the City's ability to provide services, and does not place an economic burden on existing residents.
- CF-1.3. Require new development to demonstrate that the City's existing or planned community services and facilities can accommodate the increased demand for said services and facilities prior to or at completion of the project.
- CF-1.4. Require new development to offset or mitigate impacts to community services and facilities, including fair share contribution of all costs of required public infrastructure and services, to ensure that service levels for existing users are not degraded or impaired.
- CF-1.5. Require public improvements and facilities to enhance, rather than degrade, the natural environment.
- CF-1.6. Encourage comprehensive development of public facilities and services rather than incremental, single projects.
- CF-1.7. Plan and develop public services and facilities to support economic development and residential growth.
- CF-1.8. Make use of the public right-of-way as a tool for facilitating quality design and development.
- CF-2.1. Prioritize public safety through ensuring adequate staffing, implementing best available technologies, capital investments in public safety, and organizing and utilizing community volunteers.
- CF-2.2. Ensure that the Police Department has adequate funding, staff, and equipment to accommodate existing and future growth in Manteca.
- CF-2.3. Strive to provide a police force level of a minimum of 1.00 officers per 1,000 population.
- CF-2.4. Endeavor through adequate staffing and patrol arrangements to maintain the minimum feasible police response times for police calls.
- CF-2.5. Periodically review and, if necessary, amend the criteria for determining the circumstances under which police service will be enhanced.
- CF-2.6. Promote and support community-based crime prevention programs, as an important augmentation to the provision of professional police services.
- CF-2.7. Emphasize the use of physical site planning as an effective means of preventing crime. Open spaces, landscaping, parking lots, parks, play areas, and other public spaces should be designed with maximum feasible visual and aural exposure to community residents.

- CF-2.8. Promote coordination between land use planning and urban design through consultation and coordination with the Police Department during the review of new development applications.
- CF-3.1. Through adequate staffing and station locations, maintain a maximum five-minute travel response time 90% of the time for fire and emergency calls and an overall fire insurance (ISO) rating of 3 or better for all developed areas within the City.
- CF-3.2. Provide fire services to serve the existing and projected population.
- CF-3.3. Periodically review, and if necessary amend, the criteria for determining the circumstances under which fire service will be enhanced.
- CF-3.4. Design and maintain roadways in such a way so as to maintain acceptable emergency vehicle response times.
- CF-3.5. Ensure that new development is designed, constructed, and equipped consistent with the requirements of the California Fire Code in order to minimize the risk of fire.
- CF-3.6. Ensure that new development is served with adequate water volumes and water pressure for fire protection.
- CF-4.1. Ensure the provision of sufficient parks, trails, and recreation facilities that are well distributed and interconnected throughout the community.
- CF-4.2. Expand, renovate, and maintain high quality parks, trails, and recreation facilities, programs, and services to accommodate existing and future needs that address traditional and non-traditional recreation, active and passive recreation, wellness, historical, cultural arts, environmental education, conservation, accessibility, inclusion, diversity, safety, and new technology.
- CF-4.3. Uphold design, construction, implementation, and maintenance standards to ensure high quality parks, trails, and recreation facilities, programs, and services, now and into the future.
- CF-5.1. Continue to work cooperatively with the local school districts to encourage the maintenance of high quality schools and to order to ensure that superior educational facilities and opportunities for all students are provided in a timely manner in accordance with the pace of residential development.

Implementation: Community Facilities Element

- CF-1a. Periodically review the fee schedules for water and sewer connections, city facilities and major equipment, and development impact fees and revise fees as necessary.
- CF-1b. Cooperate with other jurisdictions, agencies, and utility providers where appropriate to achieve timely and cost-effective provision of public facilities and services.
- CF-3a. Continuously monitor response times and provide the City Council with an annual report on the results of the monitoring.
- CF-3b. Continue to enforce the California Building Code and the California Fire Code to ensure that all construction implements fire-safe techniques, including fire resistant materials, where required.

- CF-3c. As part of the City's existing development review process for new projects, the Fire Department will continue to make determinations on projects' potential impacts on fire protection services. Requirements will be added as conditions of project approval, if appropriate.
- CF-3d. The Planning Commission and City Engineer will review proposed residential street patterns to evaluate the accessibility for fire engines and emergency response.
- CF-2a. Continue to require preparation of an annual Police Department Performance Report, as amended periodically.
- CF-2b. In conjunction with the annual Police Department Performance Report, further develop and refine best practices to assess, monitor, and maintain the Police Department's organizational performance goals and monitor police staffing levels. The assessment categories related to adequate police staffing could include but are not limited to:
    - Crime rates;
    - Response times;
    - Clearance rates;
    - Police department workload;
    - Financial resources; and
    - Performance standards.
- CF-2c. As part of the development review process, consult with the Police Department in order to ensure that the project design facilitates adequate police services and that the project addresses its impacts on police services.
- CF-2d. Continue to implement community-based police outreach services and programs, including but not limited to, neighborhood watch, volunteers in police service (VIPS), and crime and safety needs of seniors (TRIAD).
- CF-4a. Continuously monitor the condition of parks, trails, and recreation facilities throughout the community and prioritize the rehabilitation of existing facilities that serve the greatest number of residents.
- CF-4b. Periodically review the City's Parks and Recreation Master Plan to ensure that parks and recreation needs are adequately identified and prioritized, to update cost estimates for park acquisition and development and remaining development potential based on the General Plan and to ensure that the City maintains a minimum overall ratio of 5 acres of parkland for every 1,000 residents.
- CF-4c. As part of the next Parks and Recreation Master Plan Update, consider the community needs identified during the General Plan process, including a community park and a combined or separate facility to accommodate community-wide events, a nature-based park, bicycle and pedestrian improvements necessary to improve access to park and recreation facilities, methods to increase physical activity opportunities in the community, and increased joint use of facilities with the school districts.
- CF-4d. Investigate and pursue a diverse range of funding opportunities for parks, trails, and recreation facilities, including but not limited to, grants, joint use/management strategies, user fees, private sector funding, assessment districts, homeowners' associations, non-

profit organizations, funding mechanisms for the maintenance of older parks, and management assistance through Federal, State, and regional partnerships.

- CF-4e. Periodically review, and if necessary update, the Parks and Recreation development impact fees in order to ensure that the City's parks and recreation needs are adequately identified and prioritized and that new development continues to provide a fair-share contribution towards parks, trails, and recreation facilities.
- CF-4f. Implement a wide range of public outreach programs, including the City's website, newsletters, and other emerging communications technologies to keep the public informed about available parks, trails, and recreation facilities, programs, and services.
- CF-4g. Continue to pursue joint-use of schools and detention facilities to supplement the parks, trails, and recreation needs of the community.
- CF-4h. Through conditions of approval and/or development agreements, ensure that new development provides for its fair-share of park and recreation facilities, including connections to adjacent facilities, and that the development of new parks, trails, and recreation facilities occurs during the infrastructure construction phase of new development projects so that they are open and available to the public prior to completion of the project.

3.12.3 IMPACTS AND MITIGATION MEASURES

THRESHOLDS OF SIGNIFICANCE

Consistent with Appendix G of the CEQA Guidelines, the proposed Project will have a significant impact on public services if it would 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;
    - Police Protection;
    - Schools;
    - Parks; and
    - Other public facilities.
- An increase in 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; or
- If it includes recreational facilities or requires the construction or expansion of recreational facilities which might have an adverse physical effect on the environment.

IMPACTS AND MITIGATION MEASURES

Impact 3.12-1: The proposed Project has the potential to require the construction of police department facilities which may cause substantial adverse physical environmental impacts. (Less than Significant)

The proposed Project would introduce new residential uses and residents to the City in addition to existing residential uses that will be annexed as part of the proposed Project. This will create an increased demand for police protection services compared to existing conditions. The City's Existing General Plan designated the Development Area as LDR and Park and therefore anticipated development and potential annexation into the City. Specifically, the proposed Project includes 915 residential units. According to the most recent U.S. Census (2019) and Department of Finance (2020) estimates, the average number of persons residing in a dwelling unit in the City of Manteca is 3.18; therefore, the Project is estimated to increase the population by 2,910 residents (based on 3.18 persons per household). With the addition of 2,910 residents and a projected population of 78,877, that equates to a staffing level of approximately 79 officers per 1000 residents. The City has anticipated additional officers would be hired as the City population grows. The City continuously monitors response times and reports annually on the results to ensure adequate police protection service levels are provided.

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.

Based on the current adequacy of existing response times and the ability of the MPD to serve the City, it is anticipated that the existing police department facilities are sufficient to serve the proposed Project and the construction of new or expanded police department facilities would not be required. Consequently, any impacts would be **less than significant**.

Impact 3.12-2: The proposed Project has the potential to require the construction of fire department facilities which may cause substantial adverse physical environmental impacts. (Less than Significant)

The Manteca Fire Department maintains a goal for the initial company of three firefighters to arrive on scene for fire and emergency medical service (EMS) incidents within five 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. In 2017, the Department averaged a 4:22 response time City-wide. In 2017, the MFD on an average handled 7,579 emergency calls and 6,737 in 2016. The Department is currently meeting the Response Effectiveness goal.

The proposed Project would introduce new residential uses to the city in addition to existing residential uses that will be annexed as part of the proposed Project. This will create an increased demand for fire services compared to existing conditions. The City's Existing General Plan designated the Development Area as LDR and Park and therefore anticipated development and potential annexation into the City.

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. Therefore, the impact of the proposed Project on the need for additional fire services facilities is **less than significant** and would not require the construction of additional fire department facilities.

Impact 3.12-3: The proposed Project has the potential to require the construction of school facilities which may cause substantial adverse physical environmental impacts. (Less than Significant)

The proposed Project is located within the service boundaries of the MUSD. Specifically, the Project site is within the attendance boundaries of the Neil Hafley Elementary School and the East Union High School located approximately a mile south of the Project site, and the George McParland School located approximately 1.20 miles southeast of the Project site.

The proposed Project would include the development of 915 dwelling units, which would directly cause population growth, including school-aged children that would attend the schools that serve the Project site and surrounding area. Utilizing the student generation rates provided by the MUSD in the School Mitigation Fee Justification Calculation of Cost per Student for School Facilities (dated March 2017), the proposed Project would be expected to generate roughly 523 new students[1], broken down by grades as follows:

- K–8: 390 students
- 9–12: 189 students

[1] 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.

MUSD has purchased a 17-acre school site[2] but they may have a need for additional schools. Until new school facilities are developed, students within the Project site would most likely attend Neil Hafley Elementary School and George McParland Elementary School, and East Union High School, subject to MUSD's determination.

The MUSD collects impact fees from new developments under the provisions of SB 50. 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, sales taxes, and other revenues generated by the proposed Project, would fund improvements associated with school services. According to Government Code Section 65996, the development fees authorized by SB 50 (1998) are deemed to be "full and complete school facilities mitigation" for any demands or impacts on school facilities caused by new development. It is noted that the Applicant has agreed to enter into a Mitigation Agreement with MUSD which allows them to annex into the District's Community Facilities District (CFD). This provides the MUSD with a longer-term stream of revenue paid through annual property taxes, and reduced impact fee in the near term. Therefore, the impact of the proposed Project on the need for additional school facilities is **less than significant**.

Impact 3.12-4: The proposed Project has the potential to have effects on other public facilities. (Less than Significant)

The proposed Project will bring residents to the area which may require the use of other public services such as libraries, etc. The City collects impact fees from new development based upon projected impacts from each development, including impacts on other public services as required by Chapter VI Development Fees of the City's Municipal Code. The City also reviews the adequacy of impact fees on an annual basis to ensure that the fee is commensurate with services provided. 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 these other public services.

The proposed Project does not trigger the need for new facilities associated with other public services. Consequently, new facilities for other public services are not proposed at this time. The proposed Project would not result in the need for new facilities for other public services, thus it will have a **less than significant** impact relative to this topic.

[2] Manteca Unified School District, Facilities Need Analysis, July 21, 2020.

Impact 3.12-5: The proposed Project has the potential to require the construction of park and recreational facilities which may cause substantial adverse physical environmental impacts. (Less than Significant)

The proposed Project directly increases the number of persons in the area as a result of new residential development. The proposed Project includes 915 residential units. According to the most recent U.S. Census (2019) and Department of Finance (2020) estimates, the average number of persons residing in a dwelling unit in the City of Manteca is 3.18; therefore, the Project is estimated to increase the population by 2,910 residents (based on 3.18 persons per household).

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. Based on 2,910 residents, the Project would require approximately 8.73 acres of parkland. The Project proposes to include approximately 14.45 acres for the development of park, open space, and trail, including 10.37 acres of neighborhood park, park/basin and open space, which would provide the park land needed to meet the three acres per 1,000 people. Municipal Code Chapter 3.20, Park Acquisition and Improvement Fees, allows the parks and recreation director to determine whether or not a development would be required to build and dedicate a neighborhood park or pay the neighborhood park in-lieu fee. In accordance with the Municipal Code, 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. Thus, upon provision and dedication of the proposed parkland and/or payment of required fees in accordance with the Manteca Municipal Code Chapter 3.20, the proposed Project will result in a **less than significant** impact.

Impact 3.12-6: The proposed Project has the potential to 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. (Less than Significant)

As stated previously, the proposed Project will directly increase the number of persons in the area. It is not anticipated that the proposed Project would result in a significant increase in the use of existing neighborhood and regional parks or other recreational facilities because the Project includes extensive new recreational facilities for the community and residents within the Project site.

The proposed Project would not significantly increase the use of an existing park, or other recreational facility. Therefore, it is not anticipated that any substantial physical deterioration of existing facilities would occur or be accelerated. As such, the proposed Project would have a **less than significant** impact relative to this topic.

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This section of the EIR analyzes the potential impacts of the proposed Project on the surrounding transportation system including roadways, bicycle/pedestrian facilities, rail, and transit facilities/services. This section identifies the significant impacts of the proposed Project and recommends mitigation measures to lessen their significance. An evaluation of vehicular access to the proposed Project is also provided. All technical calculations are in the Appendix A of the Transportation Analysis Report prepared by Fehr & Peers for the proposed Project (provided in Appendix E of this EIR).

Comments were received during the public review period or scoping meetings for the Notice of Preparation regarding this topic from neighboring landowners, Brian Bergerson and Larissa Founts-Bergerson, and attorney Steven A. Herum. Each of the comments related to this topic are addressed within this section. Full comments received are included in Appendix A.

3.13.1 INTRODUCTION

PROJECT LOCATION

The Project site is directly north of the City of Manteca's limit line adjacent to the Union Ranch development. The Project site is immediately west of State Route 99 (SR 99) and east of the Union Ranch Specific Plan Area. The Project site is bounded on the north by farmland, on the east by SR 99, on the south by existing residences and agricultural fields, and on the west by Union Road and the Union Ranch Specific Plan. Figures 2.0-1 and 2.0-2 in *Chapter 2.0: Project Description* show the Project's regional location and vicinity. The Project site is in the northwest ¼ of Section 20, Township 1 South, Range 7 East Mount Diablo Base and Meridian (MDBM). Figure 2.0-3 illustrates the Project location on the USGS Manteca, California, 7.5-minute series quadrangle map.

PROJECT SITE DEFINED

The project site encompasses approximately 202.81 acres north of the City of Manteca city limits, within the City's Sphere of Influence. The project site is located on the west side of State Route 99 (SR 99) and east of Union Road. The project site includes several distinct planning boundaries which are cumulatively described as the "Annexation Area". The specific planning boundaries that make up the Annexation Area are described below:

1. Annexation Area – includes the whole of the Project site (approximately 202.81 acres), including the approximate 175.67-acre Development Area, the approximate 27.14-acre Non-Development Areas, and all public right-of-way along Union Road fronting the Development and Non-Development Areas.
2. Development Area – includes the parcels being annexed that will be entitled for subdivision and development. This includes the Union Ranch North Project Area (Subdivision 1) and the Stagecoach at M&E Project Area (Subdivision 2).
3. Non-Development Area – Includes the parcels being annexed that will not be entitled for subdivision or development. This includes three separate areas, each described as an Annexation SubArea. The three areas total (27.14 acres) and are further defined below:

1. Annexation SubArea 1 – 9.82 acres
2. Annexation SubArea 2 – 6.04 acres
3. Annexation SubArea 3 – 11.28 acres

DEVELOPMENT AREA DESCRIPTION

The Development Area consists of two separate, but geographically linked, subdivision projects as described below:

- Union Ranch North – includes seven parcels totaling 106.04 acres intended for the development of 410 single family residential units, 200 multi-family residential units, and a community park. Primary access to the development would be provided by one full access intersection on Union Road (Union Road/Shady Pines Street). Secondary access would be provided by one right-in/right-out intersection on Union Road (Union Road/Duluth Way). The median will extend across the access point.
- Stagecoach At M&E – includes two parcels totaling 69.93 acres intended for the development of 305 single family residential units and a community park. Primary access to the subdivision would be provided by the continuation of Shady Pines Street on the west and one full access intersection on SR 99 Frontage Road (SR 99 Frontage Road/Shady Pines Street) on the east.

STUDY AREA

The study area was selected based on the development project's location, site access, and expected trip distribution and assignment. The analysis considers traffic operations at the following intersections, which are displayed on Figure 3.13-1.

Study Intersections

Twenty-two existing intersections were selected for study. The study intersections include:

1. Union Road/French Camp Road
2. Union Road/Lovelace Road
3. Union Road/Shady Pines Street
4. Union Road/Del Webb Boulevard/Clearwater Creek Boulevard
5. Union Road/Lathrop Road
6. Roth Road/I-5 Southbound (SB) Ramps
7. Roth Road/I-5 Northbound (NB) Ramps
8. Roth Road/Airport Way
9. Lathrop Road/I-5 SB Ramps
10. Lathrop Road/I-5 NB Ramps
11. Lathrop Road/Old Harlan Road
12. Lathrop Road/Harlan Road
13. Lathrop Road/Airport Way

14. Lathrop Road/Madison Grove Drive
15. Lathrop Road/SR 99 Frontage Road
16. Lathrop Road/SR 99 SB Ramps/Main Street
17. Lathrop Road/SR 99 NB Ramps
18. Airport Way/Lovelace Road
19. Airport Way/Daisywood Drive
20. SR 99 Frontage Road/Brunswick Road
21. French Camp Road/SR 99 SB Ramps/SR 99 Frontage Road
22. French Camp Road/SR 99 NB Ramps/SR 99 Frontage Road

STUDY SCENARIOS

The study intersections were evaluated for the following four scenarios:

1. ***Existing Conditions*** – Analyzes operations as they exist today.
2. ***Existing Plus Project Conditions*** – Analyzes existing operations with the addition of trips generated from the Development Area.
3. ***Cumulative No Project Conditions*** – Analyzes cumulative year (2042) volumes based on the City of Manteca / San Joaquin Council of Governments Travel Demand Forecasting (TDF) Model, assuming the Development Area remains in its current undeveloped state.
4. ***Cumulative Plus Project Conditions*** – Analyzes cumulative year volumes with the addition of trips generated from the Development Area.

It should be noted that the Existing Plus Project Conditions and Cumulative Plus Project Conditions include both the proposed Project and the proposed North Manteca Annexation #2 project. The North Manteca Annexation #2 project is located north of the Project site. The Annexation #2 project proposes 560 single family residential units and 22.13 acres of Business Industrial Park that is proposed to be developed at the same time as the proposed Project. Both projects are included in the With Project Conditions analyses in order to capture the interaction of project trips and VMT between these two projects. A separate Transportation Analysis Report is prepared for the Annexation #2 project.

3.13.2 ANALYSIS METHODOLOGY

DATA COLLECTION

Traffic count data was collected in fall 2021, when school was in session, and weather condition was dry. Intersection turning movement counts were conducted during the AM (7:00 to 9:00) and PM (4:00 to 6:00) peak periods.

TRAVEL DEMAND FORECASTING

Fehr & Peers recently developed an Interim General Plan Year 2040 TFM for the City of Manteca, encompassing adjacent areas. The City of Manteca, Lathrop, and Ripon Travel Forecasting Model

(TFM) is a modified version of the Three-County RTP/SCS Air Quality Conformity Model, but improved all major components of the model. The development of the TFM is described below.

BASELINE (EXISTING) TFM

The Base Year TFM incorporates Base Year land use data for dwelling units (single family and multi-family) and employment (food, retail, office, industrial, medical, government, and school), as well as the roadway network (lanes, speed, capacity class), based on existing (i.e., 2019) data. The TFM Trip generation rates were derived from the Institute of Transportation Engineer's Trip Generation Manual and include appropriate inbound/outbound trip generation rates for residential and employment land uses for AM and PM Peak Hour Conditions. The TFM was calibrated to reflect more accurate trip distribution for Internal-to-Internal Trips, Internal-to-External Trips, External-to-Internal Trips and External-to-External (i.e., Through) Trips based on a combination of the Caltrans Household Travel Survey (CHTS), the American Community Survey (ACS), and California Statewide Model to replicate the majority of vehicle trips to and from the west (San Francisco Bay Area) and a smaller percentage to and from the north (including Stockton and Sacramento) and lastly to and from the south.

INTERIM GENERAL PLAN YEAR 2040 MODEL

The Cumulative Year 2040 TFM was developed based on expected future land use and transportation network for the City of Manteca and adjacent areas in 2040. Similar to other cities in the Central Valley region, the City of Manteca is projecting large amount of growth for both housing and employment in the next 20 years. The Cumulative Year 2040 model scenario was developed in coordination with both Manteca and Lathrop to ensure that the TFM represents market-based demand for future growth in both housing (population) and employment, and therefore does not underestimate or overestimate traffic demand volumes. The City of Manteca 2040 land use inputs were developed based on the City of Manteca's approved and anticipated projects that will be constructed and occupied by year 2040. The City of Lathrop 2040 land use inputs were developed based on the City's historic rate of growth in households and employment for the past 5 years (2016 to 2020). The location of the growth was allocated across the city where future growth is anticipated, including the area west of I-5 and along the SR 120 corridor.

The TFM also includes projects identified in the City of Manteca Public Facilities Implementation Plan (PFIP) and the San Joaquin Council of Government (SJCOG) Regional Transportation Plan/Sustainable Communities Strategy (RTP/SCS) Project List for:

1. Mainline Highway Improvements (Table 6-1 from SJCOG RTP);
2. Interchange Improvements (Table 6-1 from SJCOG RTP); and
3. Regional Roadway Improvements (Table 6-3 from SJCOG RTP).

The Base Year and Cumulative Year 2040 TFM was updated to detail out the street system in and near the Project site. The Base Year Plus Project and Cumulative Plus Project scenarios of the model incorporate the proposed residential developments.

The traffic forecasting adjustment procedure known as the "difference method" was used to develop Cumulative Year (2040) AM and PM Peak Hour traffic forecasts. For a given intersection, this forecasting procedure is calculated as follows for every movement at the study intersections:

Cumulative Year Forecast = Existing Volume + (Cumulative Year TDF Model – Base Year TDF Model)

In addition to developing intersection turning movement forecasts, the Base Year and Cumulative Year scenarios were used to develop trip distribution for Existing Plus Project and Cumulative Plus Project Conditions.

VMT ANALYSIS METHODOLOGY

As previously described, VMT is used as the primary metric for significant transportation impacts. Residential development that would generate vehicle travel exceeding 15 percent below the established baseline VMT may indicate a significant transportation impact. The following sections describe the methodology used for the Baseline and Cumulative Vehicle Miles Traveled (VMT) Analysis.

BASELINE (EXISTING) MANTECA MODEL

The Base Year TFM developed for the General Plan Update was used to develop Baseline Average Weekday Daily home-based VMT per single family household and Baseline Average Weekday Daily home-based VMT per multi-family household. The Base Year TFM was also used to develop trip distribution under Existing Plus Project Conditions. The Base Year model represents 2019/2020 Pre-COVID AM peak hour, PM peak hour, and Average Daily Traffic conditions.

Baseline home-based VMT was calculated by taking the total home-based VMT generated by all households of the same housing category (single family, multi-family, or age-restricted) in the City of Manteca and dividing it by the total number of households in the respective housing category.

INTERIM GENERAL PLAN YEAR 2040 MODEL

The Cumulative Year 2040 TFM was used to estimate the Development Area's Cumulative Average Weekday Daily VMT.

Cumulative City of Manteca average home-based VMT was calculated by taking the total home-based VMT generated by all households of the same housing category (single family, multi-family, or age-restricted) in the City of Manteca under Cumulative Conditions and dividing it by the total number of households in the respective housing category under Cumulative Conditions.

INTERSECTION ANALYSIS

Study intersections were analyzed using procedures and methodologies contained in the Highway Capacity Manual – 6th Edition (Transportation Research Board, 2016). These methodologies were applied using Synchro 11 software which considers traffic volumes, lane configurations, signal timings, signal coordination, and other pertinent parameters of intersection operations.

Level of Service (LOS)

The operational performance of the roadway network is commonly described with the term Level of Service (LOS). LOS is a qualitative measure of traffic operating conditions whereby a letter grade, from A (the best) to F (the worst), is assigned. These grades represent the perspective of drivers and are an indication of the comfort and convenience associated with driving. In general, LOS A represents free-flow conditions with no congestion, and LOS F represents severe congestion and delay under stop-and-go conditions. For signalized intersections, roundabouts and all way stop control intersections, LOS is based on the average delay experienced by all vehicles passing through the intersection.

For side-street stop-controlled intersections, the delay and LOS for the overall intersection is reported along with the delay for the worst-case movement. Table 3.13-1 displays the delay range associated with each LOS category for signalized and unsignalized intersections

TABLE 3.13-1: INTERSECTION LOS CRITERIA

LEVEL OF SERVICE	*DESCRIPTION (FOR SIGNALIZED INTERSECTIONS)*	*AVERAGE CONTROL DELAY PER VEHICLE (SECONDS)*	
		SIGNALIZED INTERSECTIONS	*UNSIGNALIZED INTERSECTIONS*
A	Operations with very low delay occurring with favorable traffic signal progression and/or short cycle lengths.	≤ 10.0	≤ 10.0
B	Operations with low delay occurring with good progression and/or short cycle lengths.	> 10.0 to 20.0	> 10.0 to 15.0
C	Operations with average delays resulting from fair progression and/or longer cycle lengths. Individual cycle failures begin to appear.	> 20.0 to 35.0	> 15.0 to 25.0
D	Operations with longer delays due to a combination of unfavorable progression, long cycle lengths, or high V/C ratios. Many vehicles stop and individual cycle failures are noticeable.	> 35.0 to 55.0	> 25.0 to 35.0
E	Operations with high delay values indicating poor progression, long cycle lengths, and high V/C ratios. Individual cycle failures are frequent occurrences. This is considered to be the limit of acceptable delay.	> 55.0 to 80.0	> 35.0 to 50.0
F	Operations with delays unacceptable to most drivers occurring due to over-saturation, poor progression, or very long cycle lengths.	> 80.0	> 50.0

SOURCE: LOS = LEVEL OF SERVICE, V/C RATIO = RATIO-TO-CAPACITY RATIO
SOURCE: TRANSPORTATION RESEARCH BOARD 2016

Although LOS cannot be used as a CEQA metric to identify significant transportation impacts, intersection operations were analyzed for the proposed Project and are discussed in section 3.13.6, Impact Analysis.

3.13.3 EXISTING CONDITIONS

This subsection presents the existing bicycle, pedestrian, and transit facilities as well as intersection operations under Existing Conditions.

EXISTING PEDESTRIAN AND BICYCLE FACILITIES

The City of Manteca Active Transportation Plan (adopted September 1, 2020) defines the following bicycle facility types:

CLASS I BIKEWAY: BIKE PATH

Bike paths, often referred to as shared-use paths or trails, are off-street facilities that provide exclusive use for non-motorized travel, including bicyclists and pedestrians. Bike paths have minimal cross flow with motorists and are typically located along landscaped corridors.

CLASS II BIKEWAY: BIKE LANE

Class II bike lanes are on-street facilities that use striping, stencils, and signage to denote preferential or exclusive use by bicyclists. On-street bike lanes are located adjacent to motor vehicle traffic.

CLASS III BIKEWAY: BIKE ROUTE

Class III bike routes are streets with signage and optional pavement markings where bicyclists travel on the shoulder or share a lane with motor vehicles. Class III bike routes are utilized on low-speed and low volume streets to connect bike lanes or paths along corridors that do not provide enough space for dedicated lanes.

CLASS III BIKEWAY: BICYCLE BOULEVARD

Class III bicycle boulevards are similar to Class III bike routes, in that they are primarily utilized on low speed and low-volume streets, and can close important gaps in the bicycle network where there may be insufficient space for dedicated lanes. Bicycle boulevards provide further enhancements to bike routes to encourage slow speeds and discourage non-local vehicle traffic via traffic diverters, chicanes, traffic circles, and/or speed tables.

CLASS IV BIKEWAY: SEPARATED BIKEWAY

Class IV separated bikeways, commonly known as cycle tracks, are physically separated bicycle facilities that are distinct from the sidewalk and designed for exclusive use by bicyclists. They are located within the street right-of-way, but provide comfort similar to Class I bike paths.

Figure 3.13-2 presents the existing bicycle and pedestrian network in the study area. As displayed, sidewalks are present along Union Road south of Shady Pines Street, adjacent to residential subdivisions and along internal roadways within those subdivisions. The Tidewater Bikeway, a north-south Class I bike path that runs through residential areas between Union Road and SR 99, terminates just south of the Development Area. An east-west Class I bicycle and pedestrian path runs through the residential subdivision south of the Development Area and connects with the Tidewater Bikeway.

TRANSIT SERVICE

Figure 3.13-3 presents the existing transit network in the study area. Manteca Transit operates a fixed-route and Dial-a-Ride bus service with stops throughout the City. The nearest bus stop is the Route 3 stop located at the intersection of Union Road and Lathrop Road, less than one mile from the Development Area. Route 3 provides weekday fixed route service. In addition to Manteca Transit, the San Joaquin Regional Transportation District provides both weekday and weekend service to the City.

RAIL

Currently, there are no Union Pacific Railroad (UPRR) tracks within the study area. There are UPRR tracks in the City of Manteca and, at certain locations, the tracks have at-grade crossings with streets serving vehicular traffic.

EXISTING INTERSECTION OPERATIONS

Existing operations were analyzed for the weekday AM and PM peak hours at the study intersections. Table 3.13-2 displays the existing AM and PM peak hour operations at the study intersections. Traffic associated with the existing residential properties located in Non-Development Areas are included in the existing traffic counts and corresponding Existing Conditions analysis. Technical calculations are displayed in Appendix A of the Transportation Analysis Report prepared by Fehr & Peers for the proposed Project (contained within Appendix E of this EIR).

TABLE 3.13-2: INTERSECTION OPERATIONS – EXISTING CONDITIONS

INTERSECTION		*TRAFFIC CONTROL*	*AM PEAK HOUR*		*PM PEAK HOUR*	
			DELAY	*LOS*	*DELAY*	*LOS*
1.	Union Road/French Camp Road	Signal	13.0	B	15.1	B
2.	Union Road/Lovelace Road	SSSC	2.4 (10.4)	A (B)	2.1 (11.9)	A (B)
3.	Union Road/Shady Pines Street	SSSC	1 (12.3)	A (B)	<1 (14.2)	A (B)
4.	Union Road/Del Webb Boulevard/Clearwater Creek Boulevard	Signal	12.6	B	12.4	B
5.	Union Road/Lathrop Road	Signal	31.7	C	30.8	C
6.	Roth Road/I-5 SB Ramps	SSSC	10.5 (18.5)	B (C)	10.9 (22.1)	B (C)
7.	Roth Road/I-5 NB Ramps	SSSC	3.4 (13.1)	A (B)	3.2 (15.7)	A (C)
8.	Roth Road/Airport Way	Signal	12.0	B	13.1	B
9.	Lathrop Road/I-5 SB Ramps	Signal	14.4	B	17.8	B
10.	Lathrop Road/I-5 NB Ramps	Signal	13.1	B	17.4	B
11.	Lathrop Road/Old Harlan Road	SSSC	1.0 (15.5)	A (C)	<1 (16.3)	A (C)
12.	Lathrop Road/Harlan Road	Signal	34.4	C	37.7	D
13.	Lathrop Road/Airport Way	Signal	26.6	C	27.0	C
14.	Lathrop Road/Madison Grove Drive	SSSC	<1 (19.9)	A (C)	<1 (19.7)	A (C)
15.	Lathrop Road/SR 99 Frontage Road	Signal	13.7	B	14.0	B
16.	Lathrop Road/SR 99 SB Ramps/Main	Signal	21.1	C	24.0	C
17.	Lathrop Road/SR 99 NB Ramps	Signal	10.1	B	9.9	A

INTERSECTION		TRAFFIC CONTROL	AM PEAK HOUR		PM PEAK HOUR	
			DELAY	LOS	DELAY	LOS
18.	Airport Way/Lovelace Road	Signal	9.7	A	9.0	A
19.	Airport Way/Daisywood Drive	Signal	6.7	A	5.8	A
20.	SR 99 Frontage Road/Brunswick Road	SSSC	<1 (8.6)	A (A)	<1 (8.9)	A (A)
21.	French Camp Road/SR 99 SB Ramps/SR	Signal	22.5	C	28.1	C
22.	French Camp Road/SR 99 NB Ramps/SR	Signal	24.6	C	17.3	B

NOTE: FOR SIGNALIZED INTERSECTIONS AND ALL-WAY STOP CONTROLLED INTERSECTIONS, AVERAGE INTERSECTION DELAY IS REPORTED IN SECONDS PER VEHICLE FOR ALL APPROACHES. FOR SIDE STREET STOP-CONTROLLED INTERSECTIONS, INTERSECTION DELAY IS REPORTED IN SECONDS PER VEHICLE FOR THE OVERALL INTERSECTION AND (WORST-CASE) MOVEMENT. INTERSECTION DELAY IS CALCULATED BASED ON THE PROCEDURES AND METHODOLOGY CONTAINED IN THE HIGHWAY CAPACITY MANUAL 6TH EDITION (TRANSPORTATION RESEARCH BOARD, 2016).
SOURCE: FEHR & PEERS, 2021.

3.13.4 EXISTING PLUS PROJECT CONDITIONS

PROJECT TRIP GENERATION

Proposed Project trips generated by the Development Area were estimated using trip rates published in the *Trip Generation Manual 11th Edition* (Institute of Transportation Engineers, 2021). Table 3.13-3 displays the estimated number of daily, AM peak hour, and PM peak hour vehicle trips for the proposed development project.

TABLE 3.13-3: PROJECT TRIP GENERATION

LAND USE	TRAFFIC CONTROL	DAILY	AM PEAK HOUR			PM PEAK HOUR		
			IN	OUT	TOTAL	IN	OUT	TOTAL
Single-Family Residential Detached Housing (ITE 210)	715 DU	6,742	130	371	501	423	249	672
Multi-Family Housing (ITE 220)	200 DU	1,348	19	61	80	64	38	102
Total		8,090	149	432	581	487	287	774

NOTES: TRIP GENERATION IS BASED ON TRIP RATES PUBLISHED IN TRIP GENERATION MANUEL 11TH EDITION (INSTITUTE OF TRANSPORTATION ENGINEERS, 2021).
SOURCE: FEHR & PEERS, 2021

PROJECT TRIP DISTRIBUTION

Project trips were distributed throughout the study area based the location of project access roads, existing directional patterns and output from the base year Manteca Travel Demand Model. Figure 3.13-4 presents the trip distribution under Existing Plus Project conditions.

EXISTING PLUS PROJECT INTERSECTION OPERATIONS

Access to the proposed development project would be provided by two full access intersections located at Union Road/Shady Pines Street and SR 99 Frontage Road/Shady Pines Street, as well as a right-in/right-out driveway at Union Road/Duluth Way. The following improvements were assumed

under Existing Plus Project Conditions based on the Tentative Subdivision Map Plans (labeled Attachment A) in the Notice of Preparation dated October 22, 2021.

- Union Road – The existing 3-lane Union Road between Shady Pines Street and the southern Project Site boundary will be widened to 4-lanes. The widening would add a northbound lane and preserve the existing median and turn lanes.
- Lovelace Road – The existing 2-lane Lovelace Road that terminates at Union Road would be extended east of Union Road and terminates at SR 99 Frontage Road. Lovelace Road east of Union Road would be constructed as a 4-lane road.
- Union Road/Lovelace Road – The existing 3-way, side-street stop-controlled intersection would be modified to a four-way intersection with a shared left/through/right turn lane on the northbound, southbound, and eastbound approach, and a left turn lane and a shared through/right turn lane on the westbound approach. As discussed below, this intersection would be signalized.
- Union Road/Shady Pines Street – The existing 3-way, side-street stop-controlled intersection would be modified to a four-way intersection. The southbound and westbound approach would consist of a left turn pocket and shared through/right turn lane. The northbound approach would consist of a left-turn pocket, one through lane, and one shared through/right turn lane. No modifications are proposed to the eastbound approach. As discussed below, this intersection would be signalized.
- Union Road/Duluth Way – This new 3-way, side-street stop-controlled intersection would be constructed with a through lane and a shared through/right turn lane on the northbound approach, a through lane on the southbound approach, and a right turn lane on the westbound approach.
- SR 99 South Frontage Road/Shady Pines Street – This new 3-way, side-street stop-controlled intersection would be constructed with a left turn pocket and a through lane on the northbound approach, a shared through/right turn lane on the southbound approach, and a left turn pocket and a right turn lane on the eastbound approach.

Table 7 within Appendix E of this EIR displays the AM and PM peak hour intersection operations under Existing Plus Project conditions.

As displayed in Table 7 of Appendix E of this EIR, with the addition of project trips, the Union Road/Shady Pines Street and Union Road/Lovelace Road intersections would operate deficiently as side-street stop controlled intersections during both the AM and PM peak hour.

The Union Road/Shady Pines Street intersection provides primary access to the Development Area. Of the three intersections that provides ingress and egress to the Development area, this intersection is expected to have the highest usage due to its proximity to other land use destinations in Manteca and Lathrop.

An AM and PM peak hour signal warrant analysis was completed to determine if traffic volumes under Existing Plus Project Conditions satisfy the warrant for installation of a traffic signal. Results of this analysis indicate that the Union Road/Shady Pines Street intersection does not satisfy the AM and PM peak hour warrant for installation of a traffic signal under Existing Plus Project Conditions. However, as part of the proposed project, Union Road will be widened to 2 lanes in the northbound direction. At the Union Road/Shady Pines Street intersection, the northbound approach will consist of a left turn pocket, one through lane, and one shared through/right turn lane. The widening of Union Road would increase safety risks for pedestrians crossing the intersection. With consideration to safety, it is recommended that this intersection be constructed as a signalized intersection. In addition, it is recommended that the southbound approach be modified to include a left-turn pocket that will provide storage for project traffic.

The Union Road/Lovelace Road intersection is a side-street stop controlled intersection. As part of the Annexation 1 and Annexation 2 developments, Lovelace Road would be extended east to connect to SR 99 Frontage Road and provide access for the proposed industrial use in Annexation 2. The new Lovelace Road connection would divert existing traffic to Lovelace Road and the Union Road/Lovelace Road intersection. In the near-term, project trips traveling north on Union Road to access northbound SR 99 or destinations along French Camp Road lead to an increase in trips at this intersection.

Results of the signal warrant analysis indicate that the Union Road/Lovelace Road intersections satisfy Warrant 3A during the PM peak hour for installation of a traffic signal under Existing Plus Project Conditions. Therefore, this intersection is analyzed as a signalized intersection in Table 3.13-4 below. The following improvements were assumed under Existing Plus Project with Mitigation Conditions:

1. Union Road/Lovelace Road – The existing 3-way, side-street stop-controlled intersection would be modified to a four-way, signalized intersection. In order to operate traffic signal with a typical 8-phase signal timing with protected left-turns, each approach of the intersection would consist of a left turn pocket and shared through/right turn lane.

Table 3.13-4 displays the AM and PM peak hour intersection operations at both intersections with installation of a traffic signal and improvements as described above. As shown, both intersections would operate acceptably during both AM and PM peak hour.

TABLE 3.13-4: INTERSECTION OPERATIONS – EXISTING PLUS PROJECT CONDITIONS MITIGATION

INTERSECTION	CONTROL TYPE[2]	PEAK HOUR	EXISTING + PROJECT		EXISTING + PROJECT MITIGATION	
			DELAY[1]	LOS	DELAY[1]	LOS
1. Union Road/Lovelace Road	Signal	AM	13.6 (52.3)	B (F)	18.5	B
		PM	39.9 (250.1)	E (F)	19.6	B
2. Union Road/Shady Pines Street	Signal	AM	23.7 (76.9)	C (F)	17.8	B
		PM	15.3 (73.8)	B (F)	15.5	B

NOTES: AWSC = ALL WAY STOP CONTROLLED; SSSC = SIDE STREEP STOP CONTROL.

1. *FOR SIGNALIZED INTERSECTIONS AND ALL-WAY STOP CONTROLLED INTERSECTIONS, AVERAGE INTERSECTION DELAY IS REPORTED IN SECONDS PER VEHICLE FOR ALL APPROACHES. INTERSECTION DELAY IS CALCULATED BASED ON THE PROCEDURES AND METHODOLOGY CONTAINED IN THE HIGHWAY CAPACITY MANUAL 6TH EDITION (TRANSPORTATION RESEARCH BOARD, 2016).*
2. *INTERSECTION WAS ANALYZED AS AWSC UNDER EPP CONDITIONS AND WITH A TRAFFIC SIGNAL UNDER EPP MITIGATION.*

***BOLD** INDICATES DEFICIENT OPERATIONS.*

SOURCE: FEHR & PEERS, 2021.

Based on results of the intersection operations analysis, it is recommended that the following be included in the Conditions of Approval (COA) for the proposed project.

- **Traffic COA #1** – The developer shall install a traffic signal and implement intersection lane configuration improvements (i.e., add a southbound left turn pocket) at the Union Road/Shady Pines Street intersection. The design of the traffic signal and intersection improvements shall be reviewed and approved by the Director of Engineering. The developer shall pay for the total cost for the design and installation of the improvements as this intersection would provide direct access to the project site.
- **Traffic COA #2** – The developer shall pay the current PFIP fee as determined by the City of Manteca prior to issuance of building permits to mitigate the proposed project's impact at Union Road/Lovelace Road. The project contributes to approximately 15 percent of volumes at this intersection under Existing Plus Project conditions. Therefore, the project's fair share would be 15 percent of the cost of signalizing the Union Road/Lovelace intersection. The traffic signal shall be constructed when the Lovelace Road extension is constructed.

3.13.5 CUMULATIVE CONDITIONS ANALYSIS

A Cumulative Conditions analysis was performed to identify potential impacts of the Project under Cumulative AM and PM peak hour conditions. The analysis reflects long-term development in the City of Manteca and other nearby jurisdictions using the original Manteca TDF model previously described.

The Cumulative Year analysis assumes the following improvements:

1. **PFIP Improvements**: Intersection lane configurations, traffic controls, and roadway improvements identified in the City of Manteca PFIP were assumed to be constructed. This results in modifications at the following locations:

- Widening of Union Road to 4 lanes between Shady Pines Street and Lovelace Road

- Widening of Lovelace Road to 4 lanes between Airport Way and Union Road
- Construction of 4-lane Lovelace Road between Union Road and SR 99 Frontage Road
- Widening of Airport Way to 4 lanes between French Camp Road and Yosemite Avenue
- Widening of Lathrop Road to 4 lanes between western city limit and London Avenue; between Arrowsmith Drive and SR 99 Frontage Road
- Union Road/Lovelace Road
- Airport Way/Roth Road expansion and signal modification
- Airport Way/Lathrop Road expansion and signal modification
- Airport Way/Lovelace Road expansion and signal modification
- Airport Way/Daisywood Road expansion and signal modification

1. **City of Manteca General Plan Improvements**: planned future roadways identified in the draft proposed City of Manteca General Plan were assumed to be constructed. This results in modifications at the following locations:

- Construction of 4-lane Roth Road east of Airport Way

1. **SJCOG RTP/SCS Improvements**: Intersection lane configurations, traffic controls, and roadway improvements identified in the SJCOG RTP were assumed to be constructed. This results in modifications at the following locations:

- Reconstruction of the I-5/Lathrop Road interchange. The design has not been formalized; therefore, we conservatively assumed the reconstruction would be an improved tight-diamond interchange that is similar to the existing configuration.
- Widening of Roth Road to 5 lanes between Manthey Road and Harlan Road
- Widening of Roth Road to 4 lanes between UPRR and Airport Way
- I-5 Southbound Ramps/Roth Road expansion and signalization
- I-5 Northbound Ramps/Roth Road expansion and signalization
- Roth Road/Harlan Road expansion and signalization

CUMULATIVE NO PROJECT INTERSECTION OPERATIONS

The Interim General Plan Year 2040 TFM was used to develop Cumulative No Project forecasts. Table 9 in Appendix E of this EIR displays the AM and PM peak hour intersection operations.

As displayed, the following three intersections would operate deficiently:

- Union Road/Lathrop Road would operate deficiently at LOS F during the AM peak hour and LOS E during the PM peak hour
- Lathrop Road/Harlan Road would operate deficiently at LOS E during the PM peak hour.
- Lathrop Road/Madison Grove Drive would operate deficiently at LOS F during the AM and PM peak hour.

CUMULATIVE PLUS PROJECT INTERSECTION OPERATIONS

Under Cumulative conditions, changes in availability and locations of complimentary land use and transportation network would result in modifications to the development project's trip distribution.

The Interim General Plan Year 2040 TFM was used to develop Cumulative Plus Project trip distribution and forecasts. Table 10 of Appendix E of the EIR presents the results of the Cumulative Plus Project intersection operations analysis.

Traffic COA #1 requires the developer to install a traffic signal and implement intersection lane configuration improvements at the Union Road / Shady Pines Street intersection. As shown in **Error! R eference source not found.** of Appendix E of this EIR, with improvements identified in Traffic COA #1, this intersection would operate acceptably at LOS B during the AM and PM peak hour.

As displayed in Table 10 of Appendix E, under Cumulative Plus Project Conditions:

- Union Road/Lathrop Road would continue to deficiently with additional delay during the AM and PM peak hour.
- Lathrop Road/Madison Grove Drive would continue to deficiently with additional delay during the AM and PM peak hour.
- Lathrop Road/Harlan Road would continue to operate deficiently with additional delay during the PM peak hour, and operate deficiently during the AM peak hour.

The City of Manteca is in the process of updating the PFIP. The improvements required for Union Road/Lathrop Road and Lathrop Road/Madison Grove Drive will be analyzed separately as part of the PFIP update. Because the Project would contribute to the cumulative growth in traffic volumes at these intersections, it is recommended that the following be incorporated into the Conditions of Approval for the proposed project:

- **Traffic COA #3 –** The developer shall pay the current PFIP fee as determined by the City of Manteca prior to issuance of building permits to mitigate the Project's impact at Union Road/Lathrop Road and Lathrop Road/Madison Grove Drive. The developer shall install a new traffic signal controller at the Union Road/Lathrop Road intersection and fund a traffic signal timing optimization study.

The Lathrop Road/Harlan Road intersection is located in the City of Lathrop. this intersection will be further evaluated as part of the I-5/Lathrop Road interchange improvement project identified in the SJCOG RTP/SCS. Potential improvements may include lane configuration improvements and signal coordination with the reconstructed -5/Lathrop Road interchange that may reduce motor vehicle delay.

3.13.6 REGULATORY SETTING

Existing transportation polices, laws, and regulations that would apply to the proposed Project are summarized below. This information provides a context for the impact discussion related to the Project's consistency with applicable regulatory conditions and development of significance criteria for evaluating Project impacts.

STATE

Senate Bill 743

Senate Bill (SB) 743 was signed into law in 2013 and is leading to substantial changes in the way transportation impact analyses are being prepared. Notably, it precludes the use of level of service (LOS) to identify significant transportation impacts in CEQA documents for land use projects, recommending instead that VMT be used as the preferred metric. On December 28, 2018, the CEQA Guidelines were amended to add Section 15064.3, Determining the Significance of Transportation Impacts, which states that generally, VMT is the most appropriate measure of transportation impacts. According to 15064.3(a), "Except as provided in subdivision (b)(2) (regarding roadway capacity), a project's effect on automobile delay shall not constitute a significant environmental impact." Beginning on July 1, 2020, the provisions of 15064.3 applied statewide.

To aid in SB 743 implementation, OPR released a *Technical Advisory on Evaluating Transportation Impacts in CEQA* (Technical Advisory) in December 2018. The Technical Advisory provides advice and recommendations to CEQA lead agencies on how to implement the SB 743 changes. This includes technical recommendations regarding the assessment of VMT, thresholds of significance, VMT mitigation measures, and screening thresholds for certain land use projects. Lead agencies may consider and use these recommendations at their discretion and with the provision of substantial evidence to support alternative approaches.

The Technical Advisory identifies "screening thresholds" to quickly identify when a project should be expected to cause a less-than-significant impact without conducting a detailed study. The Technical Advisory suggests that projects meeting one or more of the following criteria should be expected to have a less-than-significant impact on VMT:

1. **Small projects** – projects consistent with a SCS and local general plan that generate or attract fewer than 110 trips per day.

2. **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.

3. **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.

4. **Local-serving retail** – local-serving retail development tends to shorten trips and reduce VMT. The Technical Advisory encourages lead agencies to decide when a project will likely be local-serving, but generally acknowledges that retail development including stores larger than 50,000 square feet might be considered regional-serving. The Technical Advisory suggests lead agencies analyze whether regional-serving retail would increase or decrease VMT (i.e., not presume a less-than-significant).

5. **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 Technical Advisory also identifies recommended numeric VMT thresholds for residential, office, and retail projects. The residential threshold is described below.

1. Residential development that would generate vehicle travel exceeding 15 percent below existing (baseline) residential VMT per capita may indicate a significant transportation impact. Existing VMT per capita may be measured as a regional VMT per capita or as city VMT per capita.

The Travel Demand Forecasting 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 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.

LEVEL OF SERVICE (LOS)

As previously noted, LOS may no longer be used to identify significant transportation impacts in CEQA documents for land use projects. However, this analysis includes a LOS analysis to determine if the proposed Project would result in deficient intersection operations per the City of Manteca standards. Policy C-P-2 of the 2023 General Plan strives for LOS D or better while LOS E or worse is considered deficient.

LOCAL

City of Manteca General Plan

The City of Manteca General Plan 2023 includes several policies that are relevant to an evaluation of the visual quality of the Project site. However, as previously stated, the city is undergoing an Update to the General Plan. Both existing 2023 General Plan policies and proposed General Plan Update policies applicable to the Project are identified below:

2023 GENERAL PLAN (EXISTING)

Policies: Level of Service

1. C-P-1. The City shall 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 complete and efficient circulation system. The impact of new development and land use proposals on LOS and accessibility for all modes should be considered in the review process.
2. C-P-2. To the extent feasible, the City shall strive for a vehicular LOS of D or better at all streets and intersections, except in the Downtown area where right-of-way is limited, pedestrian, bicycle, and transit mobility are most important and vehicular LOS is not a

consideration. See Figure 4.1 for a map defining the Downtown area. While vehicular LOS is not a consideration in the Downtown area, traffic studies shall disclose whether any proposed transportation or land use action will substantially increase traffic at intersections and roadways within this area of the City.

3. C-P-3. At the discretion of City staff, certain locations may be allowed to fall below the City's LOS standard under the following circumstances:
    1. Where constructing facilities with enough capacity to provide LOS D is found to be unreasonably expensive. This applies to facilities, for example, on which it would cost significantly more per dwelling unit equivalent (DUE) to provide LOS D than is deemed reasonable by City staff.
    2. Where it is difficult or impossible to maintain LOS D because surrounding facilities in other jurisdictions operate at LOS E or worse.
    3. Where maintaining LOS D will be a disincentive to use of existing alternative modes or to the implementation of new transportation modes that would reduce vehicle travel. Examples include roadway or intersection widening areas with substantial pedestrian activity or near major transit centers.
    4. In the Downtown area the city cannot maintain the vehicular LOS D standard because of the historic nature of development and limited street right-of-way. However, it is the City's goal to maintain high quality access and mobility in the area with a priority toward non-auto modes. Therefore, the City shall require that new discretionary land use action within the Downtown area, which generate net new PM peak hour auto trips, to participate in enhancing access and mobility for transit, bicycle, and pedestrian modes. These enhancements may include but are not limited to:
        1. Enhancing sidewalks to create a high quality pedestrian environment, including wider sidewalks and improved crosswalks, landscaping, buffers between sidewalks and vehicle travel lanes, enhanced pedestrian lighting, increased availability of benches, provisions for café-style seating, and usage of monument elements and other public art.
        2. Improving bicycle facilities to include attractive and secure bicycle parking, installation of bike lockers in appropriate locations, and provision of bicycle lanes along appropriate roadways.
        3. Enhancing transit stops through high quality, well maintained shelters, and provision of wayfinding signage and transit timetables.
        4. Providing off-street parking with high quality access to Downtown businesses, and which is well-maintained and provides amenities like shade streets, canopies, adequate lighting, and wayfinding signage.
        5. Supporting the development of a Downtown Business Improvement District or similar mechanism to help fund ongoing maintenance of the streetscape enhancements.

Policies: Street System

4. C-P-5. Major circulation improvements shall be completed as 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.
5. C-P-6. New development shall pay a fair share of the costs of street and other transportation improvements based on impacts to LOS and other modes in conformance with the goals and policies established in this Circulation Element and the PFF program.

Policies: Bikeways and Pedestrian Facilities

6. C-P-29. Through regular updates to the City's Bicycle Master Plan, the City shall establish a safe and convenient network of identified bicycle routes connecting residential areas with recreation, shopping, and employment areas within the city. The City shall also strive to develop connections with existing and planned regional routes shown in the San Joaquin County Bicycle Master Plan.
7. C-P-30. Provide adequate bicycle parking facilities at commercial, business / professional and light industrial users.
8. C-P-36. City shall strive to provide a sidewalk system that serves all members of the community and meets the latest guidelines related to the Americans with Disabilities Act (ADA).
9. C-P-40. Provide sidewalks along all new streets in the city.

MANTECA GENERAL PLAN UPDATE (PROPOSED)

Policies: Multimodal Accessibility

10. 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.
11. 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.
12. 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:
    1. Where constructing facilities with enough capacity to provide LOS D is found to be unreasonably expensive.
    2. Where conditions are worse than LOS D and caused primarily by traffic from adjacent jurisdictions.
    3. 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.

Policies: Major Streets Master Plan

13. 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).
14. C-2.4. Design street improvements to provide multiple, direct, and convenient routes for all modes.
15. C-2.5. Include sound attenuation walls in the frontage improvements associated with Arterial roadways in accordance with City adopted Street Standards and Specifications, as amended.
16. C-2.6. Align residential and collector street intersections with collector and arterial streets with other residential and collector streets, where feasible, to maintain a high degree of connectivity between neighborhoods, minimize circuitous travel, and to allow bicyclists and pedestrians to travel conveniently and safely from one neighborhood to another without using major streets.
17. C-2.7. Provide access for bicycles and pedestrians at the ends of cul-de-sacs, where right-of-way is available, to provide convenient access within and between neighborhoods and to encourage walking and bicycling to neighborhood destinations.
18. C-2.8. Signals, roundabouts, traffic circles and other traffic management techniques shall be applied appropriately at residential and collector street intersections with collector and arterial streets in order to allow bicyclists and pedestrians to travel conveniently and safely from one neighborhood to another.
19. C-2.9. Where traffic congestion, pedestrian travel, collision history, or other factors warrant the installation of a traffic signal, the feasibility of a roundabout shall also be evaluated on a whole life cycle cost basis. In general, a roundabout should be installed at these locations unless right of way, cost, operational concerns, design limitations, or other issues preclude the installation of a roundabout.
20. 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.
21. 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.
22. 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).

Policies: Bikeway and Pedestrian Systems

23. C-4.3. Provide a sidewalk and bicycle route system that serves all pedestrian and bicycle users and meets the latest guidelines related to the Americans with Disabilities Act (ADA).
24. C-4.8. Provide sidewalks and/or walkways connecting to the residential neighborhoods, primary public destinations, major public parking areas, transit stops, and intersections with the bikeway system.
25. C-4.9. Provide sidewalks along both sides of all new streets in the city.

Policies: Public Transit

1. C-5.8. Design future roadways to accommodate transit facilities, as appropriate. These design elements should include installation of transit stops adjacent to intersections and provision of bus turnouts and sheltered stops, where feasible.

City of Manteca Active Transportation Plan

The Manteca Active Transportation Plan (ATP) is a comprehensive guide that creates a vision for a network of trails, bike lanes, sidewalks, and other elements aimed at supporting safe walking and bicycling throughout the city and providing connections to nearby destinations.

San Joaquin County Regional Transportation Plan

In June 2014, SJCOG adopted the *2014 Regional Transportation Plan / Sustainable Communities Strategy (RTP/SCS*). This document outlines countywide transportation expenditures based on funding from sources like the federal government, the State of California, and locally collected funds. The RTP contains several proposed improvements that would benefit the regional roadway network within the study area.

San Joaquin County Congestion Management Plan

SJCOG operates a Regional Congestion Management Program (RCMP), which monitors cumulative transportation impacts of growth on the regional roadway system, identifies deficient roadways, and develops plans to mitigate the deficiencies. The RCMP considers LOS E or F operations to be deficient and includes segments of SR 120 and Airport Way (north of SR 120) as CMP facilities.

San Joaquin County Regional Traffic Impact Fee (RTIF)

SJCOG has implemented a regional traffic impact fee that is assessed on new developments throughout San Joaquin County. The RTIF capital project list provides funding for various freeway and local road widening (project list found at: http://www.sjcog.org/DocumentCenter/View/495). The RTIF capital project began in 2005, and has generated millions in funding for project delivery.

Measure K

Measure K is the half-cent sales tax dedicated to transportation projects in San Joaquin County. Measure K was passed in November 1990, and began collecting funds for a system of improved highways and local streets, new passenger rail service, regional and inter-regional bus routes, park-

and-ride lots, new bicycle facilities, and railroad crossings. On November 7, 2006, San Joaquin County voters decided to extend Measure K for an additional 30 years. The renewal of Measure K is estimated to generate $2.552 billion for the transportation programs identified in the Measure K Expenditure Plan.

City of Manteca Public Facilities Implementation Plan

The City of Manteca is in the midst of updating the Public Facilities Implementation Plan (PFIP). The PFIP is a fee program which collects fees from new development to finance capacity expansion of public facilities (i.e., water, sewer collection, drainage, and transportation) necessary to accommodate the new demands. The City's draft PFIP includes a variety of roadway widenings or extensions such as Airport Way, Atherton Drive, McKinley Avenue, and other roadways within the city. The plan also includes various intersection improvements.

3.13.7 THRESHOLDS OF SIGNIFICANCE

This section describes the thresholds or criteria that determine whether the Project causes a significant impact on the roadway, bicycle, pedestrian, rail, and/or transit systems. These thresholds are based on California Environmental Quality Act (CEQA), policies from the General Plans for the City of Manteca and San Joaquin County, and Caltrans policies. For the purposes of this Draft EIR, the Project would cause a significant impact if it would result in any of the following listed criteria:

1. Conflict with a program, plan, ordinance or policy addressing the circulation system, including transit, roadway, bicycle, and pedestrian facilities;
2. Conflict or be inconsistent with CEQA Guidelines Section 15064.3, subdivision (b);
3. Substantially increase hazards due to a geometric design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment); and/or
4. Result in inadequate emergency access.

Appendix G of the CEQA Guidelines indicates that impacts may be significant if a project conflicts with a program, plan, ordinance or policy addressing the circulation system, including transit, roadway, bicycle and pedestrian facilities. The proposed Project would have a significant impact on transit, bicycles, or pedestrians if it would conflict with adopted policies, plans, or programs regarding these systems, or create or exacerbate disruptions to the performance or safety of these systems.

Appendix G of the CEQA Guidelines indicates that impacts may be significant if a project would substantially increase hazards due to a geometric design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment). Impacts may also be significant if a project results in inadequate emergency access. The proposed Project would have a significant impact on the transportation system if it would increase hazards due to a design feature, incompatible uses, or inadequate emergency access.

The existing General Plan includes a policy within the Transportation Element which requires maintenance of a level of service (LOS) D standard on City roadways, with some exceptions. Because LOS is no longer a CEQA significance metric, an analysis of LOS is provided for the purposes of policy consistency analysis.

3.13.8 IMPACTS AND MITIGATION MEASURES

Impact 3.13-1: Project implementation would not result in VMT increases that are greater than 85 percent of Baseline conditions (Significant and Unavoidable)

The proposed development was evaluated against the screening criteria in OPR's Technical Advisory. The following criteria is applicable to residential developments.

1. Small projects – projects consistent with a Sustainable Communities Strategy and local general plan that generate or attract fewer than 110 trips per day.
2. 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.
3. 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.
4. 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 SB 743 Memorandum identifies the recommended numeric VMT thresholds for residential projects. Based on the VMT thresholds, a residential project would result in a less-than-significant transportation impact if:

5. Under existing (baseline) conditions, the residential development would generate home-based VMT per dwelling unit equal or below 85 percent of the existing (baseline) City of Manteca average for the same housing category (single family, multi-family, or age-restricted); and
6. Under cumulative conditions, the residential development would generate home-based VMT per dwelling equal or below 85 percent of the cumulative City of Manteca average for the same housing category (single family, multi-family, or age-restricted).

Alternatively, the project would result in a less-than-significant transportation impact if:

7. The residential development would cause the total VMT in the model area to decrease under baseline AND cumulative conditions.

The proposed development does not constitute a small project, is not located within ½ mile of an existing major transit stop, and is not a redevelopment project. Therefore, the development is not

eligible to be screened out based on these criteria. Furthermore, the SB 743 Memorandum identifies no low VMT areas in Manteca for project screening purposes.

A detailed VMT analysis was conducted using methodology discussed in Appendix E of this EIR. The proposed residential development would result in a significant transportation impact if it would 1). generate vehicle travel exceeding 85 percent of the established baseline VMT under existing (baseline) or cumulative conditions, or 2). result in an increase in total VMT in the model area.

Table 3.13-5 presents the established Baseline Citywide VMT and the project generated VMT under existing (baseline) and cumulative conditions.

TABLE 3.13-5: PROJECT VEHICLE MILES TRAVELED ANALYSIS – PROJECT GENERATED VMT

LAND USE	*CITY OF MANTECA AVERAGE VMT*	*PROJECT-GENERATED VMT*	*COMPARED TO CITY AVERAGE*
Single Family Households	103.3 home-based VMT per single family household	99.5 home-based VMT per single family household	-3.7%
Multi-Family Households	78.1 home-based VMT per multi-family household	77.7 home-based VMT per multi-family household	-0.6%
Cumulative Year			
Single Family Households	100.1 home-based VMT per single family household	94.8 home-based VMT per single family household	-5.2%
Multi-Family Households	73.2 home-based VMT per multi-family household	73.9 home-based VMT per multi-family household	+1.0%

SOURCE: CITY OF MANTECA TRAVEL DEMAND MODEL, FEHR & PEERS, 2021.

As displayed, under Existing Conditions, the proposed development would generate an estimated average of 99.5 home-based VMT per single family household (3.7 percent below the city-wide average), and 77.7 home-based VMT per multi-family household (0.6 percent below the city-wide average).

Under Cumulative Conditions, the proposed development would generate an estimated average of 94.8 home-based VMT per single family household (5.2 percent below the Cumulative city-wide average), and 73.9 home-based VMT per multi-family household (1 percent above the Cumulative city-wide average). The proposed development would generate fewer home-based VMT per single family and multi-family household compared to under Baseline conditions due to the fact that in the Cumulative Year, the number of jobs and the amount of commercial, retail, and recreational development in the City is anticipated to increase and residents would be able to travel shorter distances to access these types of land uses.

Because the development would generate vehicle travel exceeding 15 percent below the established city-wide average under Existing and Cumulative Conditions, this is a **significant** transportation impact.

Table 3.13-6 presents the comparison of Total VMT in the model area before and after project.

TABLE 3.13-6: PROJECT VEHICLE MILES TRAVELED ANALYSIS – MODEL-WIDE VMT

MODEL-WIDE VMT WITHOUT PROJECT	*MODEL-WIDE VMT WITH PROJECT*	*DIFFERENCES*	*DIFFERENCES AS A PERCENTAGE*
Existing (Baseline) Year			
13,853,921	14,049,346	195,426	+1.4%
Cumulative Year			
20,717,051	20,910,138	193,087	+0.9%

SOURCE: CITY OF MANTECA TRAVEL DEMAND MODEL, FEHR & PEERS, 2021.

As displayed, under Existing Conditions, the proposed development would result in a net increase of 195,426 total VMT in the model area, representing a 1.4% increase in total VMT. Under Cumulative Conditions, the proposed development would result in a net increase of 193,087 total VMT in the model area, representing a 0.9% increase in total VMT.

Because the development would cause the total VMT in the model area to increase under Existing and Cumulative Conditions, this is a **significant** transportation impact.

The VMT generation of a project is largely dictated by the combination of land use proximity and transportation infrastructure. Transportation Demand Management (TDM) strategies are designed to increase the transportation system efficiency and reduce vehicle demand on the multi-modal transportation system. Common TDM strategies are based on discouraging single-occupancy vehicle travel; encouraging transit, carpooled, and active modes of travel (i.e., bicycling, walking, scooter); shifting travel patterns from congested peak to less congested off-peak hours, and proximity to closer complimentary destinations. But most importantly, the biggest of effect of TDM strategies on VMT derive from regional policies related to land use location efficiency, jobs/housing/activity balance, and infrastructure investments that support transit, walking, and bicycling. Of these strategies, only a few are likely to be effective in a suburban or rural setting such as the City of Manteca.

In August 2021, the California Air Pollution Control Officers Association (CAPCOA) released the Draft Handbook for Analyzing Greenhouse Gas (GHG) Emission Reductions, Assessing Climate Vulnerabilities, and Advancing Health and Equity (GHG Handbook). Mitigation Measure 3.13-1, below, summarizes transportation measures with VMT-reducing benefits that may be applicable at the project or community level in the City of Manteca. The proposed Project would be required to implement all feasible measures contained in Mitigation Measure 3.13-1, that are applicable to be implemented at the improvement plan stage of development. However, it should be noted that some of these strategies such as increased land use density or diversity would not be feasible for the Project site because it would change the nature of the Project. Furthermore, other strategies contained in Mitigation Measure 3.13-1 may not be deemed feasible for other reasons, such as due

to financial infeasibility, or would not be possible to implement at the improvement plan stage (such as increasing residential density). Therefore, even with implementation of Mitigation Measure 3.13-1, the Project impact is considered to be **significant and unavoidable** relative to this topic.

MITIGATION MEASURE(S)

Mitigation Measure 3.13-1*: As feasible, and where applicable at the improvement plan stage of development, as determined through consultation between the Project applicant and the City of Manteca, the Project applicant shall implement the following measures, which are identified in the CAPCOA Draft Handbook for Analyzing Greenhouse Gas (GHG) Emission Reductions, assessing Climate Vulnerabilities, and Advancing Health and Equity (GHG Handbook):*

- *Increase residential density;*
- *Limit residential parking supply;*
- *Unbundle residential parking cost from property cost;*
- *Provide access to transit (Transit Oriented Development);*
- *Improve street connectivity;*
- *Provide ride-share program;*
- *Implement subsidized or discounted transit program;*
- *Provide end-of-trip bicycle facilities;*
- *Provide community-based travel planning;*
- *Implement market price public on-street parking;*
- *Provide pedestrian network improvement;*
- *Construct or improve bike facility;*
- *Construct or improve bike boulevard;*
- *Expand bikeway network;*
- *Implement conventional or electric carshare program;*
- *Implement pedal or electric bikeshare program;*
- *Implement scooter-share program;*
- *Extend transit network coverage or hours;*
- *Increase transit service frequency;*
- *Implement transit-supportive roadway treatments;*
- *Reduce transit fares*

Impact 3.13-2: Project implementation may conflict with a program, plan, policy or ordinance addressing the circulation system, including transit, bicycle, and pedestrian facilities (Less than Significant)

The City of Manteca ATP (2020) and City of Manteca General Plan (2003) were reviewed to determine if the proposed development project results in any inconsistencies with adopted transportation related policies.

ACTIVE TRANSPORTATION PLAN (ATP)

The ATP identifies planned future Class II bike lane on Union Road north of Lathrop Road and SR 99 Frontage Road north of Lathrop Road. Based on the Tentative Subdivision Map Plans (labeled Attachment A) in the Notice of Preparation dated October 22, 2021, the proposed project will include the widening of Union Road, which will provide a second northbound vehicle travel lane and landscaped sidewalk area. The proposed project will also construct landscaped sidewalk area long SR 99 Frontage Road. However, the project plans do not currently include the construction of Class II bike lanes as identified in the ATP. Therefore, the following COA is recommended to ensure the project is consistent with the ATP:

1. **Traffic COA #4** – The developer shall construct Class II bike lanes along its frontage on Union Road and SR 99 Frontage Road, as identified in the City of Manteca ATP. The design of the bike lane shall be reviewed and approved by the Director of Engineering. The cost of bike lane construction shall be included in the total cost associated with the Union Road widening along the project frontage.

The proposed project will construct the continuation of the Class I Tidewater Bikeway. The proposed project will also construct sidewalks on internal streets, providing adequate connections to and throughout the site for pedestrians.

MANTECA GENERAL PLAN 2023

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. The proposed General Plan Update shows the Development Area portion of the Project site with a Low Density Residential, High Density Residential, and Park land use designation. It is noted that the proposed Project includes a General Plan Amendment that proposes land uses consistent with the proposed General Plan Update.

The proposed General Plan Update shows the Annexation Subarea 1 and 2 as Low Density Residential, and Annexation SubArea 3 as Low Density Residential, Medium Density Residential, and Commercial. It is noted that the proposed Project includes a General Plan Amendment that proposes land uses in the Annexation SubAreas consistent with the proposed General Plan Update.

Additionally, the proposed project is consistent with goals and policies identified in the Circulation Element of the City of Manteca General Plan 2023, as described below:

Goals

1. Goal C-2. Provide complete streets designed to serve a broad spectrum of travel modes, including automobiles, public transit, walking, and bicycling.
2. Goal C-9. Provide a safe, secure, and convenient bicycle route system that connects to retail, employment centers, public facilities, and parks
3. Goal C-10. Provide for safe and convenient pedestrian circulation.

The proposed project includes bicycle and pedestrian improvements that will help create complete streets and are consistent with the goals described above.

Policies

1. C-P-2: To the extent feasible, the City shall strive for a vehicular LOS of D or better at all streets and intersections, except in the Downtown area where right-of-way is limited, pedestrian, bicycle, and transit mobility are most important and vehicular LOS is not a consideration.
2. C-P-9: Residential and collector street intersections with collector and arterial streets shall be aligned with other residential and collector streets, where feasible, to maintain a high degree of connectivity between neighborhoods, minimize circuitous travel, and to allow bicyclists and pedestrians to travel conveniently and safely from one neighborhood to another without using major streets.

Although LOS cannot be used as a CEQA metric to identify significant transportation impacts, intersection operations were analyzed for the proposed project and are discussed in Chapters 4, 5, and 6. With recommended improvements described in those chapters, all intersections would operate at LOS D or better with the addition of project trips. Additionally, the project has been designed so residential streets align with the existing intersection at Union Road/Shady Pines Street and connect to the residential development to the west.

The City's PFIP is also developed and periodically updated to provide funding for local roadway expansion and improvements, which include bicycle and pedestrian facilities.

Implementation of the proposed Project would not result in a conflict with an existing or planned pedestrian facility, bicycle facility, or transit service/facility. Because the proposed Project would not conflict with adopted programs, plans, policies, or ordinances that address the circulation system, including transit, bicycle, and pedestrian facilities; this impact is considered **less than significant**.

Impact 3.13-3: Project implementation may increase hazards due to a design feature, incompatible uses, or inadequate emergency access (Less than Significant)

As described in section 3.13-1, access for the proposed development project would be at Union Road/Shady Pines Street, SR 99 Frontage Road/Shady Pines Street, and Union Road/Duluth Way. The preliminary site plan indicates adequate emergency access would be provided and there do not appear to be any geometric hazards. All intersections and street sections would be reviewed by the City of Manteca and designed to comply with typical City standards. With consideration to pedestrian safety, Fehr & Peers recommends that Union Road/Shady Pines Street be constructed as a signalized intersection under Existing Plus Project and Cumulative Plus Project Conditions. SR 99 Frontage Road/Shady Pines Street and Union Road/Duluth Way intersections may be constructed as side-street stop control intersections. All project access intersections, internal

intersections, and internal roadways are anticipated to be carefully designed to ensure they can accommodate emergency vehicles, subject to approval of the City of Manteca.

Additionally, the proposed development project would not conflict with any program, plan, ordinance, or policy addressing the circulation system, substantially increase hazards due to a geometric feature, or result in inadequate emergency access. Therefore, implementation of the proposed Project would be **less than significant** relative to this topic.

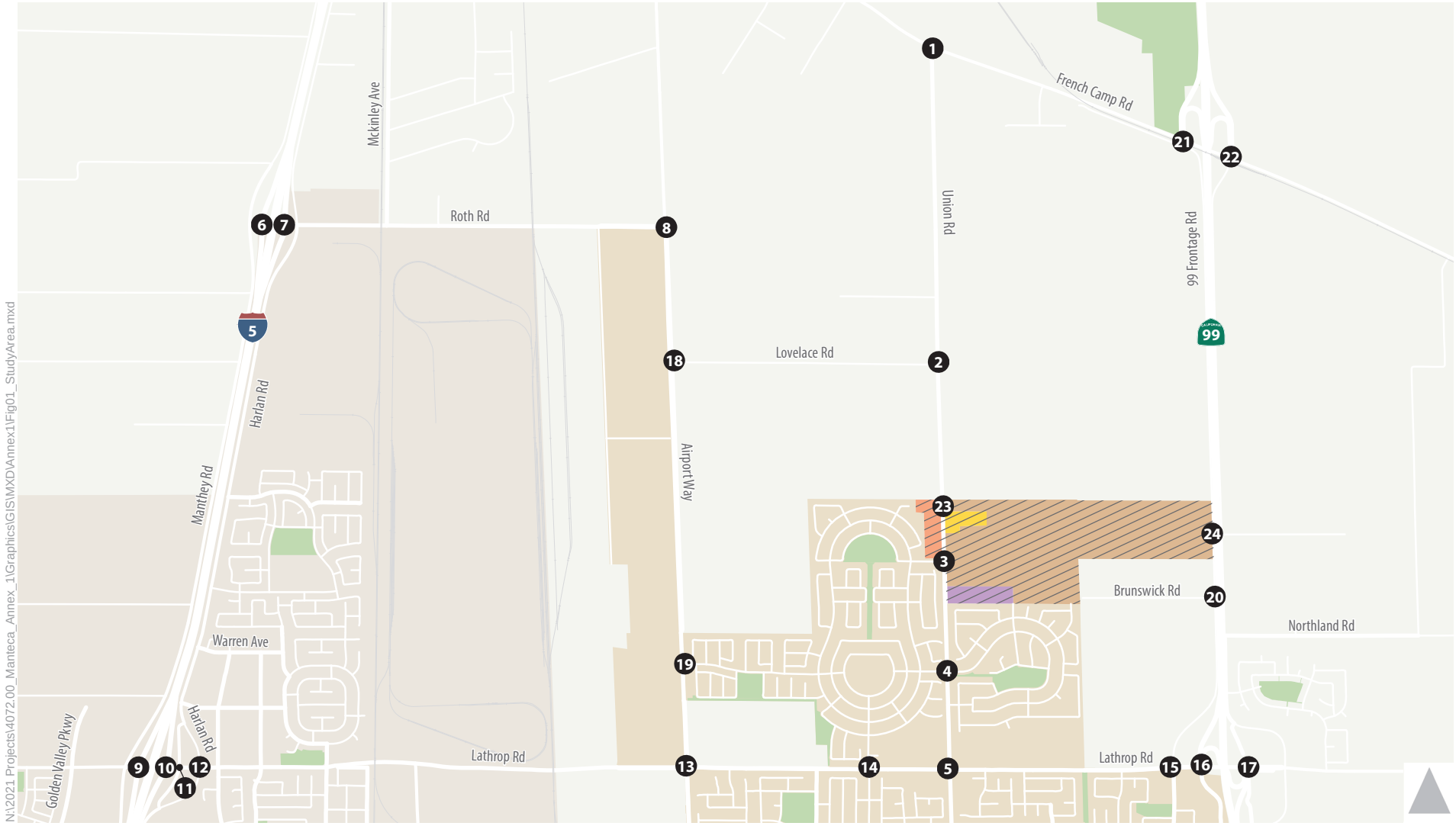


Figure 1

Study Area

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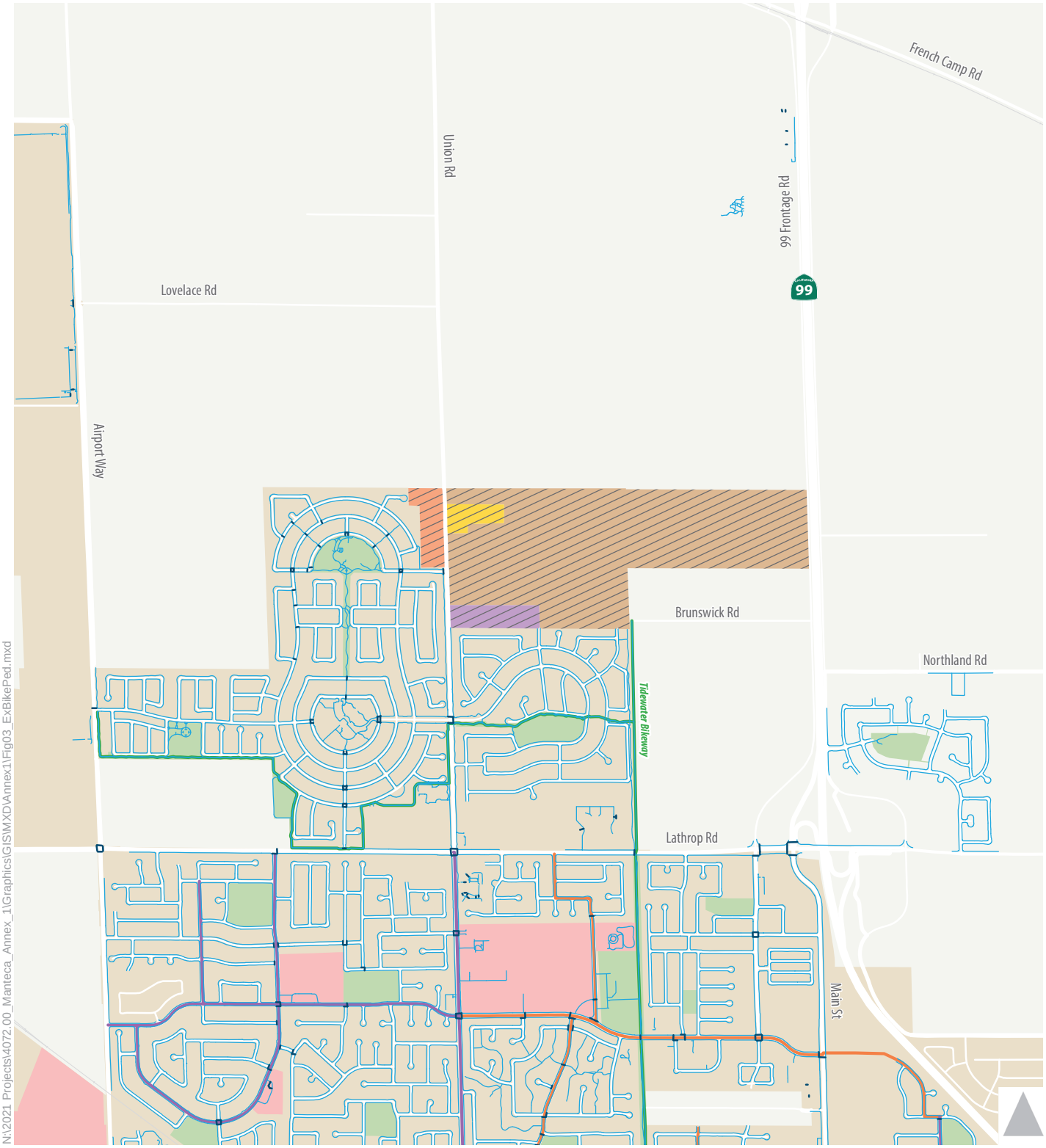


Figure 3

Existing Bicycle and Pedestrian Facilities

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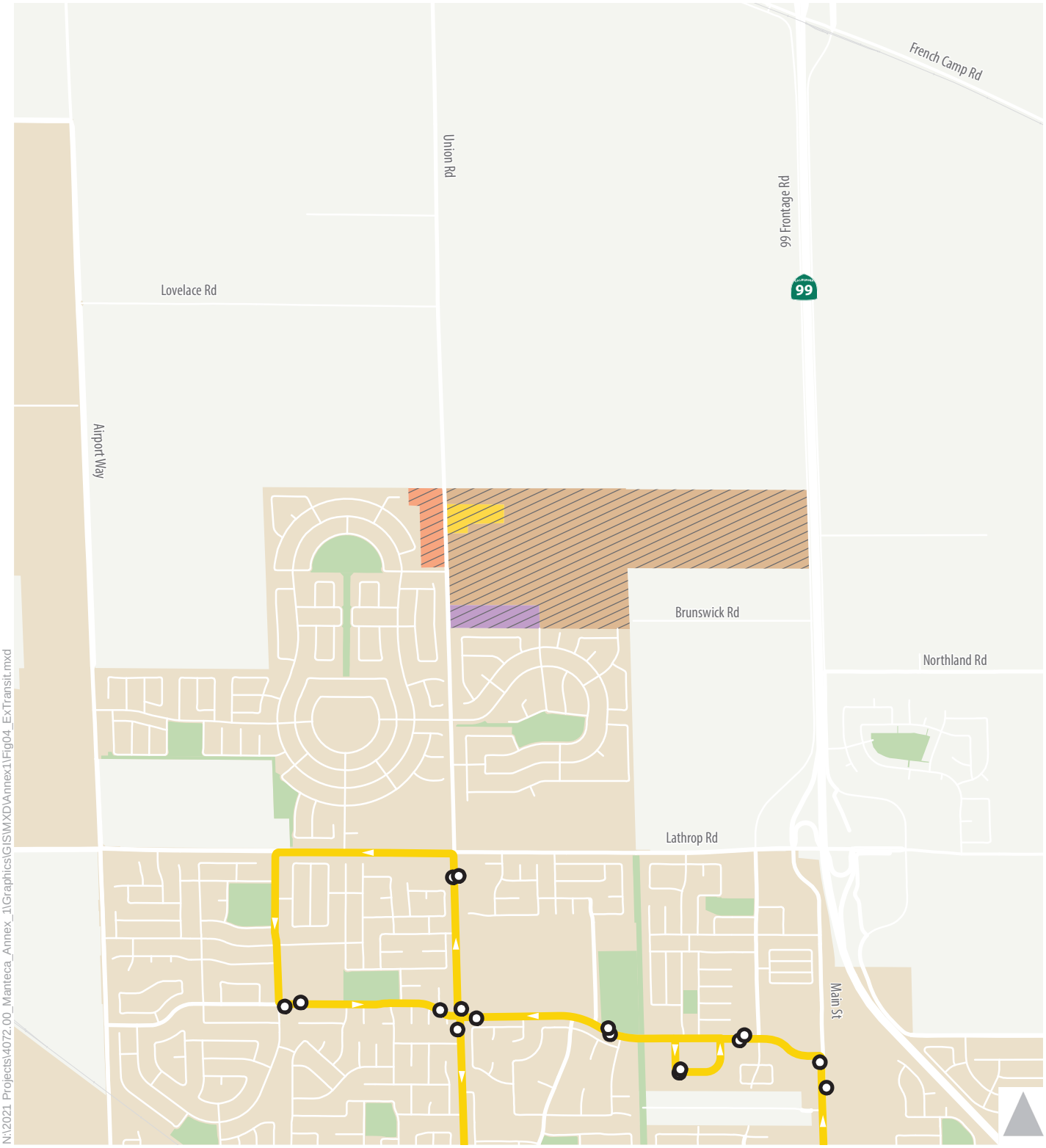
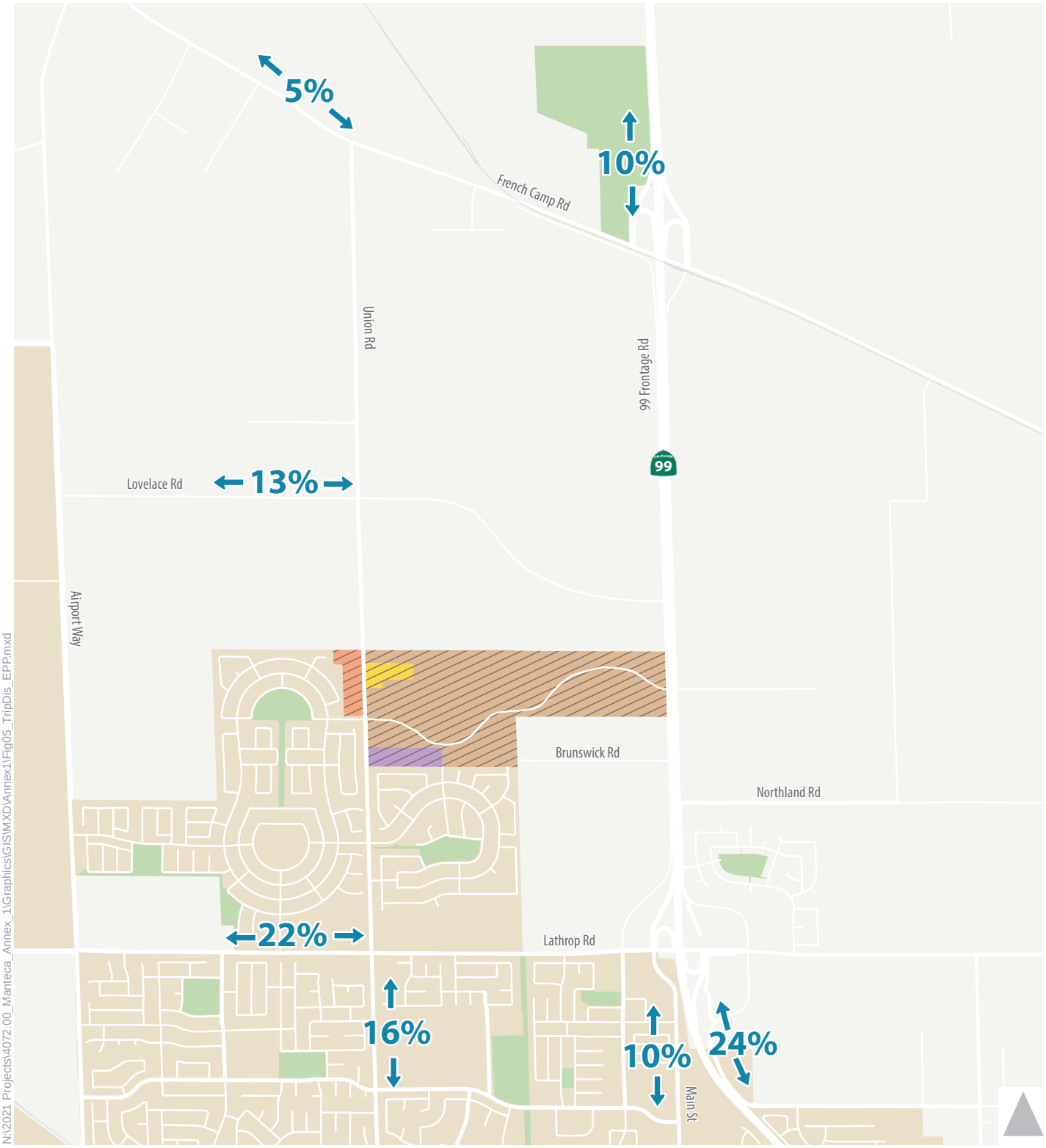


Figure 4

Existing Transit Facilities

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XX% Trip Distribution Percentage

Figure 5

Existing Plus Project Trip Distribution

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This section describes the regulatory setting, impacts associated with wastewater services, water services, storm drainage, and solid waste disposal that are likely to result from Project implementation, and measures to reduce potential impacts to wastewater, water supplies, storm drainage, and solid waste facilities. Information in this section is derived primarily from:

- *California's Groundwater, CalRecycle Solid Waste Information System, CalRecycle Jurisdiction Diversion/Disposal Rate Summary, Manteca Municipal Services Review (City of Manteca, 2008);*
- *City of Manteca General Plan Update (De Novo Planning Group, 2021)*
- *City of Manteca Urban Water Management Plan (Manteca, 2015);*
- *Eastern San Joaquin Groundwater Subbasin Groundwater Sustainability Plan* (ESJCGA, 2019),
- *San Joaquin Groundwater Basin Groundwater Management Plan, South County Surface Water Supply Project EIR (South San Joaquin Irrigation District [SSJID], 1999);*
- *South San Joaquin Irrigation District 2020 UWMP* (SSJID, 2020)
- *Water Master Plan (Manteca, 2005), Storm Drain Master Plan (Manteca, 2013) Wastewater Collection System Master Plan (Manteca, 2012);*
- *Wastewater Quality Control Facility Master Plan Update (Manteca, 2006), Draft Sewer Rate Study (Manteca, 2008); and*
- *North Manteca Annexation #1 Water Supply Assessment (West Yost, 2022).*

There were no comments received during the NOP scoping process related to this environmental topic.

3.14.1 WASTEWATER SERVICES

ENVIRONMENTAL SETTING

Wastewater service is provided by the City of Manteca via their network of collection infrastructure and the Wastewater Quality Control Facility (WQCF), which is located southwest of the Project site at 2450 West Yosemite Avenue. The WQCF provides services to the City of Manteca, City of Lathrop, and Raymus Village in San Joaquin County. The WQCF has a maximum average dry weather capacity of 9.87 million gallons per day (mgd).

Wastewater Conveyance

The City's sewer service area is contiguous with City limits, and is divided into north, south and central sewer sheds. The municipal wastewater collection system includes 242 miles of sewer mains and 19 pump stations (City of Manteca, 2017). The collection system includes gravity flow pipes ranging from 6-inch to 60-inch diameter, and force mains from 6-inch to 24-inch diameter. The existing collection system generally serves the developed portions of the city, with major trunk sewers located throughout the city.

Wastewater Treatment

The WQCF is located west of downtown Manteca on 22-acres owned by the City. The WQCF treats municipal wastewater from the City of Manteca and the City of Lathrop, and seasonally accepts industrial food processing waste effluent from Eckert Cold Storage (Nolte, 2007). Per contractual agreement, 8.42 mgd of plant capacity is allocated to the City of Manteca and 1.45 mgd is allocated to the City of Lathrop (EDAW, 2007). The WQCF treats an average dry weather flow (ADWF) of about 7.2 mgd and had an original average dry weather design capacity of 9.87 mgd. However, historic water use reductions in the community combined with population growth have drastically increased the concentration of biological oxygen demand (BOD) and total Kjeldahl nitrogen (TKN) in the influent wastewater. This essentially makes the incoming wastewater higher strength and makes the overall biological and nitrogen loading on the plant higher even with lower wastewater flows. As a result of these changes, the actual plant capacity is limited by biological and nitrogen loading. Development that occurred up through 2021 has used the Phase III capacity. In order to provide WQCF capacity for the growing population until the Phase IV expansion is completed, interim improvements are currently underway to improve plant operations which will provide temporary additional capacity. The facility's current NPDES permit is currently shared between the City and Dutra Farms, Inc. and is effective until April 2026 (CA RWQCB, 2021). The anticipated buildout ADWF within areas served by the WQCF was originally 27 mgd (EDAW, 2007) but may be adjusted downward in future wastewater master plans to account for higher sewer strength.

The City has been aware of historical reductions in water usage combined with population growth increasing the biological and nitrogen load at the WQCF since 2014 and has been working with engineers to monitor and plan for capacity needs under these changed conditions. Interim projects such as the Aeration Basin Efficiency projects completed in 2015 for the North Plant and 2019 for the South plant have improved the City's ability to treat the higher loadings in a reliable and more efficient manner. Other interim projects needed to treat the higher loadings until the Phase IV plant expansion is completed are currently being planned and developed. The City is starting the planning process for the Phase IV expansion and a new wastewater master plan, with Stantec already under contract. These proactive efforts ensure the City will be able to reliably treat the wastewater as the community expands its population up to and through the next plant expansion. The WQCF is an activated sludge tertiary treatment plant. The facility includes an influent pump station, and primary, secondary and tertiary treatment facilities. Primary treatment at the WQCF consists of aerated grit removal and primary sedimentation. Secondary treatment at the facility consists of nitrification and denitrification in activated sludge aeration basins and subsequent secondary sedimentation. Undisinfected secondary effluent is either stored for agricultural use in a 15-milliongallon pond or blended with food processing waste and applied directly on the agricultural fields owned by the City (126 acres) (CA RWQCB, 2021).

Secondary effluent not used for crop demands undergoes tertiary treatment, including rapid mixing, flocculation, cloth media filtration, and ultraviolet light (UV) disinfection. Treated tertiary effluent is either pumped to a truck fill station for construction vehicles to receive recycled water for construction purposes or discharged year-round through a 36-inch diameter pipe into the San

Joaquin River (CA RWQCB, 2021). As the practice of discharging to fields is gradually phased out due to land development, effluent will increasingly be diverted to the River (City of Manteca, 2016).

The City is planning to expand the facility from the currently permitted 9.87 mgd to 27 mgd by buildout. The various WQCF facilities are designed to be expanded in phases, based on future growth. Proposed treatment improvements identified in the 2006 WQCF Master Plan Update include expansion of the primary, secondary, and tertiary treatment facilities, expansion of the solids handling systems and expansion of the co-generation system to generate electricity from methane produced during the treatment process (EDAW, 2007). Methane generation is no longer used to produce electricity and has now been converted to fueling City solid waste trucks.

The WQCF recently completed expansions to the solids handling streams to provide increased capacity to meet permitted requirements and new State regulations. Improvements include new facilities for receiving Fats, Oils, and Greases (FOGs), and receiving food waste separated from the solid waste streams. The separation of these materials is required by State regulations and is anticipated to provide transportation fuel for City garbage trucks (City of Manteca, 2016). Because of high nitrogen loadings at the WQCF the City has paused directing food waste to the WQCF until sufficient nitrogen treatment capacity is in place at the WQCF.

Current and Projected Wastewater Flows

Historically, wastewater flows to the Manteca WQCF have increased as the population and commercial and industrial activity has grown. ADWF was 4 mgd in 1991, 5.81 mgd in 2003, and 6 mgd in December 2005 (EDAW, 2007). Since 2007, average daily influent flow to the WQCF has remained relatively constant, ranging from a low of 6.1 mgd (2008) to a high of 6.3 mgd (2011) (City of Manteca, 2017b). In 2020, the average annual wastewater flow was 7.2 mgd.

The 2006 WQCF Master Plan Update reported wastewater flow projections for the City of Manteca of 19.5 mgd by 2023 and 23 mgd by buildout (Nolte Associates, 2006). Projections were based on wastewater generation factors developed from historical studies, and developed based on different household densities for different residential land use categories. Assuming a similar level of development as anticipated in the 2006 WQCF Master Plan Update, future wastewater projections are anticipated to be lower than those estimated in the 2006 WQCF Master Plan Update because of existing and pending water use efficiency regulations that will reduce indoor water use and wastewater flows. This lower water usage effect has already been experienced by the City as noted above. According to the City's NPDES permit, current permitted average dry weather flow at the WQCF is 9.87 million gallons per day (MGD). Once the Phase IV expansion and other projects at the facility are completed, the average dry weather flow at the WQCF is permitted to be 17.5 MGD.

REGULATORY SETTING

Clean Water Act (CWA) / National Pollutant Discharge Elimination System (NPDES) Permits

The CWA is the cornerstone of water quality protection in the United States. The statute employs a variety of regulatory and non-regulatory tools to sharply reduce direct pollutant discharges into

waterways, finance municipal wastewater treatment facilities, and manage polluted runoff. These tools are employed to achieve the broader goal of restoring and maintaining the chemical, physical, and biological integrity of the nation's waters so that they can support "the protection and propagation of fish, shellfish, and wildlife and recreation in and on the water."

The CWA regulates discharges from "non-point source" and traditional "point source" facilities, such as municipal sewage plants and industrial facilities. Section 402 of the Act creates the NPDES regulatory program which makes it illegal to discharge pollutants from a point source to the waters of the United States without a permit. Point sources must obtain a discharge permit from the proper authority (usually a state, sometimes EPA, a tribe, or a territory). NPDES permits cover industrial and municipal discharges, discharges from storm sewer systems in larger cities, stormwater associated with numerous kinds of industrial activity, runoff from construction sites disturbing more than one acre, mining operations, and animal feedlots and aquaculture facilities above certain thresholds.

Permit requirements for treatment are expressed as end-of-pipe conditions. This set of numbers reflects levels of five key parameters: (1) biochemical oxygen demand (BOD), (2) total suspended solids (TSS), (3) pH acid/base balance, (4) Ammonia, and (5) Nitrate. These levels can be achieved by well-operated sewage plants employing "secondary" treatment with denitrification. Primary treatment involves screening and settling, while secondary treatment uses biological treatment in the form of "activated sludge." Denitrification uses the activated sludge process to remove nitrogen from the wastewater.

All so-called "indirect" dischargers are not required to obtain NPDES permits. An indirect discharger is one that sends its wastewater into a city sewer system, so it eventually goes to a sewage treatment plant. Although not regulated under NPDES, "indirect" discharges are covered by another CWA program called pretreatment. "Indirect" dischargers send their wastewater into a city sewer system, which carries it to the municipal sewage treatment plant, through which it passes before entering surface water.

The City's current NPDES Permit, which regulates the wastewater effluent quantity and quality upon discharge, was issued by the Central Valley Regional Water Quality Control Board and is Order R5-2021-0003 NPDES No. CA0081558.

Porter-Cologne Water Quality Control Act

The Porter-Cologne Water Quality Control Act is California's statutory authority for the protection of water quality. Under the Porter-Cologne Act, the State is required to adopt policies, plans, and objectives that will protect the State's waters for the use by and enjoyment of Californians. In California, the State Water Resources Control Board (SWRCB) has the authority and responsibility for establishing policy related to the State's water quality. Regional authority is delegated by the SWRCB to a Regional Water Quality Control Board (RWQCB). The Porter-Cologne Act authorizes the SWRCB and RWQCB to issue NPDES permits.

Under the Central Valley Regional Water Quality Control Board (CVRWQCB) NPDES permit system, all existing and future municipal and industrial discharges to surface water within the city would be subject to regulation. NPDES permits are required for operators of municipal separate storm sewer

systems, construction projects, and industrial facilities. These permits contain limits on the amount of pollutants that can be contained in each facility's discharge.

City of Manteca General Plan

2023 GENERAL PLAN (EXISTING)

Policies: Sewer

- PF-P-18. Ensure wastewater collection and treatment for all development in the City and the safe disposal of wastes.
- PF-P-19. The City will maintain capacity to process combined residential, commercial, and industrial flow.
- PF-P-20. The City shall develop new sewage treatment and trunk line capacity as necessary to serve new development.
- PF-P-21. City sewer services will not be extended to unincorporated areas, except in extraordinary circumstances. Existing commitments for sewer service outside the city limits shall continue to be honored.
- PF-P-22. Development of individual septic systems may be allowed only where the City makes a finding that it cannot feasibly provide public sewer service, and such systems shall only be used until such time as City sewer service becomes available. Such systems shall meet the minimum standards of the San Joaquin County Health Department.
- PF-P-23. The City shall establish and maintain a growth management plan to ensure the development of a balanced mix of residential, commercial, industrial, and public land uses.
- PF-P-24. Ensure that all new development provides for and funds a fair share of the costs for adequate sewer distribution, including line extensions, easements, and plant expansions.
- PF-P-25. The City will maintain the ability to handle peak discharge flow while meeting State Regional Water Quality Control Board Standards as established in the current NPDES Permit.

Implementation: Sewer

- PF-I-8. The City shall update the Public Facilities Implementation Plan regarding wastewater collection and treatment every five years. The update shall be reviewed annually for adequacy and consistency with the General Plan.
- PF-I-9. The City will require all sewage generators within its service area to connect to the City's system, except those areas where on-site treatment and disposal facilities are deemed appropriate.
- PF-I-11. The City will investigate methods of improving the quality of the effluent from the City plant and will investigate options for reuse of treated wastewater. The recycled wastewater will be used for irrigation of public recreation lands, restoration of wetland areas, and irrigation of landscaped areas.
- PF-I-12. The City will promote reduced wastewater system demand through efficient water use by:

- requiring water conserving design and equipment in new construction,
- encouraging retrofitting with water conserving devices,
- designing wastewater systems to minimize inflow and infiltration to the extent economically feasible; and
- maintaining a Citywide map of all sewer collection system components and monitoring the condition of the system on a regular basis.

Policies: Water Conservation

- RC-P-1. The City shall continue to implement water conservation standards for all commercial and industrial development, and for all existing and new residential development.
- RC-P-2. The City shall explore potential uses of treated wastewater when such opportunities become available.
- RC-P-3. The City shall protect the quantity of Manteca's groundwater.
- RC-P-4. The City shall require water conservation in both City operations and private development to minimize the need for the development of new water sources.

Implementation: Water Conservation

- RC-I-1. Continue to implement standards for water conserving landscape practices, including the use of drought tolerant plants, for both public and private projects.
- RC-I-2. Continue efforts to increase public participation in water conservation.
- RC-I-4. Cooperate with other agencies and jurisdictions to expand water conservation programs, and to develop methods of water reuse.
- RC-I-5. Actively pursue the use of treated wastewater in irrigation and industrial applications, including development of appropriate infrastructure.

GENERAL PLAN UPDATE (PROPOSED)

Policies: Community Facilities Element

- CF-7.1. Ensure adequate wastewater collection and treatment infrastructure to serve existing and future development and the safe disposal of wastes.
- CF-7.2. Develop new sewage treatment and trunk line capacity as necessary to serve new development. The City shall incorporate current technologies into the design and operation of these facilities.
- CF-7.3. Only extend sewer services to unincorporated areas under extraordinary circumstances. Existing commitments for sewer service outside the city limits shall continue to be honored.
- CF-7.5. Maintain the ability to handle peak discharge flow while meeting State Regional Water Quality Control Board Standards as established in the current NPDES Permit.
- CF-7.6. Maintain the existing wastewater system on a regular basis to increase the lifespan of the system and ensure public safety.

Implementation: Community Facilities Element

- CF-7a. Update the Public Facilities Implementation Plan regarding wastewater collection and treatment every five years. The update shall be reviewed annually for adequacy and consistency with the General Plan.
- CF-7b. Require new development to provide for and fund a fair share of the costs for adequate sewer distribution, including line extensions, easements, and plant expansions.
- CF-7c. Require all sewage generators within the City's service area to connect to the City's system, except those areas where on-site treatment and disposal facilities are deemed appropriate.
- CF-7e. Investigate methods of improving the quality of the effluent from the City wastewater treatment plant and options for reuse of treated wastewater. The recycled wastewater will be used for irrigation of public recreation lands, restoration of wetland areas, irrigation of landscaped areas, dust control, fire protection, and soil compaction.
- CF-7f. Promote reduced wastewater system demand through efficient water use by:
    - Requiring water conserving design and equipment in new construction,
    - Encouraging retrofitting with water conserving devices,
    - Designing wastewater systems to minimize inflow and infiltration to the extent economically feasible; and
    - Maintaining a Citywide map of all sewer collection system components and monitoring the condition of the system on a regular basis.

City of Manteca Municipal Code

The City of Manteca Municipal Code, Title 13 (Public Services) Chapter 13.12 (Sewer Connection Charges), Chapter 13.14 (Sewer Capacity Charges), and Chapter 13.16 (Sewer Service Charges) contain regulations associated with sewer management.

Title 13 (Public Services), Chapter 13.38 (Public Facilities Implementation Program Fees), Section 13.38.050 (Establishment of a Sewer Fee) requires developers of property to pay a sewer facility development fee.

Utility Master Plans

The City of Manteca maintains a variety of Master Plan documents that guide the design, development, and maintenance of the utilities within the city limits. These include: *Urban Water Management Plan* (2015), *Water Master Plan* (2005), *Storm Drain Master Plan* (2013) *Wastewater Collection System Master Plan* (2012), *Wastewater Quality Control Facility (WQCF) Master Plan Update* (2006), *Draft Sewer Rate Study* (2008). This City is planning to start the next WQCF and Sewer Master Plan and Rate Study in 2021.

Order R5-2021-0003 NPDES NO. CA0081558

The NPDES permit program addresses water pollution by regulating point sources that discharge pollutants to waters of the United States. Created in 1972 b y the Clean Water Act, the NPDES permit program is authorized to state governments by the EPA to perform many permitting, administrative, and enforcement aspects of the program. The City of Manteca WQCF is subject to waste discharge requirements under Order R5-2021-0003 NPDES NO. CA0081558 by the Regional Water Quality Control Board.

THRESHOLDS OF SIGNIFICANCE

Consistent with Appendix G of the CEQA Guidelines, the proposed Project will have a significant impact on the environment associated with Utilities if it will:

- Require or result in the relocation or construction of new or expanded wastewater facilities, the construction or relocation of which could cause significant environmental effects; and/or
- Result in a determination by the wastewater treatment provider which serves or may serve the Project that it does not have adequate capacity to serve the project's projected demand in addition to the providers existing commitments.

IMPACTS AND MITIGATION MEASURES

Impact 3.14-1: The proposed Project would not result in a determination by the wastewater treatment provider which serves or may serve the Project that it does not have adequate capacity to serve the project's projected demand in addition to the providers existing commitments (Less than Significant)

WASTE DISCHARGE REQUIREMENTS (WDRS) BOARD ORDER NUMBER NO R5-2021-0003 (NPDES PERMIT NO. CA0081558).

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, Low Density Residential uses are estimated to generate 1,338 gallons per acre per day or 160 gallons per day per equivalent dwelling unit (edu). The Project site includes 915 Residential Lots of Low Density Residential. Using this rate, the proposed Low Density Residential uses would generate approximately 146,400 gallons per day 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.

As described above, the City must also periodically review and update their WQCF Master Plans, and as growth continues to occur within the City, the City will identify necessary system upgrades and capacity enhancements to meet growth, prior to the approval of new development. Additionally, the WQCF Phase IV plant expansion is currently being planned and developed. The City is starting the planning process for the Phase IV expansion and a new wastewater master plan, with Stantec already under contract. These pre-existing proactive efforts ensure the City would be able to reliably treat the wastewater as the community expands its population up to and through the next plant expansion, including with implementation of the proposed Project.

The City's Existing General Plan designated the Development Area as LDR and Park and therefore anticipated development and potential annexation into the City. Given that projected wastewater generation volumes associated with the buildout of the Development Area would not exceed the projected wastewater generation volumes described in the WQCF Master Plan, this impact would be **less than significant**, and no mitigation is required.

Impact 3.14-2: The proposed Project would not require or result in the relocation or construction of new or expanded wastewater facilities, the construction or relocation of which could cause significant environmental effects (Less than Significant)

As Manteca continues to develop in the future, there will be an increased need for water and wastewater services, including a reliable source of recycled water. These needs have been addressed in the WQCF master plan and will require that the City continue to implement phased improvements to some pump stations, sewer mains, and the various wastewater treatment plants when triggered by growth.

3.14 UTILITIES

The overall collection sewer strategy for the City of Manteca, including the proposed Project, consists of a combination trunk sewer gravity collection system with pump or lift stations located along the collection system to convey wastewater to an influent pump station located at the City WQCF.

Wastewater from the Project site will be collected and conveyed via a network of gravity flow sewer main lines serving the development. An internal pipe collection system having various diameters will be installed within the Project site. These future on-site effluent collection facilities will discharge into the City system at various locations. The Development and Non-Development Areas would be served by a new wastewater distribution system. The proposed wastewater conveyance facilities would connect to the existing sewer mains as part of the City of Manteca collection and treatment system. The proposed Project will also construct a new sewer mains, as appropriate, to extend the existing City of Manteca collection and treatment system.

The wastewater collection and conveyance system that will serve the proposed Project will consist of engineered infrastructure consistent with the City's existing infrastructure requirements. Sizing of existing infrastructure in the City varies based on location, but generally includes gravity sewers and force mains ranging in size from 8 to 24 inches, and pump stations. The existing facilities have undergone environmental review and have waste discharge permits from the State.

New wastewater collection and conveyance infrastructure needed for the proposed Project will require trenching/excavation of earth, and placement of pipe within the trenches at specific locations, elevations, and gradients. The applicant will refine the wastewater collection/conveyance infrastructure design through the development of improvements plans which undergo review by the Engineering Department to ensure consistency with the City's engineering standards. This improvement plan process will include full engineering design (i.e. location, depth, slope, etc.) of all conveyance infrastructure as well as a review of new sewer pump stations and new force mains if needed. Ultimately, the sanitary sewer collection system will be an underground collection system installed as per the City of Manteca standards and specifications. Sanitary sewer disposal and treatment will be to the City of Manteca WQCF.

The installation of the wastewater collection and conveyance system infrastructure to serve the proposed Project would have a **less than significant** impact relative to this topic. Although the wastewater treatment plant would require upgrades or improvements in order to serve the proposed Project, this would not cause additional significant environmental effects due to the proposed Project, as such potential improvements have already been planned for. Therefore, implementation of the proposed Project would have a **less than significant** impact relative to this topic.

3.14.2 WATER SUPPLIES

The following information is based on the *North Manteca Annexation #1 Water Supply Assessment* (West Yost Associates, 2022), which is included as Appendix F of this Draft EIR, and the Public Review Draft EIR for the Manteca General Plan Update (March 2021).

ENVIRONMENTAL SETTING

City of Manteca Water Service Area

The Project site is located adjacent to the Manteca city limits and within the Manteca Sphere of Influence (SOI). The City is located in the flat plain at the northern end of California's San Joaquin Valley in south San Joaquin County. The City is located approximately 10 miles south of Stockton and 15 miles north of Modesto. Rich agricultural lands abut Manteca on the north, east, and south, while areas to the west are used primarily for industry. The Southern Pacific Railroad cuts the City diagonally from southeast to northwest. State Highway 120 crosses the southern portion of the City and provides a connection between Interstate 5, located about four miles to the west of the City, and Highway 99 along the eastern boundary of the City. This location creates a good setting for Bay Area commuter housing, as well as new commercial and industrial locations.

The City's water service planning area corresponds with the City SOI established in the City's 2023 General Plan. The 2023 General Plan includes a designation of area planned to be developed by 2023. The City's current water distribution service area coincides with the City limits. It is assumed that the City's water distribution system will extend to areas within the SOI beyond the existing City limits as those areas are approved for development and annexed into the City.

Presently, the City limits encompass an area of about 13,746 acres. The total existing developed land is made up of approximately 64 percent residential land uses, 18 percent commercial, industrial, and institutional land uses, and 18 percent agriculture, parks, landscape, and other land uses. Water demands not served by the City (e.g., agriculture, schools) rely on private groundwater wells and the South San Joaquin Irrigation District (SSJID) groundwater for their supply.

Current and Projected Population

Between 1980 and 2020 the City experienced an average annual population growth rate of 3.1 percent, from 24,925 persons in 1980 to 84,800 persons in 2020. During this period, peak population growth occurred between 1980 and 1990 with an average growth rate of over 5 percent. Recent population growth since 2010 has averaged about 2.4 percent per year.

By comparison, the City's boundary area has grown from about 6,300 acres in 1990 to about 13,400 acres in 2015, an annual average area growth rate of about 3.1 percent. The greatest growth in area occurred between 1990 and 2000. Since 2000, the City's area has grown about 1.8 percent per year.

For purposes of the Water Supply Assessment (WSA) prepared for the proposed Project, the City elected to use the 1980-2020 average annual population growth rate of 3.1 percent to project the

population of the water service area through 2045. It is assumed that this population growth includes population acquired through City annexations of the surrounding area, as well as City infill development. The current and projected water service area populations for the City are summarized in the Water Supply Assessment prepared for the proposed Project. According to California Department of Finance, the City's population in 2020 was 84,800, and by 2045 it is anticipated to increase to 182,354.

Climate

Climate and precipitation information are described in the City's 2015 UWMP. The City experiences hot summer temperatures with many days over 100°F during July and August. Nighttime temperatures during July and August drop into the fifties. The winter temperatures are much colder, with daytime highs in the forties and fifties. Winter lows are in the thirties and forties. Overnight freezes are infrequent. Spring and fall provide moderate temperature ranges. The mean annual precipitation is 14 inches. A greater quantity of water is evaporated during May through August in correlation to high temperatures and low humidity, which results in high water demand for landscape irrigation.

City of Manteca Water Demands

City potable and raw water demand in 2020 was approximately 16,253 AF, which may have been caused by a higher daytime population than normal due to stay-at-home orders and mandated closure of non-essential businesses in response to the COVID-19 pandemic.

The projected water demand for future land use area for the buildout of the General Plan areas, which includes the proposed Project in the City's General Plan Update, was calculated by multiplying the projected land uses by the unit water demand factor. The resulting water demand projection was 17,971 AFY.

Therefore, the projected potable and raw water demand at buildout of the General Plan is 34,224 AFY (16,253 AFY existing plus 17,971 AFY projected). Buildout of the General Plan planning area is projected to occur shortly before 2050.

The City's existing and projected potable and raw water demand is shown in Table 3.14-1. The 2020 data reflect actual 2020 demand. The projected water demands shown in Table 3.14-1 will be used throughout this WSA.

TABLE 3.14-1: EXISTING AND PROJECTED TOTAL WATER DEMAND IN NORMAL YEARS, AFY

	2020	*2025*	*2030*	*2035*	*2040*	*2045*
Total Water Demand	16,253	18,480	21,012	23,891	27,164	30,885

SOURCE: 2020 WATER DEMAND PER CITY OF MANTECA, PROJECTED GROWTH FROM WEST YOST

The City's projected water demand at buildout (based on existing water demand and buildout of the General Plan Update, and the projected water demand of the proposed Project) is summarized in the Water Supply Assessment. The City's preliminary water demand projections for future developments with approved water supply, as of March 2021, have been updated by West Yost to be based on water use factors that were adjusted for SB X7-7. These revised demand projections for

future developments within the City are included in Appendix A of the WSA (see Appendix F of this EIR).

TABLE 3.14-2: CITY OF MANTECA PROJECTED BUILDOUT WATER DEMAND, AFY

PROPOSED LAND USE	*AREA, ACRES(A)*
Existing 2020 Water Demand	16,253
2040 General Plan Horizon Water Demand[1]	10,911
2045 Water Demand[2]	3,721
Buildout of General Plan[3]	3,339
Total Water Demand	**34,224**

SOURCES: 2020 WATER DEMAND PER CITY OF MANTECA, PROJECTED GROWTH FROM WEST YOST, demand projections assume a constant growth rate between 2020 and buildout of the General Plan, which translates to 2.60 percent per year.

Notes: [1]2040 General Plan Horizon Water Demand represents incremental increase in water demand beyond existing demand.

[2] 2045 Water Demand represents incremental increase in water demand beyond existing and 2040 General Plan demand.

[3] General Plan Buildout represents incremental increase in water demand beyond the existing, 2040 General Plan, and 2045 water demand.

DRY YEAR WATER DEMAND

The City currently has a water conservation program in place, as described in Chapter 8 of the City's 2015 UWMP. The City's Water Shortage Contingency Plan includes a five-stage plan describing water conservation measures to reduce water demand by up to 50 percent in the event of a water supply shortage or emergency. The water shortage stages, and their respective anticipated reduction in potable water demand, are shown in 3.14-3.

TABLE 3.14-3: WATER SHORTAGE CONTINGENCY PLAN PROJECTED DEMAND REDUCTION

STAGE	*PERCENT SUPPLY REDUCTION*
I	Up to 10 percent
II	11 – 20 percent
III	21 – 30 percent
IV	31 – 40 percent
V	41 – 50 percent

SOURCE: CITY OF MANTECA 2015 UWMP, TABLE 8-1 STAGES OF WSCP

When comparing potable water supply to demand in the City's 2015 UWMP and in this WSA, the dry year water demands are assumed to not include implementation of the City's Water Shortage Contingency Plan. This is a conservative assumption as additional water conservation will likely occur as a result of the City's implementation of its Water Shortage Contingency Plan in response to dry years or other water supply shortages. **Error! Reference source not found.** Table 3.14-4 presents t he projected future dry year potable water demand.

TABLE 3.14-4: PROJECTED FUTURE DRY YEAR POTABLE AND RAW WATER DEMAND

HYDROLOGIC CONDITION	*2020*	*2025*	*2030*	*2035*	*2040*	*2045*
Single Dry Year, AFY	16,253	18,480	21,012	23,891	27,164	30,885
Multiple Dry Year 1	16,253	18,480	21,012	23,891	27,164	30,885
Multiple Dry Year 2	16,253	18,480	21,012	23,891	27,164	30,885

Multiple Dry Year 3	16,253	18,480	21,012	23,891	27,164	30,885
Multiple Dry Year 4	16,253	18,480	21,012	23,891	27,164	30,885
Multiple Dry Year 5	16,253	18,480	21,012	23,891	27,164	30,885

[A] Conservatively assumes no demand reduction in dry years.

WATER SUPPLIES

Surface Water Supply

The principal component of future water supply for the City is deliveries from the SSJID's South County Water Supply Program (SCWSP). The City, along with three other cities/retail water suppliers (Escalon, Lathrop, and Tracy), signed water supply agreements with SSJID to supply treated potable water to the participating cities.

The Nick C. DeGroot Water Treatment Plant (WTP) is commissioned for the SCWSP and is currently operated by SSJID. The WTP has a total Phase 1 capacity of 31,522 AFY and the Phase 2 capacity is anticipated to be 43,090 AFY. Phase 2 has not yet been implemented but is expected by 2040, according to the SSJID 2020 UWMP. Currently, the City is allotted 11,500 AFY under Phase 1 and 18,500 AFY under Phase 2. The term of the City's water supply agreement with SSJID is through December 2029. The City and SSJID signed a new contract to extend this contract through 2049. Historically, the City has not utilized its full allocation of surface water due to system constraints and State and SSJID supply limits in response to the drought conditions.

Groundwater Supply

BASIN DESCRIPTION

The City's wells are located in the Eastern San Joaquin (ESJ) Subbasin, which is a subbasin of the San Joaquin Valley Groundwater Basin. The groundwater aquifers underlying the City have been identified to include four geologic formations. In increasing depth from the surface, the identified aquifers are Victor Formation, Laguna Formation, Mehrten Formation, and Valley Springs Formation. Due to the alluvial generation of these aquifers, there is significant variation in grain size, with lenses and strata of high yield gravel, permeable sandy material and lower permeability clays. In general, the strata slope from the hills east of the City downward to the west, providing good recharge from hill runoff as well as from the Stanislaus River. The City's wells primarily withdraw water from the Laguna and Victor Formations.

The basin is not adjudicated; however, a basin management plan has been created. The Eastern San Joaquin Groundwater Basin Groundwater Management Plan (ESJGB-GMP) (NSJCGB, 2004) was prepared in September 2004. According to Department of Water Resources (DWR) Bulletin 118 (DWR, 2006), the ESJ Subbasin is in a critical condition of overdraft[1]. Groundwater levels have been historically declining at an average rate of 1.7 feet per year. Groundwater overdraft in the overall

[1] The Eastern San Joaquin County Groundwater Subbasin was confirmed to be in critical condition of overdraft in the DWR Bulletin 118 Interim Update 2016.

basin and the City's groundwater withdrawal rate is of vital concern to the City as this poses a long-term risk to the reliability of the groundwater supply.

In 2014, the Sustainable Groundwater Management Act (SGMA) was signed into law to provide a framework for management of groundwater supplies by local agencies and restricts state intervention, if required. SGMA provides an opportunity for local agencies overlying the basin to form a Groundwater Sustainability Agency (GSA), which is the primary agency responsible for achieving sustainability. As part of the region's compliance with SGMA, the Eastern San Joaquin Groundwater Authority was formed in 2017, and includes representatives from Calaveras County Water District / Stanislaus County, California Water Service Company, Central Delta Water Agency, Central San Joaquin Water Conservation District, City of Lathrop, City of Lodi, City of Manteca, City of Stockton, Linden County Water District, Lockeford Community Services District, North San Joaquin Water Conservation District, Oakdale Irrigation District, San Joaquin County, South Delta Water Agency, South San Joaquin Groundwater Sustainability Agency, Stockton East Water District, and the Woodbridge Irrigation District GSA. This GSA adopted a Groundwater Sustainability Plan (GSP) in late 2019, because the Eastern San Joaquin Groundwater Subbasin has been identified as being in a state of critical overdraft and is considered a high priority. Two projects for the City that were identified in the GSP are the implementation of advanced metering infrastructure(AMI), mentioned above, and the transfer of recycled water to agricultural uses to offset groundwater pumping.

GROUNDWATER PRODUCTION

According to the City's 2015 UWMP, the sustainable yield of the groundwater basin was estimated in the 2019 GSP[2] to be approximately 1 acre-foot per acre per year (715,000 AFY plus or minus 10 percent over the subbasin area of 1,195 square miles, an average of 0.935 AF/acre). In 2005, the City began receiving treated surface water from SCWSP and the City has had limited groundwater pumping since the implementation of the SCWSP. Although groundwater pumping in some years prior to 2005 has exceeded that rate, as part of the SCWSP, the City intends to limit groundwater pumping to that rate or less. Projected groundwater availability is therefore based on an assumption that up to 1 AFY of groundwater is available per acre of City service area.

The total groundwater pumping that occurs within the City boundaries include City-owned municipal wells and City-owned park irrigation wells, in addition to irrigation and domestic wells owned and operated by others. This section provides a summary of the estimated groundwater pumping that occurs within the current City limits and planning area. According to the City's 2015 UWMP, groundwater pumping data collection is on-going and there are potentially many groundwater pumping wells that are unmetered and unidentified.

City-Produced Groundwater

The City currently (2021) owns and operates 17 potable water wells and 31 irrigation wells. The City's annual potable groundwater production has steadily increased historically, reaching a peak of 14,900

[2] "Eastern San Joaquin County Groundwater Subbasin. Groundwater Sustainability Plan." Eastern San Joaquin Groundwater Authority, November 2019.

acre-feet (AF) in 2004. Commissioning of the surface water treatment plant in 2005 decreased groundwater use considerably and currently supplies an average of 52 percent of the City's annual potable water supply. Since 2005, the City has constructed dedicated irrigation wells at many parks in an effort to reduce potable demand, which requires wellhead treatment at many wells for arsenic and other constituents to meet drinking water standards. In 2000, the City pumped about 1.2 AFY/acre, but has since decreased pumping to about 0.7 AFY/acre in 2010 and to about 0.5 AFY/acre in 2015. When the City annexes new areas, the safe yield remains unchanged; however, the volume of available groundwater increases with the annexation of land into the City. However, the 1 AFY/acre does not provide sufficient water supply for most projects.

Pumping by Others

Because there are numerous wells not owned by the City that are drawing from the ESJ Subbasin, this pumping could affect the amount of groundwater available to the City within the groundwater basin safe yield. Wells currently in operation not owned by the City include private domestic wells, agricultural wells, wells for school irrigation owned by the Manteca Unified School District (MUSD), and irrigation wells owned by SSJID, among others. Well completion reports obtained from DWR suggest that approximately 1,000 water wells have been constructed within the General Plan area since record keeping began in the 1960s; however, many may not have been registered as abandoned. It is anticipated that most domestic wells are no longer in use, though further investigation would be needed to verify this assumption.

It is known that MUSD and others own and operate wells within the City and its planning area. It is also assumed that pumping by MUSD and other known pumpers within the City and its planning area should be included in the groundwater safe yield accounting for purposes of this evaluation. Groundwater pumping by others may also be included in future updates of this initial estimate.

Metered pumping records for MUSD have not been provided. The MUSD is assumed to irrigate 25 percent of its parcels at 4 AFY/acre. According to the City's 2015 UWMP, the groundwater pumping from other ESJ entities were estimated as follows:

- Given that the MUSD has approximately 500 total acres, the total annual water use is estimated at approximately 500 AFY.
- According to SSJID pumping records for 2010 through 2015, an average of 4,860 AFY groundwater was pumped from SSJID-leased wells. Of this, an average of 2,860 AFY was pumped within the City of Manteca and the City's Planning Area. Therefore, groundwater pumping from SSJID-leased wells is projected to be 2,860 AFY.
- Other known industrial groundwater pumpers include Eckerts Cold Storage. The City treats over 130 AF of wastewater produced by Eckerts each year. Based upon this average, groundwater pumping is estimated at 150 AFY assuming a return-to-sewer ratio of approximately 85 percent.

HISTORICAL GROUNDWATER PUMPING

Historically, the City extracted groundwater at a rate as high as 1.6 AFY/acre, based on the developed City area. As discussed previously, the SCWSP allowed the City to reduce local groundwater extraction to less than the estimated basin safe yield of 1 AFY/acre.

Since 2006, after the commissioning of the SCWSP, the total groundwater pumping for the City of Manteca has ranged from 8,062 AFY to 10,374 AFY averaging about 8,700 AFY. Pumping amounts were generally consistent over the years 2011 to 2015, with a decrease in 2014 and 2015, likely attributable to statewide mandatory demand reduction regulations. With this exception, there were no limitations or challenges for obtaining groundwater during the last 5 years, and the available groundwater quantity was sufficient. Groundwater pumping by City wells (potable and irrigation) from 2011 to 2015 is summarized in Table 3.14-5.

TABLE 3.14-5: HISTORICAL GROUNDWATER PRODUCTION

	2011	*2012*	*2013*	*2014*	*2015*
Groundwater Supply, AFY	9,156	10,374	9,922	6,546	7,249

SOURCE: CITY OF MANTECA 2015 UWMP

Potable Water Supply Availability and Reliability

The City's surface water and groundwater supply reliability as described in the City's 2015 UWMP is summarized below.

SURFACE WATER RELIABILITY

SSJID has existing agreements to provide surface water to agricultural interests, federal and state agencies, and cities in the south San Joaquin area. Some of these agreements are long-term, while others are as short as one week for agricultural deliveries.

Surface water reliability is in part reliant on storage and releases from upstream dams along the Stanislaus River with respect to the Nick C. DeGroot WTP intake location. While SSJID has surface water rights to approximately 600,000 AFY jointly held with the Oakdale Irrigation District (OID), the full allocation to SSJID and OID is subject to runoff from the Stanislaus River and other constraints per the 1988 Stipulation and Agreement with the U.S. Bureau of Reclamation that constructed and operates New Melones Reservoir on the Stanislaus River.

According to the 1988 Agreement, SSJID is entitled to 300,000 AFY during normal water years, however drought conditions and seasonal variations have the potential to reduce the allocation to SSJID and the contracted cities it delivers water to, including the City. The New Melones Reservoir inflow has a direct effect on surface water availability to SSJID. The following equation governs water supply availability to SSJID when inflows are less than 600,000 AF:

New Melones Inflow + [(600,000 - New Melones Inflow) / 3]

Currently, SSJID is expected to provide total supplies (including irrigation and potable) ranging from 225,000 AFY to 300,000 AFY, though the lowest supply on record was 225,000 AF in both 2014 and 2015 (2015 UWMP). In the event that shortages do occur, SSJID and OID share the deficiencies equally.

As mentioned in Section 6.2, the City is allotted 11,500 AFY from SSJID under Phase 1 and a total of 18,500 AFY under Phase 2. It is anticipated that SJJID will implement Phase 2 of the SCWSP by 2040, providing an additional 7,000 AFY in surface water supply to the City.

Reliability of SCWSP Deliveries

Under single year and multiple year dry period scenarios, deliveries to the City by SSJID could be reduced. The availability and reliability of the City's SCWSP surface water deliveries during dry years according to SSJID's 2020 UWMP are described below:

- For Single Dry Year reliability, the City has based its projected SSJID allocations on the single driest hydrologic year (Year 1977). With this assumption, it is anticipated that the City will receive between 79 and 100 percent of its normal year water supply during a single dry year.

- For Multiple Dry Years reliability, the City has based its projected SSJID allocations on the most recent five-year multiple dry year hydrologic cycle (Year 2012 through 2016). With this assumption, it is anticipated that the City will receive 100 percent of its normal year water supply during the first, second, and fifth years of a multiple dry year scenario and between 79 percent and 100 percent of its normal year supply during the third and fourth years of a multiple dry year scenario.

In December 2018, the SWRCB released an updated Water Quality Control Plan for the San Francisco Bay/Sacramento San Joaquin Delta Estuary with significant changes to the previous Bay Delta Water Quality Control Plan. The updated plan (Bay-Delta Plan Amendment) requires releases of approximately 40 percent of what would naturally flow in watersheds tributary to the San Joaquin River (including the Stanislaus River) during the February to June period. This means that surface water users on those watersheds would be restricted from using and storing water until 40 percent of unimpaired flows are rededicated for water quality and instream fishery purposes. For the Stanislaus River, the resulting surface water cutbacks would be significant. Because over a dozen lawsuits have been filed in both state and federal courts, the SSJID 2020 UWMP indicates that SSJID has opted to make no near-term planning assumptions related to the implementation of the Bay-Delta Plan Amendment for the purposes of its 2020 UWMP. Should conditions change or consequential resolution of the issues come to be, SSJID indicates it will revise and re-adopt a 2020 UWMP to reflect changes to its impacted water supply.

The projected surface water deliveries available to the City through 2045 as derived from the SSJID 2020 UWMP, are presented in Table 3.14-6. The City's 2020 UWMP is in progress and the water, sewer, recycled water, and stormwater master plans will be updated within the next one to two years.

TABLE 3.14-6: SCWSP SURFACE WATER DELIVERIES TO THE CITY OF MANTECA DURING HYDROLOGIC NORMAL, SINGLE DRY, AND MULTIPLE DRY YEARS, AFY

	2025	*2030*	*2035*	*2040*	*2045*
Normal Year(a)	11,500	11,500	11,500	18,500	18,500
Single Dry Year	9,649	10,566	11,483	14,592	15,671
Multiple Dry Year 1	11,500	11,500	11,500	18,500	18,500
Multiple Dry Year 2	11,500	11,500	11,500	18,500	18,500

Multiple Dry Year 3	9,649	10,566	11,483	14,592	15,671
Multiple Dry Year 4	9,649	10,566	11,483	14,592	15,671
Multiple Dry Year 5	11,500	11,500	11,500	18,500	18,500

SOURCE: DERIVED FROM SSJID 2020 UWMP, TABLE 7-2 BASIS OF WATER YEAR DATA

GROUNDWATER RELIABILITY

There are many factors that can affect groundwater supply reliability, including current storage conditions, water quality, seasonal groundwater level variations and climate change. Reduced use by the City, combined with seasonal variations such as intense wet seasons, can result in increased groundwater table elevation. Additionally, all wells are located in the western portion of the SSJID service area and draw from the Eastern San Joaquin Subbasin, the same basin that the City, the City of Lathrop, the City of Stockton and other groundwater users draw from. For the purposes of this evaluation, only groundwater pumping estimated to be occurring within the City General Plan Update area is included.

While seasonal fluctuations do have a noticeable effect on groundwater elevation, the overall trend showed a decline over time until the City began to use imported surface water in 2005. Historical trends from California Statewide Groundwater Elevation Monitoring (CASGEM) indicate that the basin has experienced groundwater overdraft conditions. The introduction of surface water supply has helped groundwater elevation trends recover within the City by reducing pumping in the area.

Groundwater supply projections include approved developments outside of the City boundaries, but within the planning area, and estimated groundwater pumping by others within the planning area. The projected groundwater supply reliability does not account for groundwater pumping outside the City planning area, nor undocumented privately owned domestic or irrigation wells. Groundwater use may increase as population increases, and groundwater use by others (including MUSD and agricultural users) may also increase in single dry years and multiple dry years (when surface water cutbacks occur). Constant groundwater demands from the MUSD and agricultural users have been assumed for all hydrologic scenarios.

The GSP indicates that the sustainable yield of the groundwater basin is approximately 1 AFY/acre (0.935 AFY/acre plus or minus 10 percent). For purposes of this WSA, West Yost assumes the City will limit groundwater use to approximately 24,877 AFY (the projected City area at Buildout of the General Plan planning area). The projected groundwater availability, assuming a constant growth rate through 2045, is shown in **Error! Reference source not found.**.

TABLE 3.14-7: PROJECTED GROUNDWATER PRODUCTION DURING HYDROLOGIC NORMAL, SINGLE DRY, AND MULTIPLE DRY YEARS, AFY

	2020(A)	*2025(B)*	*2030(B)*	*2035(B)*	*2040(B)*	*2045(B)*
Assumed Groundwater Supply	10,060	11,760	13,747	16,069	18,784	21,957

(A) CITY OF MANTECA 2015 UWMP, TABLE 6-10.

(B) BASED ON 1 AFY OF GROUNDWATER IS AVAILABLE PER ACRE OF CITY SURFACE AREA AS DISCUSSED IN SECTION 6.3 OF THIS WSA. THE PROJECTED GROUNDWATER PRODUCTION DURING 2025 TO 2045 WERE INTERPOLATED USING A CONSTANT GROWTH RATE AND THE 2020 (10,060)

AND GENERAL PLAN BUILDOUT (24,877) VALUES. IT IS NOTED THAT GENERAL PLAN BUILDOUT IS ANTICIPATED TO OCCUR BETWEEN 2049 AND 2050.

The 2020 value of 10,060 AFY accounts for the area within the City limits and then subtracts out other estimated groundwater uses within City limits. As development continues, the largest groundwater usage inside City limits, agricultural use, would decrease. The groundwater supply shown in Table 3.14-7 assumes the City's available ground water supply within the safe yield would increase as area outside the current City limits, and within the Planning Area, are annexed into the City for development.

REGULATORY SETTING

California Department of Health Services

The Department of Health Services, Division of Drinking Water and Environmental Management, oversees the Drinking Water Program. The Drinking Water Program regulates public water systems and certifies drinking water treatment and distribution operators. It provides support for small water systems and for improving their technical, managerial, and financial capacity. It provides subsidized funding for water system improvements under the State Revolving Fund ("SRF") and Proposition 50 programs. The Drinking Water Program also oversees water recycling projects, permits water treatment devices, supports and promotes water system security, and oversees the Drinking Water Treatment and Research Fund for Methyl Tertiary Butyl Ether (MTBE) and other oxygenates.

California Code of Regulations

California Code of Regulations (CCR) Title 22, Chapter 15, Article 20 requires all public water systems to prepare a Consumer Confidence Report for distribution to its customers and to the Department of Health Services. The Consumer Confidence Report provides information regarding the quality of potable water provided by the water system. It includes information on the sources of the water, any detected contaminants in the water, the maximum contaminants levels set by regulation, violations and actions taken to correct them, and opportunities for public participation in decisions that may affect the quality of the water provided.

Urban Water Management Planning Act

The Urban Water Management Planning Act has as its objectives the management of urban water demands and the efficient use of urban water. Under its provisions, every urban water supplier is required to prepare and adopt an urban water management plan. An "urban water supplier" is a public or private water supplier that provides water for municipal purposes either directly or indirectly to more than 3,000 customers or supplying more than 3,000 acre-feet of water annually. The plan must identify and quantify the existing and planned sources of water available to the supplier, quantify the projected water use for a period of 20 years, and describe the supplier's water demand management measures. The urban water supplier should make every effort to ensure the appropriate level of reliability in its water service is sufficient to meet the needs of its various

categories of customers during normal, dry, and multiple dry years. The Department of Water Resources must receive a copy of an adopted urban water management plan.

Safe Drinking Water Act

The federal Safe Drinking Water Act, as passed in 1947 and amended in 1986 and 1996, is the Country's primary law regulating drinking water quality and is implemented by the United States Environmental Protection Agency (US EPA). The Safe Drinking Water Act authorizes the US EPA to set national health-based standards for drinking water and requires actions to protect drinking water and its sources. Additionally, it provides for treatment, monitoring, sampling, analytical methods, reporting, and public information requirements. Implementation of the Act, in California, is under the jurisdiction of the California Department of Public Health (CDPH), Division of Drinking Water and Environmental Management. Drinking Water regulations are set forth in the California Code of Regulations (CCR), Titles 7 and 22.

Water Conservation Projects Act

California's requirements for water conservation are codified in the Water Conservation Projects Act of 1985 (Water Code Sections 11950 – 11954).

Consistent with California Water Code Sections 11950 – 11954, the City has implemented various water conservation efforts, as well as a Water Shortage Contingency Plan that identifies actions that can be taken to respond to catastrophic interruption of water supply.

California Water Code

Water Code section 10910 states:

> *10910(c)(2) If the projected water demand associated with the proposed project was accounted for in the most recently adopted urban water management plan, the public water system may incorporate the requested information from the urban water management plan in preparing the elements of the assessment required to comply with subdivisions (d), (e), (f) and (g).*
>
> *10910(d)(1) The assessment required by this section shall include an identification of any existing water supply entitlements, water rights, or water service contracts relevant to the identified water supply for the proposed project, and a description of the quantities of water received in prior years by the public water system, or the city or county if either is required to comply with this part pursuant to subdivision (b), under the existing water supply entitlements, water rights, or water service contracts.*
>
> *10910(d)(2) An identification of existing water supply entitlements, water rights, or water service contracts held by the public water system, or the city or county if either is required to comply with this part pursuant to subdivision (b), shall be demonstrated by providing information related to all of the following:*

(A) Written contracts or other proof of entitlement to an identified water supply.

(B) Copies of a capital outlay program for financing the delivery of a water supply that has been adopted by the public water system.

(C) Federal, state, and local permits for construction of necessary infrastructure associated with delivering the water supply.

(D) Any necessary regulatory approvals that are required in order to be able to convey or deliver the water supply.

10910(e) If no water has been received in prior years by the public water system, or the city or county if either is required to comply with this part pursuant to subdivision (b), under the existing water supply entitlements, water rights, or water service contracts, the public water system, or the city or county if either is required to comply with this part pursuant to subdivision (b), shall also include in its water supply assessment pursuant to subdivision (c), an identification of the other public water systems or water service contract-holders that receive a water supply or have existing water supply entitlements, water rights, or water service contracts, to the same source of water as the public water system, or the city or county if either is required to comply with this part pursuant to subdivision (b), has identified as a source of water supply within its water supply assessments.

Additionally, Water Code section 10910 states:

10910(f) If a water supply for a proposed project includes groundwater, the following additional information shall be included in the water supply assessment.

10910(f)(1) A review of any information contained in the urban water management plan relevant to the identified water supply for the proposed project.

10910(f)(2) A description of any groundwater basin or basins from which the proposed project will be supplied. For those basins for which a court or the board has adjudicated the rights to pump groundwater, a copy of the order or decree adopted by the court or the board and a description of the amount of groundwater the public water system, or the city or county if either is required to comply with this part pursuant to subdivision (b), has the legal right to pump under the order or decree. For basins that have not been adjudicated, information as to whether the department has identified the basin or basins as overdrafted or has projected that the basin will become overdrafted if present management conditions continue, in the most current bulletin of the department that characterizes the condition of the groundwater basin, and a detailed description by the public water system, or the city or county if either is required to comply with this part pursuant to subdivision (b), of the efforts being undertaken in the basin or basins to eliminate the long term overdraft condition.

10910(f)(3) A detailed description and analysis of the amount and location of groundwater pumped by the public water system, or the city or county if either is required to comply with this part pursuant to subdivision (b), for the past five years from any groundwater basin from which the proposed project will be supplied. The description and analysis shall be based on information that is reasonably available, including, but not limited to, historical use records.

A detailed description and analysis of the amount and location of groundwater that is projected to be pumped by the public water system, or the city or county if either is required to comply with this part pursuant to subdivision (b), from any basin from which the proposed project will be supplied. The description and analysis shall be based on information that is reasonably available, including, but not limited to, historical use records.

10910(f)(4) An analysis of the sufficiency of the groundwater from the basin or basins from which the proposed project will be supplied to meet the projected water demand associated with the proposed project.

A water assessment shall not be required to include the information required by this paragraph if the public water system determines, as part of the review required by paragraph (1), that the sufficiency of groundwater necessary to meet the initial and projected water demand associated with the project was addressed in the description and analysis required by paragraph (4) of subdivision (b) of Section 10631.

Senate Bill (SB) 610

Senate Bill (SB) 610 was adopted in 2001 and reflects the growing awareness of the need to incorporate water supply and demand analysis at the earliest possible stage in the land use planning process. SB 610 amended the statutes of the Urban Water Management Planning Act, as well as the California Water Code Section 10910 et seq. The foundation document for compliance with SB 610 is the Urban Water Management Plan (UWMP), which provides an important source of information for cities and counties as they update their general plans. Likewise, planning documents such as general plans and specific plans form the basis for the demand information contained in an UWMP, as well as a WSA required under SB 610.

Water Code Section 10910 (c)(4) states "If the city or county is required to comply with this part pursuant to subdivision (b), the water assessment for the project shall include a discussion with regard to whether the total projected water supplies, determined to be available by the city or county for the project during normal, single dry and multiple dry water 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, including agricultural and manufacturing uses."

Water supply planning under SB 610 requires reviewing and identifying adequate available water supplies necessary to meet the demand generated by a project, as well as the cumulative demand for the general region over the next 20 years, under a broad range of water conditions. This

information is typically found in the current UWMP for the project area. SB 610 requires the identification of the public water supplier for a project.

In addition, SB 610 requires the preparation of a WSA if a project meets the definition of a "Project" under Water Code Section 10912 (a). The code defines a "Project" as meeting any of the following criteria:

- A proposed residential development of more than 500 dwelling units;
- A proposed shopping center or business establishment employing more than 1,000 persons or having more than 500,000 square feet of floor space;
- A commercial building employing more than 1,000 persons or having more than 250,000 square feet of floor space;
- A hotel or motel with more than 500 rooms;
- A proposed industrial, manufacturing, or processing plant, or industrial park, planned to house more than 1,000 persons, occupying more than 40 acres of land, or having more than 650,000 square feet of floor area;
- A mixed-use project that includes one or more of these elements; or
- A project creating the equivalent demand of 500 residential units.

Alternately, if a public water system has less than 5,000 service connections, the definition of a "Project" includes any proposed residential, business, commercial, hotel or motel, or industrial development that would account for an increase of 10 percent or more in the number of service connections for the public water system.

Based on the following, SB 610 applies to the proposed Project:

1. The proposed Project is subject to CEQA and an EIR is required.
2. The proposed Project, with up to 915 proposed residential dwelling units, and other non-residential land uses, meets the definition of a "Project" as specified in Water Code section 10912(a) paragraph (1) as defined for residential development.

The proposed Project has not been the subject of a previously adopted WSA and has not been included in an adopted WSA for a larger project. Thus, a WSA, as required by these criteria under SB 610, has been prepared for the Project. The WSA is included in Appendix F of this EIR.

Senate Bill (SB) 221

SB 221 adds Government Code Section 66455.3, requiring that the local water agency be sent a copy of any proposed residential subdivision of more than 500 dwelling units within five days of the subdivision application being accepted as complete for processing by the city or county. It also adds Government Code Section 66473.7, establishing detailed requirements for establishing whether a "sufficient water supply" exists to support any proposed residential subdivisions of more than 500

dwellings, including any such subdivision involving a development agreement. When approving a qualifying subdivision tentative map, the city or county must include a condition requiring availability of a sufficient water supply. The applicable public water system must provide proof of availability. If there is no public water system, the city or county must undertake the analysis described in Government Code Section 66473.7. The analysis must include consideration of effects on other users of water and groundwater.

Executive Order B-37-16

In May 2016, Governor Edmund G. Brown, Junior, signed Executive Order B-37-16 (Executive Order), Making Water Conservation a California Way of Life. The Executive Order directed DWR to work with the State Water Resources Control Board (State Water Board) to develop new water use targets as part of a permanent conservation framework for urban water agencies. The targets will build upon requirements established in the 2009 Water Conservation Act, but will strengthen standards for indoor residential per capita water use, outdoor irrigation, commercial, industrial and institutional (CII) water use, and water lost through leaks. DWR will be establishing interim water use targets by 2018, with final standards to be published by 2021. Agencies will need to demonstrate progress towards achieving final compliance in 2025 (DWR, 2017).

City of Manteca General Plan

2023 GENERAL PLAN (EXISTING)

Policies: General Services

- PF-P-2. Encourage comprehensive development rather than incremental, single project development.
- PF-I-1. The City shall periodically review its fee schedules for water and sewer connections and for city facilities and major equipment and revise them as necessary.
- PF-P-4. Secure sufficient sources of water to meet the needs of the existing community and planned residential and commercial growth.
- PF-P-5. City will continue to rely principally on groundwater resources for its municipal water in the near term, will participate in the regional improvements to deliver surface water to augment the City's groundwater supply.
- PF-P-6. The City shall develop new water sources as necessary to serve new development.
- PF-P-7. The City shall develop new water storage facilities and major distribution lines as necessary to serve new development.
- PF-P-8. The City will provide water for future development to maintain a balance of jobs and housing.
- PF-P-9. City water services shall not be extended to unincorporated areas except in extraordinary circumstances. Existing commitments for City water service outside the City limits shall continue to be honored.
- PF-P-11. The City will develop and implement water conservation measures as necessary elements of the water system.
- PF-P-12. The City shall continue to assess a water development fee on all new commercial, industrial, and residential development sufficient to fund system wide capacity

improvements. The water development fee schedule shall be periodically reviewed and revised as necessary.

- PF-P-13. Ensure that all new development provides for and funds a fair share of the costs for adequate water distribution, including line extensions, easements, and plant expansions.
- PF-P-14. The City shall continuously monitor water flows through the City's water system to identify areas of potential water loss and cases of under billing for water service and shall make improvements in the systems as necessary.
- PF-P-15. The City shall monitor water quality regularly and take necessary measures to prevent contamination.
- PF-P-16. The City of Manteca shall include a groundwater analysis as a technical analysis of water system capacity in the update of the Public Facilities Implementation Plan (PFIP), and shall prepare an environmental analysis in the PFIP that addresses the quality and availability of groundwater.
- PF-P-17. The City of Manteca shall consider incremental increases in the demands on groundwater supply and water quality when reviewing development applications.

Implementation: Water Supply and Distribution

- PF-I-2. The City shall update the Public Facilities Implementation Plan, regarding water supply and distribution, every five years. The update shall be reviewed annually for adequacy and consistency with the General Plan.
- PF-I-3. The City shall require, as a condition of project approval, dedication of land and easements, or payment of appropriate fees and exactions, to help offset municipal costs of expansion of water treatment facilities and delivery systems.
- PF-I-4. The City shall retain a water conservation ordinance requiring the installation of low-flush toilets, low-flow showerheads, and similar features in all new development.
- PF-I-5. The City shall institute a remote monitoring program for the City's water system and replace faulty meters in the system as necessary. The City will continue the practice of identifying and replacing faulty meters at service connections on an ongoing basis.
- PF-I-6. The City shall regularly monitor water quality in City wells and take remedial action as necessary.
- PF-I-7. The City will encourage the use of recycled water for landscape irrigation where feasible, within the parameters of State and County Health Codes and standards.
- PF-I-8. The City shall update the Public Facilities Implementation Plan regarding wastewater collection and treatment every five years. The update shall be reviewed annually for adequacy and consistency with the General Plan.

Policies: Water Conservation

- RC-P-1. The City shall continue to implement water conservation standards for all commercial and industrial development, and for all existing and new residential development.
- RC-P-2. The City shall explore potential uses of treated wastewater when such opportunities become available.
- RC-P-3. The City shall protect the quantity of Manteca's groundwater.

- RC-P-4. The City shall require water conservation in both City operations and private development to minimize the need for the development of new water sources.
- RC-P-5. Development of private water wells within the city limits shall be allowed only where the City makes a finding that municipal water service is not readily and feasibly available, and such private well systems shall only be allowed to be used until such time as City water service becomes available.

Implementation: Water Conservation

- RC-I-1. Continue to implement standards for water conserving landscape practices, including the use of drought tolerant plants, for both public and private projects.
- RC-I-2. Continue efforts to increase public participation in water conservation.
- RC-I-3. Require large commercial and industrial water users to submit a use and conservation plan as part of the project entitlement review and approval process, and develop a program to monitor compliance with and effectiveness of that plan.
- RC-I-4. Cooperate with other agencies and jurisdictions to expand water conservation programs, and to develop methods of water reuse.
- RC-I-5. Actively pursue the use of treated wastewater in irrigation and industrial applications, including development of appropriate infrastructure.

Policies: Water Quality

- RC-P-11. Minimize sedimentation and loss of topsoil from soil erosion.
- RC-P-12. Minimize pollution of waterways and other surface water bodies from urban runoff.
- RC-P-13. Protect the quality of Manteca's groundwater.
- RC-P-14. Encourage participation by the County and surrounding communities in a basin-wide groundwater management study.
- RC-P-15. Once sewer service has been extended to incorporated areas, new septic tanks shall not be permitted.

GENERAL PLAN UPDATE (PROPOSED)

Policies: Community Facilities Element

- CF-6.1. Ensure the water system and supply is adequate to meet the needs of existing and future development and is utilized in a sustainable manner.
- CF-6.2. Ensure safe drinking water standards are met throughout the community.
- CF-6.3. Pursue additional water supply agreements to supplement the City's existing system in order to meet projected demand and to reduce the City's reliance on groundwater resources.
- CF-6.4. Ensure that the City's water supply provides for and supports a balance of jobs and housing in future development.
- CF-6.5. Prohibit extension of City water services to unincorporated areas except in extraordinary circumstances. Existing commitments for City water service outside the City limits shall continue to be honored.
- CF-6.7. Ensure that all new development provides for and funds a fair share of the costs for adequate water distribution, including line extensions, easements, and plant expansions.

- CF-6.8. Continue efforts to reduce potable water use and increase water conservation.
- CF-6.9. Encourage the use of recycled water for industrial uses and landscape irrigation where feasible, within the parameters of State and County Health Codes and standards.
- CF-6.10. Consider the effect of incremental increases in the demands on groundwater supply and water quality when reviewing development applications.

Utility Master Plans

CITY OF MANTECA URBAN WATER MANAGEMENT PLAN (2015)

The purpose of the 2015 Urban Water Management Plan is to ensure efficient use of urban water supplies in the City of Manteca and promote conservation. The UWMP discusses not only the availability of water but also water use, reclamation, and water conservation activities. The UWMP complies with the Urban Water Management Planning Act (UWMP Act) (California Water Code [CWC] Section 10610 et seq.).

CITY OF MANTECA WATER MASTER PLAN (2005)

The City's 2005 Water Master Plan includes a summary of the City's system-wide water demands, the planning criteria used to determine water system demands, the City's water distribution system model, an analysis of the City's water system, and a summary of existing and future water system facilities.

THRESHOLDS OF SIGNIFICANCE

Consistent with Appendix F of the CEQA Guidelines, the proposed Project may have a significant impact on the environment associated with Utilities if it would:

- Require or result in the relocation or construction of new or expanded water facilities, the construction or relocation of which could cause significant environmental effects; and/or
- Have insufficient water supplies available to serve the project and reasonably foreseeable future development during normal, dry and multiple dry years.

IMPACTS AND MITIGATION MEASURES

Impact 3.14-3: The proposed Project has the potential to require or result in the construction of new water treatment facilities or expansion of existing water facilities, the construction of which could cause significant environmental effects. (Less than Significant)

POTABLE WATER SYSTEM

The Project Site would be served by a new potable water distribution system. Development of the proposed potable water system will require the installation of additional water mains within the proposed roadways to comply with the 2005 City of Manteca Master Water Plan. The proposed on-site water distribution system will have various points-of-connection to existing City mains. The Project will connect to the existing water main lines along nearby roadways. Additionally, an internal looped system of water lines will be installed within the Project Site.

NON-POTABLE WATER SYSTEM

The Project Site would include the development of an on-site non-potable water distribution system that would eventually provide irrigation water to planned parks, open space, and landscaped areas. This system will include a non-potable irrigation well which will be constructed by the project. All landscape irrigation is to be installed with non-potable components.

CONCLUSION

The proposed Project Site will provide an adequate potable and non-potable water distribution systems in strict accordance with City of Manteca Standards and Specification. Furthermore, the Project will provide an oversized lot to facility the construction of a future potable well. Finally, the project site will construct a non-potable irrigation well to reduce the landscape demand from the project. The civil engineer's technical memorandum is included in the Water Supply Assessment.

The environmental impacts of constructing and operating the new water distribution infrastructure are discussed in Chapters 3.1 through 3.14, 3.16, and 4.0 of this Draft EIR. Implementation of the proposed Project would have a **less than significant** impact relative to this topic.

Impact 3.14-4: The proposed Project has the potential to have insufficient water supplies available to serve the Project and reasonably foreseeable future development during normal, dry and multiple dry years. (Less than Significant)

Proposed Project: The Project site is approximately 202.81 acres within 18 Assessor parcels (APNs). This includes the Development Area (175.67 acres), and the Non-development Area (27.14 acres). The Development Area includes the parcels being annexed that will be entitled for subdivision and development. This includes the Union Ranch North Project Area (Subdivision 1) (approximately 106.04 acres) and the Stagecoach at M&E Project Area (Subdivision 2) (approximately 69.63 acres). The Non-development area includes the parcels being annexed that will not be entitled for subdivision or development.

Adjusted City Water Demand Factors: The City of Manteca 2005 Water Master Plan developed unit water use factors for projecting water demand based on the proposed future land uses within the City's General Plan.. These unit water use factors assume a per capita water use of approximately 225 gallons per capita per day (GPCD) and do not account for conservation goals, water recycling and other possible conservation-derived sources. In the City's 2015 Urban Water Management Plan (UWMP), water demand projections assume that the City is able to meet its SB X7-7 (Water Conservation Act of 2009) 2020 per capita water use target of 179 GPCD. Therefore, to reflect the City's 2020 conservation goals, the water use factors for Low Density Residential (LDR) and High Density Residential (HDR) was reduced by 20 percent, corresponding to the overall per capita water use reduction from 225 GPCD to 179 GPCD. The water use factors for Parks were reduced by 10 percent to correspond with the climate data discussed in Section 4 of the WSA.

The unit water use factors for the land use designations applicable to the proposed Project are shown in Table 3.14-8. The adjusted water use factors are the factors used throughout this assessment. Backbone right-of-way (ROW) land uses are assumed to not require water.

TABLE 3.14-8: WATER USE FACTORS BY LAND USE TYPE

LAND USE DESIGNATION	WATER USE FACTOR, GPD/AC	
	2005 WATER MASTER PLAN[A]	ADJUSTED FOR SBX7-7[B]
Low Density Residential (LDR)	2,800	2,240[b]
High Density Residential (HDR)	6,500	5,200
Park (P)	4,000	3,600[

NOTES: GPD/AC = GALLONS PER DAY PER ACRES

[A] BASED ON UNIT WATER DEMAND FACTORS ESTABLISHED IN THE CITY OF MANTECA 2005 WATER MASTER PLAN. THESE FACTORS ASSUME A PER CAPITA WATER USE OF APPROXIMATELY 225 GPCD AND DO NOT ACCOUNT FOR CONSERVATION MEASURES.

[B] BASED ON A 20 PERCENT REDUCTION (10 PERCENT REDUCTION FOR PARK LAND USE) OF FACTORS SHOWN IN THE CITY OF MANTECA 2005 WATER MASTER PLAN. THESE FACTORS ASSUME THAT THE CITY IS ABLE TO MEET ITS 2020 PER CAPITA WATER USE TARGET OF 179 GPCD.

SOURCE: NORTH MANTECA ANNEXATION #1 WATER SUPPLY ASSESSMENT (WEST YOST ASSOCIATES, 2022).

Potable water losses documented in the City's 2015 UWMP were calculated using a historical loss estimate of 12 percent of potable demands. It is anticipated that the implementation of AMI by 2018 will reduce losses to 8 percent by 2020, 7 percent by 2025, 6 percent by 2030, and 5 percent thereafter. Because the proposed Project is anticipated to have AMI, the WSA assumes that unaccounted-for-water (UAFW) will be 6 percent of the Project's potable demands.

Projected Water Demand for the Proposed Project: Based on the water use factors shown in Table 3.14-8 and a UAFW of 6 percent, the projected water demand for the proposed Project is shown in Table 3.14-9. The total projected annual potable water demand for the Project is projected to be 523.4 AFY. This includes approximately 62.4 AFY of raw water demand for the park and open space land uses, which will be served by a non-potable irrigation well.

The proposed Project does not intend to use recycled water at this time. The City currently uses undisinfected secondary effluent to irrigate fodder crops in the land adjacent to the City's wastewater treatment plant. Tertiary treated recycled water is used for dust control at construction sites and for irrigation at the Great Wolf Lodge. Although a Recycled Water Master Plan is being prepared with the intent that the City would use recycled water to offset potable water demands for outdoor uses in the future, recycled water infrastructure is not planned to be constructed in time to serve the buildout of the proposed Project. Therefore, recycled water supplies are not assumed for use at the proposed Project in the WSA.

TABLE 3.14-9: PROJECTED WATER DEMAND FOR BUILDOUT OF THE PROPOSED PROJECT

LAND USE	GROSS AREA (ACRES)	DWELLING UNITS (DU)	WATER USE FACTOR		WATER DEMAND (AFY)
Potable Water					
Low Density Residential (LDR)	152.36	715	477[A]	gpd/DU	382.3
High Density Residential (HDR)	8.76	200	228[B]	gpd/DU	51.0
Potable Water Subtotal	161.12	915	-	-	433.3
				UAFW[c]	27.7

				Potable Water Total	461.0
Raw Water					
Park/Open Space	14.55	--	3,600	gpd/acre	58.7
				UAFW[c]	3.7
				Raw Water Total	62.4
				Total Demand (Potable and Raw Water)	***523.4***

NOTES: GPD/AC = GALLONS PER DAY PER ACRES, GPD/DU = GALLONS PER DAY PER DWELLING UNIT, AFY = ACRE-FEET PER YEAR.
[A] BASED ON LDR WATER USE FACTOR 2,240 GPD/ACRE AND AN AVERAGE DENSITY OF 4.7 DU/ACRE.
[B] BASED ON HDR WATER USE FACTOR OF 5,200 GPD/DU AND AN AVERAGE DENSITY OF 22.8 DU/ACRE.
[C] BASED ON 6 PERCENT OF PROJECT WATER DEMANDS.
[D] PARKS/OPEN SPACE LAND USE WILL BE SERVED BY A NON-POTABLE IRRIGATION WELL.

SOURCE: NORTH MANTECA ANNEXATION #1 PROJECT WATER SUPPLY ASSESSMENT (WEST YOST ASSOCIATES, 2022).

Projected Water Supply for the Proposed Project: Water demands for the proposed Project will be served using the City's existing and future portfolio of water supplies. The inclusion of existing and planned future supplies is specifically allowed by the Water Code:

> *Water Code section 10631(b): Identify and quantify, to the extent practicable, the existing and planned sources of water available to the supplier over the same five-year increments described in subdivision (a).*

The applicants 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 Project site.

Determination of Water Supply Sufficiency Based on the Requirements of SB 610: Water Code section 10910 states:

> *10910(c)(4) If the city or county is required to comply with this part pursuant to subdivision (b), the water supply assessment for the project shall include a discussion with regard to whether the total projected water supplies, determined to be available by the city or county for the project during normal, single dry, and multiple dry water 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, including agricultural and manufacturing uses.*

Pursuant to Water Code section 10910(c)(4) and based on the technical analyses described in the WSA, 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.

A comparison of the City's projected potable and raw water supplies and demands is shown in Table 3.14-10 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 2045. For purposes of the WSA, 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 3.14-10: 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	2045
NORMAL YEAR						
Available Potable and Raw Water Supply(a)		23,260	25,247	27,569	37,284	40,457
Total Water Demand(b)		18,480	21,012	23,891	27,164	30,885
Potential Surplus (Deficit)		4,780	4,235	3,678	10,120	9,572
Supply Shortfall, Percent of Demand		-	-	-	-	
SINGLE DRY YEAR						
Available Potable and Raw Water Supply(a)		21,409	24,313	27,552	33,376	37,628
Total Water Demand(b)		18,480	21,012	23,891	27,164	30,885
Potential Surplus (Deficit)		2,929	3,301	3,661	6,212	6,743
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	40,457
	Total Water Demand(b)	18,480	21,012	23,891	27,164	30,885
	Potential Surplus (Deficit)	4,780	4,235	3,678	10,120	9,572
	Supply Shortfall, Percent of Demand	-	-	-	-	-
Multiple Dry Year 2	Available Potable and Raw Water Supply(a)	23,260	25,247	27,569	37,284	40,457
	Total Water Demand(b)	18,480	21,012	23,891	27,164	30,885
	Potential Surplus (Deficit)	4,780	4,235	3,678	10,120	9,572
	Supply Shortfall, Percent of Demand	-	-	-	-	-
Multiple Dry Year 3	Available Potable and Raw Water Supply(a)	21,409	24,313	27,552	33,376	37,628
	Total Water Demand(b)	18,480	21,012	23,891	27,164	30,885
	Potential Surplus (Deficit)	2,929	3,301	3,661	6,212	6,743
	Supply Shortfall, Percent of Demand	-	-	-	-	-
Multiple Dry Year 4	Available Potable and Raw Water Supply(a)	21,409	24,313	27,552	33,376	37,628
	Total Water Demand(b)	18,480	21,012	23,891	27,164	30,885
	Potential Surplus (Deficit)	2,929	3,301	3,661	6,212	6,743
	Supply Shortfall, Percent of Demand	-	-	-	-	-
Multiple Dry Year 5	Available Potable and Raw Water Supply(a)	23,260	25,247	27,569	37,284	40,457
	Total Water Demand(b)	18,480	21,012	23,891	27,164	30,885
	Potential Surplus (Deficit)	4,780	4,235	3,678	10,120	9,572
	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).

CONCLUSION

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.

3.14.3 STORMWATER

ENVIRONMENTAL SETTING

Existing City Stormwater and Flood Control Facilities

The City of Manteca operates and maintains a storm drain system to control stormwater and protect residences and businesses from flooding. The City system includes approximately 150 miles of pipelines, 52 pump stations and 54 detention basins (City of Manteca, 2017). SSJID owns a complex network of irrigation laterals and drains that run within the City limits to which the City pumps stormwater, which is conveyed to the San Joaquin River either directly or via the French Camp Outlet Canal.

An agreement between the City and SSJID requires that the City monitor stormwater discharges to SSJID facilities to make sure capacities are not exceeded. The City is also required to control stormwater quality to meet applicable regulations. The agreement has been in place since 1975, and was most recently amended in 2006 (City of Manteca, 2013).

The detention basins are used to detain stormwater to attenuate peak flows before pumping drainage flows into SSJID facilities. Where required, to meet NPDES permit requirements, stormwater is treated prior to release to natural water bodies within the area. Treatment is provided at detention basin sites, or by on-site source control. Most of the City's pump stations pump from detention basins into the SSJID laterals and drains. The City system also includes 10 water level monitoring stations that are used to obtain real-time water level measurements at critical low points in the system, to prevent flooding. The storm drain system is monitored and controlled remotely through SCADA (City of Manteca, 2013).

The City's stormwater detention basins are designed based on a 10-year, 48-hour duration storm for urbanized areas and a 10-year, 24-hour duration storm for rural areas. Detention basins are required to be emptied over a 96-hour period (City of Manteca, 2013).

Future Stormwater Drainage Demand and System Improvements

The 2013 Storm Drain Master Plan (2013 SDMP) provides a comprehensive planning document to guide improvement and expansion of the City's storm drainage system to meet current and future needs in a safe and reliable manner while maintaining compliance with all applicable regulations. Five planning zones have been identified to define the capital improvements needed to serve future growth: Zones 30, 32, 34, 36 and 39. With the exception of drainage Zone 39, all drainage zones are located in the SSJID service area. The Project site is located in Zone 30 and is currently served by the SSJID.

REGULATORY SETTING

Clean Water Act

The Clean Water Act (CWA) regulates the water quality of all discharges into waters of the United States including wetlands, perennial and intermittent stream channels. Section 401, Title 33, Section 1341 of the CWA sets forth water quality certification requirements for "any applicant applying for a federal license or permit to conduct any activity including, but not limited to, the construction or operation of facilities, which may result in any discharge into the navigable waters." Section 404, Title 33, Section 1344 of the CWA in part authorizes the U.S. Army Corps of Engineers to:

- Set requirements and standards pertaining to such discharges: subparagraph (e); Issue permits "for the discharge of dredged or fill material into the navigable waters at specified disposal sites": subparagraph (a);
- Specify the disposal sites for such permits: subparagraph (b);
- Deny or restrict the use of specified disposal sites if "the discharge of such materials into such area will have an unacceptable adverse effect on municipal water supplies and fishery areas": subparagraph (c);
- Specify type of and conditions for non-prohibited discharges: subparagraph (f);
- Provide for individual State or interstate compact administration of general permit programs: subparagraphs (g), (h), and (j);
- Withdraw approval of such State or interstate permit programs: subparagraph (i);
- Ensure public availability of permits and permit applications: subparagraph (o);
- Exempt certain Federal or State projects from regulation under this Section: subparagraph (r); and,
- Determine conditions and penalties for violation of permit conditions or limitations: subparagraph (s).
- Section 401 certification is required prior to final issuance of Section 404 permits from the U.S. Army Corps of Engineers.

The California State Water Resources Control Board and RWQCBs enforce State of California statutes that are equivalent to or more stringent than the Federal statutes. RWQCBs are responsible for establishing water quality standards and objectives that protect the beneficial uses of various waters including the San Joaquin River, and other waters in the city. In the city the RWQCB is responsible for protecting surface and groundwater from both point and non-point sources of pollution. Water quality objectives for all of the water bodies within the city were established by the RWQCB and are listed in its Basin Plan.

National Pollutant Discharge Elimination System

National Pollutant Discharge Elimination System (NPDES) permits are required for discharges of pollutants to navigable waters of the United States, which includes any discharge to surface waters, including lakes, rivers, streams, bays, the ocean, dry stream beds, wetlands, and storm sewers that are tributary to any surface water body. NPDES permits are issued under the Federal Clean Water Act, Title IV, Permits and Licenses, Section 402 (33 USC 466 et seq.)

The RWQCB issues these permits in lieu of direct issuance by the Environmental Protection Agency, subject to review and approval by the Environmental Protection Agency Regional Administrator. The terms of these NPDES permits implement pertinent provisions of the Federal Clean Water Act and the Act's implementing regulations, including pre-treatment, sludge management, effluent limitations for specific industries, and anti- degradation. In general, the discharge of pollutants is to be eliminated or reduced as much as practicable so as to achieve the Clean Water Act's goal of "fishable and swimmable" navigable (surface) waters. Technically, all NPDES permits issued by the RWQCB are also Waste Discharge Requirements issued under the authority of the CWA.

These NPDES permits regulate discharges from publicly owned treatment works, industrial discharges, stormwater runoff, dewatering operations, and groundwater cleanup discharges. NPDES permits are issued for five years or less, and are therefore to be updated regularly. The rapid and dramatic population and urban growth in the Central Valley Region has caused a significant increase in NPDES permit applications for new waste discharges. To expedite the permit issuance process, the SWRCB has adopted several general NPDES permits, each of which regulates numerous discharges of similar types of wastes. The SWRCB has issued general permits for stormwater runoff from industrial and construction sites statewide. Stormwater discharges from industrial and construction activities in the Central Valley Region can be covered under these general permits, which are administered jointly by the SWRCB and RWQCB.

A new Phase II Small Municipal Separate Storm Sewer (MS4) General Permit was adopted by the State Water Resources Control Board on April 17, 2015 became effective June 1, 2015. The Permit has numerous new components and the City is required to implement these components in stages over the five-year period of the Permit.

Federal Emergency Management Agency

San Joaquin County is a participant in the National Flood Insurance Program (NFIP), a Federal program administered by FEMA. Participants in the NFIP must satisfy certain mandated floodplain management criteria. The National Flood Insurance Act of 1968 has adopted as a desired level of protection, an expectation that developments should be protected from floodwater damage of the Intermediate Regional Flood (IRF). The IRF is defined as a flood that has an average frequency of occurrence on the order of once in 100 years, although such a flood may occur in any given year. Communities are occasionally audited by the Department of Water Resources to insure the proper implementation of FEMA floodplain management regulations.

Department of Water Resources

The Department of Water Resources' (DWR) major responsibilities include preparing and updating the California Water Plan to guide development and management of the State's water resources, planning, designing, constructing, operating, and maintaining the State Water Resources Development System, protecting and restoring the Sacramento-San Joaquin Delta, regulating dams, providing flood protection, assisting in emergency management to safeguard life and property, educating the public, and serving local water needs by providing technical assistance. In addition, the DWR cooperates with local agencies on water resources investigations; supports watershed and

river restoration programs; encourages water conservation; explores conjunctive use of ground and surface water; facilitates voluntary water transfers; and, when needed, operates a State drought water bank.

California Water Code

California's primary statute governing water quality and water pollution issues with respect to both surface waters and groundwater is the Porter-Cologne Water Quality Control Act of 1970 (Division 7 of the California Water Code) (Porter-Cologne Act). The Porter-Cologne Act grants the State Water Resource Control Board (SWRCB) and each of the RWQCBs power to protect water quality, and is the primary vehicle for implementation of California's responsibilities under the Federal Clean Water Act. The Porter-Cologne Act grants the SWRCB and the RWQCBs authority and responsibility to adopt plans and policies, to regulate discharges to surface and groundwater, to regulate waste disposal sites and to require cleanup of discharges of hazardous materials and other pollutants. The Porter-Cologne Act also establishes reporting requirements for unintended discharges of any hazardous substance, sewage, or oil or petroleum product.

Each RWQCB must formulate and adopt a water quality control plan (Basin Plan) for its region the regional plans are to conform to the policies set forth in the Porter-Cologne Act and established by the SWRCB in its State water policy. The Porter-Cologne Act also provides that a RWQCB may include within its regional plan water discharge prohibitions applicable to particular conditions, areas, or types of waste.

The Water Code Section 13260 requires all dischargers of waste that may affect water quality in waters of the state to prepare and provide a water quality discharge report to the RWQCB. Section 13260a-c is as follows:

> (a) Each of the following persons shall file with the appropriate regional board a report of the discharge, containing the information that may be required by the regional board:
>
> > (1) A person discharging waste, or proposing to discharge waste, within any region that could affect the quality of the waters of the state, other than into a community sewer system.
> >
> > (2) A person who is a citizen, domiciliary, or political agency or entity of this state discharging waste, or proposing to discharge waste, outside the boundaries of the state in a manner that could affect the quality of the waters of the state within any region.
> >
> > (3) A person operating, or proposing to construct, an injection well.
>
> (b) No report of waste discharge need be filed pursuant to subdivision (a) if the requirement is waived pursuant to Section 13269.
>
> (c) Each person subject to subdivision (a) shall file with the appropriate regional board a report of waste discharge relative to any material change or proposed change in the character, location, or volume of the discharge.

State Water Resource Control Board (State Water Board) Stormwater Strategy

The Stormwater Strategy is founded on the results of the Stormwater Strategic Initiative, which served to direct the State Water Board's role in Stormwater resources management. The Stormwater Strategy developed guiding principles to serve as the foundation of the Stormwater program; identified issues that support or inhibit the program from aligning with the guiding principles; and proposed and prioritized projects that the Water Boards could implement to address those issues. The State Water Board staff created a strategy-based document called the Strategy to Optimize Management of Stormwater (STORMS). STORMS includes a program vision, missions, goals, objectives, projects, timelines, and consideration of the most effective integration of project outcomes into the Water Board's Stormwater Program.

Stormwater Quality

The State Water Board adopted Order No. 2013-0001-DWQ in 2013, which requires that agencies regulate post-construction development (Provision E.12) through a number of different program elements. In response to this order, five cities, including Manteca, and San Joaquin County collaborated together to develop a "Multi Agency Post-Construction Stormwater Standards Manual," dated June 2015.

Water Quality Control Plan for the Central Valley Region

The Water Quality Control Plan for the Central Valley Region (Basin Plan) includes a summary of beneficial water uses, water quality objectives needed to protect the identified beneficial uses, and implementation measures. The Basin Plan establishes water quality standards for all the ground and surface waters of the region. The term "water quality standards," as used in the Federal Clean Water Act, includes both the beneficial uses of specific water bodies and the levels of quality that must be met and maintained to protect those uses. The Basin Plan includes an implementation plan describing the actions by the RWQCB and others that are necessary to achieve and maintain the water quality standards.

The RWQCB regulates waste discharges to minimize and control their effects on the quality of the region's ground and surface water. Permits are issued under a number of programs and authorities. The terms and conditions of these discharge permits are enforced through a variety of technical, administrative, and legal means. Water quality problems in the region are listed in the Basin Plan, along with the causes, where they are known. For water bodies with quality below the levels necessary to allow all the beneficial uses of the water to be met, plans for improving water quality are included. The Basin Plan reflects, incorporates, and implements applicable portions of a number of national and statewide water quality plans and policies, including the California Water Code and the Clean Water Act.

200-Year Flood Protection in Central Valley

Both State policy and recently enacted State legislation (Senate Bill 5) call for 200-year (0.5% annual chance) flood protection to be the minimum level of protection for urban and urbanizing areas in

the Central Valley. Senate Bill 5 (SB5) requires that the 200-year protection be consistent with criteria used or developed by the Department of Water Resources. SB 5 requires all urban and urbanizing areas in the Sacramento and San Joaquin Valleys to achieve 200-year flood protection in order to approve development. The new law restricts approval of development after 2016 if "adequate progress" towards achieving this standard is not met. Urban and urbanizing areas protected by State-Federal project levees cannot use "adequate progress" as a condition to approve development after 2028. Adequate progress is defined as meeting all of the following:

1. The project scope, cost and schedule have been developed;
2. In any given year, at least 90% of the revenues scheduled for that year have been appropriated and expended consistent with the schedule;
3. Construction of critical features is progressing as indicated by the actual expenditure of budget funds;
4. The city or county has not been responsible for any significant delay in completion of the system; and
5. The above information has been provided to the DWR and the Central Valley Flood Protection Board and the local flood management agency shall annually report on the efforts to complete the project.

The RD-17 levee system is designed to a 100-year flood protection standard. The Project site is currently located in Zone X, protected by levee, which by definition indicates an area protected by levees from the 1% annual chance flood. The Project site is, however, located within the 200-year floodplain as delineated on the most recent 200-year flood plain maps for Manteca.

City of Manteca General Plan

2023 GENERAL PLAN (EXISTING)

Policies: Major Drainage

- PF-P-26. The City shall continue to complete gaps in the drainage system in areas of existing development.
- PF-P-27. The City shall require the dedication and improvement of drainage detention basins as a condition of development approval according to the standards of the Drainage Master Plan. The responsibility for the dedication and improvement of detention basins shall be based on the prorated share of stormwater runoff resulting from each development.
- PF-P-28. Storm drainage systems within new development areas shall include open drainage corridors where feasible to supplement or replace an underground piped drainage system. The drainage systems would provide for short-term stormwater detention, stormwater conveyance for stormwater exceeding a 10-year event, stormwater quality treatment, bike and pedestrian paths, and visual open space within neighborhoods. The width and length of the corridors would be determined by the stormwater management requirements. The drainage systems would provide a pedestrian connection between parks and access to open

space from residential neighborhoods. The neighborhoods would be designed with homes oriented to, rather than backing on the open space corridor.

Implementation: Major Drainage

- PF-I-13. The City shall update the Storm Drainage Master Plan and Public Facilities Implementation Plan, regarding water supply and distribution, every five years. The update shall be reviewed annually for adequacy and consistency with the General Plan.

Policies: Flood Safety

- S-P-7. Periodically review and update when necessary, the General Plan Safety Element goals, policies, and implementation measures in order to maintain compliance with applicable Federal and State requirements.
- S-P-8. Maintain and periodically update, City flood safety plans, floodplain management ordinances, zoning ordinance, building codes and other related sections of the Manteca Municipal Code to reflect Safety Element goals, policies and standards, applicable Federal and State law, and National Flood Insurance Program requirement.
- S-P-9. The City shall require evaluation of potential flood hazards prior to approval of development projects to determine whether the proposed development is reasonably safe from flooding and consistent with California Department of Water Resources (DWR) Urban Level of Flood Protection Criteria. The City shall not approve the execution of a development agreement, a tentative map, or a parcel map for which a tentative map is not required, or a discretionary permit or other discretionary entitlement that would result in the construction of a new building, or construction that would result in an increase in allowed occupancy for an existing building, or issuance of a ministerial permit that would result in the construction of a new residence for property that is located within a 200-year flood hazard zone, unless the adequacy of flood protection as described in Government Code §65865.5(a), 65962(a), or 66474.5(a), has been demonstrated.
- S-P-10. The City may permit new development in areas not identified as "urban" or "urbanizing" provided that they are protected from 100-year flooding by FEMA-accredited levees or equivalent flood protection as shown on an adopted FEMA FIRM, a FEMA-approved Letter of Map Revision (LOMR) or a Conditional Letter of Map Revision (CLOMR), subject to conditions specified in the CLOMR.
- S-P-11. The City may permit new development in areas not protected by FEMA-accredited 100-year levees subject to all applicable requirements of Manteca Municipal Code Chapter 8.30 (Floodplain Management), the California Building Standards Code as adopted by the City, and the latest promulgated FEMA standards for development in the 100-year floodplain, provided that new development approval will not cause the project site or area to be defined as "urban" or "urbanizing."
- S-P-12. Work closely with the City of Lathrop, and the local reclamation districts to improve levee systems as required to provide ULOP for urban and urbanizing areas in Manteca by 2025, and to provide the basis for findings of "adequate progress" toward that objective based on substantial evidence as soon as possible.

- S-P-13. The City shall continue to cooperate with local, regional, State, and Federal agencies in securing funding to obtain the maximum level of flood protection that is practical, with a goal of achieving 200-year flood protection for all areas of the City.
- S-P-14. Maintain active participation in the National Flood Insurance Program (NFIP).
- S-P-15. The City shall maintain eligibility in the Federal Emergency Management Agency's (FEMA's) Community Rating System (CRS) program, which gives property owners discounts on flood insurance.
- S-P-15. The City shall maintain eligibility in the Federal Emergency Management Agency's (FEMA's) Community Rating System (CRS) program, which gives property owners discounts on flood insurance.
- S-P-16. Provide technical assistance and encourage landowners within the FEMA Special Flood Hazard Area (100-year floodplain) to purchase and maintain flood insurance.
- S-P-17. Ensure that the impacts of potential flooding are adequately analyzed when considering areas for future urban expansion.
- S-P-18. Provide opportunities for review of and comment by the reclamation districts, Manteca Police Services, Manteca Fire Department, the Lathrop Manteca Fire District for comment during new development project review.
- S-P-19. Consider the risks of catastrophic dam failure in the planning and environmental review of new development projects.
- S-P-20. Incorporate riparian habitat protection, mitigation or enhancement into flood protection improvements to maintain existing floodwater capacity where feasible.
- S-P-21. Combine flood control, recreation, water quality, and open space functions where feasible.
- S-P-22. Discourage large continuous paved areas unless provided with engineered drainage facilities, and where feasible, require the use of pervious paving materials.
- S-P-24. The City shall require, for areas protected by levees, all new developments to include a notice within the deed that the property is protected from flooding by a levee and that the property can be subject to flooding if the levee fails or is overwhelmed by floodwater flow.
- S-P-25. The City shall update flood hazard maps as necessary to reflect impacts from climate change in terms of long-term flood safety and long-term flood event probabilities.

GENERAL PLAN UPDATE (PROPOSED)

Policies: Community Facilities Element

- CF-8.1. Maintain and improve Manteca's storm drainage facilities.
- CF-8.2. Require all development projects to demonstrate how Stormwater runoff will be detained or retained on-site and/or conveyed to the nearest drainage facility as part of the development review process and as required by the City's NPDES Municipal Regional Permit. Project applicants shall mitigate any drainage impacts as necessary and shall demonstrate that the project will not result in any increase in off-site runoff during rain and flood events.
- CF-8.3. Continue to allow dual-use detention basins for parks, ball fields, and other uses where appropriate.
- CF-8.4. Incorporate recreational trails and parkway vegetation design where open

stormwater facilities are appropriate and ensure that vegetation does not reduce channel capacity.

- CF-8.5. Maintain drainage channels in a naturalized condition where appropriate, incorporating recreational trails, parkway vegetation, and other amenities and ensuring that vegetation does not reduce channel capacity, and consistent with the Resource Conservation Element.
- CF-8.6. Continue to work cooperatively with outside agencies such as the San Joaquin County Flood Control and Water Conservation District regarding storm drainage issues.

Implementation: Community Facilities Element

- CF-8a. Update the Storm Drainage Master Plan and Public Facilities Implementation Plan every five years. The update shall be reviewed annually for adequacy and consistency with the General Plan.
- CF-8b. Continue to complete gaps in the drainage system in areas of existing development.
- CF-8c. Identify which Stormwater and drainage facilities are in need of repair and address these needs through the City's Capital Improvement Program.
- CF-8d. Continue to review development projects to identify potential stormwater and drainage impacts and require development to include measures to ensure that off-site runoff is not increased as a during rain and flood events.

City of Manteca Municipal Code

TITLE 13 CHAPTER 13.28 STORMWATER MANAGEMENT DISCHARGES

The purpose of this chapter is to establish minimum stormwater 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. This chapter seeks to meet that purpose through the following objectives:

A. Minimize increases in stormwater runoff from any development in order to reduce flooding, siltation and stream bank erosion and maintain the integrity of drainage channels;

B. Minimize increases in non-point source pollution caused by stormwater runoff from development that would otherwise degrade local water quality;

C. Minimize the total annual volume of surface water runoff that flows from any specific site during and following development to not exceed the pre-development hydrologic regime to the maximum extent practicable; and

D. Reduce stormwater runoff rates and volumes, soil erosion and non-point source pollution wherever possible, through stormwater management controls and to ensure that these management controls are properly maintained and pose no threat to public safety. (Ord. 1253 § 1, 2004)

TITLE 13 CHAPTER 13.28 SECTION 13.28.060 DISCHARGES IN VIOLATION OF INDUSTRIAL OR CONSTRUCTION ACTIVITY NPDES STORMWATER DISCHARGE PERMIT.

> A. Any person subject to an industrial NPDES stormwater discharge permit shall comply with all provisions of such permit. Proof of compliance with said permit may be required in a form acceptable to the director upon inspection of the facility, during any enforcement proceeding or action or for any other reasonable cause.
>
> B. Any person subject to a construction activity NPDES stormwater discharge permit shall comply with all provisions of such permit. Proof of compliance with said permit may be required in a form acceptable to the director prior to or as a condition of a subdivision map, site plan, building permit or development or improvement plan; upon inspection of the facility; during any enforcement proceeding or action; or for any other reasonable cause. Prior to issuance of a construction permit a copy of the Notice of Intent (NOI) and the Stormwater Pollution Prevention Plan (SWPPP) shall be submitted to the city. (Ord. 1253 § 1, 2004).

Utility Master Plans

The City of Manteca maintains a variety of Master Plan documents that guide the design, development, and maintenance of the utilities within the city limits. This includes the City's *Storm Drain Master Plan* (2013).

THRESHOLDS OF SIGNIFICANCE

Consistent with Appendix G of the CEQA Guidelines, the proposed Project may have a significant impact on the environment associated with Utilities if it would:

- Require or result in the relocation or construction of new or expanded stormwater drainage facilities, the construction or relocation of which could cause significant environmental effects.

IMPACTS AND MITIGATION MEASURES

Impact 3.14-5: The proposed Project has the potential to require or result in the construction of new stormwater drainage facilities, the construction of which could cause significant environmental effects. (Less than Significant with Mitigation)

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 majority of 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. None of the Project site is located within

either the 100-year or 500-year flood zone. Figure 3.9-2 shows the 100- and 500-year flood boundaries.

Onsite storm drainage would be installed to serve the proposed Project. As discussed in Chapter 2.0, Project Description, 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.

The proposed public storm drainage and water quality system is planned to function independently from surrounding developments. An internal layout of stormwater collection pipes with various sizes, as necessary, will be installed within the Development Area. A system of drainage swales may be included to treat and convey collected stormwater. All on-site storm drainage runoff will be collected through drain inlets in the landscaped areas and catch basins along the streets and within properties, and conveyed via surface swales and underground trunk lines to the detention and water quality basins. The conveyance systems and detention basins may include facilities designed to address water quality standards and requirements. 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. The duration of the discharge will comply with City of Manteca standards. The water quality detention basins will be designed to comply with SWRCB and City of Manteca specifications and standards.

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.

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 outlet canal and describes the 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 3.14-1*: 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 discharge and describes the treatment controls used to reach attainment consistent with the Manteca Storm Drain Master Plan.*

3.14.4 SOLID WASTE

ENVIRONMENTAL SETTING

Waste Collection Services

The City of Manteca Public Works Department, Solid Waste Division provides solid waste collection services for the Manteca area. The Solid Waste Department works to meet commercial and residential demands in a low cost and environmentally conscious manor. The Department's team of drivers, yard personnel, superintendent, and office staff help residents and businesses reduce waste generation and utilize diversion techniques. Manteca provides the following solid waste services:

- Residential recycling picked up on a bi-weekly schedule
- Residential bi-weekly curbside pickup of compost materials
- Residential weekly curbside pickup of trash
- Leaf and Christmas tree pick up
- Oil collection containers picked up on a weekly basis
- Commercial recycling
- Household Hazardous Waste collection

Lovelace Transfer Station, owned and operated by San Joaquin County, is used to process and ship collected waste to its final destination. Recyclables are transported to a small Transfer Station adjacent to Forward Landfill where they are loaded onto larger trucks and taken to Sacramento Recycling. The majority of Manteca's solid waste is landfilled at the Forward Sanitary Landfill, located north of French Camp Road. Foothill Sanitary Landfill and North County landfill are also employed, but to a much lesser degree.

As part of a food to energy project, Manteca's food waste will soon be transported to a biogas conversion facility. A "turbo separator" will be installed at the Lovelace Transfer station to mechanically separate food waste from municipal solid waste. Trucks will ship the separated food waste to the Wastewater Quality Control Facility where it will be conveyed to digesters. The food waste will then be composted and the natural gas from the decomposition process will be used to power Manteca's solid waste collection trucks. This project is still in the planning phase but once completed, it is expected to increase diversion rates, decrease Manteca's diesel usage, and keep long term municipal service rates low.

Waste Disposal Facilities

FORWARD SANITARY LANDFILL

Forward Sanitary Landfill, owned by Forward Incorporated/Allied Waste North America, is located on a 567-acre property off of Austin Road. The current Forward Landfill was created in 2002 by joining the former Forward, Inc. Class II landfill with the adjacent Austin Road Class III Sanitary Landfill previously owned by the City of Stockton. Combining the two landfills was accomplished by filling in the air space between the landfills, employing lower base grades, and expanding the hours of operation.

The current Forward Landfill site includes a materials recovery facility and transfer station. The materials recovery facility composts food waste and processes wood waste for diversion purposes. The transfer station receives Manteca's recycling and loads it onto larger trucks to be transported to Sacramento Recycling. Forward, Inc. also operates a landfill gas-to-energy (LFGTE) plant on the northwest portion of the site to control air pollution and mitigate fire hazard from the methane gas released by anaerobic microorganisms during the decomposition process. PG&E purchases 760 kilowatts per hour of electrical power generated by Forward Landfill under a long-term contract.

The support facilities at Forward Landfill include scale houses, water production wells, a groundwater extraction and treatment system, sedimentation and detention ponds, and leachate evaporation basins.

Forward landfill is the only Class II facility in San Joaquin County designed to accept both designated wastes such as contaminated soil as well as inert municipal solid waste. The facility is closed to the general public and all waste deliveries are scheduled in advance and pre-screened. Accepted wastes include green materials, sludge (biosolids), asbestos, tires, industrial, and mixed municipal.

Although the site's total acreage is 567 acres, the allotted disposal footprint is 355 acres to allow for a boundary between the facility and surrounding developments. The current constructed Waste Management Unit scope is 288 acres and the remaining allotted land is used for other landfill activities such as soil borrow and storage until it is converted to Waste Management Units. Natural land elevations at the site are 30 to 40 feet above mean sea level and the landfill is permitted reach heights up to 210 feet above mean sea level.

Forward landfill was projected to close in 2020 at current acceptance rates due to reaching its permitted size parameters. 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. This allowed the lifespan of the landfill to be extended 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.

LOVELACE MATERIALS RECOVERY FACILITY AND TRANSFER STATION

Lovelace Materials Recovery Facility and Transfer Station is a 15-acre site permitted to receive 1,300 tons of waste per day and accommodate a traffic volume of 1,280 vehicles per day; however, the average daily tonnage received is less than half of this amount.

This station accepts waste from the general public in the form of agricultural waste, cabover campers, camper shells, dismantled camper trailers less than 25 feet in length, commercial and household waste, construction/demolition waste, tires, and white goods such as refrigerators, freezers, and air conditioning units. The transfer station is not permitted to accept any liquid waste sludge, any waste requiring special handling, designated wastes, or hazardous wastes. These items must be taken to San Joaquin County Hazardous Waste Facility located at the Stockton Airport.

SAN JOAQUIN COUNTY HAZARDOUS WASTE FACILITY

The San Joaquin County Hazardous Waste facility is located on a 2-acre site at 7850 R A Bridgeford Street in Stockton. The hazardous waste facility is available for public drop-off of hazardous wastes on Thursday through Sunday with the exception of conditionally exempt small quantity generators, which are accepted by appointment only. The facility is free of charge; however, some conditions do apply. Hazardous wastes accepted by this facility include paint, oil, antifreeze, pool chemicals, fertilizers, batteries, cleaning products, medical sharps, and medicines.

In February 2006, it became illegal for residents and small businesses to dispose of universal waste in the trash due to a decision by the Department of Toxic Substance Control and the California Integrated Waste Management Control. Universal waste is a type of hazardous waste containing mercury or other heavy metals that can release neurotoxins into the environment if not disposed of properly. Almost any product with a circuit board is considered universal waste. Other universal waste items include batteries, motor oil, mercury thermostats, fluorescent lights, cathode ray tube devices (computer monitors, televisions), and mercury thermometers. These items are banned from landfills and require special handling. Most of these items are accepted at both Lovelace Transfer Station and the County Hazardous Waste facility. E-waste not accepted by these two facilities consists of computers, TVs, and printers, which must be taken to the City Of Manteca Solid Waste Office.

California limits the transportation of hazardous wastes to 15 gallons or 125 pounds per vehicle but the number of trips made per day is not regulated. Single containers cannot be over 5 gallons. Manteca provides residents with free 5-quart motor oil collection containers upon request. They can be left out curbside next to trash carts on collection days to be picked up for no extra charge.

Solid Waste Generation Rates and Volumes

The California Department of Resources Recycling and Recovery (CalRecycle) tracks and monitors solid waste generation rates on a per capita basis. Per capita solid waste generation rates and total annual solid waste disposal volumes for the City of Manteca between 2010 and 2014 are shown in Table 3.15-9.

As shown in the Table 3.14-11, the per capita waste generation rate increased from 4.9 to 5.9 lbs/person/day over the 8-year (2010-2018) period. In addition, the total annual disposal tonnage in Manteca increased by 28,272 tons over the 2010-to-2018-time span. With the passage of SB 1016, per capita disposal rate is used to determine the diversion progress of a city and not the jurisdictional diversion rates. Therefore, a population increase resulting in the generation of more overall city waste does not affect the jurisdiction's ability to meet its waste goals. The City's waste disposal rate targets are shown in Table 3.14-12.

TABLE 3.14-11: SOLID WASTE GENERATION RATES

YEAR	WASTE GENERATION RATE (LBS/PERSON/DAY)	POPULATION	TOTAL DISPOSAL TONNAGE (TONS/YEAR)
2010	4.9	66,749	59,206
2011	4.6	68,410	57,462
2012	4.5	69,815	57,467
2013	4.6	71,164	59,537
2014	4.7	72,880	61,696
2015	5.0	74,721	67,089
2016	5.4	76,692	73,050
2017	5.5	78,738	80,277
2018	5.9	80,829	87,478
2019	--	--	--

SOURCE: CAL RECYCLE. ACCESSED AUGUST 2019
NOTES: 2019 DATA NOT AVAILABLE

TABLE 3.14-12: CITY OF MANTECA WASTE DISPOSAL RATE TARGETS (POUNDS/DAY)

YEAR	POPULATION		EMPLOYMENT	
	TARGET	ANNUAL	TARGET	ANNUAL
2010	5.6	4.9	22.5	22.5
2011	5.6	4.6	21.1	20.6
2012	5.6	4.5	21.1	19.9
2013	5.6	4.6	21.1	19.6
2014	5.6	4.7	21.1	19.1
2015	5.6	5.0	21.1	19.7
2016	5.6	5.4	21.1	20.7
2017	5.6	5.5	21.1	21.8
2018	5.6	5.9	21.1	23.6
2019	5.6	6.0	21.1	24.1

SOURCE: CAL RECYCLE. ACCESSED AUGUST 2019.

The City's target rate represents a 50% diversion rate. In accordance with AB 939, which required municipalities to aggressively pursue Municipal Solid Waste (MSW) source reduction and recycling, the City continues to meet and exceed all AB 939 goals. The various solid waste management actions adopted by the City include, but are not limited to, recycling and yard waste programs for residents and businesses, public education and public outreach awareness events, and school recycling and composting.

Landfill Capacity

As stated, solid waste from Manteca is primarily landfilled at the Forward Sanitary Landfill. Forward Landfill is currently permitted to accept 46,080 tons of solid waste per week, not to exceed 8,668 tons per day. The average daily disposal is 620 tons per day. The allotted disposal area is 354.5 acres, and it is designed to hold 51,040,000 cubic yards of inert or designated wastes. The remaining

capacity is 23.7 million cubic yards. At that time the capacity is reached, the City can utilize the Foothill Landfill as a location for solid waste disposal. Other landfills used include Foothill Sanitary and North County. All three landfills are summarized in Table 3.14-13 below. Table 3.14-14 summarizes the City of Manteca's disposal rate targets, as identified by Cal Recycle.

TABLE 3.14-13: CITY OF MANTECA LANDFILL SUMMARY

LANDFILL	*LOCATION*	*MAXIMUM DAILY THROUGHPUT (TONS/DAY)*	*REMAINING CAPACITY (CUBIC YARDS)*	*ANTICIPATED CLOSURE DATE*
Forward Sanitary	Manteca	8,668	22.1 million	2036
Foothill Sanitary	Linden	1,500	125.0 million	2054
North County	Victor	825	35.4 million	2035

SOURCE: CAL RECYCLE. ACCESSED FEBRUARY 2021.

TABLE 3.14-14: CITY OF MANTECA WASTE DISPOSAL RATE TARGETS (POUNDS/DAY)

POPULATION		*EMPLOYMENT*	
Target	*Annual*	*Target*	*Annual*
5.6	6.0	21.1	24.1

SOURCE: CAL RECYCLE 2019.

Funding

The City's solid waste collection services operate as an enterprise fund. An enterprise fund establishes a separate accounting and financial reporting mechanism for municipal services for which a fee is charged in exchange for goods or services. Under enterprise accounting, the revenues and expenditures of services are separated into funds with their own financial statements, rather than commingled with the revenues and expenses of all other government activities. The City's General Fund is not used for solid waste collection service costs. The revenues generated from service collection fees adequately fund the operation of the City's transfer station and Solid Waste Division operations, including solid waste collections. The General Plan contains policies requiring that new developments pay an equal proportion of municipal service costs so that the economic burden is not placed on existing residents.

REGULATORY SETTING

Resource Conservation and Recovery Act

The Resource Conservation and Recovery Act (RCRA) was enacted in 1976 to address the huge volumes of municipal and industrial solid waste generated nationwide. After several amendments, the current Act governs the management of solid and hazardous waste and underground storage tanks (USTs). RCRA was an amendment to the Solid Waste Disposal Act of 1965. RCRA has been amended several times, most significantly by the Hazardous and Solid Waste Amendments (HSWA) of 1984. RCRA is a combination of the first solid waste statutes and all subsequent amendments. RCRA authorizes the Environmental Protection Agency (EPA) to regulate waste management activities. RCRA authorizes states to develop and enforce their own waste management programs,

in lieu of the Federal program, if a state's waste management program is substantially equivalent to, consistent with, and no less stringent than the Federal program.

California Integrated Waste Management Act (AB 939 and SB 1322)

The California Integrated Waste Management Act of 1989 (AB 939 and SB 1322) requires every city and county in the state to prepare a Source Reduction and Recycling Element to its Solid Waste Management Plan that identifies how each jurisdiction will meet the mandatory state waste diversion goals of 25% by 1995 and 50% by 2000. The purpose of AB 939 and SB 1322 is to "reduce, recycle, and re-use solid waste generated in the state to the maximum extent feasible." The term "integrated waste management" refers to the use of a variety of waste management practices to safely and effectively handle the municipal solid waste stream with the least adverse impact on human health and the environment. The Act has established a waste management hierarchy, as follows: Source Reduction; Recycling; Composting; Transformation; and Disposal.

California Integrated Waste Management Board Model Ordinance

Subsequent to the Integrated Waste Management Act, additional legislation was passed to assist local jurisdictions in accomplishing the goals of AB 939. The California Solid Waste Re-use and Recycling Access Act of 1991 (§42900-42911 of the Public Resources Code) directs the California Integrated Waste Management Board (CIWMB) to draft a "model ordinance" relating to adequate areas for collecting and loading recyclable materials in development projects. The model ordinance requires that any new development project, for which an application is submitted on or after September 1, 1994, include "adequate, accessible, and convenient areas for collecting and loading recyclable materials." For subdivisions of single family detached homes, recycling areas are required to serve only the needs of the homes within that subdivision.

California Green Building Standards Code (CALGreen)

CALGreen requires the diversion of at least 50 percent of the construction waste generated during most new construction projects (CALGreen Sections 4.408 and 5.408) and some additions and alterations to nonresidential building projects.

California Mandatory Commercial Recycling Law (AB 341)

Assembly Bill (AB) 341 directed CalRecycle to develop and adopt regulations for mandatory commercial recycling. The final regulation was approved by the Office of Administrative Law on May 7, 2012. The purpose of AB 341 is to reduce GHG emissions by diverting commercial solid waste to recycling efforts and to expand the opportunity for additional recycling services and recycling manufacturing facilities in California.

Beginning on July 1, 2012, businesses have been required to recycle, and each jurisdiction has implemented programs that include education, outreach, and monitoring. Jurisdictions were required to start reporting on their 2012 Electronic Annual Report (due August 1, 2013) on their

initial education, outreach, and monitoring efforts, and, if applicable, on any enforcement activities or exemptions implemented by the jurisdiction.

In addition to Mandatory Commercial Recycling, AB 341 sets a statewide goal for 75 percent disposal reduction by the year 2020. This is not written as a 75 percent diversion mandate for each jurisdiction. The 50 percent disposal reduction mandate still stands for cities, counties, and State agencies (including community colleges) under AB 939. CalRecycle continues to evaluate program implementation as it has in the past through the Annual Report review process for entities subject to either AB 939.

Assembly Bill 1826 Mandatory Commercial Organics Recycling

In October 2014 Governor Brown signed AB 1826, requiring businesses to recycle their organic waste on and after April 1, 2016, depending on the amount of waste they generate per week. This law also requires that on and after January 1, 2016, local jurisdictions across the state implement an organic waste recycling program to divert organic waste generated by businesses, including multifamily residential dwellings that consist of five or more units (please note, however, that multi-family dwellings are not required to have a food waste diversion program). Organic waste (also referred to as organics) means food waste, green waste, landscape and pruning waste, nonhazardous wood waste, and food-soiled paper waste that is mixed in with food waste. This law phases in the mandatory recycling of commercial organics over time, while also offering an exemption process for rural counties. In particular, the minimum threshold of organic waste generation by businesses decreases over time, which means an increasingly greater proportion of the commercial sector will be required to comply.

Starting on January 1, 2019, businesses that generate 4 cubic yards or more of commercial solid waste per week shall arrange for organic waste recycling services. By Summer/Fall 2021, if CalRecycle determines that the statewide disposal of organic waste in 2020 has not been reduced by 50 percent of the level of disposal during 2014, the organic recycling requirements on businesses will expand to cover businesses that generate 2 cubic yards or more of commercial solid waste per week. Additionally, certain exemptions may no longer be available if this target is not met.

SB 1374 (Construction and Demolition Waste Materials Diversion)

Senate Bill 1374 (SB 1374), Construction and Demolition Waste Materials Diversion Requirements, requires that jurisdictions summarize their progress realized in diverting construction and demolition waste from the waste stream in their annual AB 939 reports. SB 1374 required the CIWMB to adopt a model construction and demolition ordinance for voluntary implementation by local jurisdictions.

AB 2176 (Montanez, Chapter 879, Statues of 2004)

This law requires the largest venue facilities and events (as defined) in each city and county to plan and implement solid waste diversion programs, and annually report the progress of those upon the

request of their local government. In turn, local jurisdictions must report to the CIWMB waste diversion information for the top 10 percent of venues and events by waste generation.

A large event is defined as:

1. Serves an average of more than 2,000 individuals per day of operation (both people attending the event and those working at it—including volunteers—are included in this number); and

2. Charges an admission price or is run by a local agency.

The bill specifically includes public, nonprofit, or privately owned parks, parking lots, golf courses, street systems, or other open space when being used for an event, including, but not limited to, a sporting event or a flea market in addition to events that meet both of the above.

A large venue is defined as:

- A permanent facility that annually seats or serves an average of more than 2,000 individuals within the grounds of the facility per day of operation (both people attending the event and those working at it—including volunteers too—are included in this number).

Venues include, but are not limited to airports, amphitheaters, amusement parks, aquariums, arenas, conference or civic centers, fairgrounds, museums, halls, horse tracks, performing arts centers, racetracks, stadiums, theaters, zoos, and other public attraction facilities.

Senate Bill 1383 Short-Lived Climate Pollutants: Organic Waste Methane Emissions Reductions

In September 2016, Governor Brown signed SB 1383, establishing methane emissions reduction targets in a statewide effort to reduce emissions of short-lived climate pollutants (SLCP) in various sectors of California's economy. The bill codifies the California Air Resources Board's Short-Lived Climate Pollutant Reduction Strategy, established pursuant to SB 605, in order to achieve reductions in the statewide emissions of short-lived climate pollutants. Actions to reduce short-lived climate pollutants are essential to address the many impacts of climate change on human health, especially in California's most at-risk communities, and on the environment.

As it pertains to solid waste, SB 1383 establishes targets to achieve a 50 percent reduction in the level of the statewide disposal of organic waste from the 2014 level by 2020 and a 75 percent reduction by 2025. The law grants CalRecycle the regulatory authority required to achieve the organic waste disposal reduction targets and establishes an additional target that not less than 20 percent of currently disposed edible food is recovered for human consumption by 2025.

City of Manteca General Plan

2023 GENERAL PLAN (EXISTING)

Policies: Solid Waste

- PF-P-31. The City will implement and enforce the provisions of its Source Reduction and Recycling Element.
- PF-P-32. The City shall support the continued use of the Lovelace Transfer Station on Lovelace Road, between Union Road and Airport Way, for the processing and shipping of solid waste materials.

GENERAL PLAN UPDATE (PROPOSED)

Policies: Community Facilities Element

- CF-11.1. Continue to require mandatory refuse collection throughout the city.
- CF-11.2. Implement and enforce the provisions of the City's Source Reduction and Recycling Program and update the program as necessary to meet or exceed the State waste diversion requirements.
- CF-11.3. Reduce municipal waste generation by increasing recycling, on-site composting, and mulching, where feasible, at municipal facilities, as well as using resource efficient landscaping techniques in new or renovated medians and parks.
- CF-11.4. Encourage residential, commercial, and industrial recycling and reuse programs and techniques.
- CF-11.5. Coordinate with and support other local agencies and jurisdictions in the region to develop and implement effective waste management strategies and waste-to-energy technologies.
- CF-11.6. Support the continued use of the Lovelace Transfer Station on Lovelace Road, between Union Road and Airport Way, for the processing and shipping of solid waste materials.

Implementation: Community Facilities Element

- CF-11a. Regularly monitory the level of service provided by garbage and recycling collection contractors to ensure that service levels are adequate.
- CF-11b. Implement recycling and waste reduction education programs for City employees. The education program will disseminate information on what and how much is recycled by the City.
- CF-11c. Expand the provision of recycling collection containers and services to all City facilities, including parks.
- CF-11d. Include standard language in requests for services and in City agreements requiring contractors to use best management practices to maximize diversion of waste from the landfill.
- CF-11e. Coordinate with San Joaquin County concerning the City's use of the Lovelace Landfill and its capacity projections.

- CF-11f. Encourage recycling, reuse, and appropriate disposal of hazardous materials, including the following:
    - Increased participation in single family and multifamily residential curbside recycling programs;
    - Increased participation in commercial and industrial recycling programs for paper, cardboard, and plastics;
    - Reduce yard and landscaping waste through methods such as composting, grass recycling, and using resource efficient landscaping techniques; and
    - Encourage local businesses to provide electronic waste (e-waste) drop-off services and encourage residents and businesses to properly dispose of, or recycle, e-waste.

Manteca Municipal Code, Chapter 13.02: Solid Waste Collection and Disposal

Chapter 8.12 of the Municipal Code regulates the management of garbage, recyclables, and other wastes. Chapter 8.12 sets forth solid waste collection, disposal, and diversion requirements for residential, commercial, industrial, and other uses and addresses yard waste, hazardous materials, recyclables, and other forms of solid waste.

Manteca Municipal Code, Chapter 13.02.090: Mandatory Multifamily Recycling

Owners of multifamily complexes are obligated to utilize Manteca's recycling service and allow for the convenient location of recycling containers. The location of recycling containers must be approved by the Office of the Director of Public Works and the containers must remain in the agreed upon location excluding scheduled waste collection dates.

Manteca Municipal Code, Chapter 13.02.100: Commercial Business Recycling

Commercial businesses that produce two or more cubic yards of recyclable or green waste items per week must utilize Manteca's waste collection services. The placement of recycle and green waste containers require approval by the Office of the Director of Public Works.

Manteca Municipal Code, Chapter 13.02.120: Construction and Demolition Recycling

The Manteca Municipal Code Construction and Demolition Recycling Section applies to all contractors on all city construction and demolition projects. It mandates that all concrete, clean wood waste, brick, asphalt, and scrap metal be recycled when the total area of the project surpasses five thousand square feet. The recyclable items must be separated on site and stored in recycling containers to be retrieved by the City of Manteca Solid Waste Division or a permitted resource recovery collector. Construction recycling containers must only contain recyclable material. Failing to properly separate wastes at the source is unlawful and could result in a misdemeanor. All resource recovery collectors providing waste transfer services for construction or demolition related projects

within Manteca must claim the types and quantity of materials transported to landfills or transfer stations as well as provide certified weigh-master receipts.

THRESHOLDS OF SIGNIFICANCE

Consistent with Appendix G of the CEQA Guidelines, the proposed Project will have a significant impact on the environment associated with Utilities if it will:

- 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; and/or
- Comply with federal, state, and local management and reduction statutes and regulations related to solid waste.

IMPACTS AND MITIGATION MEASURES

Impact 3.14-6: The proposed Project has the potential to be served by a landfill with sufficient permitted capacity to accommodate the Project's solid waste disposal needs and comply with federal, State, and local statutes and regulations related to solid waste. (Less than Significant with Mitigation)

As previously described, permitted maximum disposal at the Forward Landfill is 8,668 tons per day. The total permitted capacity of the landfill is 51.04 million cubic yards. 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. Solid waste generated by the proposed Project was estimated based on CalRecycle generation rate estimates by use (discussed below).

The Development Area is estimated to generate roughly 10 pounds per day per household[3]. It is estimated that the proposed 915 residential units would generate 9,150 pounds per day of solid waste. The total solid waste generated by the proposed Project is estimated to be 4.58 tons per day.

Forward Landfill was projected to close in 2020 at current acceptance rates due to reaching its permitted size parameters. To increase the lifespan of the landfill, Forward, Inc. is planning to expand its disposal footprint The City's projected increase in solid waste generation associated with future buildout of the proposed General Plan is within the permitted capacity of the Forward Sanitary Landfill expansion. As noted previously, the vast majority of landfill disposed from the City of Manteca went to Forward Sanitary Landfill.[4] Other landfills that received waste from the City of Manteca include:

- Lovelace Materials Recovery Facility and Transfer Station

[3] Note: data based on CalRecycle estimated solid waste generation rates for single family residential uses.
[4] Note: data provided by CalRecycle, based on information provided by County disposal reports.

- San Joaquin County Hazardous Waste
- Foothill Sanitary Landfill
- North County

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 following mitigation measure requires the payment of a solid waste connection fee prior to issuance of grading permits. With the implementation of the following mitigation measure, potential solid waste impacts would be reduced to **less than significant**.

MITIGATION MEASURE(S)

Mitigation Measure 3.14-2*: Prior to the issuance of a building or grading permit for each phase of the Project, the Project applicant shall pay the City's waste collection fee which equates to the Project's fair share contribution, consistent with section 13.02.050, Charges for solid waste collection services, of the City's municipal code.*

This section provides a background discussion of the hazards associated with wildfires in the Planning Area. The discussion of fire suppression resources is located within Chapter 3.12, Public Services and Recreation, of this report.

No comments were received during the NOP comment period regrading this environmental topic.

3.15.1 ENVIRONMENTAL SETTING

FIRE HAZARD SEVERITY ZONES

The State has charged the California Department of Forestry and Fire Protection (CalFire) with the identification of Fire Hazard Severity Zones (FHSZ) within State Responsibility Areas (SRAs). In addition, CalFire must recommend Very High Fire Hazard Severity Zones (VHFHSZ) identified within any Local Responsibility Areas (LRAs). The FHSZ maps are used by the State Fire Marshall as a basis for the adoption of applicable building code standards.

Local Responsibility Areas

The City of Manteca is not located within a VHFHSZ as identified by CalFire; no cities or communities within San Joaquin County are categorized as containing a VHFHSZ by CalFire. Three areas of the City are located in an LRA identified as having a moderate fire hazard severity zone by CalFire. These include a developed area near Airport Way and West Yosemite Avenue, a developed area near East Yosemite Avenue and Austin Road, and a developed area near West Louise Avenue and South Airport Way. The Project site is not located within or adjacent to these areas.

State Responsibility Areas

There are no SRAs within the vicinity of the Project site.

Federal Responsibility Areas

There are no Federal Responsibility Areas (FRAs) within the vicinity of the Project site.

IDENTIFYING FIRE HAZARDS

Fuel Rank

Fuel rank is a ranking system developed by CalFire that incorporates four wildfire factors: fuel model, slope, ladder index, and crown index.

The U.S. Forest Service has developed a series of fuel models, which categorize fuels based on burn characteristics. These fuel models help predict fire behavior. In addition to fuel characteristics, slope is an important contributor to fire hazard levels. A surface ranking system has been developed by CalFire, which incorporates the applicable fuel models and slope data. The model categorizes slope into six ranges: 0-10%, 11-25%, 26-40%, 41-55%, 56-75% and >75%. The combined fuel model and slope data are organized into three categories, referred to as surface rank. Thus, surface rank reflects the quantity and burn characteristics of the fuels and the topography in a given area.

The ladder index is a reflection of the distance from the ground to the lowest leafy vegetation for tree and plant species. The crown index is a reflection of the quantity of leafy vegetation present within individual specimens of a given species.

The surface rank, ladder index, and crown index for a given area are combined in order to establish a fuel rank of medium, high, or very high. Fuel rank is used by CalFire to identify areas in the California Fire Plan where large, catastrophic fires are most likely.

The areas warranting "moderate" fuel ranks possess combustible material in sufficient quantities combined with topographic characteristics that pose a wildfire risk. As stated, there are three areas within the City identified as moderate. The Project site does not contain areas with "moderate" and "non-wildland fuel" ranks. The Project site and surrounding areas are generally identified as "Local: Non-Wildland/Non-Urban."

Fire Threat to People

As stated, there are three areas of the City located within a moderate fire hazard severity zone. There are no areas within the Project site or surrounding area classified as Very High or Extreme Fire Hazards.

3.15.2 REGULATORY SETTING

FEDERAL

FY 2001 Appropriations Act

Title IV of the Appropriations Act required the identification of "Urban Wildland Interface Communities in the Vicinity of Federal Lands that are at High Risk from Wildfire" by the U.S. Departments of the Interior and Agriculture.

Disaster Mitigation Act (2000)

Section 104 of the Disaster Mitigation Act of 2000 (Public Law 106-390) enacted Section 322, Mitigation Planning of the Robert T. Stafford Disaster Relief and Emergency Assistance Act, which created incentives for state and local entities to coordinate hazard mitigation planning and implementation efforts, and is an important source of funding for fuels mitigation efforts through hazard mitigation grants.

National Incident Management System

The City adopted the National Incident Management System (NIMS), which provides a systematic, proactive approach to guide government agencies, nongovernmental organizations, and the private sector to work together to prevent, respond to, recover from, and mitigate the effects of incidents, regardless of cause, size, location, or complexity, in order to reduce the loss of life and property and harm to the environment. NIMS improves the City's ability to prepare for and respond to potential incidents and hazard scenarios.

National Fire Plan 2000

The summer of 2000 marked a historic milestone in wildland fire records for the United States. Dry conditions (across the western United States), led to destructive wildfire events on an estimated 7.2 million acres, nearly double the 10-year average. Costs in damages including fire suppression activities were approximately 2.1 billion dollars. Congressional direction called for substantial new appropriations for wildland fire management. This resulted in action plans, interagency strategies, and the Western Governor's Association's "A Collaborative Approach for Reducing Wildland Fire Risks to Communities and the Environment - A 10-Year Comprehensive Strategy - Implementation Plan", which collectively became known as the National Fire Plan. This plan places a priority on collaborative work within communities to reduce their risk from large-scale wildfires.

Healthy Forest Initiative 2002/Healthy Forest Restoration ACT 2003

In August 2002, the Healthy Forests Initiative (HFI) was launched with the intent to reduce the severe wildfires risks that threaten people, communities, and the environment. Congress then passed the Healthy Forests Restoration Act (HFRA) on December 3, 2003 to provide the additional administrative tools needed to implement the HFI. The HFRA strengthened efforts to restore healthy forest conditions near communities by authorizing measures such as expedited environmental assessments for hazardous fuels projects on federal land. This Act emphasized the need for federal agencies to work collaboratively with communities in developing hazardous fuel reduction projects and places priority on fuel treatments identified by communities themselves in their Community Wildfire Protection Plans.

Department of the Interior Department Manual Part 620

Part 620: Wildland Fire Management of the Department of the Interior Departmental Manual pertains to wildland fire management policies, with the goal of providing an integrated approach to wildland fire management. The guiding principles of the plan emphasize the need for public health and safety considerations, risk management protocols, inter-agency collaboration, and economic feasibility of wildfire management practices, as well as the ecological role of wildfires.

STATE

California Strategic Fire Plan

This statewide plan is a strategic document, which guides fire policy for much of California. The plan is aimed at reducing wildfire risk through pre-fire mitigation efforts tailored to local areas through assessments of fuels, hazards, and risks.

California State Multi-Hazard Mitigation Plan

The purpose of the State Multi-Hazard Mitigation Plan (SHMP) is to significantly reduce deaths, injuries, and other losses attributed to natural- and human-caused hazards in California. The SHMP provides guidance for hazard mitigation activities emphasizing partnerships among local, state, and federal agencies as well as the private sector.

California Government Code

California Government Code Section 65302.5 requires the draft safety element or draft amendment to the safety element of a county or a city's General Plan be submitted to the State Board of Forestry and Fire Protection for review when the county contains state responsibility areas or the city or county contains a very high fire hazard severity zone. While not a direct and binding fire prevention requirement, general plans that adopt the Board's recommendations will include goals and policies that provide for contemporary fire prevention standards for the jurisdiction.

California Government Code Section 51175 defines Very High Fire Hazard Severity Zones and designates lands considered by the State to be a very high fire hazard.

California Government Code Section 51189 directs the Office of the State Fire Marshal to create building standards for wildland fire resistance. The code includes measures that increase the likelihood of a structure withstanding intrusion by fire (such as building design and construction requirements that use fire-resistant building materials) and provides protection of structure projections (such as porches, decks, balconies and eaves), and structure openings (such as attics, eave vents, and windows).

California Public Resource Code

The State's Fire Safe Regulations are set forth in Public Resources Code Section 4290, which include the establishment of SRAs.

Public Resources Code Section 4291 sets forth defensible space requirements, which are applicable to anyone that …owns, leases, controls, operates, or maintains a building or structure in, upon, or adjoining a mountainous area, forest-covered lands, brush-covered lands, grass-covered lands, or land that is covered with flammable material (§4291(a)).

Public Resources Code Sections 4292-4296 and 14 CCR 1256, Fire Prevention for Electrical Utilities, address the vegetation clearance standards for electrical utilities. They include the standards for clearing around energy lines and conductors such as power-line hardware and power poles. These regulations are critical to wildland fire safety because of the substantial number of power lines in wildlands, the historic source of fire ignitions associated with power lines, and the extensive damage that results from power line caused wildfires in severe wind conditions.

Assembly Bill 337

Per Assembly Bill 337, local fire prevention authorities and CalFire are required to identify VHFHSZs in LRAs. Standards related to brush clearance and the use of fire-resistant materials in fire hazard severity zones are also established.

Uniform Fire Code

The Uniform Fire Code (UFC) establishes standards related to the design, construction, and maintenance of buildings. The standards set forth in the UFC range from designing for access by firefighters and equipment and minimum requirements for automatic sprinklers and fire hydrants to the appropriate storage and use of combustible materials.

Senate Bill No. 1241

California Senate Bill No. 1241 requires that the Safety Element component of city or county general plans to incorporate fire risk related to SRAs and Very High Fire Hazard Severity Zones.

Code of Regulations Title 8 (Cal/OSHA)

In accordance with CCR, Title 8, Section 1270 and Section 6773 (Fire Prevention and Fire Protection and Fire Equipment), the Occupational Safety and Health Administration (Cal OSHA) establishes fire suppression service standards. The standards range from fire hose size requirements to the design of emergency access roads.

Code of Regulations Title 14 (Natural Resources)

Division 1.5 (Department of Forestry and Fire Protection), Title 14 of the CCR establishes a variety of wildfire preparedness, prevention, and response regulations.

Code of Regulations Title 19 (Public Safety)

Title 19 of the CCR establishes a variety of emergency fire response, fire prevention, and construction and construction materials standards.

LOCAL

San Joaquin Office of Emergency Services

The mission of the Office of Emergency Services (OES) is to minimize or reduce injury, loss of life, environmental and property damage from emergencies within San Joaquin County. OES is the key disaster preparedness office of the County, and has direct responsibility to support and coordinate the efforts of County departments carrying out their functions in the field. To ensure a coordinated response to their disaster needs, OES also provides disaster information, logistical support, facilitates mutual aid requests, and facilitates inter-jurisdictional coordination with agencies from 7 cities, 120 special districts, and locally-based State and Federal agencies.

City of Manteca Municipal Code

The City of Manteca's Municipal Code addresses wildfires and associated fire protection in Titles 8, 15, 16, and 17.

Title 8 – Health and Safety (8.08 Fireworks); this section covers sale, use, storage, public firework displays, and requiring permits from the Fire Marshal.

Title 15 - Buildings and Construction (15.24.070 Fire Code); this section includes the adoption of the 2016 California Fire code and additional amendments.

Title 16 - Subdivisions (16.23.030 Improvements Required); this section discusses the requirements for subdivisions including providing appropriate fire protection and fire protection facilities.

Title 17 – Zoning (17.58.040 Hazardous Materials); this section discusses hazardous materials, including disclosure to the Fire Department and San Joaquin County Health Department.

3.15.3 IMPACTS AND MITIGATION MEASURES

THRESHOLDS OF SIGNIFICANCE

Consistent with Appendix G of the CEQA Guidelines, the proposed project will have a significant impact related to wildfires if:

- Located in or near State Responsibility Areas or lands classified as very high fire hazard severity zones, the project would:
  - Substantially impair an adopted emergency response plan or emergency evacuation plan.
  - 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.
  - 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.
  - 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.

IMPACTS AND MITIGATION MEASURES

Impact 3.15-1: Project implementation would not have a significant impact related to wildfire risks associated with lands in or near State Responsibility Areas or lands classified as very high fire hazard severity zones (No Impact)

The Project Site is not located in or near any State Responsibility Areas and there are no lands classified as VHFHSZ within or near the Project Site. Therefore, the proposed Project would have **no impact** related to wildfire risks associated with lands in or near SRAs or lands classified as very high fire hazard severity zones.

The California Environmental Quality Act (CEQA) requires that an Environmental Impact Report (EIR) to evaluate a project's effects in relationship to broader changes occurring, or that are foreseeable to occur, in the surrounding environment. Accordingly, this chapter presents a discussion of CEQA-mandated analysis for cumulative impacts, significant irreversible effects, and significant and unavoidable impacts associated with the proposed Project.

4.1 CUMULATIVE SETTING AND IMPACT ANALYSIS

INTRODUCTION

CEQA requires that an EIR contain an assessment of the cumulative impacts that could be associated with the proposed Project. According to CEQA Guidelines Section 15130(a), "an EIR shall discuss cumulative impacts of a project when the project's incremental effect is cumulatively considerable." "Cumulatively considerable" means that the incremental effects of an individual 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 (as defined by Section 15130). As defined in CEQA Guidelines Section 15355, a cumulative impact consists of an impact that is created as a result of the combination of the project evaluated in the EIR together with other projects causing related impacts. A cumulative impact occurs from:

> *…the change in the environment which results from the incremental impact of the project when added to other closely related past, present, and reasonably foreseeable future projects. Cumulative impacts can result from individually minor but collectively significant projects taking place over a period of time.*

In addition, Section 15130(b) identifies that the following three elements are necessary for an adequate cumulative analysis:

1) Either:

(A) A list of past, present, and probable future projects producing related or cumulative impacts, including, if necessary, those projects outside the control of the agency; or,

(B) A summary of projections contained in an adopted general plan or related planning document, or in a prior environmental document which has been adopted or certified, which described or evaluated regional or area wide conditions contributing to the cumulative impact. Any such planning document shall be referenced and made available to the public at a location specified by the lead agency.

2) A summary of the expected environmental effects to be produced by those projects with specific reference to additional information stating where that information is available; and

3) A reasonable analysis of the cumulative impacts of the relevant projects. An EIR shall examine reasonable, feasible options for mitigating or avoiding the project's contribution to any significant cumulative effects.

Where a lead agency is examining a project with an incremental effect that is not "cumulatively considerable," a lead agency need not consider that effect significant, but shall briefly describe its basis for concluding that the incremental effect is not cumulatively considerable.

CUMULATIVE SETTING

The cumulative setting uses growth projections listed in the general plan, municipal services review, other planning documents and Department of Finance statistics. Table 4.0-1 shows growth projections.

TABLE 4.0-1: GROWTH PROJECTIONS

CALENDAR YEAR	*ESTIMATED POPULATION (MANTECA)*	*ESTIMATED POPULATION (SAN JOAQUIN COUNTY)*	*ESTIMATED POPULATION (CALIFORNIA)*
2020	84,800	766,644	40,619,346
2025	98,833	822,755	42,373,301
2030	115,187	893,354	44,085,600
2035	134,248	966,889	45,747,645
2040	156,463	1,037,761	47,233,240
2045	182,354	1,037,761	47,233,240

SOURCES: UNIVERSITY OF THE PACIFIC – SAN JOAQUIN COUNTY FORECAST SUMMARY AND SJCOG GROWTH PROJECTIONS, CITY OF MANTECA (2016), DEPARTMENT OF FINANCE (2016). MANTECA HISTORICAL GROWTH RATE FROM 1980-2020 WAS 3.1%, WHICH WAS EXTRAPOLATED THROUGH 2045.

CUMULATIVE EFFECTS OF THE PROJECT

Cumulative settings are identified under each cumulative impact analysis. Cumulative settings vary because the area that the impact may affect is different. For example, noise impacts generally only impact the local surrounding area because noise travels a relatively short distance while air quality impacts affect the whole air basin as wind currents control air flow and are not generally affected by natural or manmade barriers which would affect noise. Cumulative Project impacts are addressed and summarized below.

Method of Analysis

Although the environmental effects of an individual project may not be significant when that project is considered separately, the combined effects of several projects may be significant when considered collectively. State CEQA Guidelines 15130 requires a reasonable analysis of a project's cumulative impacts, which are defined as "two or more individual effects which, when considered together are considerable or which compound or increase other environmental impacts." The cumulative impact that results from several closely related projects is: the change in the environment which results from the incremental impact of the project when added to other closely related past, present, and reasonably foreseeable probable future projects. Cumulative impacts can result from individually minor but collectively significant projects taking place over a period of time

(State CEQA Guidelines 15355[b]). Cumulative impact analysis may be less detailed than the analysis of the project's individual effects (State CEQA Guidelines 15130[b]).

There are two approaches to identifying cumulative projects and the associated impacts. The list approach identifies individual projects known to be occurring or proposed in the surrounding area in order to identify potential cumulative impacts. The projection approach uses a summary of projections in adopted General Plans or related planning documents to identify potential cumulative impacts. This EIR uses the projection approach for the cumulative analysis and considers the development anticipated to occur upon buildout of the various General Plans in the area.

Project Assumptions

The proposed Project's contribution to environmental impacts under cumulative conditions is based on full buildout of the Project site. See Chapter 2.0, Project Description, for a complete description of the proposed Project.

Cumulative Impacts

Some cumulative impacts for issue areas are not quantifiable and are therefore discussed in general terms as they pertain to development patterns in the surrounding region. Exceptions to this are traffic, utilities, noise and air quality (the latter two of which are associated with traffic volumes), which may be quantified by estimating future traffic patterns, pollutant emitters, etc. and determining the combined effects that may result. In consideration of the cumulative scenario described above, the proposed Project may result in the following cumulative impacts.

AESTHETICS AND VISUAL RESOURCES

The cumulative setting for aesthetics is the City of Manteca and surrounding areas of Lathrop and San Joaquin County.

Impact 4.1: Cumulative Damage to Scenic Resources within a State Scenic Highway (Less than Significant and Less than Cumulatively Considerable)

There are no designated State Scenic Highways in the vicinity of the Project site. 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. This Designated Scenic Highway is located approximately 16 miles southwest of the Project site and is not visible from the Project site. This route traverses the edge of the Coast Range to the west and Central Valley to the east. The City of Manteca and the Project site are not visible from this roadway segment. Additionally, there are no "eligible" highway segments in the Project vicinity that may be included in the State Scenic Highway system. Cumulative development in the city would not impact a Designated Scenic Highway. Implementation of the proposed Project would have a **less than significant** cumulative impact relative to this environmental topic. As such, impacts relative to scenic resources would be a **less than cumulatively considerable contribution** and no mitigation is required.

Impact 4.2: Cumulative Degradation of the Existing Visual Character of the Region (Cumulatively Considerable and Significant and Unavoidable)

As described in Section 3.1, Aesthetics and Visual Resources, implementation of the proposed Project would convert the 202.81-acre Development Area from its existing use as primarily agricultural land to a residential neighborhood with associated park areas. Implementation of the proposed development standards and consistency with the General Plan and the Manteca Zoning Ordinance would ensure that impacts are reduced to the greatest extent possible. Nevertheless, impacts related to degradation of the visual character of the site would be significant and unavoidable.

Under cumulative conditions, buildout of the General Plan for Manteca and the surrounding jurisdictions could result in changes to the visual character and quality of the City of Manteca through development of undeveloped areas and/or changes to the character of existing communities. Development of the proposed Project, in addition to other future projects in the area, would change the existing visual and scenic qualities of the City. There are no mitigation measures that could reduce this impact except a ceasing of all future development, which is not a feasible option. As such, this is a **cumulatively considerable contribution** and **a significant and unavoidable** impact.

Impact 4.3: Cumulative Impact on Light and Glare (Less than Significant and Less than Cumulatively Considerable)

Implementation of the lighting plan required by Mitigation Measure 3.1-1 would ensure that lighting features do not result in light spillage onto adjacent properties and do not significantly impact views of the night sky. Adherence to the regulations and standards within the Manteca Municipal Code would ensure that excessively reflective building materials are not used, and that the proposed Project would not result in significant impacts related to daytime glare.

Future projects within Manteca, Lathrop, and San Joaquin County would be subject to the light and glare standards established by the individual jurisdictions. These regulations are designed to minimize potential light and glare impacts of new development. Implementation of these regulations would ensure that future projects minimize their potential cumulative light and glare impacts resulting in a **less than significant** cumulative impact relative to this environmental topic. As such, impacts related to nighttime lighting and daytime glare would be a **less than cumulatively considerable contribution**.

AGRICULTURAL RESOURCES

The cumulative setting for agriculture and forest resources is all of San Joaquin County. According to the Department of Conservation, the total acreage of crop land in the county is approximately 772,762 acres. The gross value of agricultural production in San Joaquin County for 2019 was $2,617,815,000 which represents a 9.1 percent increase from 2018 when gross production value totaled $2,594,246,000.

Impact 4.4: Cumulative Impact on Agricultural Resources (Cumulatively Considerable and Significant and Unavoidable)

As described in Section 3.2, of the proposed Project would result in the permanent conversion of approximately 26.2 acres of Prime Farmland and 146.25 acres of Farmland of Statewide Importance. The loss of Important Farmland as classified under the Farmland Mapping and Monitoring Program is considered a potentially significant environmental impact.

The City's agricultural mitigation fee program requires that future development pay the agricultural mitigation fee, currently $2,956.2 per acre, to mitigate the conversion of agricultural land to urban use. The City will use these funds to purchase conservation easements or deed restrictions on agricultural land to ensure that the land remains in agricultural use in perpetuity.

In addition to the City's agricultural mitigation fee program, the San Joaquin County Multi-Species Habitat Conservation and Open Space Plan (SJMSCP) requires development to pay fees on a per-acre basis for impacts to agricultural lands that function as habitat for biological resources. SJCOG will then use these funds to purchase the conservation easements on agricultural and habitat lands in the Project vicinity. The compensation results in the purchase of conservation easements that are placed over agricultural land, such as alfalfa and row crops. As such, the Project fees paid to SJCOG as administrator of the SJMSCP will result in the preservation of agricultural lands in perpetuity.

The purchase of conservation easements and/or deed restrictions through the City agricultural mitigation fee program and the SJMSCP allows the landowners to retain ownership of the land and continue agricultural operations and preserves such lands in perpetuity.

While the proposed Project will contribute fees toward the purchase of conservation easements on agricultural lands through the City's agricultural mitigation fee program and the SJMSCP mitigation program, as required by Mitigation Measure 3.2-1, those fees and conservation easements would not result in the creation of new farmland to offset the loss that would occur with Project implementation. As such, the loss of Important Farmland would be a **cumulatively considerable contribution** and a **significant and unavoidable** impact.

AIR QUALITY

The cumulative setting for air quality impacts is the San Joaquin Valley Air Basin (SJVAB), which consists of eight counties, stretching from Kern County in the south to San Joaquin County in the north. The SJVAB is bounded by the Sierra Nevada in the east, the Coast Ranges in the west, and the Tehachapi mountains in the south.

Impact 4.5: Cumulative Impact on the Region's Air Quality (Less than Significant and Less than Cumulatively Considerable)

Under buildout conditions in the San Joaquin County, the SJVAB would continue to experience increases in criteria pollutants and efforts to improve air quality throughout the basin would be hindered. As described in Section 3.3, San Joaquin County has a State designation Attainment or Unclassified for all criteria pollutants except for ozone, particulate matter of 10 microns or less in size (PM_{10}), and particulate matter of 2.5 microns or less in size ($PM_{2.5}$). San Joaquin County has a

national designation of either Unclassified or Attainment for all criteria pollutants except for ozone and $PM_{2.5}$. Table 3.3-2 in Section 3.3 presents the State and Federal attainment status for San Joaquin County.

As discussed under Impact 3.3-1 in Section 3.3, the SJVAPCD has established their thresholds of significance by which the Project emissions are compared against to determine the level of significance. The SJVAPCD has established operations related emissions thresholds of significance as follows: 100 tons per year of carbon monoxide (CO), 10 tons per year of oxides of nitrogen (NO_x), 10 tons per year of reactive organic gases (ROG), 27 tons per year of sulfur oxides (SO_x), 15 tons per year PM_{10}, and 15 tons per year $PM_{2.5}$.

As shown in Table 3.3-6, operational emissions would not exceed the SJVACPD thresholds of significance for criteria pollutants. Additionally, as shown in Table 3.3-7, construction emissions would not exceed the SJVACPD thresholds of significance for criteria pollutants. As such, implementation of the proposed Project would have a **less than significant** and **less than cumulatively considerable contribution**.

BIOLOGICAL RESOURCES

The cumulative setting for biological resources includes the Project site and the greater San Joaquin County region. Development associated with implementation of the local General Plan(s) would contribute to the ongoing loss of natural and agricultural lands in San Joaquin County, including the Project site. Cumulative development would result in the conversion of existing habitat to urban uses. The local General Plan(s), in addition to regional, State and federal regulations, includes policies and measures that mitigate impacts to biological resources associated with General Plan buildout. Additionally, local land use authorities in San Joaquin County require development to participate in the SJMSCP, which is a habitat conservation plan and natural community conservation plan for San Joaquin County that provides a mechanism for compensatory mitigation for habitat and species loss in accordance with federal and State laws.

Impact 4.6: Cumulative Loss of Biological Resources Including Habitats and Special Status Species (Less than Significant and Less than Cumulatively Considerable)

Under cumulative conditions, buildout of the General Plan(s) within San Joaquin County will result in impacts to biological resources in the cumulative area through new and existing development. The General Plan(s) includes policies that are designed to minimize impacts to the extent feasible and the SJMSCP has been established to provide a mechanism for compensatory mitigation and standardized avoidance and minimization measures as needed.

As described in Section 3.4, Biological Resources, construction in the Project site has the potential to result in impacts to special-status species in the region. Although there has been no documented sighting within the immediate area in, or near the Project site, the Project site provides potential habitat for several species, including those discussed in Section 3.4.

Mitigation Measure 3.4-1 requires participation with the SJMSCP, which includes fees that will be used to purchase conservation lands for a variety of special status species. The SJMSCP was created and adopted to address both the Project and cumulative impacts to biological resources, including special status species. The proposed Project will participate in the SJMSCP, including payment of fees and implementation of all Incidental Take Minimization Measures required by the SJCOG through the authorization of SJMSCP coverage.

Implementation of Mitigation Measure 3.4-1 in Section 3.4 would reduce potentially cumulative impacts to a **less than significant** level. As such, impacts to biological resources would be a **less than cumulatively considerable contribution**.

CULTURAL AND TRIBAL RESOURCES

The geography of cultural resources impact can be defined by region, by political subdivision or by the geography of the cultural resources present in an area, where sufficient inventory data is available to define it. The cumulative setting for cultural resources includes all of the San Joaquin County. There are extensive cultural sites located in the region.

Impact 4.7: Cumulative Impacts on Known and Undiscovered Cultural and Tribal Resources (Less than Significant and Less than Cumulatively Considerable)

Cumulative development anticipated in the City of Manteca, including growth projected by adopted future projects, may result in the discovery and removal of cultural resources, including archaeological, paleontological, historical, and Native American resources and human remains. As discussed in Section 3.5, Cultural and Tribal Resources, no historic period resources were previously recorded in the Development Area.

Any previously unknown cultural resources which may be discovered during development of the proposed Project would be required to be preserved, either through preservation in place, excavation, documentation, curation, data recovery, or other appropriate measures. With implementation of the mitigation measures provided in Section 3.5, the proposed Project is not anticipated to considerably contribute to a significant reduction in cultural resources in the region.

All future projects in the regional vicinity would be subject to their respective General Plans (i.e. City of Manteca, City of Lathrop, and San Joaquin County), each of which have policies and measures that are designed to ensure protection of undiscovered cultural resources. In addition, all discretionary projects in these jurisdictions would require environmental review per regulations established in CEQA.

Implementation of the proposed Project would have a **less than significant** cumulative impact relative to this environmental topic. As such, impacts related to cultural resources would result in a **less than cumulatively considerable contribution**.

GEOLOGY AND SOILS

Impacts related to geology and soils are not inherently cumulative. Geology and soils concerns are related to risks, hazards or development constraints that are largely site-specific. However, seismic hazards are regional, and management of seismic hazards is vested with the local planning and building authority. For these reasons, the potential for cumulative geology and soils impacts are considered in the context of the City of Manteca and vicinity.

Impact 4.8: Cumulative Impact on Geologic and Soils Resources (Less than Significant and Less than Cumulatively Considerable)

As discussed in Section 3.6 Geology and Soils, implementation of the proposed Project has limited potential for liquefaction, liquefaction induced settlement, and lateral spreading. However, mitigation measures provided in Section 3.6 ensure this impact will be less than significant. While the City is not within an area known for its seismic activity, there will always be a potential for groundshaking caused by seismic activity anywhere in California, including the Project site. Seismic activity could come from a known active fault such as the Greenville fault, or any number of other faults in the region. 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. Additionally, the City of Manteca has 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.

Geologic and soils impacts tend to be site-specific and Project-specific. With the mitigation measures presented in Section 3.6, implementation of the proposed Project would not result in increased risks or hazards related to geologic conditions in the cumulative setting area, nor would it result in any off-site or indirect impacts. Implementation of the proposed Project would have a **less than significant** cumulative impact relative to this environmental topic. As such, impacts related to geologic and soil resources would result in a l**ess than cumulatively considerable contribution**.

GREENHOUSE GASES, CLIMATE CHANGE AND ENERGY

The cumulative setting for greenhouse gas emissions and climate change impacts for this analysis is San Joaquin County, which is the boundary for the California Air Resources Board's regional greenhouse gas emissions reduction targets.

Impact 4.9: Cumulative Impact on Climate Change from Increased Project-Related Greenhouse Gas Emissions (Less than Significant and Less than Cumulatively Considerable)

Greenhouse gas emissions from a single Project will not cause global climate change; however, greenhouse gas emission from multiple projects throughout a region or state could result in a cumulative impact with respect to global climate change.

In California, there has been extensive legislation passed with the goal of reducing greenhouse gas emissions. The legislative goals are as follows: by 2010, reduce GHG emissions to 2000 levels; by 2020, reduce GHG emissions to 1990 levels; by 2050, reduce GHG emissions to 80 percent below 1990 levels. To meet the targets, the Governor directed several State agencies to cooperate in the development of a climate action plan. The Secretary of Cal-EPA leads the Climate Action Team, whose goal is to implement global warming emission reduction programs identified in the Climate Action Plan and to report on the progress made toward meeting the emission reduction targets established in the executive order.

The City of Manteca adopted its Climate Action Plan (CAP) in October 2013. The purpose of the CAP is to: 1) outline a course of action for the City government and the community of Manteca to reduce per capita greenhouse gas emissions by amounts required to show consistency with AB 32 goals for 2020 and adapt to effects of climate change, and 2) provide clear guidance to City staff regarding when and how to implement key provisions of the CAP, and 3) provide a streamlined mechanism for projects that are consistent with the CAP to demonstrate that they would not contribute significant greenhouse gas impacts. The GHG Plan is considered a "Qualified Plan," according to CEQA Guidelines Section 15183.5.2. The City's GHG Inventory is evaluated for baselines years 2005 and 2010 and is projected for years 2020 and 2035.

As presented in Table 3.7-3, short-term construction emissions of GHGs are estimated at a maximum of approximately 1,239 metric tons of CO_2 equivalent (MT CO_2e) per year. As presented in Table 3.7-4, the operational GHG emissions estimate for the proposed Project would be approximately 9,682 MT CO_2e. Consistent with the modeling for CalEEMod, the proposed Project is estimated to generate approximately 2,910 residents during the Project's operational phase. Dividing this number of estimated residents generated by the Project by the total annual operational GHG emissions at Project buildout yields approximately 3.33 MT CO_2e/SP/Year, which is below the 3.56 MT CO_2e/SP/year in 2030 threshold based on emissions for the land use-driven emission sectors in the CARB GHG Inventory. Construction emissions, when amortized[1], would equal approximately emissions 41.3 MT CO_2e, which is equivalent to approximately 0.01 MT CO_2e/SP/Year. Therefore, the total annual GHG emissions at Project buildout would still yield approximately 3.34 MT CO_2e/SP/Year, after inclusion of the amortized construction emissions.

Therefore, implementation of the proposed Project would have a **less than significant** cumulative impact relative to this environmental topic. As such, impacts related to geologic and soil resources would result in a l**ess than cumulatively considerable contribution**.

HAZARDS AND HAZARDOUS MATERIALS

The cumulative context for the analysis of cumulative hazards and human health impacts is San Joaquin County, including all cumulative growth therein, as represented by full implementation of each respective General Plan (i.e., Manteca, Lathrop, and San Joaquin County). As discussed in

[1] The amortization period used for this calculation is 30 years.

Section 3.8 Hazards and Hazardous Materials, implementation of the proposed Project would not result in any significant impacts related to this environmental topic with the implementation of the mitigation measures provided in Section 3.8.

Impact 4.10: Cumulative Impact Related to Hazards and Hazardous Materials (Less than Significant and Less than Cumulatively Considerable)

The proposed Project, in conjunction with cumulative development in the region, would include areas designated for a variety of urban, agricultural, and open space uses as defined by the applicable General Plan. Cumulative development would include continued operation of, or development of, new facilities as allowed under each land use designation. New development would inevitably increase the use of hazardous materials within the region, resulting in potential health and safety effects related to hazardous materials use. For the most part, potential impacts associated with new and future development would be confined to commercial and industrial areas and would not involve the use of hazardous substances in large quantities or that would be particularly hazardous. Incidents, if any, would typically be site specific and would involve accidental spills or inadvertent releases. Associated health and safety risks would generally be limited to those individuals using the materials or to persons in the immediate vicinity of the materials and would not combine with similar effects elsewhere (i.e., construction workers). Hazard-related impacts tend to be site-specific and Project-specific. The Project site is not associated with any existing hazardous materials spills; however, there are numerous areas throughout the County where hazardous conditions are present.

Implementation of the proposed Project would not result in significant increased risks of hazards in the cumulative setting area, nor would it result in any significant off-site or indirect impacts. Mitigation measures have been included to reduce the risk of on-site hazards associated with the use of on-site hazardous materials. Implementation of the proposed Project would have a **less than significant** cumulative impact relative to this environmental topic. As such, impacts related to hazards and hazardous materials would result in a l**ess than cumulatively considerable contribution**.

HYDROLOGY AND WATER QUALITY

Potential cumulative issues associated with surface waters can be addressed on a watershed basis, or in the case of groundwater, in the context of a groundwater basin. Because water resources are highly interconnected, the cumulative setting is based on San Joaquin County which is located in the San Joaquin River Hydrological Region. Cumulative development in this region, including the proposed Project, would impact the water quality and hydrological features of the San Joaquin River Hydrologic Region. The City of Manteca and much of the surrounding area is located in the Eastern San Joaquin River Groundwater Basin. This groundwater basin covers approximately 1,105 square miles. The Project site is located in the Town of French Camp-San Joaquin River watershed. Any matter that may affect water quality draining from the Project site will eventually end up in the Delta or within the groundwater basin.

Impact 4.11: Cumulative Increases in Peak Stormwater Runoff from the Project site (Less than Significant and Less than Cumulatively Considerable)

Implementation of the proposed Project would increase the amount of impervious surfaces in the Project site, which could increase peak stormwater runoff rates and volumes on and downstream on the Project site. However, the proposed Project includes an extensive system of on-site stormwater collection facilities to accommodate the increased stormwater flows that would originate in the Project site.

All on-site storm drainage runoff will be collected through drain inlets in the landscaped areas and catch basins along the streets and within properties and conveyed via surface swales and underground trunk lines to detention and water quality basins. The conveyance systems and detention basins may include facilities designed to address water quality standards and requirements. 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. The duration of the discharge will comply with City of Manteca standards. The water quality detention basins will be designed to comply with SWRCB and City of Manteca specifications and standards.

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.

With the design and construction of flood control improvements, the proposed Project would not increase peak stormwater runoff. Implementation of the proposed Project would have a **less than significant** cumulative impact relative to this environmental topic. As such, impacts related to stormwater runoff would result in a l**ess than cumulatively considerable contribution**.

Impact 4.12: Cumulative Impacts Related to Degradation of Water Quality (Less than Significant and Less than Cumulatively Considerable)

The proposed Project, along with several of the related projects within the City of Manteca, would ultimately discharge stormwater runoff to the nearby Delta waterways. This would potentially degrade the water quality of the system.

Construction of the proposed Project would contribute to a cumulative increase in urban pollutant loading, which could adversely affect water quality. Cumulative development in the Manteca area, including the proposed Project, would also result in increased impervious surfaces that could increase the rate and amount of runoff, thereby potentially adversely affecting existing surface water quality through increased erosion and sedimentation. The primary sources of water pollution include: runoff from roadways and parking lots; runoff from landscaping areas; non-stormwater connections to the drainage system; accidental spills; and illegal dumping. Runoff from roadway and

parking lots could contain oil, grease, and heavy metals; additionally, runoff from landscaped areas could contain elevated concentrations of nutrients, fertilizers, and pesticides.

The proposed Project will be required to comply with Mitigation Measure 3.9-1 which requires the development and approval of a Stormwater Pollution Prevention Plan (SWPPP). The SWPPP will include Best Management Practices (BMPs) to regulate stormwater quality for the Project site which will be designed in accordance with the City of Manteca's National Pollutant Discharge Elimination System Permit (NPDES) issued by the RWQCB. Mitigation Measure 3.9-2 requires non-structural BMPs that focus on preventing pollutants from entering stormwater. Non-structural BMPs are typically aimed at prevention of pollution through public education and outreach. Non-structural BMPs include: school educational programs, newsletters, website information, commercial, billboards/advertisements, river cleanups, and storm drain stenciling. Mitigation Measure 3.9-3 requires implementation of structural BMPs. Structural BMPS are aimed at the physical collection, filtering, and detaining of stormwater. Structural BMPs include items such as drop inlet filters, vault filters, hydrodynamic separators, surface detention basins, and underground detention facilities.

While there are no assurances that other projects in the County would incorporate the same degree or methods of treatment as the proposed Project, several of the projects within the City of Manteca would phase out existing agricultural runoff discharges from their respective sites and, similar to the proposed Project, could provide some level of water quality improvement. Also, each related Project that would discharge stormwater runoff would be required to comply with NPDES discharge permits from the RWQCB, which adjusts requirements on a case-by-case basis to avoid significant degradation of water quality. Therefore, while a greater quantity of urban runoff may be discharged to the Delta system with implementation of the related projects, because of an increase in impervious surfaces, the associated surface water quality impacts would be expected to be less than significant because of improved or similar quality of runoff compared to existing conditions.

Compliance with City and County water quality protection regulations, approval from the RWQCB, and Mitigation Measures 3.9-1 through 3.9-3 would ensure that the proposed Project minimizes impacts to surface water quality. Implementation of the proposed Project would have a **less than significant** cumulative impact relative to this environmental topic. As such, impacts related to water quality would result in a l**ess than cumulatively considerable contribution**.

Impact 4.13: Cumulative Impacts Related to Degradation of Groundwater Supply or Recharge (Less than Significant and Less than Cumulatively Considerable)

The proposed Project would result in new impervious surfaces and could reduce rainwater infiltration and groundwater recharge. Infiltration rates vary depending on the overlying soil types. In general, sandy soils have higher infiltration rates and can contribute to significant amounts of ground water recharge; clay soils tend to have lower percolation potential; and impervious surfaces such as pavement significantly reduce infiltration capacity and increase surface water runoff.

The infiltration rate of the soils on the Project site is primarily considered high. Development of the Project site with impervious surfaces could reduce rainwater infiltration and groundwater recharge when compared to existing conditions. The park and trail areas totaling approximately 14.55 acres

will remain largely pervious. The collection of rainwater for those areas of impervious surfaces will be routed into the proposed Project's storm drainage system and eventually flow into the San Joaquin River. The exact design of the drainage basin in not known at this time; therefore, it is not known whether the drainage basin will percolate or not (i.e. unlined or lined).

The project site is located in the Eastern San Joaquin County Groundwater Basin. Most of the fresh groundwater is encountered at depths of less than 1,000 feet, and most of this shallow groundwater is unconfined. The Victor formation is the uppermost formation and extends from the ground surface to a maximum depth of about 150 feet. Compared to the underlying formations, the Victor formation is generally more permeable and the groundwater is typically unconfined. The underlying Laguna formation includes discontinuous lenses of unconsolidated to semi-consolidated sands and silts interspersed with lesser amounts of clay and gravel. The Laguna formation is hydraulically connected to the Victor formation and is estimated to be 750 to 1,000 feet thick. Moderate permeability has been reported within the Laguna formation with some highly permeable coarse-grained beds. Most of the municipal and industrial wells in the Manteca area penetrate through the Victor formation into the Laguna formation.

Water supplies to meet future demands include surface water purchased from SSJID, City produced groundwater and recycled water. The City's water supply is projected to increase through 2045, primarily due to implementation of Phase 2 of the SCWSP, which is anticipated to occur around 2040. Future City groundwater pumping is estimated based on the safe yield for all groundwater pumping within the City's planning area, less estimated groundwater pumping by other users. Recycled water demand projections assumed decreased use over time of water for crop irrigation, and implementation of a tertiary-treated irrigation supply in the future.

For the reasons mentioned above, the proposed Project would not cause the substantial depletion of groundwater supplies or interfere substantially with groundwater recharge. Implementation of the proposed Project would have a **less than significant** and **less than cumulatively considerable** impact relative to this topic.

Impact 4.14: Cumulative Impacts Related to Flooding (Less than Significant and Less than Cumulatively Considerable)

As shown on Figure 3.9-2, the Project site is not within a 100-year flood zone as delineated by FEMA, the 200-year flood zone, or the 500-year flood zone. The project site is located in an area that is designated to have minimal flooding hazard. Since the Project site does not fall within a 100-year, 200-year, or 500-year floodplain there is little to no risk of flooding to the Project site. The flood zone designation of the site is also not due to a reduced risk from a levee nor is it located within a regulatory floodway. The greatest risk of flooding on the Project site is limited to local drainage which is addressed in Impact 3.9-2 and 3.9-4 respectively. Implementation of the proposed Project would have a **less than significant** and **less than cumulatively considerable** impact relative to this topic.

LAND USE, POPULATION, AND HOUSING

The cumulative setting for land use and population impacts is the City of Manteca.

Impact 4.15: Cumulative Impact on Communities and Local Land Uses (Less than Significant and Less than Cumulatively Considerable)

Cumulative land use impacts, such as the potential for conflicts with adjacent land uses and consistency with adopted plans and regulations, are typically site- and Project-specific. As shown in Table 3.10-2, the Project is consistent with the City's existing General Plan policies and would not conflict with policies adopted to avoid or mitigate an environmental effect. When land uses are not consistent with a General Plan there are two courses of action: 1) the uses are not allowed due to the inconsistency, or 2) the land uses are changed through an amendment to the General Plan to create consistency. The proposed Project would require a minor General Plan Land Use Amendment to adjust the lands uses to LDR and HDR for the Development Area. In addition, the proposed Project includes a proposed General Plan Land Use Amendment to adjust the land uses in Annexation Subarea 1, 2, and 3 to be consistent with the proposed General Plan Update. Because the Annexation Subareas are not proposed for development, establishment of the land uses under this proposed General Plan Amendment is not necessary, and as an alternative they may be left as currently designated.

Approval of the General Plan amendment would ensure that the proposed Project would be substantially consistent with the Manteca General Plan land use requirements and would have a **less than significant** and **less than cumulatively considerable** impact relative to the Manteca General Plan.

The Manteca Zoning Code implements the General Plan. The Project site is currently within the jurisdiction of San Joaquin County. The San Joaquin County 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 will include the following zoning designations: One-Family Dwelling Zoning District (R-1), Limited Multiple-Family Dwelling (R-2), Multiple-Family Dwelling (R-3), General Commercial Zoning District (CG), and Park (P). The pre-zoning would go into effect upon annexation into the City of Manteca. The proposed pre-zoning for the Project site is shown on Figure 2.0-7b. These proposed zone changes would ensure that zoning would be consistent with the proposed General Plan designations within the Project site. The zoning ordinance establishes permitted uses, development densities and intensities, and development standards for each zone to ensure that public health, safety, and general welfare are protected, consistent with the purpose of the Zoning Code. All existing City development standards and zoning requirements for the proposed zoning are applicable to any activities on the Project site. The City will review each component of the proposed Project as plans (improvement plans, building plans, site plans, etc.) are submitted for final approval to ensure that they are consistent with the City's Zoning ordinance.

The City will review each component of the proposed Project as plans (improvement plans, building plans, site plans, etc.) are submitted for final approval to ensure that they are consistent with the City's Zoning ordinance. Approval of the zone change would ensure that the proposed Project would

be consistent with the Zoning Code and will have a **less than significant** and **less than cumulatively considerable** relative to this topic.

Impact 4.16: Cumulative Impacts on Population and Housing (Less than Significant and Less than Cumulatively Considerable)

As described in Section 3.10, development of the Project would add 915 residential units. While the existing residences within the Development Area would be demolished prior to development of the proposed Project, the existing residential structures in the Non-Development Area would remain. Therefore, the proposed Project would more than replace the housing that would be removed and would not displace substantial numbers of people or existing housing.

The Housing Element of the Manteca GP identifies that the City has capacity for 5,782 residential units on vacant and underdeveloped sites. The proposed Project would not result in indirect population growth beyond the City's planned capacity as the proposed project will generate 915 residential units, well below the residential unit capacity identified in the Manteca GP. Therefore, the proposed Project is not anticipated to exceed the planned growth (directly or indirectly) in the area beyond what is anticipated in the City of Manteca General Plan. While the proposed Project will result in growth, it is not anticipated to significantly induce growth. Implementation of the proposed Project will have a **less than significant** impact relative to this topic. As such, impacts related to population and housing would result in a **less than cumulatively considerable contribution**.

NOISE

The cumulative setting for noise impacts consists of the existing and future noise sources that could affect the Project site or surrounding uses.

Impact 4.17: Cumulative Exposure of Existing and Future Noise-Sensitive Land Uses to Increased Noise Resulting from Cumulative Development (Less than Significant with Mitigation and Less than Cumulatively Considerable)

The cumulative context for noise impacts associated with the proposed Project consists of the existing and future noise sources that could affect the Project or surrounding uses. Noise generated by construction would be temporary, and would not add to the permanent noise environment or be considered as part of the cumulative context.

TRAFFIC NOISE INCREASES UNDER EXISTING (2003) GENERAL PLAN STANDARDS

As shown in Tables 3.11-4 and 3.11-5 in Section 3.11, 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 Union Road, south of Lovelace Road experience an exterior noise level of approximately 63.4 dB L_{dn}. Under Existing + Project conditions, exterior traffic noise levels are

predicted to be approximately 65.1 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 1.7 dB would not exceed the City's increase criteria of 5-10 dB. 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}, or 3.0 dB or more where existing noise levels are between 60-65 dB L_{dn}.

According to Tables 3.11-4 and 3.11-5 in Section 3.11, the maximum noise level increase due to Project traffic is predicted to be 1.7 dBA L_{dn}. For this segment of Union Road, the existing ambient noise level at the nearest sensitive receptor is 63.4 dBA. Therefore, an increase of 3 dB would be required to be considered a significant impact. All other roadway segments analyzed in the traffic study do not exceed the Proposed General Plan Standards for significant impacts. Therefore, this would be a **less than significant** impact.

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.). Proposed neighborhood parks are located internal to the Project site and would not impact off-site residential uses. Therefore, operational noise by the proposed Project is not analyzed further.

With Mitigation Measure 3.11-1 to 3.11-7, implementation of the proposed Project would have a **less than significant** cumulative impact relative to traffic noise. As such, impacts related to population and housing would result in a **less than cumulatively considerable contribution**.

CONSTRUCTION NOISE

As indicated in Table 3.11-6 of Section 3.11, 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. Mitigation Measures 3.10-1A and 3.10-1B require that construction activities adhere to the Municipal Code with respect to hours of operation, and that all equipment be fitted with factory equipped mufflers. With implementation of Mitigation Measure 3.11-1 to 3.11-7, implementation of the proposed Project would have a **less than significant** cumulative impact relative to this environmental topic. As such, impacts related to construction noise would result a l**ess than cumulatively considerable contribution**.

MITIGATION MEASURE(S)

Implement ***Mitigation Measures 3.11-1 through 3.11-7.***

PUBLIC SERVICES AND RECREATION

Cumulative setting would include all areas covered in the service areas of the City of Manteca Fire Department, Police Department, Parks and Recreation Department, the Manteca Unified School District, and any other relevant public services.

Impact 4.18: Cumulative Impact on Public Services and Recreation (Less than Significant and Less than Cumulatively Considerable)

Implementation of the proposed Project would contribute toward an increased demand for public services and facilities within the City of Manteca. It has been determined that the impacts to the Manteca Police, Manteca Fire, and Parks and Recreation Departments would be less-than-significant. Additionally, it has been determined that the impacts to the Manteca Unified School District would be less-than-significant. The proposed Project would be subject to all fees that are paid toward the enhancement of public services within the region. 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 assist in maintaining existing fire, police, schools, and park services. Implementation of the proposed Project would have a **less than significant** cumulative impact relative to this environmental topic. As such, impacts related to public services would result in a l**ess than cumulatively considerable contribution**.

TRANSPORTATION AND CIRCULATION

A Cumulative Conditions analysis was performed to identify potential impacts of the Project under Cumulative AM and PM peak hour conditions. The analysis reflects long-term development in the City of Manteca and other nearby jurisdictions using the original Manteca TDF model. See Impact 3.13-1 for the Cumulative Development Project daily vehicle-miles-traveled (VMT) discussion.

Impact 4.19: Under Cumulative conditions, Project implementation would result in VMT increases that are greater than 85 percent of Baseline conditions (Cumulatively Considerable and Significant and Unavoidable)

Table 3.13-15 in Section 3.13 presents the established Baseline Citywide VMT per single family residential household and the Cumulative Development Project VMT per household. Under Cumulative Conditions, the proposed development would generate an estimated average of 94.8 home-based VMT per single family household (5.2 percent below the Cumulative city-wide average), and 73.9 home-based VMT per multi-family household (1 percent above the Cumulative city-wide average). The proposed development would generate fewer home-based VMT per single family and multi-family household compared to under Baseline conditions due to the fact that in the Cumulative Year, the number of jobs and the amount of commercial, retail, and recreational development in the City is anticipated to increase and residents would be able to travel shorter distances to access these types of land uses.

Because the development would generate vehicle travel exceeding 15 percent below the established city-wide average under Existing and Cumulative Conditions, implementation of the proposed Project would have a **cumulatively considerable contribution** and **a significant and unavoidable** impact.

Impact 4.20: Under Cumulative conditions, the proposed Project would not conflict with a program, plan, policy or ordinance addressing the circulation system, including transit, bicycle, and pedestrian facilities (Less than Significant with Mitigation and Less than Cumulatively Considerable)

The proposed Project is consistent with the Manteca Active Transportation Plan (ATP). The proposed Project includes bicycle and pedestrian improvements consistent with those required in the ATP. The proposed project will construct the continuation of the Class I Tidewater Bikeway. The proposed project will also construct sidewalks on internal streets, providing adequate connections to and throughout the site for pedestrians.

Implementation of the proposed Project would not result in a conflict with an existing or planned pedestrian facility, bicycle facility, or transit service/facility. Because the proposed Project would not conflict with adopted programs, plans, policies, or ordinances that address the circulation system, including transit, bicycle, and pedestrian facilities; this impact is considered **less than significant**. The Project would result in a **less than cumulatively considerable contribution** to this topic.

UTILITIES

The cumulative setting includes all areas covered in the service areas of the City's wastewater system, water system, stormwater system, and the solid waste collection and disposal services.

Impact 4.21 Cumulative Impact on Wastewater Utilities (Less than Significant and Less than Cumulatively Considerable)

The City of Manteca owns and operates a wastewater collection, treatment, and disposal system, and provides sewerage service to the City of Manteca and the City of Lathrop. On April 17, 2015, the RWQCB adopted Waste Discharge Requirements Order No. R5-2015-0026 NPDES NO. CA0081558, prescribing waste discharge requirements for the City of Manteca Wastewater Quality Control Facility (WQCF) and allowing expansion of the plant up to 17.5 mgd.

The City of Manteca's wastewater treatment system is currently in compliance with the WDR requirements of Order No. R5-2015-0026 NPDES NO. CA0081558. The wastewater treatment system options covered under this Order include: City of Manteca Wastewater Quality Control Facility (WQCF) including the collection system, basin/disposal fields, discharge to the San Joaquin River, and recycling conveyance and irrigation system. The development of the proposed Project would not exceed the wastewater discharge requirements in this Order as described under Impact 3.15-1 in Section 3.15. Implementation of the proposed Project would have a **less than significant** and **less than cumulatively considerable** impact relative to this topic.

The wastewater collection and conveyance system that will serve the proposed Project will consist of engineered infrastructure consistent with the City's existing infrastructure requirements. Sizing of existing infrastructure in the City varies based on location, but generally includes gravity sewers and force mains ranging in size from 8 to 24 inches, and pump stations. The existing facilities have undergone environmental review and have waste discharge permits from the State.

New wastewater collection and conveyance infrastructure needed for the proposed Project will require trenching/excavation of earth, and placement of pipe within the trenches at specific locations, elevations, and gradients. The applicant will refine the wastewater collection/conveyance infrastructure design through the development of improvements plans which undergo review by the Public Works Department to ensure consistency with the City's engineering standards. This improvement plan process will include full engineering design (i.e. location, depth, slope, etc.) of all conveyance infrastructure as well as a review of new sewer pump stations and new force mains if needed. Ultimately, the sanitary sewer collection system will be an underground collection system installed as per the City of Manteca standards and specifications. Sanitary sewer disposal and treatment will be to the City of Manteca WQCF.

Implementation of the proposed Project would have a **less than significant** and **less than cumulatively considerable** impact relative to this topic.

The City's Existing General Plan designated the Development Area as LDR and Park and therefore anticipated development and potential annexation into the City. Given that projected wastewater generation volumes associated with the buildout of the Development Area would not exceed the projected wastewater generation volumes described in the WQCF Master Plan, implementation of the proposed Project would have a **less than significant** and **less than cumulatively considerable** impact relative to this topic.

Impact 4.22: Cumulative Impact on Water Utilities (Less than Significant and Less than Cumulatively Considerable)

The proposed Project would require extension of offsite water conveyance infrastructure to the Project site for water service. All offsite water utility improvements will be in or adjacent to existing roadways adjacent to the Project site, thereby limiting any potential impact to areas that were not already disturbed. Construction of the potable water infrastructure would not have the potential to induce growth beyond what is proposed because the infrastructure is not oversized to accommodate additional projects or growth.

The proposed Project would require the construction of new onsite water infrastructure for water service. All onsite water utility improvements will be within existing agricultural lands, the impacts of which are discussed in Section 3.2, Agricultural Resources. Construction of the onsite water infrastructure would not result in the extension of water utilities to an area of the City not currently served by water utilities, and as such, would not have the potential to indirectly induce population growth.

The proposed Project would not require the construction of new water treatment facilities or expansion of existing water treatment facilities for water service, except for a new well that is planned for within the boundary of the Project site. The City has adequate water supplies to support existing demand in the City in addition to the proposed Project under average daily and maximum daily demand conditions.

Manteca Water Demand: City potable and raw water demand in 2020 was approximately 16,253 AF, which may have been caused by a higher daytime population than normal due to stay-at-home orders and mandated closure of non-essential businesses in response to the COVID-19 pandemic.

The projected water demand for future land use area for the buildout of the General Plan areas, which includes the Proposed Project in the City's General Plan Update, was calculated by multiplying the projected land uses by the unit water demand factor. The resulting water demand projection was 17,971 AFY.

Therefore, the projected potable and raw water demand at buildout of the General Plan is 34,224 AFY (16,253 AFY existing plus 17,971 AFY projected). Buildout of the General Plan planning area is projected to occur shortly before 2050.

The City's existing and projected potable and raw water demand is shown in Table 4.0-2. The 2020 data reflect actual 2020 demand.

TABLE 4.0-2: EXISTING AND PROJECTED TOTAL WATER DEMAND IN NORMAL YEARS, AFY

	2020, CURRENT	*2025*	*2030*	*2035*	*2040*	*2045*
Total Water Demand	16,253	18,480	21,012	23,891	27,164	30,885

SOURCE: 2020 WATER DEMAND PER CITY OF MANTECA, PROJECTED GROWTH FROM WEST YOST

The City's projected water demand at buildout (based on existing water demand and buildout of the General Plan Update, and the projected water demand of the Proposed Project) is summarized in **Error! Reference source not found.**. The City's preliminary water demand projections for future developments with approved water supply, as of March 2021, have been updated by West Yost to be based on water use factors that were adjusted for SB X7-7. These revised demand projections for future developments within the City are included in Appendix A of the WSA.

TABLE 4.0-3: CITY OF MANTECA PROJECTED BUILDOUT WATER DEMAND, AFY

PROPOSED LAND USE	*AREA, ACRES(A)*
Existing 2020 Water Demand	16,253
2040 General Plan Horizon Water Demand[1]	10,911
2045 Water Demand[2]	3,721
Buildout of General Plan[3]	3,339
Total Water Demand	**34,224**

SOURCES: 2020 WATER DEMAND PER CITY OF MANTECA, PROJECTED GROWTH FROM WEST YOST, CITY OF MANTECA GENERAL PLAN WATER SUPPLY REPORT. FEBRUARY 2021

Notes: [1]2040 General Plan Horizon Water Demand represents incremental increase in water demand beyond existing demand.

[2] 2045 Water Demand represents incremental increase in water demand beyond existing and 2040 General Plan demand.

[3] General Plan Buildout represents incremental increase in water demand beyond the existing, 2040 General Plan, and 2045 water demand.

Projected Water Demand for the Proposed Project: The projected water demand for the proposed Project is shown in Table 4.0-3. The total projected annual potable water demand for the Project is projected to be 521.5 AFY.

The Proposed Project does not intend to use recycled water at this time. The City currently uses undisinfected secondary effluent to irrigate fodder crops in the land adjacent to the City's wastewater treatment plant. Tertiary treated recycled water is used for dust control at construction sites and for irrigation at the Great Wolf Lodge. Although a Recycled Water Master Plan is being prepared with the intent that the City would use recycled water to offset potable water demands for outdoor uses in the future, recycled water infrastructure is not planned to be constructed in time to serve the buildout of the Proposed Project. Therefore, recycled water supplies are not assumed for use at the proposed Project in the WSA.

TABLE 4.0-3: PROJECTED WATER DEMAND FOR BUILDOUT OF THE PROPOSED PROJECT

LAND USE	*GROSS AREA (ACRES)*	*DWELLING UNITS (DU)*	*WATER USE FACTOR*		*POTABLE WATER DEMAND (AFY)*
Low Density Residential (LDR)	152.36	715	477[(A)]	gpd/DU	382.3
High Density Residential (HDR)	8.76	200	228[(B)]	gpd/DU	51.0
Park	14.55	--	3,600	gpd/acre	58.7
Subtotal	*175.67*	*915*			*492.0*
				UAFW[(C)]	29.5
				Total Demand	***521.5***

NOTES: GPD/AC = GALLONS PER DAY PER ACRES, GPD/DU = GALLONS PER DAY PER DWELLING UNIT, AFY = ACRE-FEET PER YEAR.

[(A)] BASED ON LDR WATER USE FACTOR 5,200 GPD/ACRE AND AN AVERAGE DENSITY OF 22.8 DU/ACRE.

[(B)] BASED ON HDR WATER USE FACTOR OF 2,240 GPD/DU AND AN AVERAGE DENSITY OF 4.7 DU/ACRE.

[(C)] BASED ON 6 PERCENT OF PROJECT WATER DEMANDS.

SOURCE: NORTH MANTECA ANNEXATION #1 PROJECT WATER SUPPLY ASSESSMENT (WEST YOST ASSOCIATES, 2021).

Water demands for the proposed Project will be served using the City's existing and future portfolio of water supplies. The inclusion of existing and planned future supplies is specifically allowed by the Water Code:

> *Water Code section 10631(b): Identify and quantify, to the extent practicable, the existing and planned sources of water available to the supplier over the same five-year increments described in subdivision (a).*

The applicants 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 Project site.

Determination of Water Supply Sufficiency Based on the Requirements of SB 610: Water Code section 10910 states:

> *10910(c)(4) If the city or county is required to comply with this part pursuant to subdivision (b), the water supply assessment for the project shall include a discussion with regard to whether the total projected water supplies, determined to be available by the city or county for the project during normal, single dry, and multiple dry water 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, including agricultural and manufacturing uses.*

Pursuant to Water Code section 10910(c)(4) and based on the technical analyses described in the WSA, 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.

A comparison of the City's projected potable and raw water supplies and demands is shown in Table 4.0-4 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 2045. For purposes of the WSA, 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.

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** and **less than cumulatively considerable** impact relative to this topic.

TABLE 4.0-4: 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	2045
NORMAL YEAR						
Available Potable and Raw Water Supply(a)		23,260	25,247	27,569	37,284	40,457
Total Water Demand(b)		18,480	21,012	23,891	27,164	30,885
Potential Surplus (Deficit)		4,780	4,235	3,678	10,120	9,572
Supply Shortfall, Percent of Demand		-	-	-	-	
SINGLE DRY YEAR						
Available Potable and Raw Water Supply(a)		23,260	25,247	27,569	37,284	40,457
Total Water Demand(b)		18,480	21,012	23,891	27,164	30,885
Potential Surplus (Deficit)		4,780	4,235	3,678	10,120	9,572
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	40,457
	Total Water Demand(b)	18,480	21,012	23,891	27,164	30,885
	Potential Surplus (Deficit)	4,780	4,235	3,678	10,120	9,572
	Supply Shortfall, Percent of Demand	-	-	-	-	-
Multiple Dry Year 2	Available Potable and Raw Water Supply(a)	23,260	25,247	27,569	37,284	40,457
	Total Water Demand(b)	18,480	21,012	23,891	27,164	30,885
	Potential Surplus (Deficit)	4,780	4,235	3,678	10,120	9,572
	Supply Shortfall, Percent of Demand	-	-	-	-	-
Multiple Dry Year 3	Available Potable and Raw Water Supply(a)	21,409	24,313	27,552	33,376	37,628
	Total Water Demand(b)	18,480	21,012	23,891	27,164	30,885
	Potential Surplus (Deficit)	2,929	3,301	3,661	6,212	6,743
	Supply Shortfall, Percent of Demand	-	-	-	-	-
Multiple Dry Year 4	Available Potable and Raw Water Supply(a)	21,409	24,313	27,552	33,376	37,628
	Total Water Demand(b)	18,480	21,012	23,891	27,164	30,885
	Potential Surplus (Deficit)	2,929	3,301	3,661	6,212	6,743
	Supply Shortfall, Percent of Demand	-	-	-	-	-
Multiple Dry Year 5	Available Potable and Raw Water Supply(a)	23,260	25,247	27,569	37,284	40,457
	Total Water Demand(b)	18,480	21,012	23,891	27,164	30,885
	Potential Surplus (Deficit)	4,780	4,235	3,678	10,120	9,572
	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).

Impact 4.23: Cumulative Impact on Stormwater Facilities (Less than Significant and Less than Cumulatively Considerable)

The proposed Project includes storm drainage improvements. Onsite storm drainage would be installed to serve the proposed Project. 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.

The proposed public storm drainage and water quality system is planned to function independently from surrounding developments. An internal layout of stormwater collection pipes with various sizes, as necessary, will be installed within the Development Area. A system of drainage swales may be included to treat and convey collected stormwater. All on-site storm drainage runoff will be collected through drain inlets in the landscaped areas and catch basins along the streets and within properties and conveyed via surface swales and underground trunk lines to the detention and water quality basins. The conveyance systems and detention basins may include facilities designed to address water quality standards and requirements. 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. The duration of the discharge will comply with City of Manteca standards. The water quality detention basins will be designed to comply with SWRCB and City of Manteca specifications and standards.

Final engineering of the storm drainage system will be accomplished through the improvement plan preparation of each phase. Storm drainage infrastructure to serve the proposed Project will include an underground piped drainage system, detention park basins, and pumps as needed. The drainage systems would provide for short-term storm water detention, storm water conveyance for storm waters. The design of such infrastructure considers the drainage volume that flows through the drainage from the entire watershed to ensure that there isn't flooding. Implementation of the proposed Project would have a **less than significant** and **less than cumulatively considerable** impact relative to this topic.

Impact 4.24: Cumulative Impact on Solid Waste Facilities (Less than Significant and Less than Cumulatively Considerable)

Solid waste generated in the City is disposed at the Forward Landfill. Forward Landfill was projected to close in 2020 at current acceptance rates due to reaching its permitted size parameters. To increase the lifespan of the landfill, Forward, Inc. is planning to expand its disposal footprint The City's projected increase in solid waste generation associated with future buildout of the proposed General Plan is within the permitted capacity of the Forward Sanitary Landfill expansion. The vast majority of landfill disposed from the City of Manteca went to Forward Sanitary Landfill.[2] Other landfills that received waste from the City of Manteca include:

- Lovelace Materials Recovery Facility and Transfer Station
- San Joaquin County Hazardous Waste
- Foothill Sanitary Landfill
- North County

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

[2] Note: data provided by CalRecycle, based on information provided by County disposal reports.

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 proposed Project would be required to comply with applicable state and local requirements including those pertaining to solid waste, construction waste diversion, and recycling. The addition of the volume of solid waste associated with the proposed Project, approximately 4.58 tons per day at total buildout. As such, implementation of the proposed Project would have a **less than significant** cumulative impact relative to this environmental topic. Thus, impacts related to solid waste facilities would be a l**ess than cumulatively considerable contribution**.

WILDFIRE

Impact 4.25: Cumulative impact related to wildfire (No Impact and Less than Cumulatively Considerable)

The Project Site is not located in or near any State Responsibility Areas and there are no lands classified as very high fire hazard severity zones within or near the Project Site. Therefore, the proposed Project would have **no impact** related to wildfire risks associated with lands in or near State Responsibility Areas or lands classified as very high fire hazard severity zones. The Project's incremental contribution to cumulative wildfire impacts would be **less than cumulatively considerable.**

4.2 SIGNIFICANT IRREVERSIBLE EFFECTS

LEGAL CONSIDERATIONS

CEQA Section 15126.2(c) and Public Resources Code Sections 21100(b)(2) and 21100.1(a), require that the EIR include a discussion of significant irreversible environmental changes which would be involved in the proposed action should it be implemented. Irreversible environmental effects are described as:

- The project would involve a large commitment of nonrenewable resources;

- The primary and secondary impacts of a project would generally commit future generations to similar uses (e.g., a highway provides access to previously remote area);
- The project involves uses in which irreversible damage could result from any potential environmental accidents associated with the project; or
- The phasing of the proposed consumption of resources is not justified (e.g., the project involves the wasteful use of energy).

Determining whether the proposed Project would result in significant irreversible effects requires a determination of whether key resources would be degraded or destroyed such that there would be little possibility of restoring them. Irretrievable commitments of resources should be evaluated to assure that such current consumption is justified.

Consumption of Nonrenewable Resources

Consumption of nonrenewable resources refers to the loss of physical features within the natural environment, including the conversion of agricultural lands, loss of access to mining reserves, and nonrenewable energy use. The Project site has nonrenewable resources, including biological resources and agricultural resources.

As discussed in Section 3.4, Biological Resources, all impacts would be less than significant or less than significant with implementation of mitigation measures. As a result, the proposed Project will minimize the potential for impacts to the nonrenewable resources in the Planning Area, including biological resources and water resources, to the greatest extent feasible. More detailed and focused discussions of potential impacts to these nonrenewable resources are contained throughout this Draft EIR.

Nonrenewable agricultural resources such as agricultural land, farmland, and agricultural soils, would be converted during the construction and operation of the Project. The City's General Plan includes a variety of policies that seek to conserve and protect agricultural resources. These include policies that encourage the development of vacant lands within City boundaries prior to conversion of agricultural lands and ensure that urban development near existing agricultural lands will not unnecessarily constrain agricultural practices or adversely affect the economic viability of nearby agricultural operations. Nevertheless, as discussed in Section 3.2, Agricultural Resources, impacts related to the conversion of Important Farmland were determined to be significant and unavoidable. While the proposed Project will contribute fees toward the purchase of conservation easements on agricultural lands through the City's agricultural mitigation fee program and the SJMSCP (as required by Mitigation Measure 3.2-1), those fees and conservation easements would not result in the creation of new farmland to offset the loss that would occur with Project implementation.

Irretrievable Commitments/Irreversible Physical Changes

Implementation of the proposed Project would result in irretrievable commitments by introducing development onto the site which is presently undeveloped. The conversion of agricultural lands to urban uses would result in an irretrievable loss of agricultural land, wildlife habitat, and open space.

A variety of resources, including land, energy, water, construction materials, and human resources would be irretrievably committed for development and infrastructure installation associated with development and operation of the proposed Project. Buildout of the Project would require the commitment of a variety of other non-renewable or slowly renewable natural resources such as lumber and other forest products, sand and gravel, asphalt, petrochemicals, and metals.

Additionally, a variety of resources would be committed to the ongoing operation and life of the Project. The introduction of new residential and park uses to the Project site will result in an increase energy demand associated with building operations, vehicle travel, equipment operation, and other activities. Fossil fuels are the principal source of energy and the Project will increase consumption of available supplies, including gasoline and diesel fuel, and natural gas. These energy resource demands relate to initial construction, operation, maintenance and the transport of people and goods to and from the Project site that would occur with implementation of the proposed Project.

Additionally, development will physically change the environment in terms of aesthetics, air emission, noise, traffic, open space, and natural resources. These physical changes are irreversible after development occurs.

MANDATORY FINDINGS OF SIGNIFICANCE

CEQA Guidelines Section 15065 states that a lead agency shall find that a project may have a significant effect on the environment where there is substantial evidence that the project has potential environmental effects that are individually limited but cumulatively considerable. As defined in CEQA Guidelines Section 15065(a)(3), cumulatively considerable means "that the incremental effects of an individual project are significant when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects." Cumulative impacts are addressed previously in Section 4.1 for each of the environmental topics.

CEQA Guidelines Section 15065(a)(1) states that a lead agency shall find that a project may have a significant effect on the environment where there is substantial evidence that the project has the potential to (1) substantially reduce the habitat of a fish or wildlife species; (2) cause a fish or wildlife population to drop below self-sustaining levels; or (3) substantially reduce the number or restrict the range of an endangered, rare, or threatened species. These impacts are discussed below.

Additionally, as required by CEQA Guidelines Section 15065(a)(4), a lead agency shall find that a project may have a significant effect on the environment where there is substantial evidence that the project has the potential to cause substantial adverse effects on human beings, either directly or indirectly. These impacts are discussed below.

Substantial Adverse Effects on Fish, Wildlife, and Plant Species

Section 3.4 (Biological Resources) of this Draft EIR fully addresses any impacts that might relate to the reduction of the fish or wildlife habitat, the reduction of fish or wildlife populations, and the reduction or restriction of the range of special-status species as a result of Project implementation.

As described throughout the analysis in this Draft EIR, the proposed Project would not result in any significant impacts that would substantially reduce the habitat of fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, or reduce the number or restrict the range of a rare or endangered plant or animal to the environment. As described in greater detail in Section 3.4 (Biological Resources) any potentially significant impacts related to plant and animal species would be reduced to a less than significant level through implementation of goals, policies and implementation measures provided in the City's General Plan as well as through adherence to state and federal regulations. Therefore, this is considered a **less than significant** impact.

4.4 SIGNIFICANT AND UNAVOIDABLE IMPACTS

CEQA Guidelines Section 15126.2(b) requires an EIR to discuss unavoidable significant environmental effects, including those that can be mitigated but not reduced to a level of insignificance. The following significant and unavoidable impacts of the proposed Project are discussed in Sections 3.1, 3.2, and 3.13, and previously in this chapter (cumulative-level). Refer to those discussions for further details and analysis of the significant and unavoidable impact identified below:

- Impact 3.1-1: Project implementation may result in substantial adverse effects on scenic vistas and resources or substantial degradation of visual character;
- Impact 3.2-1: The proposed Project has the potential to result in the conversion of Farmlands, including Prime Farmland and Farmland of Statewide Importance, as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural uses;
- Impact 3.13-1: Project implementation would not result in VMT increases that are greater than 85 percent of Baseline conditions;
- Impact 4.2: Cumulative Degradation of the Existing Visual Character of the Region;
- Impact 4.4: Cumulative Impact on Agricultural Resources; and
- Impact 4.19: Under Cumulative conditions, Project implementation would result in VMT increases that are greater than 85 percent of Baseline conditions.

5.1 CEQA REQUIREMENTS

The California Environmental Quality Act (CEQA) requires that an Environmental Impact Report (EIR) analyze a reasonable range of feasible alternatives that meet most or all project objectives while reducing or avoiding one or more significant environmental effects of the project. The range of alternatives required in an EIR is governed by a "rule of reason" that requires an EIR to set forth only those alternatives necessary to permit a reasoned choice (CEQA Guidelines Section 15126.6[f]). Where a potential alternative was examined but not chosen as one of the range of alternatives, the CEQA Guidelines require that the EIR briefly discuss the reasons the alternative was dismissed.

PROJECT OBJECTIVES

The principal objective of the proposed Project is the approval and subsequent implementation of the North Manteca Annexation #1 Project (the proposed Project). The quantifiable objectives of the proposed Project include annexation of 202.81 acres, including the proposed 175.67-acre Development Area, and the 27.14 acres of Non-development area. The quantifiable objectives include the development of 715 single family residential units, (410 units in Subdivision 1 and 305 units in Subdivision 2), 200 multi-family residential units in Subdivision 1, and the development of park, open space, and trail totaling 14.55 acres, including 10.37 acres of neighborhood park, park/basin and open space and 3.45 acres of the continuation of the Tide Water Bike Trail.

The proposed Project identifies the following objectives:

- Provide residential housing opportunities that are visually attractive and accommodate the future housing demand in Manteca.
- Establish a mixture of residential product types that collectively provide for local and regional housing and that take advantage of the area's high level of accessibility.
- Provide infrastructure and park space that meets City standards, is integrated with existing and planned facilities and connections, and increases recreation opportunities for existing and future residents of the City.
- Establish a logical phasing plan designed to ensure that each phase of development would include necessary public improvements required to meet City standards.
- Annex the three Annexation SubAreas in order to avoid the creation of islands. Annexation of these areas would establish a logical and orderly city limit line that promotes the efficient extension of municipal services.
- Allow all existing property owners with existing and legal non-conforming uses located in the Non-Development Areas (SubArea 1, 2, and 3) to continue to use and enjoy their properties in perpetuity in the same manner as prior to annexation. Non-conforming uses include the existing agricultural uses (orchards, row crops, livestock/farm animal,

fowl/poultry, apiary, etc.), existing residences, existing outbuildings, equipment storage, roadways, irrigation, etc. even if left fallow or not used for such temporarily.

ALTERNATIVES NOT SELECTED FOR FURTHER ANALYSIS

A Notice of Preparation (NOP) was circulated to the public to solicit recommendations for a reasonable range of alternatives to the proposed Project. Additionally, a public scoping meeting was held during the public review period to solicit recommendations for a reasonable range of alternatives to the proposed Project. No specific alternatives were recommended by commenting agencies or the general public during the NOP public review process.

The City of Manteca considered alternative locations early in the public scoping process. The City's key considerations in identifying an alternative location were as follows:

- Is there an alternative location where significant effects of the Project would be avoided or substantially lessened?
- Is there a site available within the City's Sphere of Influence with the appropriate size and characteristics such that it would meet the basic Project objectives?

The City's consideration of alternative locations for the Project included a review of previous land use planning and environmental documents in Manteca including the General Plan. The search included a review of land in Manteca that is located within the Sphere of Influence, suitable for development, available for acquisition, and not already approved or pending development. It was found that there are numerous approved projects and proposed projects that are currently under review in Manteca. These approved and proposed projects are not available for acquisition by the Project applicant, and are not considered a feasible alternative for the Project applicant. Additionally, much of the undeveloped land located to the north of the Project site is located within a 200-year flood plain. The City has found that there are no feasible alternative locations that exist within the City's Sphere of Influence with the appropriate size and characteristics that would meet the basic Project objectives and avoid or substantially lessen a significant effect. The City has determined that alternative locations outside the Sphere of Influence would not be feasible because an expansion of the Sphere of Influence would induce unplanned growth and cause impacts greater than development on the Project site. For these reasons, the City of Manteca determined that there are no feasible alternative locations.

In addition, as discussed in Citizens of Goleta Valley v. Board of Supervisors (1990) 52 Cal.3d 553 (Goleta II), where a project is consistent with an approved general plan, no off-site alternative need be analyzed in the EIR. The EIR "is not ordinarily an occasion for the reconsideration or overhaul of fundamental land-use policy." (Goleta II, supra, 52 Cal.3d at p. 573.) In approving a general plan, the local agency has already identified and analyzed suitable alternative sites for particular types of development and has selected a feasible land use plan. "Informed and enlightened regional planning does not demand a project EIR dedicated to defining alternative sites without regard to feasibility. Such ad hoc reconsideration of basic planning policy is not only unnecessary, but would be in contravention of the legislative goal of long-term, comprehensive planning." (Goleta II, supra, 52 Cal.3d at pp. 572-573.) The proposed General Plan Update shows

the Development Area portion of the Project site with a Low Density Residential, High Density Residential, and Park land use designation, consistent with the land uses within the proposed General Plan Update. It is anticipated that the General Plan Update would be certified prior to operation of the proposed Project. Therefore, the proposed Project is generally consistent with the types of uses considered in the Manteca General Plan and associated EIR, and thus, in addition to the reasons discussed above, an off-site alternative need not be further discussed in this EIR.

5.2 ALTERNATIVES CONSIDERED IN THIS EIR

Three alternatives to the proposed Project were developed based on input from City staff and the technical analysis performed to identify the environmental effects of the proposed Project. The alternatives analyzed in this EIR include the following three alternatives in addition to the proposed Project.

- **No Project (No Build) Alternative**: Under this alternative, development of the Project site would not occur, and the Project site would remain in its current existing condition.
- **Increased Density Alternative:** Under this alternative, the proposed Project would be developed with the same amenities as described in the Project Description, but the density of the residential uses would be increased.
- **Agriculture Protection Alternative:** Under this alternative, the proposed Project would be developed in such a way to protect those lands currently identified as prime farmland and farmland of statewide importance, by reducing the overall footprint of the developed areas to a greater extent than the Increased Density Alternative.

NO PROJECT (NO BUILD) ALTERNATIVE

Under the No Project (No Build) Alternative development of the Project site would not occur, and the Project site would remain in its current existing condition. It is noted that the No Project (No Build) Alternative would fail to meet the Project objectives identified by the City of Manteca.

INCREASED DENSITY ALTERNATIVE

Under this alternative, the proposed Project would be developed with the same components as described in the Project Description, but density of the residential uses would be increased. Under the Increased Density Alternative, the same number of residential units as the proposed project (915 units) would be constructed within the Development Area. The residential areas would be clustered throughout the Project site at increased densities to allow for an increase in park/open space areas. The residential density under the Increased Density Alternative would fall within the allowed density for the City's General Plan designation of Low Density Residential (2.1 to 8.0 dwelling units per acre [du/ac]). Under the proposed Project, the residential density would be 5.2 units per gross acre. Under the Increased Density Alternative, the residential density would be 8.0 units per gross acre. The 14.55-acres of total park/open space uses would be increased to approximately 25.0 acres.

AGRICULTURE PROTECTION ALTERNATIVE

The reasoning behind this alternative is to present an alternative to protect some of the farmland on the Project site. Development of the proposed Project would result in the permanent conversion of approximately 26.2 acres of Prime Farmland and 146.25 acres of Farmland of Statewide Importance. Under this alternative, the proposed Project would be developed with the same components as described in the Project Description, but the residential areas would be reduced resulting in an increase of undeveloped land beyond the Increased Density Alternative. Residential units would be reduced from 915 to 686. The total Development Area acreage dedicated to proposed Project would be reduced by approximately 25 percent. The total acreage developed would be 131.75 acres, with 43.92 acres remaining in its current state. The 43.92 acres that would remain undeveloped would include the agricultural land only.

5.3 ENVIRONMENTAL ANALYSIS

The alternatives analysis provides a summary of the relative impact level of significance associated with each alternative for each of the environmental issue areas analyzed in this EIR. Following the analysis of each alternative, Table 5.0-1 summarizes the comparative effects of each alternative.

NO PROJECT (NO BUILD) ALTERNATIVE

Aesthetics and Visual Resources

The No Project (No Build) Alternative would leave the Project site in its existing state and would not result in increases in daytime glare or nighttime lighting. The visual character of the Project site would not change under this alternative compared to existing conditions.

As described in Section 3.1, the visual character of the Project site would be significantly altered as a result of Project implementation. Implementation of the City's Development Standards for Zoning District's for height and bulk and consistency with the General Plan and the Manteca Zoning Ordinance would ensure that impacts are reduced to the greatest extent possible. Nevertheless, impacts related to degradation of the visual character of the site would be significant and unavoidable.

Implementation of the lighting plan required by Mitigation Measure 3.1-1 would ensure that lighting features do not result in light spillage onto adjacent properties and do not significantly impact views of the night sky. Adherence to the mitigation measure would ensure that excessively reflective building materials are not used, and that the proposed Project would not result in significant impacts related to daytime glare. As such, impacts related to nighttime lighting and daytime glare would be less than significant with mitigation.

The proposed Project would result in potentially significant new sources of light and glare. The proposed Project would also result in impacts to the existing visual character or quality of the Project site and its surroundings. However, the No Project (No Build) Alternative would avoid these impacts altogether. As such, this impact would be reduced when compared to the proposed Project.

Agricultural Resources

Currently, the majority of the Project site is used for agricultural purposes. The No Project (No Build) Alternative would result in no development in on the Project site. As such, this alternative would have no impact on agricultural land, no potential for conflicts with existing agricultural resources, and no potential for conflict with regulations and plans intended to protect those resources. As such, this impact would be reduced when compared to the proposed Project.

Air Quality

Under buildout conditions in the San Joaquin County, the San Joaquin Valley Air Basin (SJVAB) would continue to experience increases in criteria pollutants and efforts to improve air quality throughout the basin would be hindered. As described in Section 3.3, San Joaquin County has a State designation Attainment or Unclassified for all criteria pollutants except for ozone, particulate matter of 10 microns or less in size (PM_{10}), and particulate matter of 2.5 microns or less in size ($PM_{2.5}$). San Joaquin County has a national designation of either Unclassified or Attainment for all criteria pollutants except for ozone and $PM_{2.5}$. Table 3.3-2 in Section 3.3 presents the State and Federal attainment status for San Joaquin County.

As discussed under Impact 3.3-1 in Section 3.3, the San Joaquin Valley Air Pollution Control District (SJVAPCD) has established their thresholds of significance by which the Project emissions are compared against to determine the level of significance. The SJVAPCD has established operations related emissions thresholds of significance as follows: 100 tons per year of carbon monoxide (CO), 10 tons per year of oxides of nitrogen (NO_x), 10 tons per year of reactive organic gases (ROG), 27 tons per year of sulfur oxides (SO_x), 15 tons per year PM_{10}, and 15 tons per year $PM_{2.5}$.

As shown in Table 3.3-6 and Table 3.3-7, operational and construction emissions would exceed the SJVACPD thresholds of significance, respectively. Therefore, the proposed Project is required to implement all feasible mitigation to reduce criteria pollutant emissions to below the applicable SJVAPCD thresholds of significance.

The proposed Project is subject to the SJVAPCD Rule 9510 (Indirect Source Rule [ISR]), which could result in substantial mitigation of NO_x and associated ROG emissions. The reductions are accomplished by the incorporation of mitigation measures into projects and/or by the payment of an Indirect Source Rule fee for any required reductions that have not been accomplished through Project mitigation commitments. The actual calculations will be determined and finalized by the SJVAPCD and Project applicants as individual projects are brought forward for approval under Rule 9510.

Under the No Project (No Build) Alternative, the Project site would not be developed, and there would be no net change in emissions and no potential for a conflict with any adopted plans or policies related to air quality. As such, this impact would be reduced when compared to the proposed Project.

Biological Resources

As described in Section 3.4, Biological Resources, construction in the Project site has the potential to result in impacts to special-status species in the region. Although there has been no documented sighting within the immediate area in, or near the Project site, the Project site provides potential habitat for several species, including those discussed in Section 3.4. Mitigation Measure 3.4-1 requires participation with the San Joaquin County Multi-Species Habitat Conservation and Open Space plan (SJMSCP), which includes fees that will be used to purchase conservation lands for a variety of special status species. The SJMSCP was created and adopted to address both the Project and cumulative impacts to biological resources, including special status species. The proposed Project will participate in the SJMSCP, including payment of fees and implementation of all Incidental Take Minimization Measures required by the San Joaquin Council of Governments (SJCOG) through the authorization of SJMSCP coverage. Mitigation Measure 3.4-2 requires 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.

Under the No Project (No Build) Alternative, the proposed Project would not be constructed, no habitat would be removed, and no ground disturbing activities would occur. As such, this impact would be reduced when compared to the proposed Project.

Cultural and Tribal Resources

As discussed in Section 3.5, Cultural and Tribal Resources, the CHRIS search for the Project site did not indicate than any historic period resources were previously recorded in the Development Area. Any previously unknown cultural resources which may be discovered during development of the proposed Project would be required to be preserved, either through preservation in place, excavation, documentation, curation, data recovery, or other appropriate measures. With implementation of the mitigation measures provided in Section 3.5, the proposed Project is not anticipated to considerably contribute to a significant reduction in cultural resources in the region.

The No Project (No Build) Alternative would result in no ground disturbing activities related to the proposed Project and would not have the potential to disturb or destroy cultural, historic, and archaeological resources, as well as paleontological resources. While the proposed Project is not anticipated to result in significant impacts to cultural resources with mitigation, the No Project (No Build) Alternative would result in less potential for impacts to cultural resources as the entire Project site would continue to be used for agriculture production. As such, this impact would be reduced when compared to the proposed Project.

Geology and Soils

The No Project (No Build) Alternative would result in the Project site remaining in its existing condition. The current uses on the Development Area are predominantly agricultural and undeveloped, except for existing houses and barns and/or sheds with associated equipment in the northwestern portion of the site. The structures on the Project site would continue to be

subject to seismic or geologic risks, including earthquakes, liquefaction, subsidence, etc. The No Project (No Build) Alternative would not involve new construction that could be subject to seismic, geologic or soils hazards; thus, this alternative would have no potential for impact. As such, this impact would be reduced when compared to the proposed Project.

Greenhouse Gases, Climate Change and Energy

As stated previously, short-term construction greenhouse gas (GHG) emissions are a one-time release of GHGs and are not expected to significantly contribute to global climate change over the lifetime of the proposed Project. Short-term construction emissions of GHGs are estimated at a maximum of approximately 1,239 metric tons of CO_2 equivalent (MT CO_2e) per year. The Project is estimated to generate approximately 2,910 residents during the Project's operational phase. Dividing this number of estimated residents generated by the Project by the total annual operational GHG emissions at Project buildout yields approximately 3.33 MT CO_2e/SP/Year, which is below the 3.56 MT CO_2e/SP/year in 2030 threshold based on emissions for the land use-driven emission sectors in the CARB GHG Inventory. Construction emissions, when amortized[1], would equal approximately emissions 41.3 MT CO_2e, which is equivalent to approximately 0.01 MT CO_2e/SP/Year. Therefore, the total annual GHG emissions at Project buildout would still yield approximately 3.34 MT CO_2e/SP/Year, after inclusion of the amortized construction emissions.

Under the No Project (No Build) Alternative, the Project site would not be developed, and there would be no net change in emissions and no potential for a conflict with any adopted plans or policies related to GHG reductions. As such, this impact would be reduced when compared to the proposed Project.

Hazards and Hazardous Materials

The proposed Project includes components which will likely use a variety of common household hazardous materials including: paints, cleaners, cleaning solvents, pesticides, fertilizers, and fuel. There will be a risk of release of these materials into the environment if they are not stored and handled in accordance with best management practices approved by San Joaquin County Department of Environmental Health.

Under the No Project (No Build) Alternative, no new land uses would be introduced to the Project site, and the potential for hazardous material release on the Project site would be eliminated. As such, this impact would be reduced when compared to the proposed Project.

Hydrology and Water Quality

As described in Section 3.9, implementation of the proposed Project has the potential to result in the violation of water quality standards and the discharge of pollutants into surface waters during both construction and long-term operations. Construction operations could result in temporary increases in runoff, erosion, sedimentation, soil compaction and wind erosion effects that could adversely affect soils and reduce the revegetation potential at construction sites and staging

[1] The amortization period used for this calculation is 30 years.

areas. The long-term operation of the proposed Project could result in long-term impacts to surface water quality from urban stormwater runoff and could enter groundwater or surface water systems. Mitigation measures provided in Section 3.9 reduce potential water quality impacts to a less than significant level. The proposed Project would not significantly impact groundwater recharge or place persons or structures in a flood hazard zone.

Under the No Project (No Build) Alternative, potential water quality impacts from construction and operation of the proposed Project would be eliminated. While groundwater recharge is not considered a significant impact under the proposed Project, under this alternative, the land will be kept in its present state with the majority of the Project site being used for agricultural purposes. The infiltration rate of the soils on the Project site is primarily considered high. The Project site is not a major source of groundwater recharge due to the lack of precipitation and the absence of a major water source. The No Project (No Build) Alternative will have a greater chance of groundwater recharge because it does not introduce large areas of impervious surfaces as would the proposed Project. As such, potential impacts related to hydrology and water quality would be reduced under the No Project (No Build) Alternative when compared to the proposed Project.

Land Use, Population, and Housing

The proposed Project is not expected to induce population growth that has not already been accounted for as a part of the existing General Plan, or analyzed in detail in this EIR. The proposed Project does not displace substantial numbers of persons or housing units. The Project would require a zoning and general plan amendment for land use changes, as well as annexation to the City of Manteca. However, impacts to land use are considered less than significant.

The No Project (No Build) Alternative would result in no changes to land use and would have no development. The proposed Project is not expected to induce substantial population increase that has not already been accounted for as a part of the approved General Plan, or analyzed in detail in this EIR. The proposed Project does not displace substantial numbers of persons or housing units. However, because the No Project (No Build) Alternative would not add any additional population and would not changes land use patterns, impacts related to land use and population would be reduced when compared to the proposed Project.

Noise

The proposed Project could increase noise-generating activities associated with the maintenance and operation of the proposed Project, as well as from vehicular traffic. Mitigation measures provided in Section 3.12 would reduce all potential impacts to a less than significant level. Under the No Project (No Build) Alternative, the Project site would not be developed and there would be no potential for new noise sources. As such, this impact would be reduced when compared to the proposed Project.

Public Services and Recreation

Under the No Project (No Build) Alternative, the Project site would remain undeveloped and there would be no increased demand for public services or recreation. The recreational amenities within the proposed Project, however, would not be developed for community use. The No Project (No Build) Alternative would have a reduced impact when compared to the proposed Project because demand on public services would be reduced with compared to the proposed Project, with the possible exception of recreational park facilities.

Transportation and Circulation

The No Project (No Build) Alternative would not introduce additional vehicle, pedestrian, or bicycle travel on the area roadways. It was determined that the proposed Project would result in VMT increases that are greater than 85 percent of Baseline conditions, even with implementation of mitigation. However, the proposed Project would not conflict with a program, plan, policy or ordinance addressing the circulation system, including transit, bicycle, and pedestrian facilities, or increase hazards due to a design feature, incompatible uses, or inadequate emergency access. The No Project (No Build) Alternative would have a reduced traffic impact when compared to the proposed Project.

Utilities

Implementation of the proposed Project would result in increased flows to the public wastewater system. The wastewater system is capable of handling the increased flows with their existing permit and infrastructure. Implementation of the proposed Project would result in increased demand for potable water. The City has adequate water supply to handle the increased demand with their existing supply and infrastructure. Implementation of the proposed Project would result in increased storm drainage from new impervious surfaces. The proposed Project includes a storm drainage collection system to handle the increased storm drainage. Implementation of the proposed Project would result in increased generation of solid waste. However, the landfill has adequate capacity to dispose the solid waste.

Under the No Project (No Build) Alternative the Project site would not increase the demand for any utilities, including wastewater services, potable water supplies, or solid waste disposal. There would be no need to construct stormwater drainage infrastructure. Overall, the demand for utilities would be reduced under the No Project (No Build) Alternative when compared to the proposed Project.

Wildfire

The Project Site is not located in or near any State Responsibility Areas and there are no lands classified as very high fire hazard severity zones within or near the Project Site. Therefore, the proposed Project would have no impact related to wildfire risks associated with lands in or near State Responsibility Areas or lands classified as very high fire hazard severity zones.

Under the No Project (No Build) Alternative, development of the Project site would not occur and the Project site would remain in its current existing condition. Although the Project would result

in no impact related to wildfires, the No Project (No Build) Alternative would not introduce new residents to a vacant area of the City which could be subject to fires. Overall, impacts related to wildfires would be reduced under the No Project (No Build) Alternative when compared to the proposed Project.

INCREASED DENSITY ALTERNATIVE

Aesthetics and Visual Resources

As described in Section 3.1, the visual character of the Project site would be significantly altered as a result of proposed Project implementation. Implementation of the City's Development Standards for Zoning District's for height and bulk and consistency with the General Plan and the Manteca Zoning Ordinance would ensure that impacts are reduced to the greatest extent possible. Nevertheless, impacts related to degradation of the visual character of the site would be significant and unavoidable.

Implementation of the lighting plan required by Mitigation Measure 3.1-1 would ensure that lighting features do not result in light spillage onto adjacent properties and do not significantly impact views of the night sky. Adherence to the mitigation measure would ensure that excessively reflective building materials are not used, and that the proposed Project would not result in significant impacts related to daytime glare. As such, impacts related to nighttime lighting and daytime glare would be less than significant with mitigation.

These impacts would be similar with the Increased Density Alternative as this alternative is located on the same site and would have similar uses. This alternative would result in the same number of residential units and an increase in park/open space uses. The impacts of light and glare would still occur and could be mitigated to a less than significant level. The impacts to the existing visual quality would be similar to the proposed Project as the Project site would be developed with the same uses as under the proposed Project, just at a higher density. However, due to the increase in park/open space areas, the Increased Density Alternative would have a slightly reduced impact on visual resources when compared to the proposed Project.

Agricultural Resources

Currently, the majority of the Project site is used for agricultural purposes. The Increased Density Alternative would result in development of the entire Project site. While this alternative would increase the amount of park/open space areas, these areas would still be converted from agricultural use. As such, this alternative would not reduce the impacts to agricultural lands when compared to the proposed Project. The loss of the agricultural land, including prime farmland, would be a significant and unavoidable impact under both the Increased Density Alternative and the proposed Project. Therefore, the Increased Density Alternative would have equal impacts on agricultural resources when compared to the proposed Project.

Air Quality

Under buildout conditions in the San Joaquin County, the SJVAB would continue to experience increases in criteria pollutants and efforts to improve air quality throughout the basin would be

hindered. As described in Section 3.3, San Joaquin County has a State designation Attainment or Unclassified for all criteria pollutants except for ozone, PM_{10}, and $PM_{2.5}$. San Joaquin County has a national designation of either Unclassified or Attainment for all criteria pollutants except for ozone and $PM_{2.5}$. Table 3.3-2 in Section 3.3 presents the State and Federal attainment status for San Joaquin County.

As discussed under Impact 3.3-1 in Section 3.3, the SJVAPCD has established their thresholds of significance by which the Project emissions are compared against to determine the level of significance. The SJVAPCD has established operations related emissions thresholds of significance as follows: 100 tons per year of CO, 10 tons per year of NO_x, 10 tons per year of ROG, 27 tons per year of SO_x, 15 tons per year PM_{10}, and 15 tons per year $PM_{2.5}$. As shown in Table 3.3-6 and Table 3.3-7, operational and construction emissions would not exceed the SJVACPD thresholds of significance, respectively.

Implementation of the proposed Project would cause an increase in traffic, which is the dominant source of air emissions associated with the proposed Project. Under the Increased Density Alternative, the proposed Project would be developed with the same components as described in the Project Description, but the amount of park/open space uses would be increased. The total development would be equal to the proposed Project. Therefore, the amount of traffic generated from the Project site would be equal under this alternative and the proposed Project. Mobile source air emissions are directly correlated to traffic volume; therefore, it is estimated that the similar trip volume would result in a similar amount of the mobile source emissions. Additionally, the area source emissions would be similar to the Project.

Uses in the Increased Density Alternative would be required to adhere to the same mitigation measures as the proposed Project. The Increased Density Alternative would result in similar air emissions when compared to the proposed Project.

Biological Resources

As described in Section 3.4, Biological Resources, construction in the Project site has the potential to result in impacts to special-status species in the region. Although there has been no documented sighting within the immediate area in, or near the Project site, the Project site provides potential habitat for several species, including those discussed in Section 3.4. Mitigation Measure 3.4-1 requires participation with the SJMSCP, which includes fees that will be used to purchase conservation lands for a variety of special status species. The SJMSCP was created and adopted to address both the Project and cumulative impacts to biological resources, including special status species. The proposed Project will participate in the SJMSCP, including payment of fees and implementation of all Incidental Take Minimization Measures required by the SJCOG through the authorization of SJMSCP coverage.

The Increased Density Alternative would result in development of the entire Project site. Under this alternative, there would be approximately 9.45 more acres of park/open space land that may provide habitat for a variety of species. This addition of park and open space land would provide biological benefits even though the remainder of the Project site would be developed. As such,

the Increased Density Alternative would result in slightly less impact to biological resources when compared to the proposed Project.

Cultural and Tribal Resources

As discussed in Section 3.5, Cultural and Tribal Resources, the CHRIS search for the Project site did not indicate than any historic period resources were previously recorded in the Development Area. Any previously unknown cultural resources which may be discovered during development of the proposed Project would be required to be preserved, either through preservation in place, excavation, documentation, curation, data recovery, or other appropriate measures. With implementation of the mitigation measures provided in Section 3.5, the proposed Project is not anticipated to considerably contribute to a significant reduction in cultural resources in the region.

The Increased Density Alternative would result in development of the entire Project site, but would increase the amount of park/open space areas by 9.45 acres. Although the amount of park/open space areas would increase as compared to the proposed Project, the entire Project site would be disturbed. This would result in a similar potential to disturb or destroy cultural, historic, and archaeological resources, as well as paleontological resources. While the proposed Project is not anticipated to result in significant impacts to cultural resources with mitigation, the Increased Density Alternative would result in a similar potential for impacts to cultural resources.

Geology and Soils

As described in Section 3.6, implementation of the proposed Project would result in the construction of new structures on the Project site. The new structures would be subject to seismic, geologic, and soils hazards for the life of the Project. Mostly notably, the proposed Project would be subject to liquefaction, liquefaction induced settlement, and lateral spreading. Mitigation measures identified in Section 3.6 would reduce the potential impacts to a less than significant level.

Under the Increased Density Alternative, the amount of developed area would be similar to the Project and an equal number of structures would be subject to hazardous geological conditions. While the proposed Project is not anticipated to result in significant impacts from geology and soils with mitigation, the Increased Density Alternative would result in similar potential for impacts when compared to the proposed Project.

Greenhouse Gases, Climate Change and Energy

As stated previously, short-term construction greenhouse gas (GHG) emissions are a one-time release of GHGs and are not expected to significantly contribute to global climate change over the lifetime of the proposed Project. Short-term construction emissions of GHGs are estimated at a maximum of approximately 1,239 metric tons of CO_2 equivalent (MT CO_2e) per year. The Project is estimated to generate approximately 2,910 residents during the Project's operational phase. Dividing this number of estimated residents generated by the Project by the total annual operational GHG emissions at Project buildout yields approximately 3.33 MT CO_2e/SP/Year, which is below the 3.56 MT CO_2e/SP/year in 2030 threshold based on emissions for the land use-driven

emission sectors in the CARB GHG Inventory. Construction emissions, when amortized[2], would equal approximately emissions 41.3 MT CO_2e, which is equivalent to approximately 0.01 MT CO_2e/SP/Year. Therefore, the total annual GHG emissions at Project buildout would still yield approximately 3.34 MT CO_2e/SP/Year, after inclusion of the amortized construction emissions.

Under the Increased Density Alternative, the Project site would be developed with the same types of uses and structures as the proposed Project, but the amount of park/open space areas would be increased. All uses in the Increased Density Alternative would be required to adhere to the same mitigation measure as the proposed Project. The equal number of residential units would result in a corresponding equal level of GHG emissions when compared to the proposed Project. As such, the GHG emissions impact would be equal when compared to the proposed Project.

Hazards and Hazardous Materials

The proposed Project includes components which will likely use a variety of common household hazardous materials including: paints, cleaners, cleaning solvents, pesticides, fertilizers, and fuel. There will be a risk of release of these materials into the environment if they are not stored and handled in accordance with best management practices approved by San Joaquin County Department of Environmental Health.

Under the Increased Density Alternative, the type and quantity of residential uses on the site would not change when compared to the proposed Project, but the amount of park/open space areas would increase. This alternative would still use the hazardous materials identified under the proposed Project. As such, this alternative would have equal impacts from hazards and hazardous materials impacts when compared to the proposed Project.

Hydrology and Water Quality

As described in Section 3.9, implementation of the proposed Project has the potential to result in the violation of water quality standards and the discharge of pollutants into surface waters during both construction and long-term operations. Construction operations could result in temporary increases in runoff, erosion, sedimentation, soil compaction and wind erosion effects that could adversely affect soils and reduce the revegetation potential at construction sites and staging areas. The long-term operation of the proposed Project could result in long-term impacts to surface water quality from urban stormwater runoff and could enter groundwater or surface water systems. Mitigation measures provided in Section 3.9 reduce potential water quality impacts to a less than significant level. The proposed Project would not significantly impact groundwater recharge or place persons or structures in a flood hazard zone.

Under the Increased Density Alternative, potential construction-related and long-term operational impacts to water quality or waste discharge related to stormwater runoff would be slightly reduced equivalent to the amount of land area that remains as park/open space under this alternative. The increased areas of park and open space under this alternative will remain

[2] The amortization period used for this calculation is 30 years.

pervious to precipitation, which will facilitate groundwater recharge and the natural biofiltration of stormwater. This alternative will still include stormwater detention/basins, and provide natural BMPs to reduce pollutants in stormwater runoff. As such, potential impacts related to hydrology and water quality would be slightly reduced under the Increased Density Alternative when compared to the proposed Project.

Land Use, Population, and Housing

The proposed Project is not expected to induce population growth that has not already been accounted for as a part of the existing General Plan, or analyzed in detail in this EIR. The proposed Project does not displace substantial numbers of persons or housing units. The Project would require a zoning and general plan amendment for land use changes, as well as annexation to the City of Manteca. However, impacts to land use are considered less than significant.

The Increased Density Alternative is not expected to induce substantial population growth in the area. Both the proposed Project and the Increased Density Alternative would not displace substantial numbers of persons or housing units. Similar to the proposed Project, development of the Increased Density Alternative would remove the housing units onsite, and add 915 residential units. Therefore, impacts relating to land use, population and housing would be equal under this alternative.

Noise

The proposed Project could increase noise-generating activities associated with the maintenance and operation of the proposed Project, as well as from vehicular traffic. Mitigation measures provided in Section 3.12 would reduce all potential impacts to a less than significant level. The Increased Density Alternative would result in the same number of residential units as the Project; therefore, the noise impacts associated with the alternative would be equal to the vehicular and operational activities of the proposed Project. All noise issues would be mitigated, as appropriate, through noise attenuation and best management practices; therefore, under this alternative, noise impacts are equal when compared to the proposed Project.

Public Services and Recreation

Development in the proposed Project will pay all applicable fees and assessments required to fund its fair share of public services and recreation. This funding would assist in the development of facilities in order to meet the City's standards. The proposed Project would have a less than significant impact to fire, police, and schools, and recreational facilities.

Under the Increased Density Alternative, the site would be developed with the same range of allowable uses as described in the Project Description, and number of the residential units would be equal. The increase in park/open space areas may result in an increase in irrigation water demand; however, these open space areas would increase the potential for on-site stormwater detention. Additionally, the increase in park/open space areas would provide for an increase in recreational opportunities for the proposed residents as compared to the Project. As such, this impact would be slightly reduced when compared to the proposed Project.

Transportation and Circulation

It was determined that the proposed Project would result in VMT increases that are greater than 85 percent of Baseline conditions, even with implementation of mitigation. However, the proposed Project would not conflict with a program, plan, policy or ordinance addressing the circulation system, including transit, bicycle, and pedestrian facilities, or increase hazards due to a design feature, incompatible uses, or inadequate emergency access.

Under this alternative, the proposed Project would be developed with the same components as described in the Project Description, but density of the residential uses would be increased. Under the Increased Density Alternative, the same number of residential units as the proposed project (915 units) would be constructed within the Development Area. The equal number of residential uses would result in an equal amount of vehicle trips generated from the Project site. Therefore, the Increased Density Alternative would result in similar traffic related impacts when compared to the proposed Project.

Utilities

Implementation of the proposed Project would result in increased flows to the public wastewater system. The wastewater system is capable of handling the increased flows with their existing permit and infrastructure. Implementation of the proposed Project would result in increased demand for potable water. The City has adequate water supply to handle the increased demand with their existing supply and infrastructure. Implementation of the proposed Project would result in increased storm drainage from new impervious surfaces. The proposed Project includes a storm drainage collection system to handle the increased storm drainage. Implementation of the proposed Project would result in increased generation of solid waste. However, the landfill has adequate capacity to dispose the solid waste.

Under the Increased Density Alternative, the proposed Project would be developed with the same components and number of residential units as described in the Project Description, but an increase in park/open space. This would result in an equal amount of wastewater, water demand, and solid waste generated from the Project site. There would be approximately 9.55 more acres of pervious soils, thereby increasing opportunities for stormwater retention at the Project site. However, uses in the Increased Density Alterative would be required to adhere to the same mitigation measure as the proposed Project, and the equal amount of dwelling units would result in similar utility demands. The Increased Density Alternative would result in similar demand on utility systems when compared to the proposed Project.

Overall, this alternative would have equal wastewater treatment demand, equal water demand, equal solid waste generated, and equal storm water runoff when compared to the proposed Project. As such, this alternative would have equal impacts when compared to the proposed Project.

Wildfire

The Project Site is not located in or near any State Responsibility Areas and there are no lands classified as very high fire hazard severity zones within or near the Project Site. Therefore, the

proposed Project would have no impact related to wildfire risks associated with lands in or near State Responsibility Areas or lands classified as very high fire hazard severity zones.

Under this alternative, the proposed Project would be developed with the same components as described in the Project Description, but density of the residential uses would be increased. Under the Increased Density Alternative, the same number of residential units as the proposed project (915 units) would be constructed within the Development Area. Both the proposed Project and this alternative would result in no impact related to wildfires. Overall, impacts related to wildfires would be equal under the Increased Density Alternative when compared to the proposed Project.

AGRICULTURE PROTECTION ALTERNATIVE

Aesthetics and Visual Resources

As described in Section 3.1, the visual character of the Project site would be significantly altered as a result of Project implementation. Implementation of the City's Development Standards for Zoning District's for height and bulk and consistency with the General Plan and the Manteca Zoning Ordinance would ensure that impacts are reduced to the greatest extent possible. Nevertheless, impacts related to degradation of the visual character of the site would be significant and unavoidable.

Implementation of the lighting plan required by Mitigation Measure 3.1-1 would ensure that lighting features do not result in light spillage onto adjacent properties and do not significantly impact views of the night sky. Adherence to the mitigation measure would ensure that excessively reflective building materials are not used, and that the proposed Project would not result in significant impacts related to daytime glare. As such, impacts related to nighttime lighting and daytime glare would be less than significant with mitigation.

Under the Agriculture Protection Alternative, a portion of the Project site would remain under agricultural production, and therefore, would retain the existing visual character. However, portions of the Project site that are currently agricultural land would be converted to urban uses. As such, there would still be an impact to the visual character under this alternative. The impact associated with increased light and glare in the developed area would be mitigated. Under this alternative, the changes to the existing visual quality would be similar to the proposed Project in the areas that are developed, but would be significant less in the areas that are not developed. As such, this alternative would have a reduced impact that is proportionate to the reduced development area, when compared to the proposed Project.

Agricultural Resources

Currently, the majority of the Project site is used for agricultural purposes. The Agriculture Protection Alternative would reduce the amount of converted Prime Farmland and Farmland of Statewide Importance. Provisions for payment of compensatory fees would partially offset conversions of farmland on the portion that would be developed; however, no new farmland would be made available, and the productivity of existing farmland would not be improved as a result of these measures. Therefore, full compensation for losses of Important Farmland under

the Agriculture Protection Alternative would not be achieved resulting in a significant and unavoidable impact.

While this alternative would still result in a significant and unavoidable impact to agriculture, the land lost to urban uses is less than under the proposed Project. As such, this alternative would have a reduced impact that is proportionate to the reduced development area, when compared to the proposed Project.

Air Quality

Under buildout conditions in the San Joaquin County, the SJVAB would continue to experience increases in criteria pollutants and efforts to improve air quality throughout the basin would be hindered. As described in Section 3.3, San Joaquin County has a State designation Attainment or Unclassified for all criteria pollutants except for ozone, PM_{10}, and $PM_{2.5}$. San Joaquin County has a national designation of either Unclassified or Attainment for all criteria pollutants except for ozone and $PM_{2.5}$. Table 3.3-2 in Section 3.3 presents the State and Federal attainment status for San Joaquin County.

As discussed under Impact 3.3-1 in Section 3.3, the SJVAPCD has established their thresholds of significance by which the Project emissions are compared against to determine the level of significance. The SJVAPCD has established operations related emissions thresholds of significance as follows: 100 tons per year of CO, 10 tons per year of NO_x, 10 tons per year of ROG, 27 tons per year of SO_x, 15 tons per year PM_{10}, and 15 tons per year $PM_{2.5}$. As shown in Table 3.3-6 and Table 3.3-7, operational and construction emissions would not exceed the SJVACPD thresholds of significance, respectively.

Implementation of the proposed Project would cause an increase in traffic, which is the dominant source of air emissions associated with the proposed Project. Under the Agricultural Protection Alternative, the proposed Project would be developed with the same components as described in the Project Description, but the number of units and the Project footprint would be reduced resulting in an increase of undeveloped land. The total development would be reduced by approximately 25 percent. This residential units would represent an approximately 25 percent reduction in the amount of traffic generated from the Project site. Mobile source air emissions are directly correlated to traffic volume; therefore, it is estimated that the reduced trip volume would reduce the mobile source emissions by approximately the same 25 percent. Additionally, this alternative would have a reduction in area source emissions proportional to the reduction in residential units.

While uses in the Agricultural Protection Alternative would be required to adhere to the same mitigation measures as the proposed Project, the decrease in residential units and reduced traffic volumes would result in reductions in air emissions. Therefore, the Agricultural Protection Alternative would result in reduced air emissions when compared to the proposed Project.

Biological Resources

As described in Section 3.4, Biological Resources, construction in the Project site has the potential to result in impacts to special-status species in the region. Although there has been no documented sighting within the immediate area in, or near the Project site, the Project site provides potential habitat for several species, including those discussed in Section 3.4. Mitigation Measure 3.4-1 requires participation with the SJMSCP, which includes fees that will be used to purchase conservation lands for a variety of special status species. The SJMSCP was created and adopted to address both the Project and cumulative impacts to biological resources, including special status species. The proposed Project will participate in the SJMSCP, including payment of fees and implementation of all Incidental Take Minimization Measures required by the SJCOG through the authorization of SJMSCP coverage.

The Agriculture Protection Alternative would result in development on the Project site, but the development would be significantly reduced with 43.92 acres remaining in its current condition. The 43.92 acres that would remain undeveloped would include the agricultural land only. Under this alternative, there would be more acres of agricultural land that would provide open space habitat for a variety of wildlife species, predominately associated with foraging (i.e., protected raptors including Swainson's hawk, migratory birds). This additional agricultural land would provide biological benefits to wildlife in the region even though a portion of the Project site would still be developed. As such, the Agriculture Protection Alternative would have a reduced impact that is proportionate to the reduced development area, when compared to the proposed Project.

Cultural and Tribal Resources

As discussed in Section 3.5, Cultural and Tribal Resources, the CHRIS search for the Project site did not indicate than any historic period resources were previously recorded in the Development Area. Any previously unknown cultural resources which may be discovered during development of the proposed Project would be required to be preserved, either through preservation in place, excavation, documentation, curation, data recovery, or other appropriate measures. With implementation of the mitigation measures provided in Section 3.5, the proposed Project is not anticipated to considerably contribute to a significant reduction in cultural resources in the region.

Under this Agricultural Protection Alternative, there would be less ground disturbing activities related to development and there would be a reduced potential to disturb or destroy cultural, historic, and archaeological resources, as well as paleontological resources. While the proposed Project is not anticipated to result in significant impacts to cultural resources with mitigation, the Agricultural Protection Alternative would have a reduced impact that is proportionate to the reduced development area, when compared to the proposed Project.

Geology and Soils

As described in Section 3.6, implementation of the proposed Project would result in the construction of new structures on the Project site. The new structures would be subject to seismic, geologic, and soils hazards for the life of the Project. Mostly notably, the proposed Project would be subject to liquefaction, liquefaction induced settlement, and lateral spreading.

Mitigation measures identified in Section 3.6 would reduce the potential impacts to a less than significant level.

Under the Agriculture Protection Alternative, there would be less developed area, resulting in fewer structures that would be subject to geological conditions. The Agricultural Protection Alternative would result in more of the Project site remaining in its existing undeveloped condition. While the proposed Project is not anticipated to result in significant impacts from geology and soils with mitigation, the Agricultural Protection Alternative would have a reduced impact that is proportionate to the reduced development area when compared to the proposed Project.

Greenhouse Gases, Climate Change and Energy

As stated previously, short-term construction greenhouse gas (GHG) emissions are a one-time release of GHGs and are not expected to significantly contribute to global climate change over the lifetime of the proposed Project. Short-term construction emissions of GHGs are estimated at a maximum of approximately 1,239 metric tons of CO_2 equivalent (MT CO_2e) per year. The Project is estimated to generate approximately 2,910 residents during the Project's operational phase. Dividing this number of estimated residents generated by the Project by the total annual operational GHG emissions at Project buildout yields approximately 3.33 MT CO_2e/SP/Year, which is below the 3.56 MT CO_2e/SP/year in 2030 threshold based on emissions for the land use-driven emission sectors in the CARB GHG Inventory. Construction emissions, when amortized[3], would equal approximately emissions 41.3 MT CO_2e, which is equivalent to approximately 0.01 MT CO_2e/SP/Year. Therefore, the total annual GHG emissions at Project buildout would still yield approximately 3.34 MT CO_2e/SP/Year, after inclusion of the amortized construction emissions.

Under the Agriculture Protection Alternative, the Project site would be developed with the same uses as the proposed Project in the developed area, but the total footprint and number of residential units would be significantly reduced. While uses in the Agricultural Protection Alternative would be required to adhere to the same mitigation measure as the proposed Project, the decrease in total residential unit count would decrease the total GHG emissions. As such, the GHG emissions impact is reduced when compared to the proposed Project.

Hazards and Hazardous Materials

The proposed Project includes components which will likely use a variety of common household hazardous materials including: paints, cleaners, cleaning solvents, pesticides, fertilizers, and fuel. There will be a risk of release of these materials into the environment if they are not stored and handled in accordance with best management practices approved by San Joaquin County Department of Environmental Health.

Under the Agriculture Protection Alternative, the type of residential uses on the site would not change when compared to the proposed Project, but the number of residences would decrease.

[3] The amortization period used for this calculation is 30 years.

This alternative would still use the hazardous materials identified under the proposed Project, but in smaller quantities, given the reduction in development intensity. As such, this alternative would have reduced impacts from hazards and hazardous materials impacts when compared to the proposed Project.

Hydrology and Water Quality

As described in Section 3.9, implementation of the proposed Project has the potential to result in the violation of water quality standards and the discharge of pollutants into surface waters during both construction and long-term operations. Construction operations could result in temporary increases in runoff, erosion, sedimentation, soil compaction and wind erosion effects that could adversely affect soils and reduce the revegetation potential at construction sites and staging areas. The long-term operation of the proposed Project could result in long-term impacts to surface water quality from urban stormwater runoff and could enter groundwater or surface water systems. Mitigation measures provided in Section 3.9 reduce potential water quality impacts to a less than significant level. The proposed Project would not significantly impact groundwater recharge or place persons or structures in a flood hazard zone.

Under the Agricultural Protection Alternative, potential construction-related and long-term operational impacts to water quality or waste discharge related to stormwater runoff would be reduced equivalent to the amount of land area that remains undisturbed. The undeveloped land will remain pervious to precipitation and will not have the potential to discharge urban pollutants into surface water resources. This alternative would include a stormwater detention/basin, and provide natural BMPs to reduce pollutants in stormwater runoff from the developed areas. As such, potential impacts related to hydrology and water quality would be reduced proportionate to the reduced development area under the Agricultural Protection Alternative when compared to the proposed Project.

Land Use, Population, and Housing

The proposed Project is not expected to induce population growth that has not already been accounted for as a part of the existing General Plan, or analyzed in detail in this EIR. The proposed Project does not displace substantial numbers of persons or housing units. The Project would require a zoning and general plan amendment for land use changes, as well as annexation to the City of Manteca. However, impacts to land use are considered less than significant.

The Agricultural Protection Alternative is not expected to induce substantial population growth in the area but would displace persons and remove housing units. The amount of population growth and the number of housing units removed under this alternative would be reduced when compared to the proposed Project. The land use impacts would be reduced under this alternative by reducing agricultural land that is converted to residential and commercial uses. Therefore, impacts relating to land use, population, and housing would be reduced under this alternative proportionate to the reduced development area.

Noise

The proposed Project could increase noise-generating activities associated with the maintenance and operation of the proposed Project, as well as from vehicular traffic. Mitigation measures provided in Section 3.12 would reduce all potential impacts to a less than significant level. Because the Agricultural Protection Alternative would result in less development, the noise impacts associated with future uses would be reduced when compared to the proposed Project. The preserved agriculture area would involve the use of farming equipment and haul trucks that would cause a noise impact; however, the noises related to the agricultural activities already exist, and therefore, this would not introduce a new source of noise to the area. All other noise issues in the developed areas would be similar to the proposed Project, but on a reduced scale given the 25 percent decrease in development intensity under this alternative. Under this alternative, noise impacts would be reduced proportionate to the reduced development area when compared to the proposed Project.

Public Services and Recreation

Development in the proposed Project will pay all applicable fees and assessments required to fund its fair share of public services and recreation. This funding would assist in the development of facilities in order to meet the City's standards. The proposed Project would have a less than significant impact to fire, police, and schools, and recreational facilities.

Under the Agricultural Protection Alternative, the site would be developed with the same type of uses as described in the Project Description, but the number of residential units would be reduced, resulting in an increase of undeveloped land by 25 percent. The total development would be reduced by approximately 25 percent. This reduction in total residential housing units would represent an approximately 25 percent reduction in the amount of public service needs from the Project site. As such, this impact would be reduced when compared to the proposed Project.

Transportation and Circulation

It was determined that the proposed Project would result in VMT increases that are greater than 85 percent of Baseline conditions, even with implementation of mitigation. However, the proposed Project would not conflict with a program, plan, policy or ordinance addressing the circulation system, including transit, bicycle, and pedestrian facilities, or increase hazards due to a design feature, incompatible uses, or inadequate emergency access.

Under this alternative, the proposed Project would be developed with the same components as described in the Project Description, but the residential areas would be reduced resulting in an increase of undeveloped land beyond the Increased Density Alternative. Residential units would be reduced from 915 to 686. The reduction of residential units would result in a reduced amount of vehicle trips generated from the Project site. Therefore, the Agricultural Protection Alternative would result in reduced traffic related impacts when compared to the proposed Project.

Utilities

Implementation of the proposed Project would result in increased flows to the public wastewater system. The wastewater system is capable of handling the increased flows with their existing permit and infrastructure. Implementation of the proposed Project would result in increased demand for potable water. The City has adequate water supply to handle the increased demand with their existing supply and infrastructure. Implementation of the proposed Project would result in increased storm drainage from new impervious surfaces. The proposed Project includes a storm drainage collection system to handle the increased storm drainage. Implementation of the proposed Project would result in increased generation of solid waste. However, the landfill has adequate capacity to dispose the solid waste.

Under the Agricultural Protection Alternative, the proposed Project would be developed with the same components as described in the Project Description, but the overall Project footprint and number of units would be reduced resulting in an increase of undeveloped land. The total development would be reduced by approximately 25 percent. This reduction in square footage and footprint would represent an approximately 25 percent reduction in the amount of wastewater and solid waste generated from the Project site. This reduction would also reduce water demand by approximately 25 percent. There would be approximately 43.92 more acres of pervious soils, thereby reducing the amount of storm drainage from the Project site. While uses in the Agricultural Protection Alternative would be required to adhere to the same mitigation measures as the proposed Project, the decrease in residential units would reduce the utility demands.

Overall, this alternative would have less wastewater treatment demand, less water demand, less solid waste generated, and less storm water runoff when compared to the proposed Project. As such, this alternative would have a reduced impact when compared to the proposed Project.

Wildfire

The Project Site is not located in or near any State Responsibility Areas and there are no lands classified as very high fire hazard severity zones within or near the Project Site. Therefore, the proposed Project would have no impact related to wildfire risks associated with lands in or near State Responsibility Areas or lands classified as very high fire hazard severity zones.

Under this alternative, the proposed Project would be developed with the same components as described in the Project Description, but the residential areas would be reduced resulting in an increase of undeveloped land beyond the Increased Density Alternative. Residential units would be reduced from 915 to 686. Both the proposed Project and this alternative would result in no impact related to wildfires. Overall, impacts related to wildfires would be equal under Agricultural Protection Alternative when compared to the proposed Project.

ENVIRONMENTALLY SUPERIOR ALTERNATIVE

CEQA requires that an environmentally superior alternative be identified among the alternatives that are analyzed in the EIR. If the No Project (No Build) Alternative is the environmentally

superior alternative, an EIR must also identify an environmentally superior alternative among the other alternatives (CEQA Guidelines Section 15126.6(e)(2)). The environmentally superior alternative is that alternative with the least adverse environmental impacts when compared to the proposed Project.

As Table 5.0-1 presents a comparison of the alternative Project impacts with those of the proposed Project. As shown in the table, the No Project (No Build) Alternative is the environmentally superior alternative. However, as required by CEQA, when the No Project (No Build) Alternative is the environmentally superior alternative, the environmentally superior alternative among the others must be identified. Therefore, the Agricultural Protection Alternatives would be the environmentally superior alternative because all environmental issues would have reduced impacts compared to the proposed Project. It is noted that neither the Agricultural Protection Alternative nor the Increased Density Alternative fully meet all of the Project objectives.

TABLE 5.0-1: COMPARISON OF ALTERNATIVE PROJECT IMPACTS TO THE PROPOSED PROJECT

ENVIRONMENTAL ISSUE	*NO PROJECT (NO BUILD) ALTERNATIVE*	*INCREASED DENSITY ALTERNATIVE*	*AGRICULTURE PROTECTION ALTERNATIVE*
Aesthetics and Visual Resources	Less (Best)	Less (3rd Best)	Less (2nd Best)
Agricultural Resources	Less (Best)	Equal (3rd Best)	Less (2nd Best)
Air Quality	Less (Best)	Equal (3rd Best)	Less (2nd Best)
Biological Resources	Less (Best)	Less (3rd Best)	Less (2nd Best)
Cultural and Tribal Resources	Less (Best)	Equal (3rd Best)	Less (2nd Best)
Geology and Soils	Less (Best)	Equal (3rd Best)	Less (2nd Best)
Greenhouse Gases, Climate Change and Energy	Less (Best)	Equal (3rd Best)	Less (2nd Best)
Hazards and Hazardous Materials	Less (Best)	Equal (3rd Best)	Less (2nd Best)
Hydrology and Water Quality	Less (Best)	Less (3rd Best)	Less (2nd Best)
Land Use, Population, and Housing	Less (Best)	Equal (3rd Best)	Less (2nd Best)
Noise	Less (Best)	Equal (3rd Best)	Less (2nd Best)
Public Services and Recreation	Less (Best)	Less (3rd Best)	Less (2nd Best)
Transportation and Circulation	Less (Best)	Equal (3rd Best)	Less (2nd Best)
Utilities	Less (Best)	Equal (3rd Best)	Less (2nd Best)
Wildfire	Less (Best)	Equal (3rd Best)	Less (2nd Best)

GREATER = GREATER IMPACT THAN THAT OF THE PROPOSED PROJECT

LESS = LESS IMPACT THAN THAT OF THE PROPOSED PROJECT

EQUAL = NO SUBSTANTIAL CHANGE IN IMPACT FROM THAT OF THE PROPOSED PROJECT

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Appendix A

Notice of Preparation and NOP Comments

CITY OF MANTECA

COMMUNITY DEVELOPMENT DEPARTMENT

DATE: **October 22, 2021**

TO: Interested Parties

SUBJECT: **Notice of Preparation of an Environmental Impact Report (EIR) for the Proposed Annexation #1 Project**

LEAD AGENCY CONTACT:

Lea C. Simvoulakis, Senior Planner
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REVIEW PERIOD: **October 22, 2021 – November 22, 2021**

Notice is hereby given that the City of Manteca is the lead agency for the preparation of a project-level Environmental Impact Report (EIR) for the proposed Annexation #1 Project (proposed Project), in accordance with the California Environmental Quality Act (CEQA), Section 15050. The purpose of this Notice of Preparation (NOP) is to provide responsible agencies and interested persons with sufficient information in order to provide meaningful input on the scope and content of the EIR. Your timely comments will ensure an appropriate level of environmental review for the proposed Project.

Scoping Meeting: The Lead Agency will hold a public scoping meeting to receive verbal comments on the scope of the EIR on **November 9, 2021** at **5:30pm**.

Pursuant to Governor Newsom's Executive Order N-29-20, the meeting will be held via video- and teleconference. Members of the public are invited to participate in the Scoping Meeting via Zoom, which will be used to share information during the meeting. The City is requesting that you RSVP to Lea Simvoulakis, Senior Planner at LSimvoulakis@ca.manteca.ca.us to obtain the link and/or telephone call-in instructions/information for the Zoom meeting.

A copy of this NOP is available for review at the City of Manteca Community Development Department and on the City of Manteca website:

https://www.ci.manteca.ca.us/CommunityDevelopment/Planning%20Division/Pages/default.aspx

PROJECT DESCRIPTION

Project Location and Setting

The Project site is located directly north of the City of Manteca's limit line. The Project site is immediately west of State Route 99 (SR 99) and east of the Union Ranch Specific Plan Area. The Project site is bounded on the north by farmland, on the east by SR 99, on the south by existing residences and agricultural fields, and on the west by Union Road and the Union Ranch Specific Plan. Figures 1 and 2 show the proposed Project's regional location and vicinity. The Project site is located within Sections 12 of Township 2 South,

Range 6 East Mount Diablo Base and Meridian (MDBM). Figure 3 illustrates the Project location on the USGS Manteca, California, 7.5-minute series quadrangle map.

Project Site Defined

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

- Annexation Area – includes the whole of the Project site (approximately 202.81 acres), including the approximate 175.67-acre Development Area, the approximate 27.14-acre Non-Development Areas, and all public right-of-way along Union Road fronting the Development and Non-Development Areas.
- Development Area - includes the parcels being annexed that will be entitled for subdivision and development. This includes the Union Ranch North Project Area (Subdivision 1) (approximately 106.04 acres) and the Stagecoach at M&E Project Area (Subdivision 2) (approximately 69.63 acres). The two areas total (175.67 acres) and are further defined below
    - Union Ranch North Project Area is Subdivision 1 (approximately 106.04 acres) – includes the western portion of the Annexation and Development Area.
    - Stagecoach at M&E Project Area is Subdivision 2 (approximately 69.93 acres) – includes the eastern portion of the Annexation and Development Area.
- Non-Development Area - includes the parcels being annexed that will not be entitled for subdivision or development. This includes three separate areas, each described as an Annexation SubArea. The three areas total (27.14 acres) and are further defined below:
    - Annexation SubArea 1 - 9.82 ac
    - Annexation SubArea 2 - 6.04 ac
    - Annexation SubArea 3 - 11.28 ac

Existing Site Conditions

The Project site includes approximately 202.81 acres within nineteen Assessor parcels (APNs). This includes the Union Ranch North Project Area (APNs 197-020-21, 197-020-22, 197-020-23, 197-020-35, 197-020-41, 197-020-46, 197-020-47), the Stagecoach at M&E Project Area (APNs 197-020-020 and 197-020-390), Annexation SubArea 1 (APN 197-020-20), Annexation SubArea 2 (APNs 197-020-29, 197-020-30, 197-020-36), and Annexation SubArea 3 (APNs 204-100-03, 204-100-05, 204-100-06, 204-100-07, 204-100-08, 204-100-28). Figure 4 shows an APN map of the Project site.

Site Topography

The Project site is relatively flat with natural gentle slope from south to north. The Project site topography ranges in elevation from approximately 29 to 36’ feet above sea level.

Existing Site Uses

Figure 5 shows aerial imagery of the existing site uses within the Project site and the surrounding. The existing uses within the Development and Non-Development Areas are described in detail below.

The Development Area primarily contains farmland, with a few existing homes and outbuildings. The outbuildings include barns, sheds, livestock/farm animal pens, bee hives, equipment yards, dirt/gravel roadways, irrigation ditches, and overhead power lines. The majority of the Development Area is in active agricultural use (orchards), with all existing homes and outbuildings clustered on each parcel.

The Non-Development areas contains farmland and existing ranchettes. Each SubArea is uniquely different and is described in detail below:

Annexation SubArea 1 includes mostly active agricultural use (orchards), with a cluster of existing structures along Union Road. The cluster of structures in this SubArea includes existing homes, barns, sheds, livestock/farm animal pens, equipment yards, dirt/gravel roadways, irrigation ditches,

and overhead power lines. Union Road is located along the western side of this SubArea and is fully improved on the southbound portion of the roadway to a City standard with 2 southbound lanes, a landscaped median, and landscaped pedestrian sidewalks. The eastside of Union Road functions as an unimproved County roadway with one northbound lane and no pedestrian sidewalk, curb/gutter, or landscaping.

Annexation SubArea 2 is characterized as existing ranchettes, with homes, barns, sheds, livestock/farm animal pens, equipment yards, dirt/gravel roadways, irrigation ditches, and overhead power lines. The agricultural land within this SubArea is pasture and/or cropland. Union Road is located along the western side of this SubArea and is an unimproved 2-lane County roadway without any landscaping or pedestrian facilities in either the northbound or southbound direction.

Annexation SubArea 3 is characterized as existing ranchettes, with existing homes, barns, sheds, livestock/farm animal pens, equipment yards, dirt/gravel roadways, and overhead power lines. This is no active production agricultural operation in this area, but there are small livestock pens that would be expected to house sheep, goats, horses, cows, hogs, foul, or poultry. Union Road is located along the eastern side of this SubArea and is an unimproved 2-lane County roadway without any landscaping or pedestrian facilities in either the northbound or southbound direction. Shady Pines Street is located along the southern side of this SubArea and is a fully improved City roadway that serves as an access road into the existing Woodbridge residential development.

Existing Surrounding Uses

Uses immediately adjacent to the north of the Project site include agricultural uses. Uses immediately to the west of the Project site include residential uses. Uses to the south and east of the Project site include agricultural and residential uses, including ranchettes and large estates lots (to the south and east) and a residential subdivision (to the east).

General Plan Land Use Designations

The Project site is currently designated as Very Low Density Residential (VLDR, 0.5 to 2 du/ac), Park (P), and Agriculture (AG) designations under the current General Plan. Figure 6a depicts the existing Manteca General Plan 2023 land use designations for the Project site and the surrounding areas.

The proposed General Plan Update shows the Development Area portion of the Project site with a Low Density Residential, High Density Residential, and Park land use designation. It is noted that the proposed Project includes a General Plan Amendment that proposes land uses consistent with the proposed General Plan Update.

The proposed General Plan Update shows the Annexation SubArea 1 and 2 as Low Density Residential, and Annexation SubArea 3 as Low Density Residential, Medium Density Residential, and Commercial. It is noted that the proposed Project includes a General Plan Amendment that proposes land uses in the Annexation SubAreas consistent with the proposed General Plan Update; however, because no development is proposed in the Annexation SubAreas, an alternative also includes annexation of these areas without any land use changes. Under this Alternative, it would be anticipated that the City's General Plan Update would change the land uses to what is described above. Figure 6b depicts the proposed Manteca General Plan Update.

The General Plan contains the following standards to guide development for these land uses within the Development area. 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 are noted below:

2023 General Plan

LDR (Low Density Residential): The LDR land use will establish 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.

VLDR (Very Low Density Residential): The VLDR land use category will provide for residences on larger lots and small, quasi-agricultural activities, including raising and boarding livestock. Residential units shall be permitted to deviate from standard lot dimensions within agricultural areas in order to cluster dwellings together and thereby allow for continued agricultural use. The agricultural use areas that remain on the residential parcel shall be subject to an easement dedicated to the City that allow continued agricultural use, but prohibits any further non-agricultural related development.

AG (Agriculture): This designation provides for agricultural uses (such as vineyards, orchards, row crops, farm animals), single family homes directly related to the agricultural use of the property, limited industrial uses directly related to agriculture, and similar and compatible uses.

Park (P): This designation provides for neighborhood, community and regional parks, golf courses, and other outdoor recreational facilities within urban development. Specific uses include public recreation sites, including ball fields, tot lots and play apparatus, adult softball and soccer playing fields, swimming pools, community center buildings, meeting facilities, libraries, art centers, after school care facilities, art in public places, facilities for night-time recreation, trails benches, interpretive markers, picnic areas, barbecue facilities, landscaping, city irrigation, city potable wells, trees and natural habitat areas.

General Plan Update

LDR (Low Density Residential): This designation provides for a mix of single-family housing, including small lots, clustered lots, attached homes, and conventional large lot detached residences. Density ranges from 2.1 to 8 dwelling units per acre.

HDR (High Density Residential): This designation provides for multi-family townhome, condominium, and apartment style housing and mobile home parks. The multi-family dwelling sites are typically located with direct access to arterial streets. The sites have access to the pedestrian and bikeway network along the street corridor and are located along the conceptual route of a public transportation shuttle route. Sites should be located near a neighborhood park, a neighborhood commercial center, or jobs centers and should provide pedestrian and bicycle connections to these amenities and services

PROJECT GOALS AND OBJECTIVES

Consistent with CEQA Guidelines Section 15124(b), a clear statement of objectives and the underlying purpose of the proposed Project shall be discussed.

Project Objectives

The principal objective of the proposed Project is the annexation of the Project site into the City of Manteca, and approval and subsequent development of Subdivision 1 and Subdivision 2. The quantifiable objectives of the proposed Project include annexation of 202.81 acres, including the Union Ranch North Project Area (i.e., Subdivision 1) (approximately 106.04 acres), and the Stagecoach at M&E Project Area (i.e. Subdivision 2) (approximately 69.93 acres).

The quantifiable objectives include the development of 715 single family residential units, (410 units in Subdivision 1 and 305 units in Subdivision 2), 200 multi-family residential units in Subdivision 1. The quantifiable objectives include the development of park, open space, and trail totaling 14.55 acres, including 10.37 acres of neighborhood park, park/basin and open space and 3.45 acres of the continuation of the Tide Water Bike Trail. The Project objectives also include the installation of new public roadways that will provide pedestrian and vehicular access to the Project site and surrounding community areas, and other improvements, including water supply, storm drainage, sewer facilities and landscaping.

The goals of the proposed Development are as follows:

- Provide residential housing opportunities that are visually attractive and accommodate the future housing demand in Manteca.
- Establish a mixture of residential product types that collectively provide for local and regional housing and that take advantage of the area's high level of accessibility.
- Provide infrastructure and park space that meets City standards, is integrated with existing and planned facilities and connections, and increases recreation opportunities for existing and future residents of the City.
- Establish a logical phasing plan designed to ensure that each phase of development would include necessary public improvements required to meet City standards.
- Annex the three Annexation SubAreas in order to avoid the creation of islands. Annexation of these areas would establish a logical and orderly city limit line that promotes the efficient extension of municipal services.
- Allow all existing property owners with existing and legal non-conforming uses located in the Non-Development Areas (SubArea 1, 2, and 3) to continue to use and enjoy their properties in perpetuity in the same manner as prior to annexation. Non-conforming uses include the existing agricultural uses (orchards, row crops, livestock/farm animal, fowl/poultry, apiary, etc.), existing residences, existing outbuildings, equipment storage, roadways, irrigation, etc. even if left fallow or not used for such temporarily.

PROJECT ENTITLEMENTS

General Plan Amendment

The proposed Project would require a General Plan Land Use Amendment to adjust the land uses to LDR and HDR for the Development Area.

Additionally, the proposed Project includes a proposed General Plan Land Use Amendment to adjust the land uses in Annexation SubArea 1, 2, and 3 to be consistent with the proposed General Plan Update. Because the Annexation SubAreas are not proposed for development, establishment of the land uses under this proposed General Plan Amendment is not necessary, and as an alternative they may be left as currently designated. It is noted that the proposed General Plan Update is anticipated to change the land uses in the Annexation SubAreas, although the exact timing of that change is not defined.

Prezoning

The Project site is currently outside of the jurisdiction of the City of Manteca, and therefore does not have zoning. The existing County zoning for the Project site is shown in Figure 7a. The proposed Project includes a request for pre-zoning of the Project site consistent with the General Plan Land Uses. The proposed prezoning is shown in Figure 7b.

Tentative Map

The proposed Project includes a Tentative Map for each of the subdivisions (i.e., Subdivision 1 and Subdivision 2) that would ultimately be developed in phases. The Tentative Map covers approximately 175.67 acres within nine Assessor parcels (APNs). This includes the Union Ranch North Project Area (APNs 197-020-21, 197-020-22, 197-020-23, 197-020-35, 197-020-41, 197-020-46, 197-020-47), and the Stagecoach at M&E Project Area (APNs 197-020-020 and 197-020-390).

The Tentative Map would result in the subdivision of a total of approximately 175.67 acres into 715 single family residential units, (410 units in Subdivision 1 and 305 units in Subdivision 2), 200 multi-family residential units in Subdivision 1.

10.37acres of neighborhood park, park/basin and open space and 3.45 acres of the continuation of the Tide Water Bike Trail. The Project objectives also include the installation of new public roadways that will

provide pedestrian and vehicular access to the Project site and surrounding community areas, and other improvements, including water supply, storm drainage, sewer facilities and landscaping.

The Tentative Map would result in 14.55 acres for the development of park, open space, and trail, including 10.37 acres of neighborhood park, park/basin and open space and 3.45 acres of the continuation of the Tide Water Bike Trail. The Tentative Map calls for the installation of new public roadways that will provide pedestrian and vehicular access to the Project site and surrounding community areas, and other improvements, including water supply, storm drainage, sewer facilities and landscaping. Figures 8a and 8b illustrates the proposed site plans for Subdivision 1 and Subdivision 2 (respectively), and the full Tentative Map for each Subdivision is included as Attachment A.

Annexation
The proposed Project includes an annexation of nineteen APNs totaling approximately 202.81 acres. This includes 175.67 acres for development, and 27.14 acres that is not proposed for development, but is being annexed to avoid the creation of islands. The 27.14 acres is located on nine APNs and will be designated as an existing and legal non-conforming use whereby all property owners are allowed to continue to use and enjoy their properties in perpetuity in the same manner as prior to annexation. Non-conforming uses include the existing agricultural uses (orchards, row crops, livestock/farm animal, fowl/poultry, apiary, etc.), existing residences, existing outbuildings, equipment storage, roadways, irrigation, etc. even if left fallow or not used for such temporarily.

Development Agreement
The proposed Project anticipates a Development Agreement that will be negotiated between the City and Applicant. Terms of the Development Agreement are not available at this early stage of review, but will be required to be consistent with the environmental analysis, including any mitigation measures that are created to reduce impacts.

DEVELOPMENT PROJECT CHARACTERISTICS
Residential
The proposed Project is primarily a residential development anticipated to provide up to approximately 915 residential units (715 single family and 200 multi-family residential units), split between the Union Ranch North portion of the Project (410 single family units and 200 multi-family units) and the Stagecoach at M&E portion of the Project (305 single family units). Development of housing will depend on market conditions and demand.

Park/Open Space/Trails
The proposed Project would provide development of park, open space, and trail totaling 14.55 acres for the development of park, open space, and trail, including 10.37 acres of neighborhood park, park/basin and open space and 3.45 acres of the continuation of the Tide Water Bike Trail.

Circulation
The proposed Project will expand the existing circulation system to serve the proposed Project and northern Manteca. This includes construction of a new East-West Connector Street connecting Union Road with State Route 99. This also includes the buildout of Union Road along the western side of the Project site. This section of Union Road is partially improved along the frontage of the Woodbridge Subdivision, and unimproved along the remaining portion of this roadway. Additionally, the proposed Project will provide sidewalks, bike lanes, and landscaping to offer additional bicycling and walking facilities for all of Manteca's residents. This includes the continuation of the Tide Water Bike Trail through the Project site. The Development Area and its circulation system is a natural progression of the existing developed land uses and the street network in northern Manteca.

Utilities and Planned Infrastructure Improvements
The construction of on-site infrastructure improvements would be required to accommodate development of the Project site, as described below.

Water System: The Project site would be served by a new potable and non-potable water distribution system. The proposed water system will be a looped system of water lines with various points-of-connection to existing City mains to comply with City Master Plans and standards. A water system analysis will be prepared during future design of Improvement Plans to ensure that the final design is compliant with fire flow and pressure standards.

Wastewater System: The Project site would be served by a new wastewater collection system installed within the North Manteca Collection Shed (NMCS). The NMCS has been planned to serve areas of future growth in the north of Manteca. The proposed wastewater conveyance facilities would connect to the existing sewer mains as part of the City of Manteca collection and treatment system. Wastewater treatment would be provided at the City's existing Wastewater Quality Control Facility (WQCF) at 2450 West Yosemite Avenue in western Manteca.

Storm Drainage: The Project site would include construction of a new storm drainage system, including a drainage collection system, storm drain pump stations, and detention basins. The final basin location and design will conform to the Manteca Design Specifications and Standards and will be finalized during the Improvement Plan phase. The detention basins are intended to help attenuate peak flows before drainage discharge is pumped into storm drainage facilities. The proposed detention basins are joint-use facilities providing park/recreation uses when not being used for stormwater detention. The storm drainage collection and detention system will be subject to the State Water Resources Control Board Requirements (SWRCB) and City of Manteca regulations, including: Manteca Storm Drain Master Plan, 2013; Phase II, National Pollutant Discharge Elimination System (NPDES) Permit Requirements; NPDES-MS4 Permit Requirements; and LID Guidelines.

Regulated Public Utilities: Electrical, gas, phone, cable and related internet services would be extended to all portions of the Project site from existing facilities located along Union Road, SR 99, and from existing residential development surrounding the Project site. Proposed utilities would be located within public utility easements to be dedicated along street frontages. Utility improvements would be installed in conjunction with planned street improvements.

USES OF THE EIR AND REQUIRED AGENCY APPROVALS

This EIR may be used for the following direct and indirect approvals and permits associated with adoption and implementation of the proposed Project.

City of Manteca

The City of Manteca will be the Lead Agency for the proposed Project, pursuant to the State Guidelines for Implementation of CEQA, Section 15050. Actions that would be required from the City include, but are not limited to the following:

- Certification of the EIR;
- Adoption of the Mitigation Monitoring and Reporting Program;
- Approval of City of Manteca General Plan Amendment (Land Use Element);
- Approval of City of Manteca Zoning Pre-zoning;
- Approval of Annexation of the Development and Non-Development Areas and Authorization to submit an Annexation request to San Joaquin LAFCo;
- Approval of Development Agreement;
- Approval of Tentative Maps;
- Approval of future Final Maps, including Large Lot Final Maps;
- Approval of future Improvement Plans;
- Approval of future Grading Plans;
- Approval of future Site Plan and Design Review;
- City review, approval, and construction and utility plans;
- Approval of future Building Permits;

- Approval of future Conditional Use Permits.

Other Governmental Agency Approvals
The following agencies may be required to issue permits or approve certain aspects of the proposed Project. Other governmental agencies that may require approval include, but are not limited to, the following:

- San Joaquin Local Agency Formation Commission (LAFCo) – Annexation and Detachment from Lathrop Manteca Fire District;
- 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).
- South San Joaquin Irrigation District - Irrigation Service Abandonment Agreements, Improvement Plan review and Board of Directors consideration.

PROBABLE ENVIRONMENTAL EFFECTS AND SCOPE OF THE EIR

The City has reviewed the proposed Project application and has determined that an EIR should be prepared for the proposed Project because it may have a significant effect on the environment. All environmental topics identified in Appendix G of the State CEQA Guidelines require analysis within an EIR. The Draft EIR will examine the following: Aesthetics, Agricultural and Forest Resources, Air Quality, Biological Resources, Cultural Resources, Energy, Geology/Soils, Greenhouse Gases/Climate Change, Hazards and Hazardous Materials, Hydrology/Water Quality, Land Use/Planning, Mineral Resources, Noise, Population/Housing, Public Services, Recreation, Transportation/Circulation, Tribal Resources, Utilities, Cumulative Impacts, and Growth Inducing Impacts.

Each chapter of this EIR will include a discussion of the existing setting, thresholds of significance, evaluation of potential impacts, and if necessary, feasible mitigation measures to reduce or eliminate potentially significant impacts to the applicable resource. Additionally, the EIR will include cumulative impacts analyses, as well as analyses of alternatives to the proposed Project.

An Initial Study has not been prepared for the proposed Project. As noted above, each environmental topic identified in Appendix G of the State CEQA Guidelines requires analysis in an EIR.

SUBMITTING COMMENTS

To ensure that all significant issues related to the proposed Project are identified and addressed, written comments are invited from all interested parties. To be considered, all comments must be in writing and clearly legible. Written comments concerning the proposed CEQA analysis for the Manteca Annexation #1 Project should be directed to the name and address below:

Lea C. Simvoulakis, Senior Planner
Community Development Department
City of Manteca
1001 West Center Street
Manteca, CA 95337
Office:(209) 456-8516
Email: LSimvoulakis@ci.manteca.ca.us
Written comments are due to the City of Manteca at the location addressed above by 5:00 p.m. November 22, 2021.

Figure 1: Regional Location

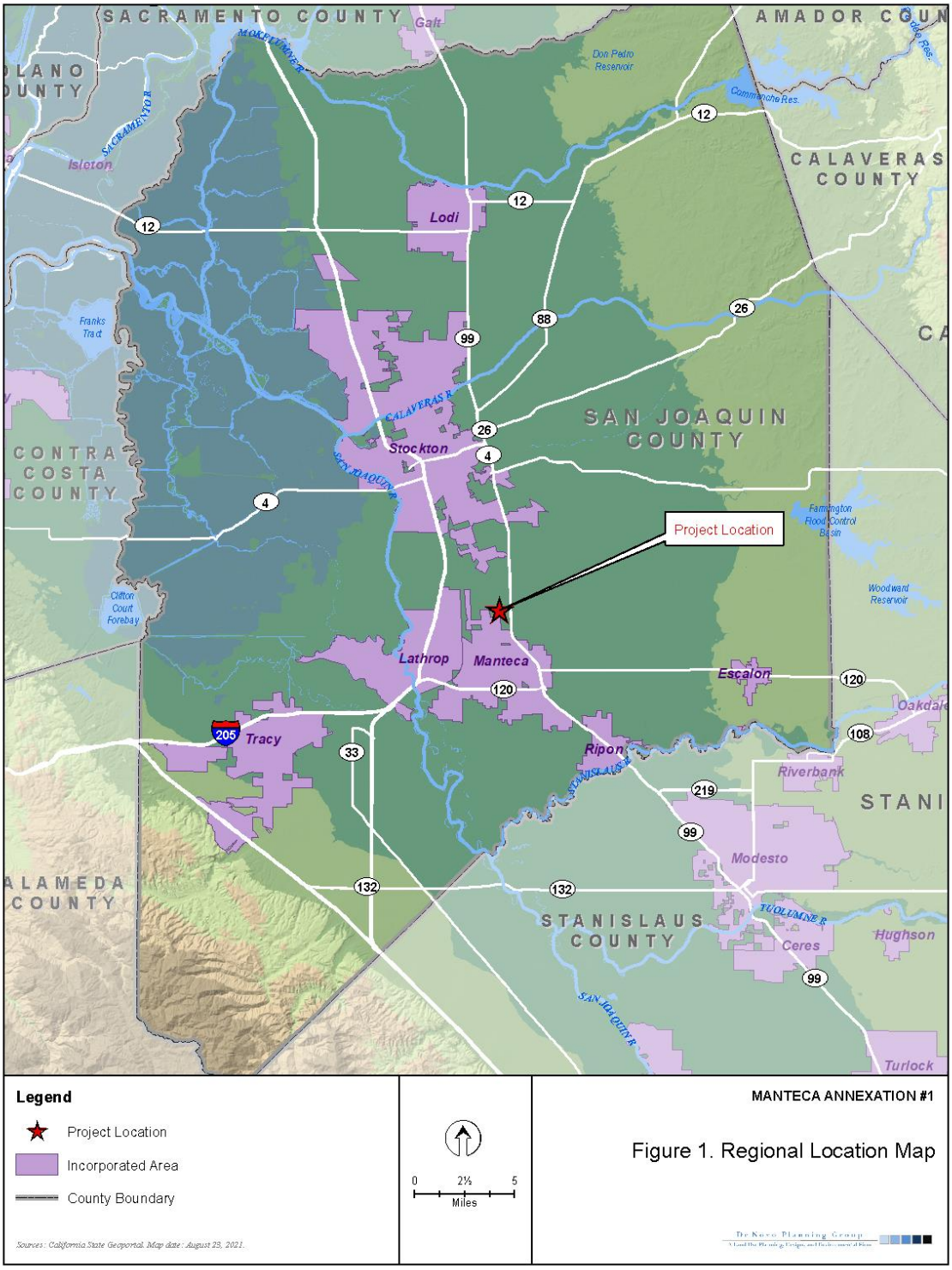


Figure 2: Project Vicinity

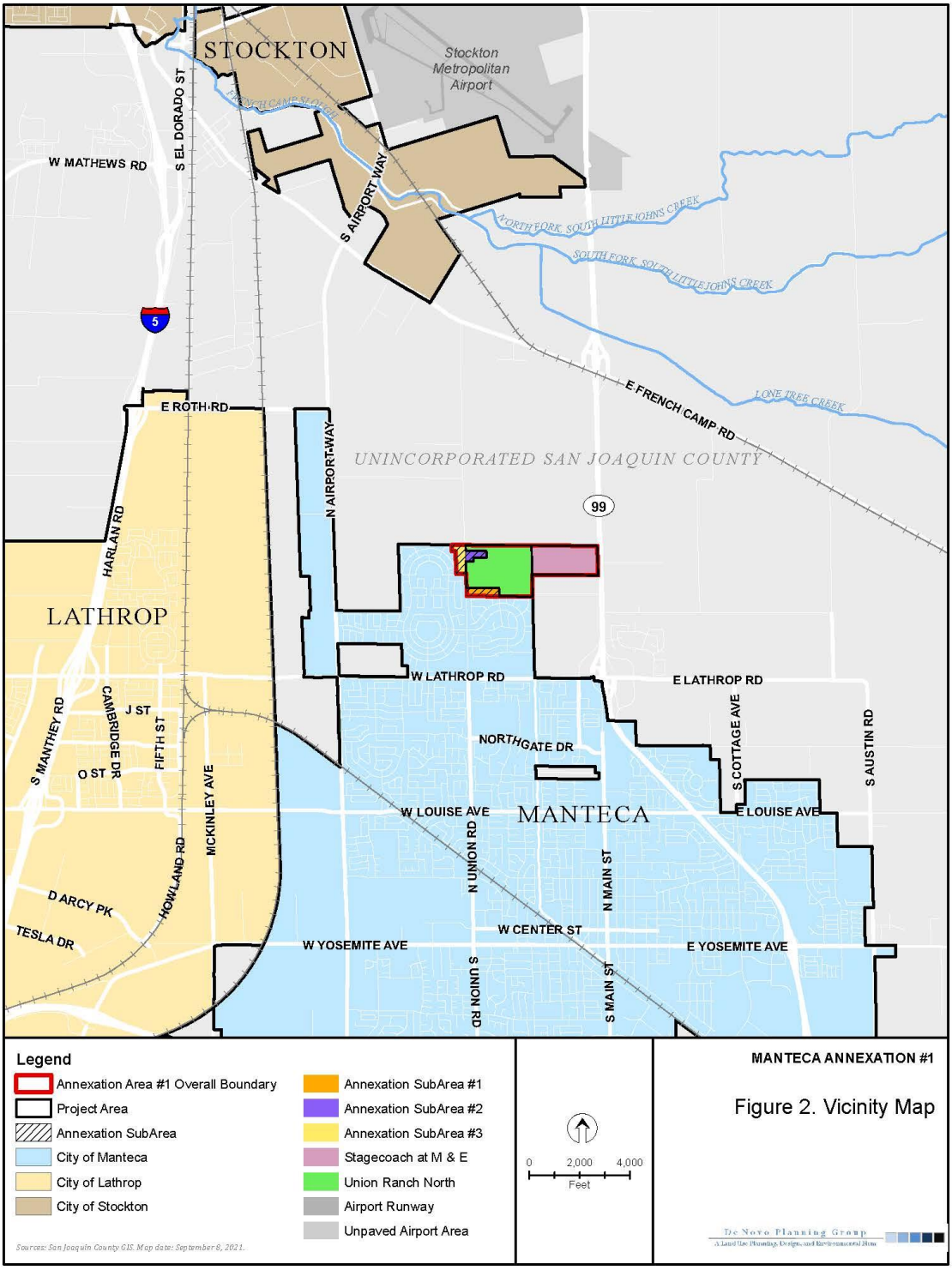


Figure 3: USGS Map

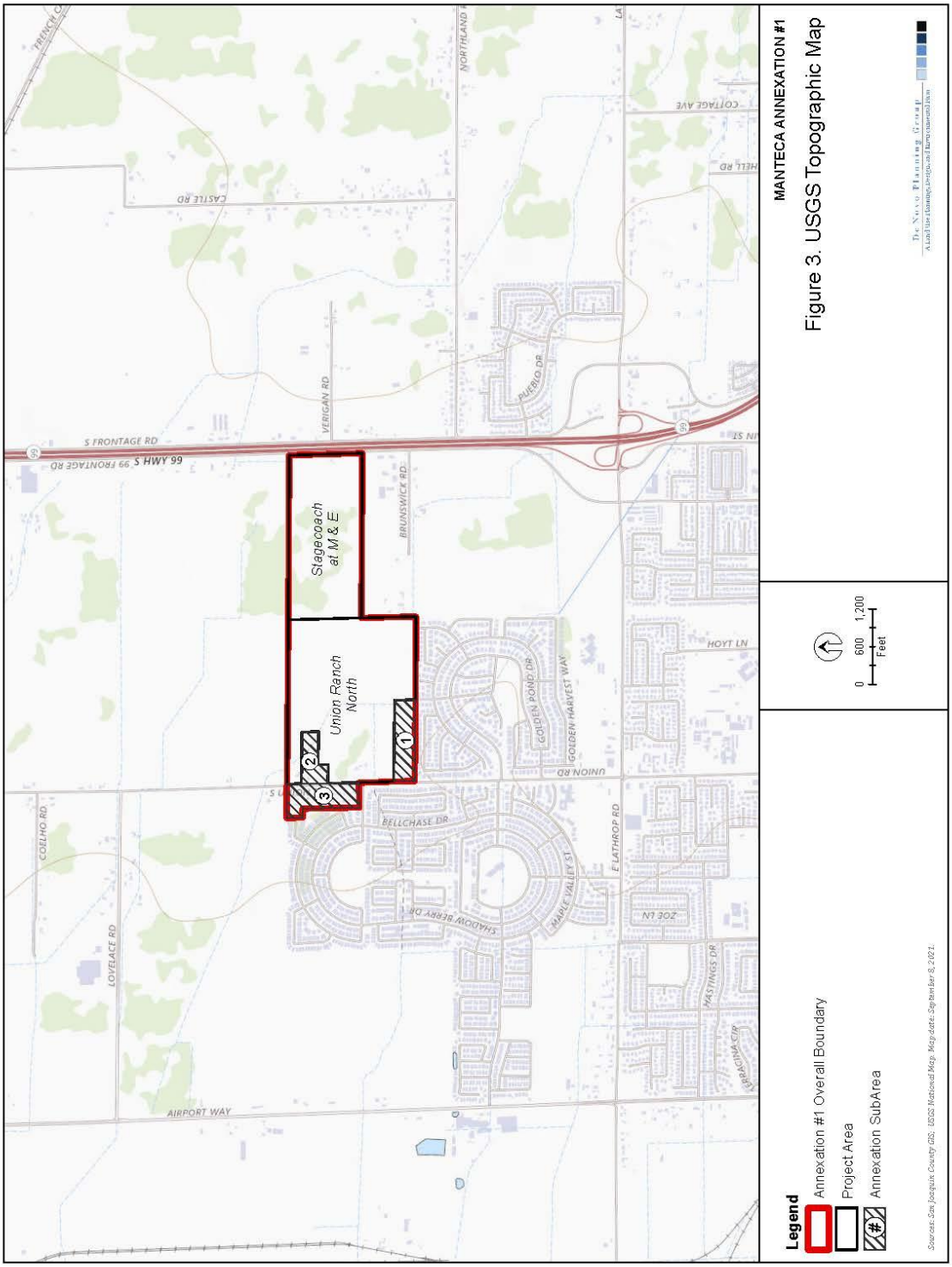


Figure 4: Assessor Parcel Map

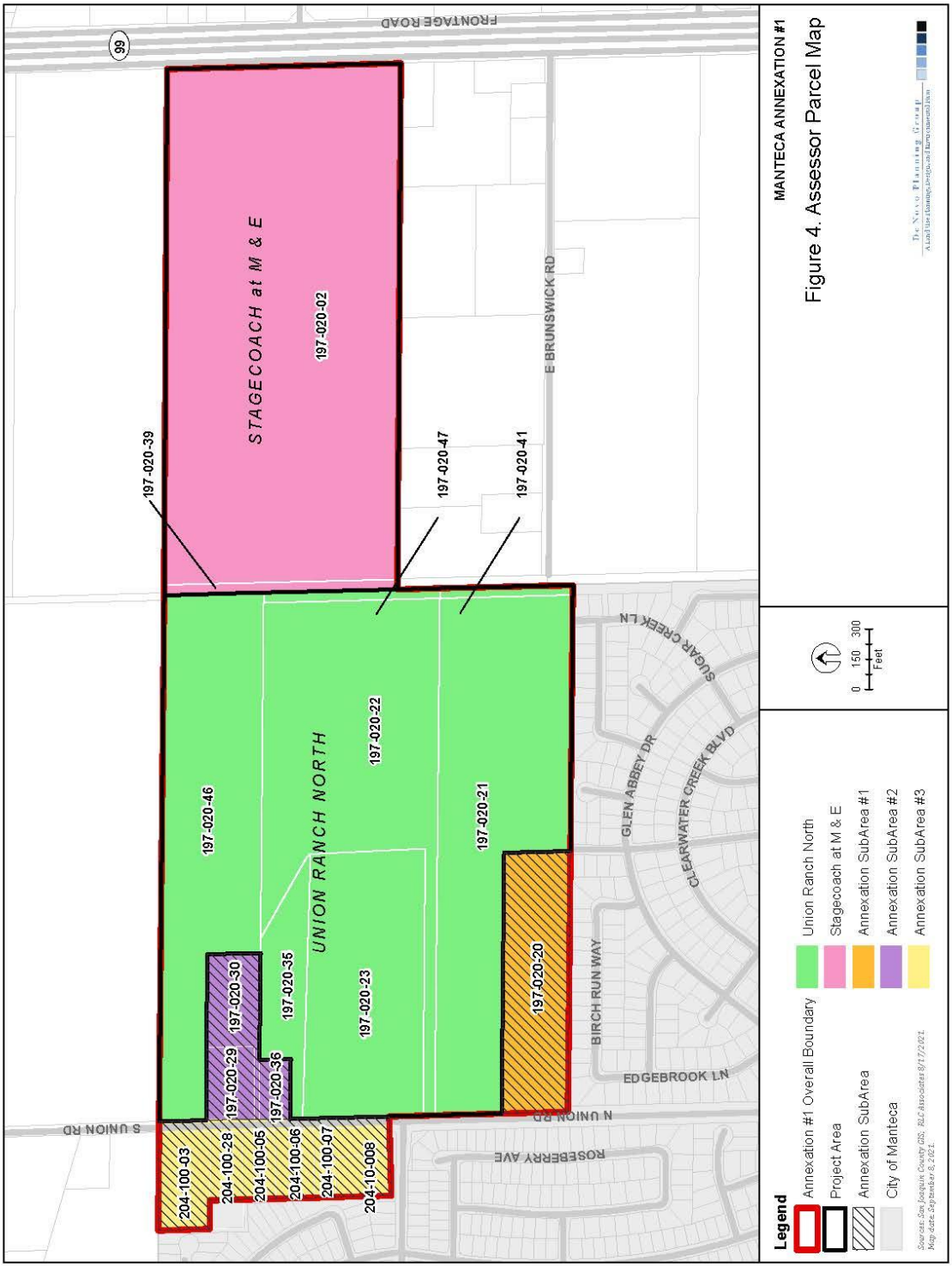


Figure 5: Aerial View Photo



Figure 6a: Existing General Plan Land Use Designations

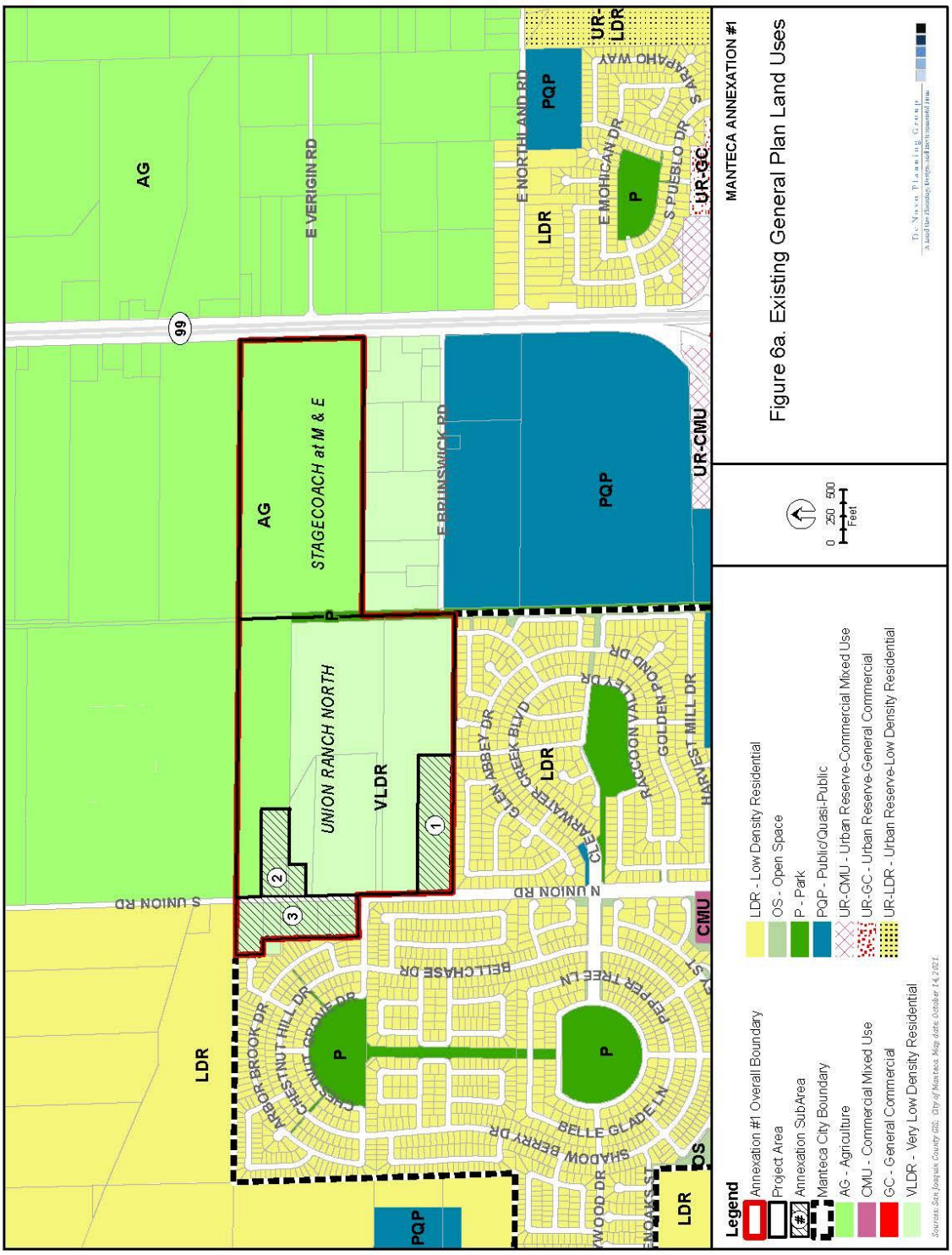


Figure 6b: Proposed General Plan Land Use Designations

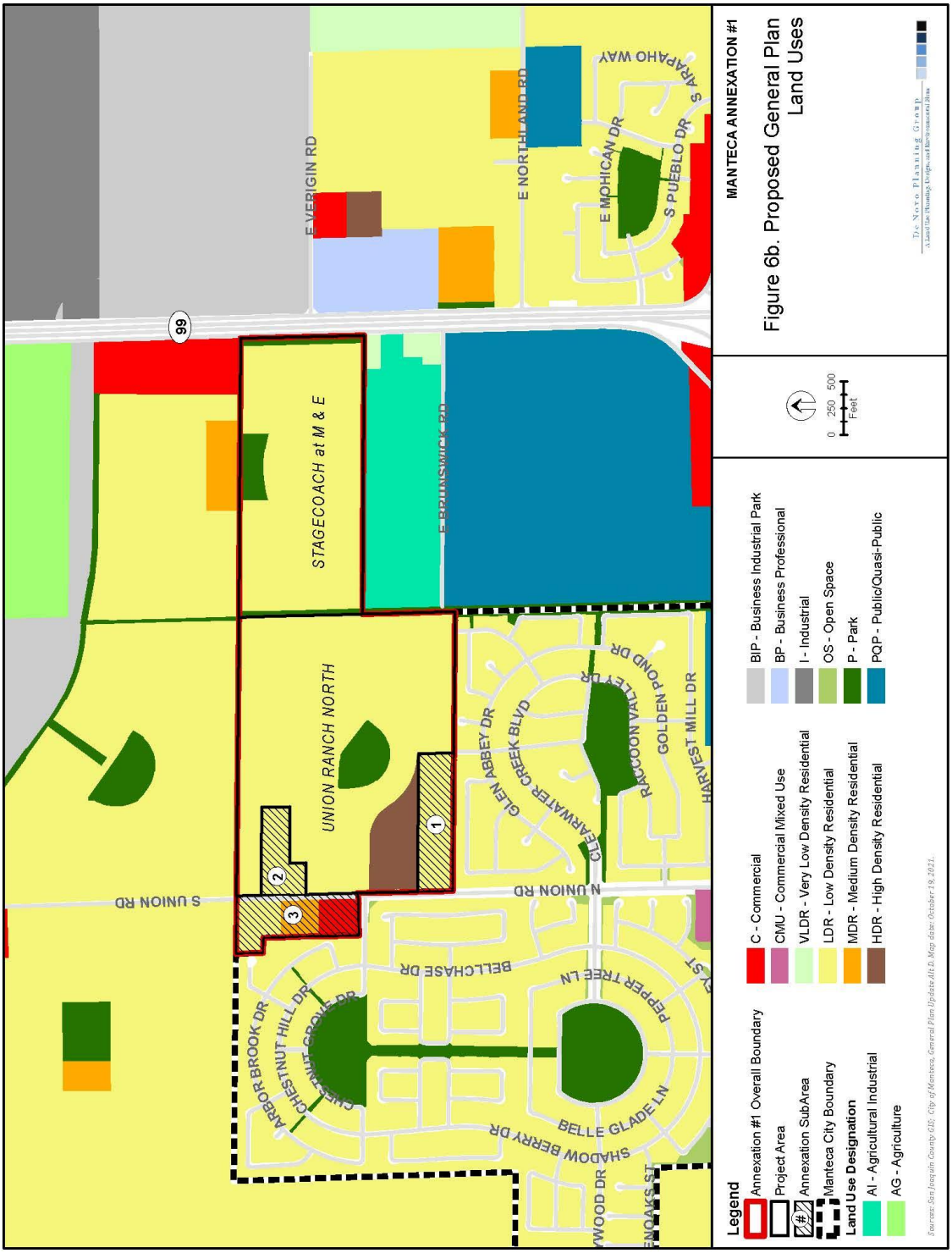


Figure 7a: Existing Zoning Designations

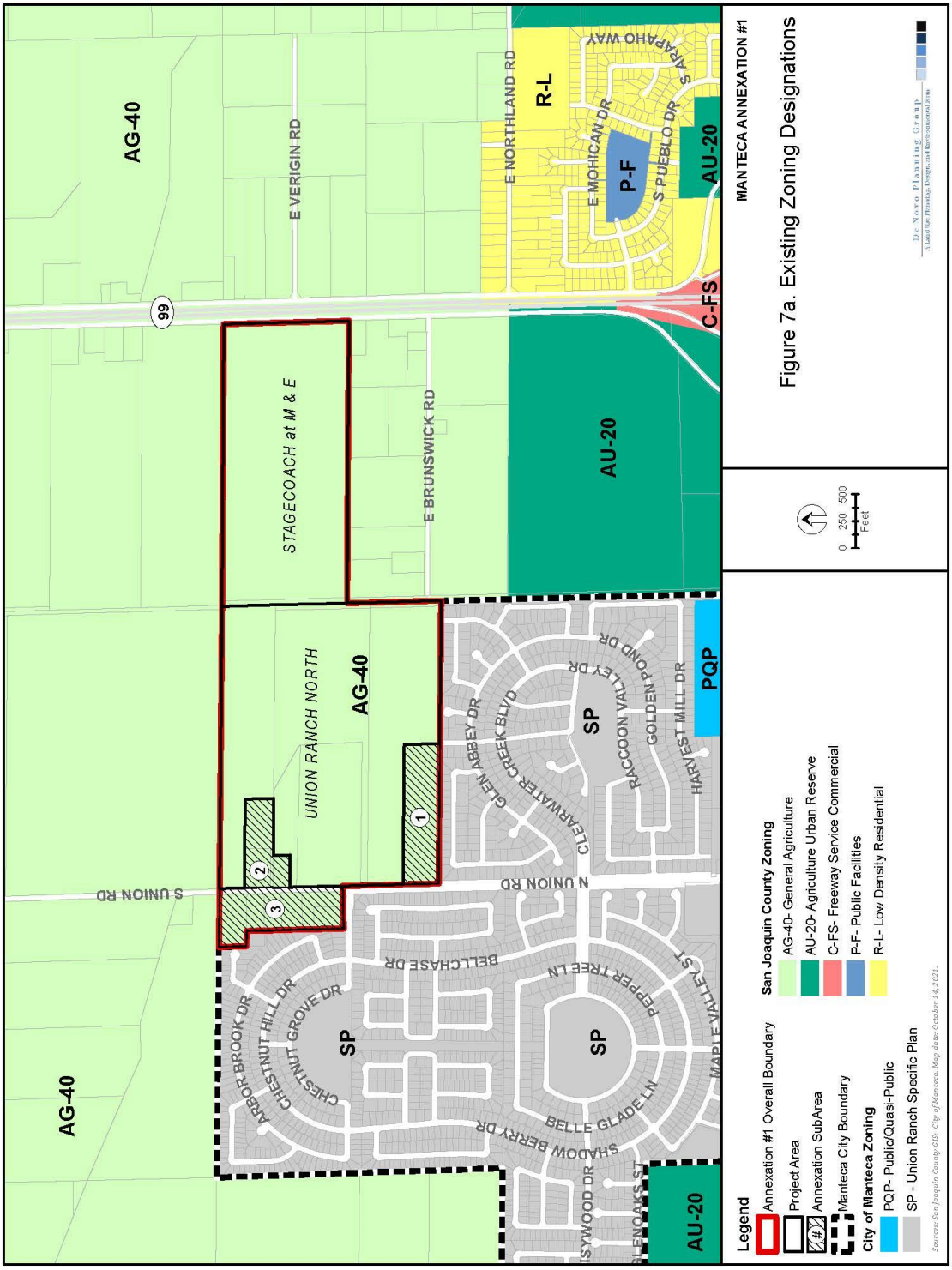


Figure 7b: Proposed Zoning Designations

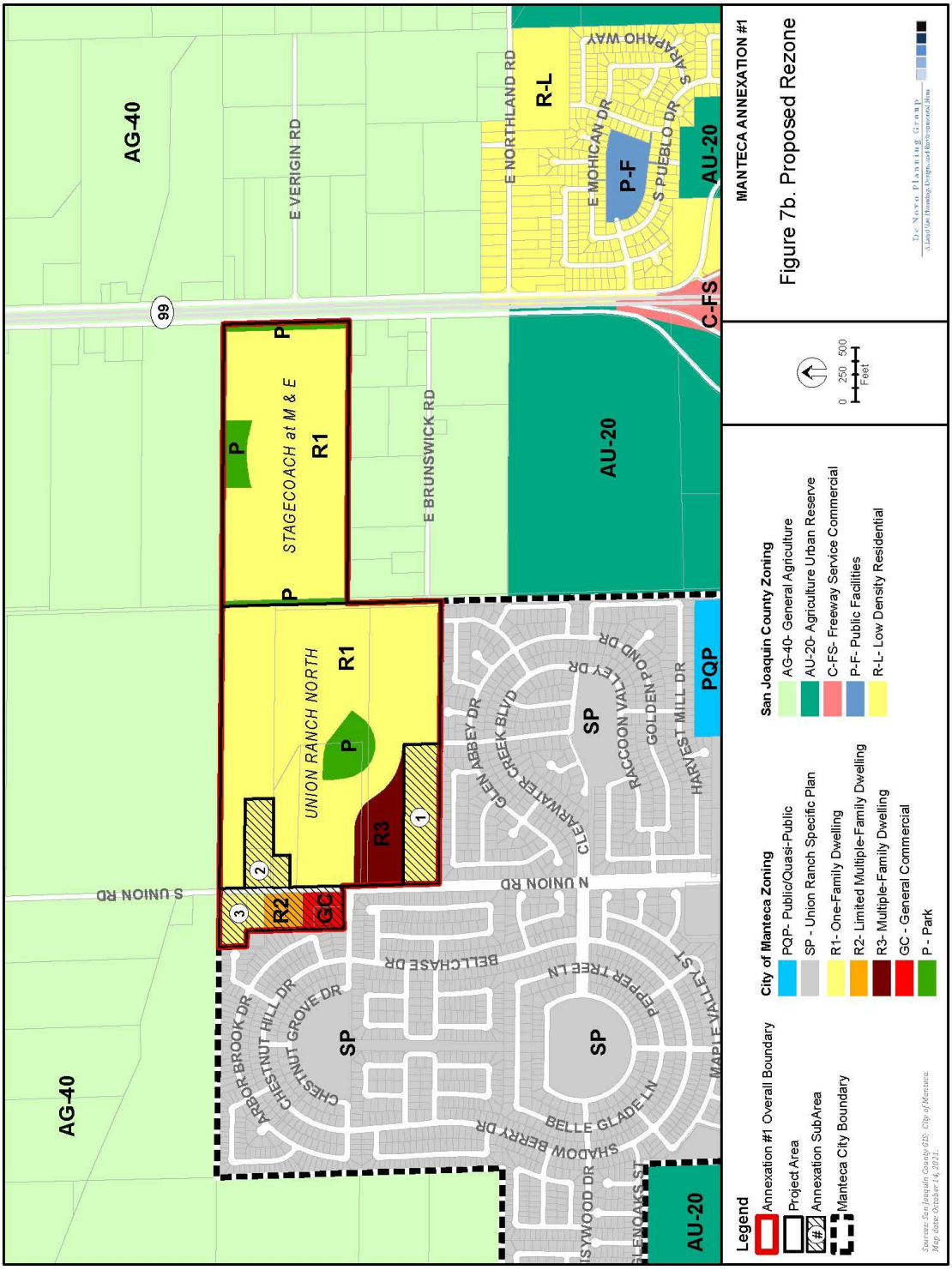
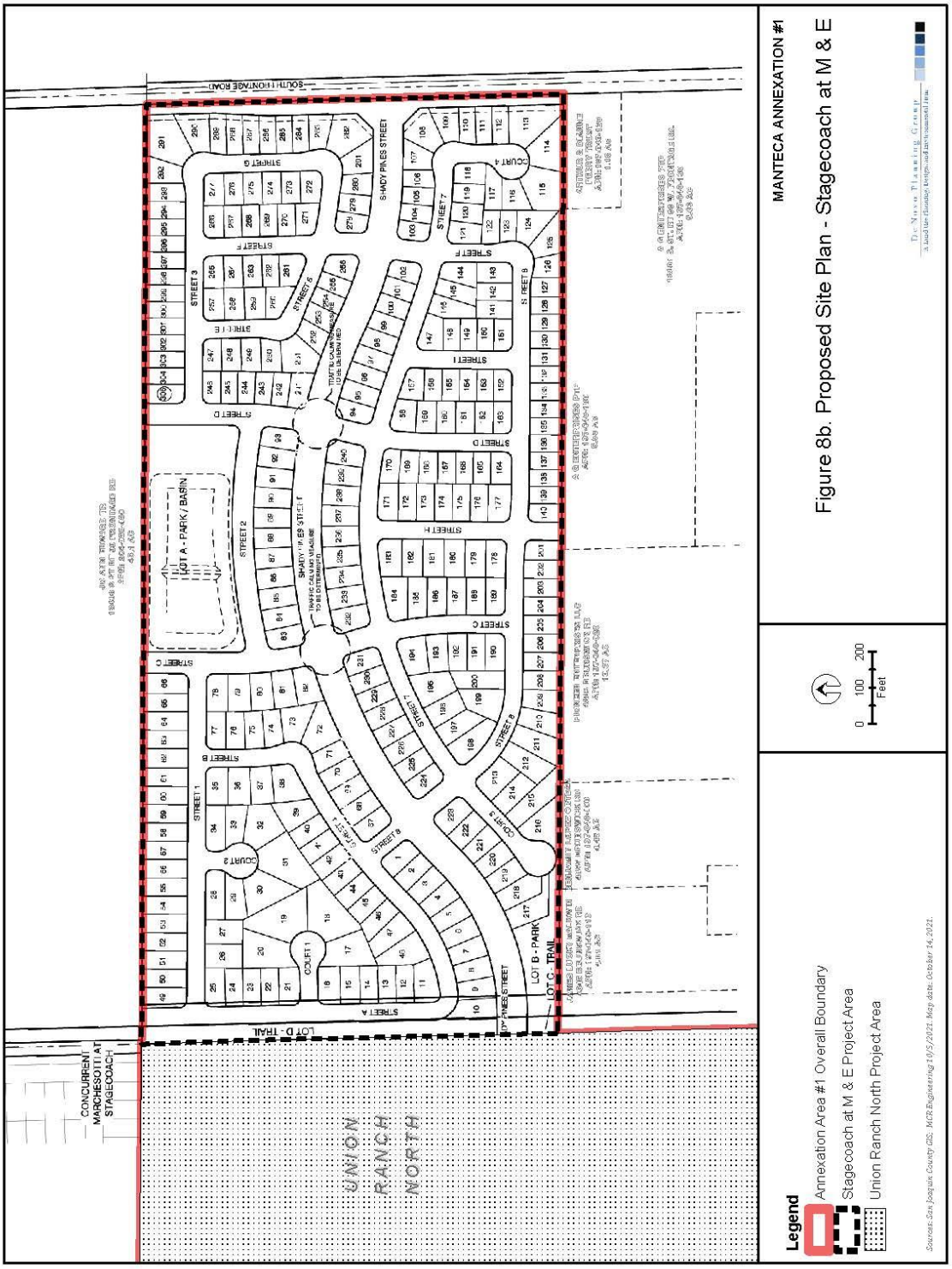


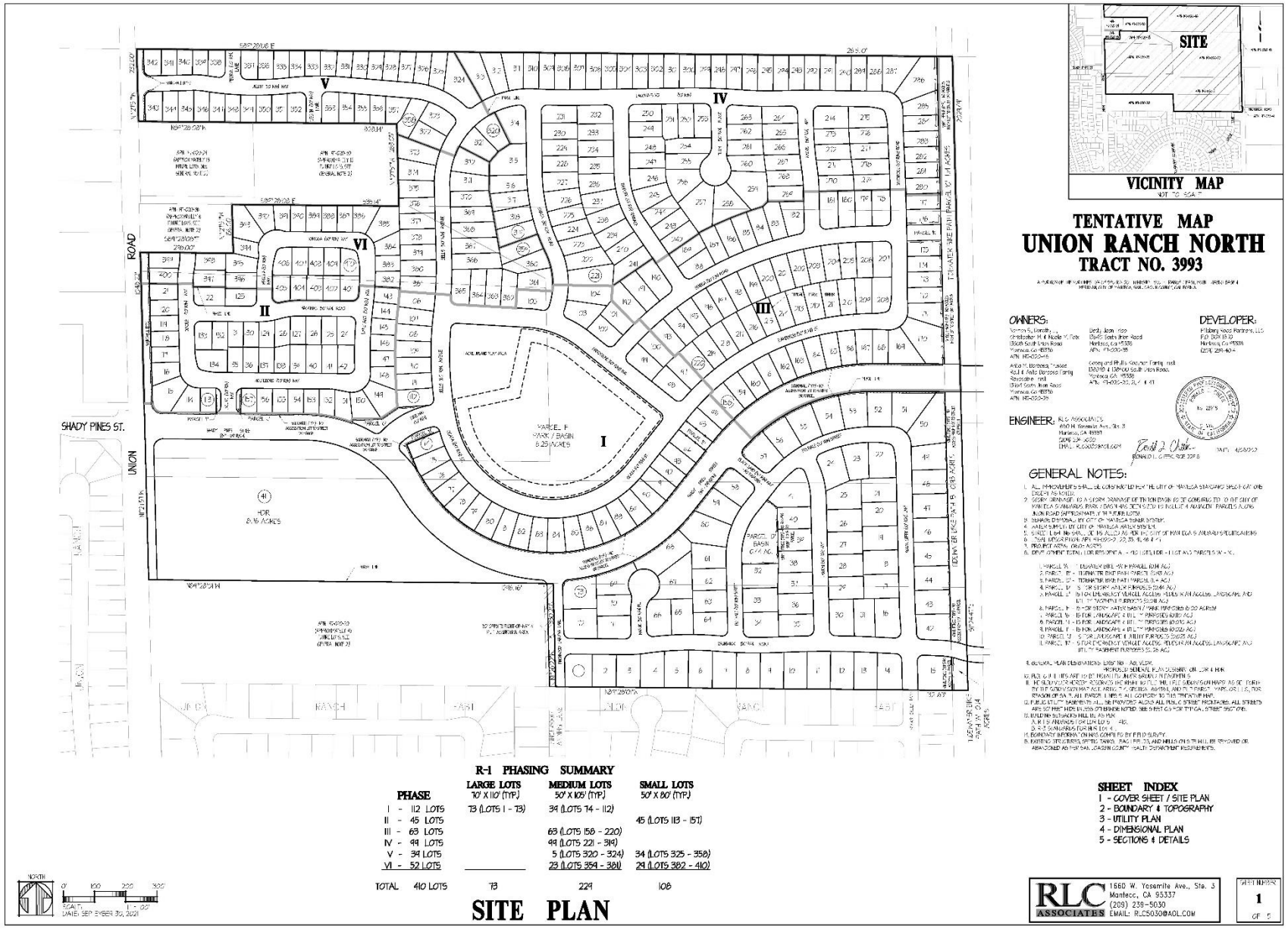
Figure 8a: Site Plan for Subdivision 1 (Union Ranch North)



Figure 8b: Site Plan for Subdivision 2 (Stagecoach at M&E)



Attachment A Tentative Maps



TENTATIVE MAP
UNION RANCH NORTH
TRACT NO. 3993

A PORTION OF THE NORTHWEST QUARTER (NW¼) OF SECTION 19, T.13S., R.19E., M.D.B.&M. AND BEING A SUBDIVISION OF PARCEL 'A' OF PARCEL MAP 2003-01 RECORDED IN BOOK 4 OF PARCEL MAPS AT PAGE 21, MADERA COUNTY RECORDS

OWNERS:

Yamon S. Family, ...
Christopher M. & Nicole M. Fink
35605 South Union Road
Yamona, Ca 93639
APN: 012-020-018

Arthur M. Barbosa Trustee
Ruth E. Avila Barbosa Family
Revocable Trust
31647 South Union Road
Yamona, Ca 93639
APN: 012-020-039

Betty Jean Rice
31665 South Union Road
Yamona, Ca 93639
APN: 012-020-038

Leonard & Phyllis Koehler Family Trust
33230 & 33240 South Union Road
Yamona, CA 93639
APN: 012-020-037, 012-020-041

DEVELOPER:

Hillberg Wood Partners, LLC
P.O. BOX 1810
Manteca, Ca 95336
(209) 239-4040

ENGINEER: RLC ASSOCIATES
1660 W. Yosemite Ave., Ste. 3
Manteca, CA 95337
(209) 239-5030
EMAIL: RLC5030@AOL.COM

RONALD L. CLIFFORD, RCE 32918 — DATE: 10/31/22

GENERAL NOTES:

1. ALL IMPROVEMENTS SHALL BE CONSTRUCTED PER THE CITY OF YAMONA STANDARD SPECIFICATIONS UNLESS NOTED.
2. STORM DRAINAGE: (2) A STORM DRAINAGE DETENTION BASIN TO BE CONSTRUCTED TO THE CITY OF YAMONA'S 5 YEAR/10 YEAR/100 YEAR CRITERIA TO INCLUDE A MINIMUM OF TWO PARCELS ALONG MAJOR IMPROVEMENTS OF THE SUBDIVISION.
3. SEWER: DISPOSAL BY CITY OF YAMONA SEWER SYSTEM.
4. WATER SUPPLY: BY CITY OF YAMONA WATER SYSTEM.
5. STREET LIGHTING: SHALL BE INSTALLED AS PER THE CITY OF YAMONA'S MINIMUM SPECIFICATIONS
6. TOTAL GROSS ACREAGE: APN 41-020-23 - 22.25 AC. (M & P)
7. PROPOSED ARTIFICIAL GRADE ADDED.
8. DEVELOPMENT TOTALS FOR RESIDENTIAL = 410 LOTS, HDR = 11.57 AC. DIRECTIONAL = XX.

I. PARCEL 'A' = DETENTION BASIN PARCEL (0.44 AC.)
2. PARCEL 'B' = DETENTION BASIN PARCEL (0.65 AC.)
3. PARCEL 'C' = DETENTION BASIN PARCEL (1.4 AC.)
4. PARCEL 'D' = 2 - 2 OR 3 STORY APT. OR CONDOS (8.16 AC.)
5. PARCEL 'E' = 15 FOR EMERGENCY VEHICLE ACCESS, UTILITIES AND ACCESS, LANDSCAPE AND UTILITY EASEMENT PURPOSES (0.08 AC.)
6. PARCEL 'F' = 15 - 2 OR 3 STORY NATIVE BASIN / PARK PURPOSES (8.25 AC.)
7. PARCEL 'G' = 15 FOR LANDSCAPE & UTILITY PURPOSES (0.02 AC.)
8. PARCEL 'H' = 15 FOR LANDSCAPE & UTILITY PURPOSES (0.02 AC.)
9. PARCEL 'I' = 15 FOR LANDSCAPE & UTILITY PURPOSES (0.02 AC.)
10. PARCEL 'J' = 5 FOR LANDSCAPE & UTILITY PURPOSES (0.025 AC.)
11. PARCEL 'K' = 5 FOR EMERGENCY VEHICLE ACCESS, UTILITIES AND ACCESS, LANDSCAPE AND UTILITY EASEMENT PURPOSES (0.26 AC.)

9. GENERAL PLAN DESIGNATIONS: EXISTING - AGRICULTURE
PROPOSED: SUBURBAN PLAN DESIGNATION FOR LOW & HDR
10. ALL LOTS SHALL BE SUBJECT TO MASTER GRADING AGREEMENT.
11. NO BUILDING PERMITS SHALL BE ISSUED FOR ANY LOT UNTIL THE FINAL SUBDIVISION MAP HAS BEEN RECORDED BY THE SUBDIVISION MAP ACT, ARTICLE 2.7 SPECIAL AGRICULTURAL AND OPEN SPACE YARD DETAILS, FOR THE PORTION OF R-1 ZONE, LIMITS ARE ALL CONFORM TO THIS TENTATIVE MAP.
12. PUBLIC UTILITY EASEMENTS SHALL BE PROVIDED ALONG ALL PUBLIC STREET FRONTAGES. ALL STREETS ARE 50' RIGHT WIDE UNLESS OTHERWISE NOTED. SEE STREET CROSS FOR TYPICAL STREET SECTIONS.
13. BUILDING SETBACKS WILL BE AS PER:
A. R-1 IS AS PER CODE FOR LOTS 1 - 410.
B. R-2 IS AS PER CODE FOR LOT 4.
14. BOUNDARY INFORMATION WAS COMPILED BY FIELD SURVEY.
15. EXISTING STRUCTURES, SEPTIC TANKS, WELLS, FENCES, AND WELLS ON SITE WILL BE REMOVED OR ABANDONED AS PER SAN JOAQUIN COUNTY HEALTH DEPARTMENT REQUIREMENTS.

SHEET INDEX

1 - COVER SHEET / SITE PLAN
2 - BOUNDARY & TOPOGRAPHY
3 - UTILITY PLAN
4 - DIMENSIONAL PLAN
5 - SECTIONS & DETAILS

R-1 PHASING SUMMARY

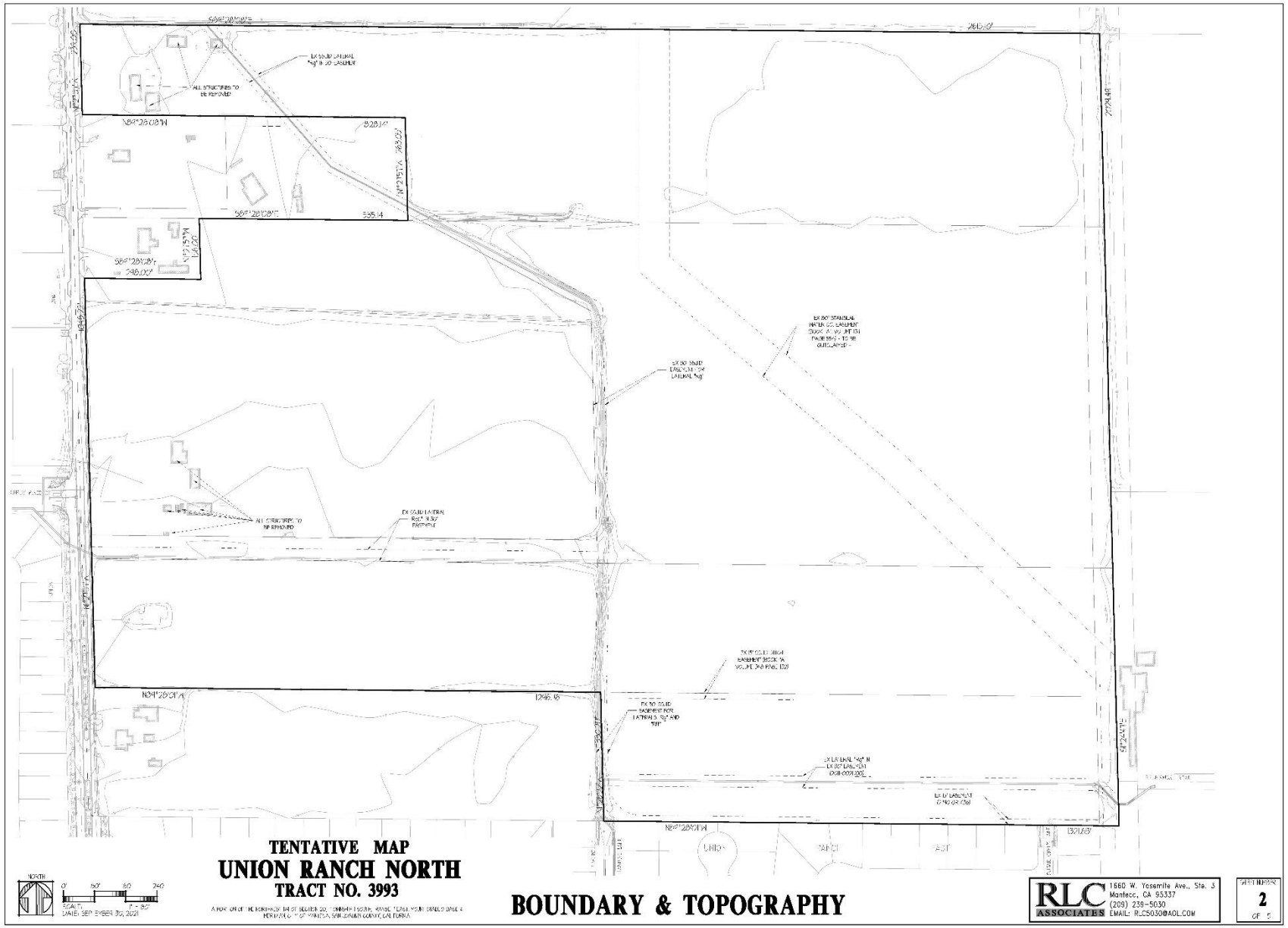
PHASE	LARGE LOTS 70' X 110' (TYP.)	MEDIUM LOTS 50' X 105' (TYP.)	SMALL LOTS 50' X 80' (TYP.)
I - 112 LOTS	73 (LOTS 1 - 73)	39 (LOTS 74 - 112)	
II - 45 LOTS			45 (LOTS 113 - 157)
III - 63 LOTS		63 (LOTS 158 - 220)	
IV - 99 LOTS		99 (LOTS 221 - 319)	
V - 39 LOTS		5 (LOTS 320 - 324)	34 (LOTS 325 - 358)
VI - 52 LOTS		23 (LOTS 359 - 381)	29 (LOTS 382 - 410)
TOTAL 410 LOTS	73	229	108

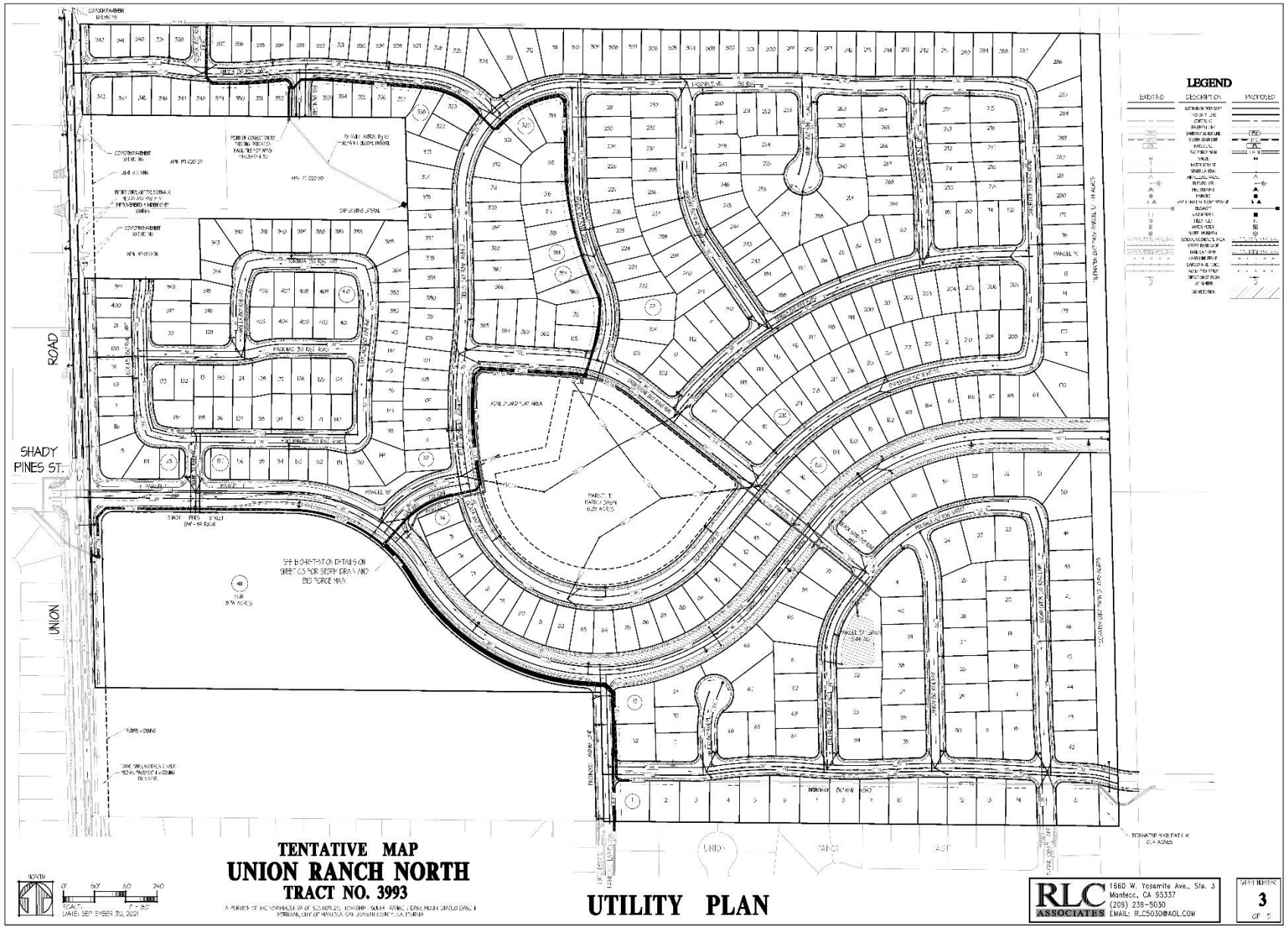
SITE PLAN

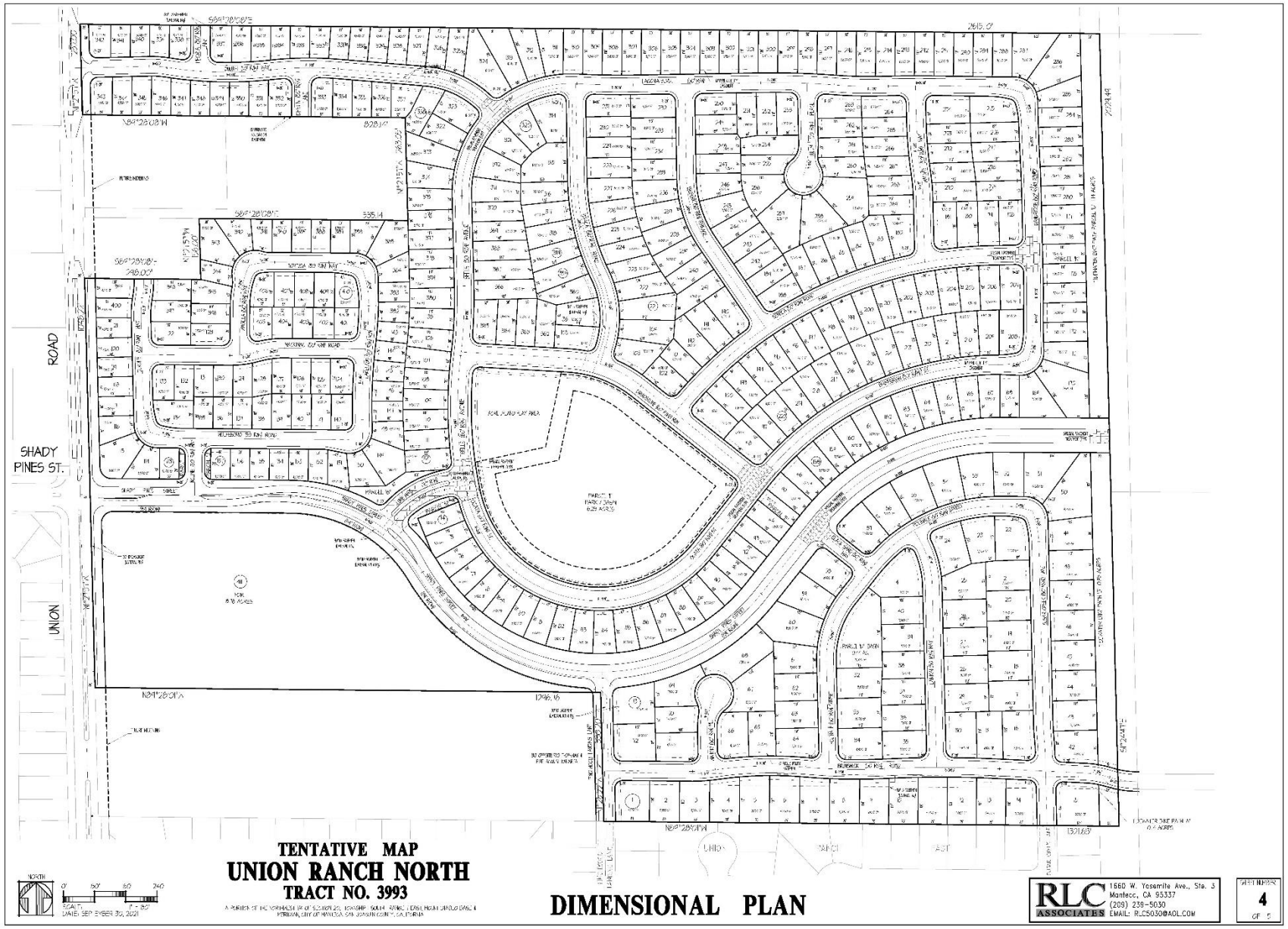
NORTH
0' 100' 200' 300'
SCALE: 1" = 200'
DATE: SEPTEMBER 30, 2021

RLC ASSOCIATES
1660 W. Yosemite Ave., Ste. 3
Manteca, CA 95337
(209) 239-5030
EMAIL: RLC5030@AOL.COM

SHEET NUMBER 1 OF 5


TENTATIVE MAP
UNION RANCH NORTH
TRACT NO. 3993
A PORTION OF THE NORTHEAST 1/4 OF SECTION 28, TOWNSHIP 5 SOUTH, RANGE 7 EAST, MOUNT DIABLO BASE & MERIDIAN, CITY OF MANTECA, SAN JOAQUIN COUNTY, CALIFORNIA
SCALE: 1" = 60'
DATED: SEPTEMBER 30, 2021
BOUNDARY & TOPOGRAPHY
RLC ASSOCIATES
1660 W. Yosemite Ave., Ste. 3
Manteca, CA 95337
(209) 239-5030
EMAIL: RLC5030@AOL.COM
SHEET NUMBER
2
OF 5


LEGEND
SHADY PINES ST.
UNION ROAD
TENTATIVE MAP
UNION RANCH NORTH
TRACT NO. 3993
UTILITY PLAN
RLC ASSOCIATES
1660 W. Yosemite Ave., Ste. 3
Manteca, CA 95337
(209) 239-5030
EMAIL: RLC5030@AOL.COM
SHEET NUMBER
3
OF 5


SHADY PINES ST.
UNION ROAD
TENTATIVE MAP
UNION RANCH NORTH
TRACT NO. 3993
DIMENSIONAL PLAN
RLC ASSOCIATES
1660 W. Yosemite Ave., Ste. 3
Manteca, CA 95337
(209) 239-5030
EMAIL: RLC5030@AOL.COM
SHEET NUMBER 4 OF 5



TYPICAL 50' STREET SECTION

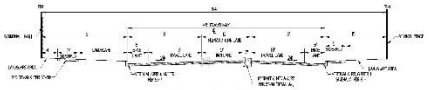


TYPICAL 60' STREET SECTION

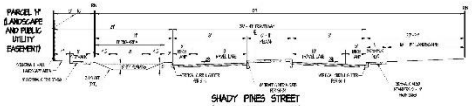


LURE WAY
TYPICAL STREET SECTION

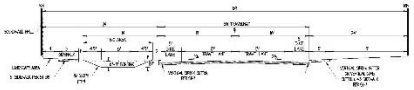
NOTE: CENTERLINE OF RIGHT-OF-WAY MAY OR MAY NOT COINCIDE WITH TRAVELWAY CENTERLINE.



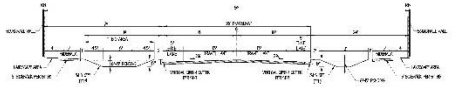
SHADY PINES STREET
(UNION ROAD TO PARCEL 'H')
TYPICAL STREET SECTION



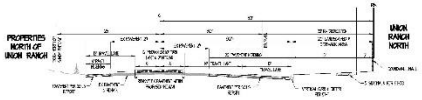
SHADY PINES STREET
(PARCEL 'H' TO LOT 16)
TYPICAL STREET SECTION



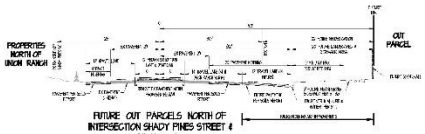
SHADY PINES STREET
(LOT 16 TO FINCHWOOD LANDING LANE)
TYPICAL STREET SECTION



SHADY PINES STREET
(FINCHWOOD LANDING LANE TO EAST BOUNDARY)
TYPICAL STREET SECTION



UNION ROAD
- NORTHERLY 252' OF UNION RANCH NORTH -



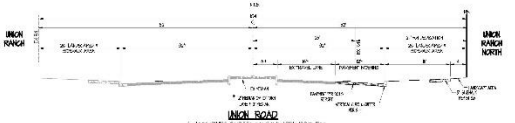
FUTURE OUT PARCELS NORTH OF INTERSECTION SHADY PINES STREET & UNION ROAD
TYPICAL STREET SECTION



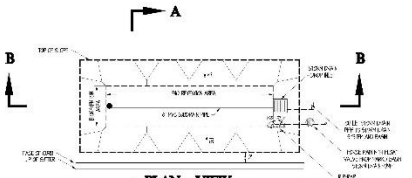
UNION ROAD
460' NORTH OF SHADY PINES ST. RELT.
(SOUTH SIDELINE OF OUT PARCEL IS PART OF THE TO BE CONSTRUCTED SHADY PINES STREET)



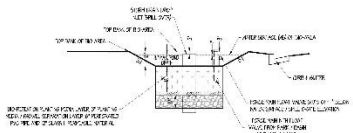
UNION ROAD
- 1320' NORTH OF SHADY PINES STREET TO SHADY PINES ST. RELT.



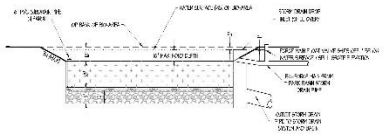
UNION ROAD
SHADY PINES ST. RELT. TO EAST PERIMETER BOUNDARY



PLAN VIEW



SECTION A - A



SECTION B - B

BIO-RETENTION TYPICAL DETAIL

TENTATIVE MAP
UNION RANCH NORTH
TRACT NO. 3993

A PORTION OF THE NORTHEAST 1/4 OF SECTION 20, TOWNSHIP 7 SOUTH, RANGE 11 EAST, MOUNT DIABLO BASE & MERIDIAN, CITY OF MANTECA, SAN JOAQUIN COUNTY, CALIFORNIA

SECTIONS & DETAILS

RLC ASSOCIATES
1660 W. Yosemite Ave., Ste. 3
Manteca, CA 95337
(209) 239-5030
EMAIL: RLC5030@AOL.COM

SHEET NUMBER 5 OF 5

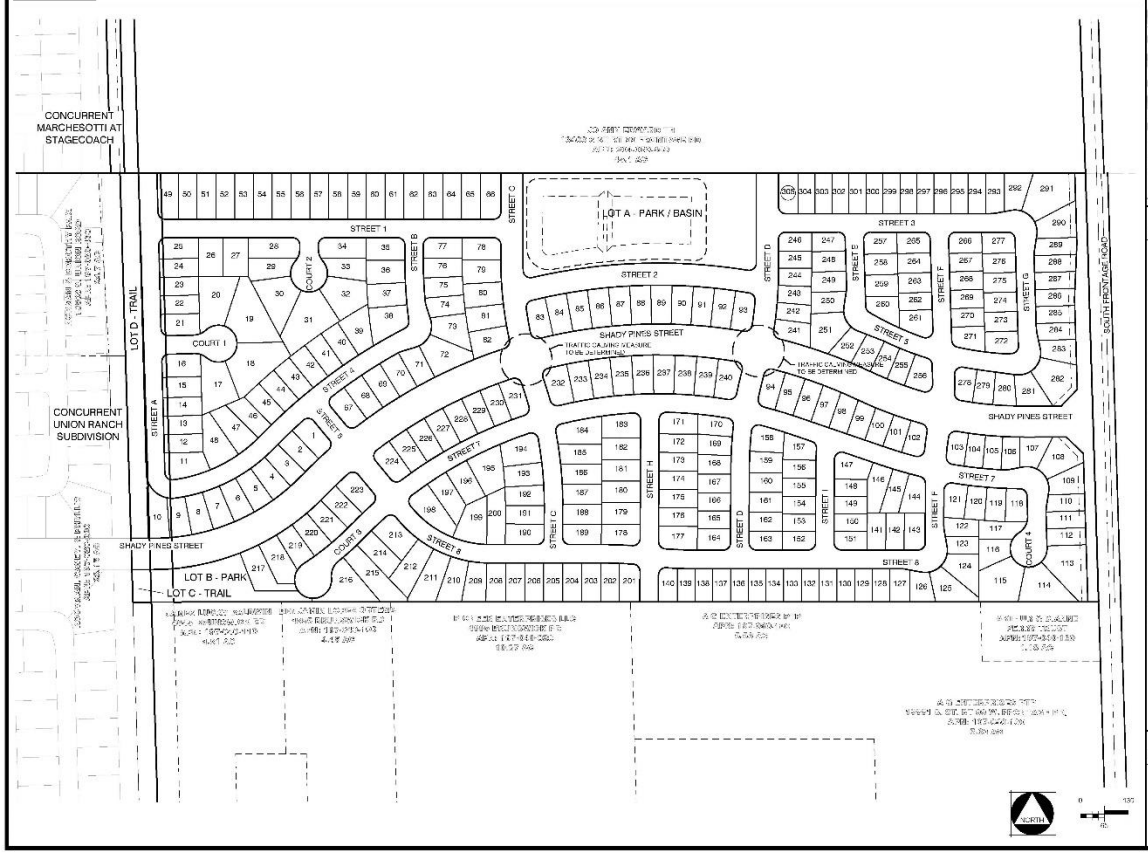
TENTATIVE SUBDIVISION MAP FOR:

STAGECOACH AT M & E

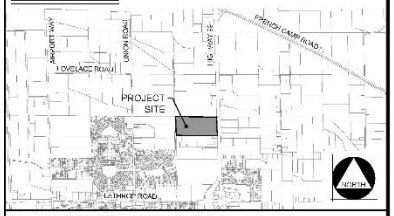
TRACT NO 4065

BEING A PORTION OF THE NORTHEAST 1/4 OF SECTION 20, T.1S., R.7E., M.D.B.M.,
CITY OF MANTECA, SAN JOAQUIN COUNTY, CALIFORNIA

SITE PLAN



VICINITY MAP



INFORMATION DATA TABLE

1. OWNER:	ROBERT HASUB M & E RANCHOS III C 2400 BOOTHBROOK PARKWAY SUITE 205 SANTA ROSA, CA 95405
2. APPLICANT:	TONI RAYMUS CMF 12, LLC 1422 MONTE BLVD, SUITE D MANTECA, CA 95336
3. ENGINEER:	MCR ENGINEERING, INC. 1242 DUPONT COURT MANTECA, CA 95336
4. NO. OF LOTS:	259 (256 SINGLE FAMILY RESIDENTIAL)
5. LAND USE:	LAND USE AS EXISTS: VACANT PROPOSED: SINGLE FAMILY RESIDENTIAL
6. PROPERTY ZONING:	R1
7. GENERAL PLAN:	LDR (LOW DENSITY RESIDENTIAL)
8. UTILITIES:	WATER: CITY OF MANTECA SEWER: CITY OF MANTECA TELEPHONE: VERIZON GAS & ELECTRIC: PACIFIC GAS & ELECTRIC COMPANY IRRIGATION: SSJID
9.	APN: 19-000-020 & 19-022-260
10.	THE SUBDIVISION CONTAINS 65.3± SINGLE FAMILY RESIDENTIAL LOTS, 4 PARK/OPEN SPACE LOTS ON 39.4± ACRES
11.	THE PROPERTY IS RELATIVELY FLAT WITH ELEVATIONS RANGING FROM 30.32'. A SMALL PORTION OF THE EASTERN PARCEL IS ELEVATED FROM 34-38'
12.	BOUNDARY LINES ARE BASED ON RECORD INFORMATION.
13.	EXISTING LOT LINES BASED ON RECORD INFORMATION AND TOPOGRAPHIC SURVEY REFERENCING CITY OF MANTECA BENCHMARK NO. 4 ELEVATION=34.66
14.	ANY EXISTING WELLS AND/OR SEPTIC SYSTEMS ON SITE SHALL BE ABANDONED PER SAN JOAQUIN COUNTY STANDARDS
15.	PUBLIC UTILITY EASEMENTS SHALL BE DEDICATED ALONG ALL STREET FRONTAGES. "PUE" NOT PROVIDED ON SOUTH FRONTAGE ROAD
16.	UTILITIES TO BE LOCATED WITHIN PUBLIC UTILITY EASEMENTS AND SHALL BE MAINTAINED BY GOVERNING AUTHORITY
17.	THE PROJECT MAY BE DEVELOPED IN PHASES. PARCEL MAPS MAY BE FILED OF PHASE BOUNDARIES FOR PURPOSES OF SALE OR FINANCING
	LOT SUMMARY: LOT A - PARK (BASIN) - 3.70 ACRES LOT B - PARK/OPEN SPACE - 3.0 ACRES LOT C - TRAIL - 0.12 ACRES LOT D - TRAIL - 1.14 ACRES LOTS 64-73 & 241-259 (142 LOTS) - 40' X 82' = 4,140 SF MIN. LOTS 48 & 187-240 (61 LOTS) - 50' X 105' = 5,550 SF MIN.

SHEET INDEX

#	SHEET TITLE
1	GENERAL NOTES, KEY MAP AND LEGEND
2	TYPICAL STREET SECTIONS
3	TOPOGRAPHIC SURVEY
4	GRADING PLAN
5	DIMENSION PLAN
6	UTILITY PLAN

MCR ENGINEERING
www.mcreng.com
1242 DUPONT COURT
MANTECA, CA 95336
TEL: (209) 239 - 6229
FAX: (209) 239 - 8839

APPROVED:

PLAN REVISIONS

NO.	DESCRIPTIONS	DATE
1		
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TENTATIVE SUBDIVISION MAP FOR:
STAGECOACH AT M & E

GENERAL NOTES, KEY MAP AND LEGEND

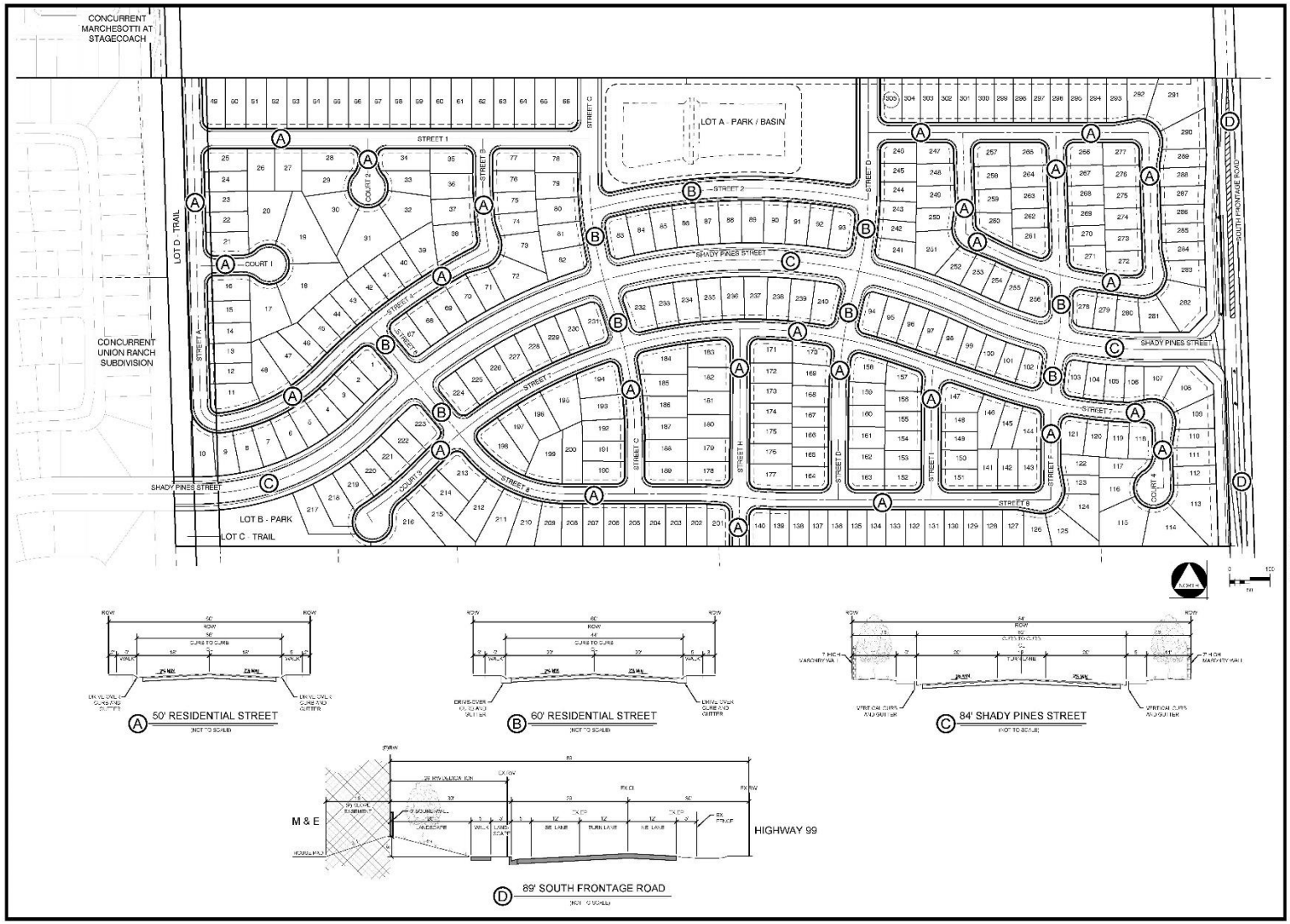
MANTECA, CA

STAGECOACH AT M & E

811 Know what's below. Call before you dig. 811 / 800-227-2600

JOB NO.: 20-047
DATE: 10/8/2021
SCALE: AS S OWN
DR. BY: JB, RP
CK. DY: R R

SHEET NO.
1
OF 7 SHEET



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TENTATIVE SUBDIVISION MAP FOR:
STAGECOACH AT M & E

TYPICAL STREET SECTIONS

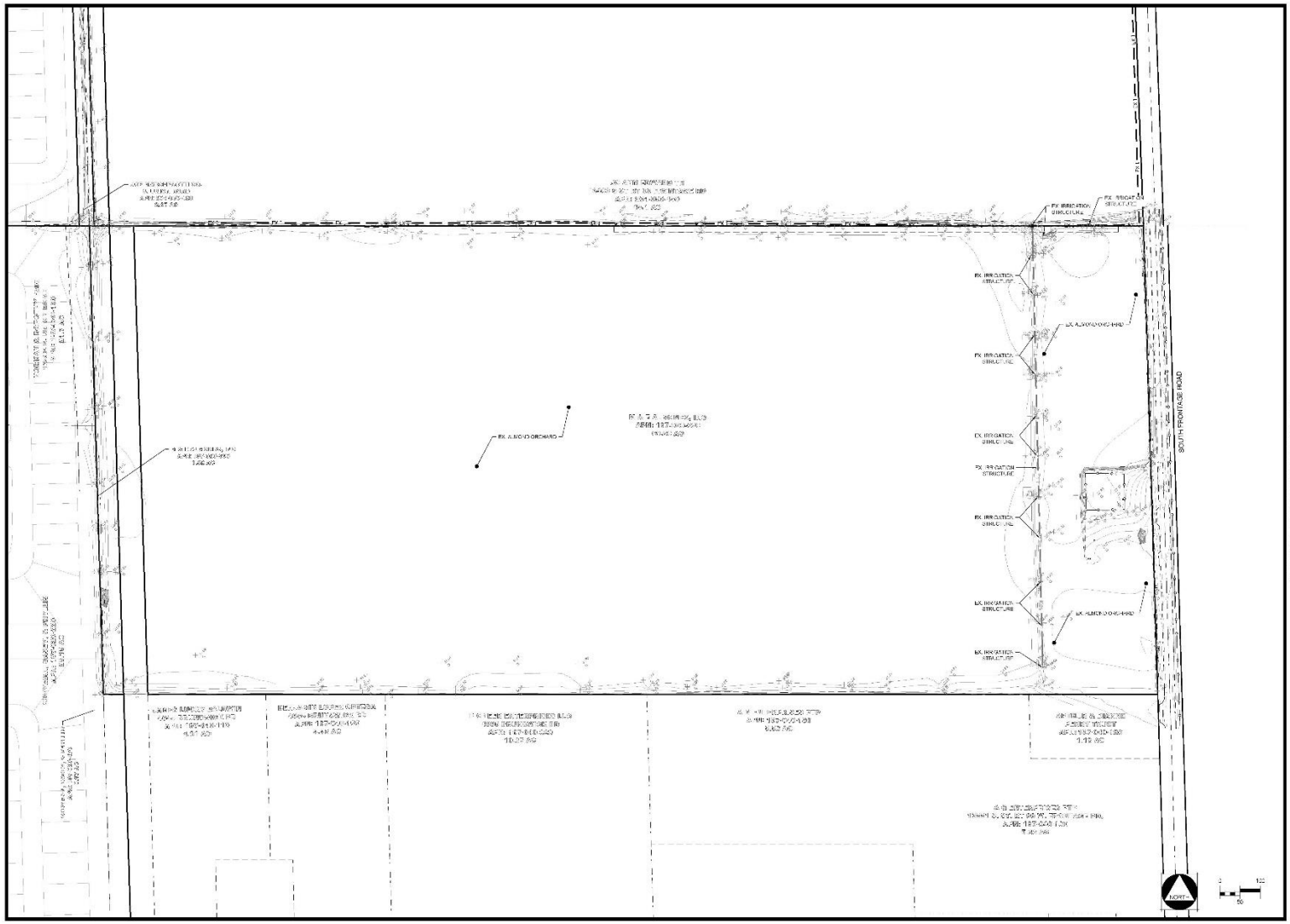
MANTECA, CA

STAGECOACH AT M & E

811 Know what's below. Call before you dig. 811 / 800-227-2600

JOB NO.: SCAM7
DATE: 10/8/2021
SCALE: AS S TOWN
DR. BY: CB, RP
CK. BY: R R

SHEET NO.
2
OF 7 SHEET



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www.mcreng.com
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MANTECA, CA 95336
TEL: (209) 239-6229
FAX: (209) 239-8839

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TENTATIVE SUBDIVISION MAP FOR:
STAGECOACH AT M & E

TOPOGRAPHIC SURVEY

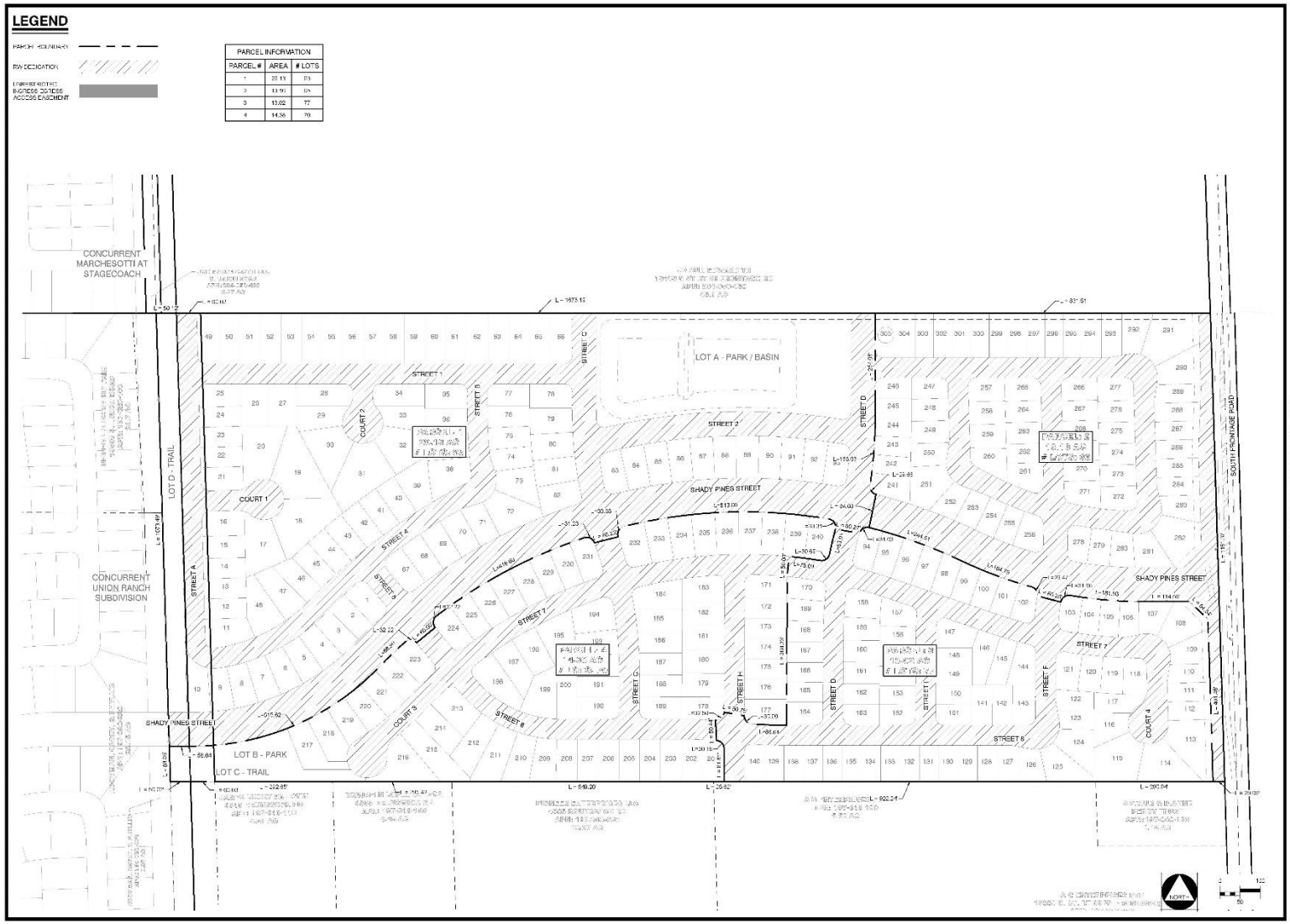
MANTECA, CA

STAGECOACH AT M & E

811
Know what's below.
Call before you dig.
811 / 800-227-2600

JOB NO.:	22-047
DATE:	10/6/2022
SCALE:	AS SHOWN
DR. BY:	CB, RP
CK. BY:	R.R.

SHEET NO.
3
OF 7 SHEET



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TENTATIVE SUBDIVISION MAP FOR:
STAGECOACH AT M & E

LARGE LOT FINAL MAP

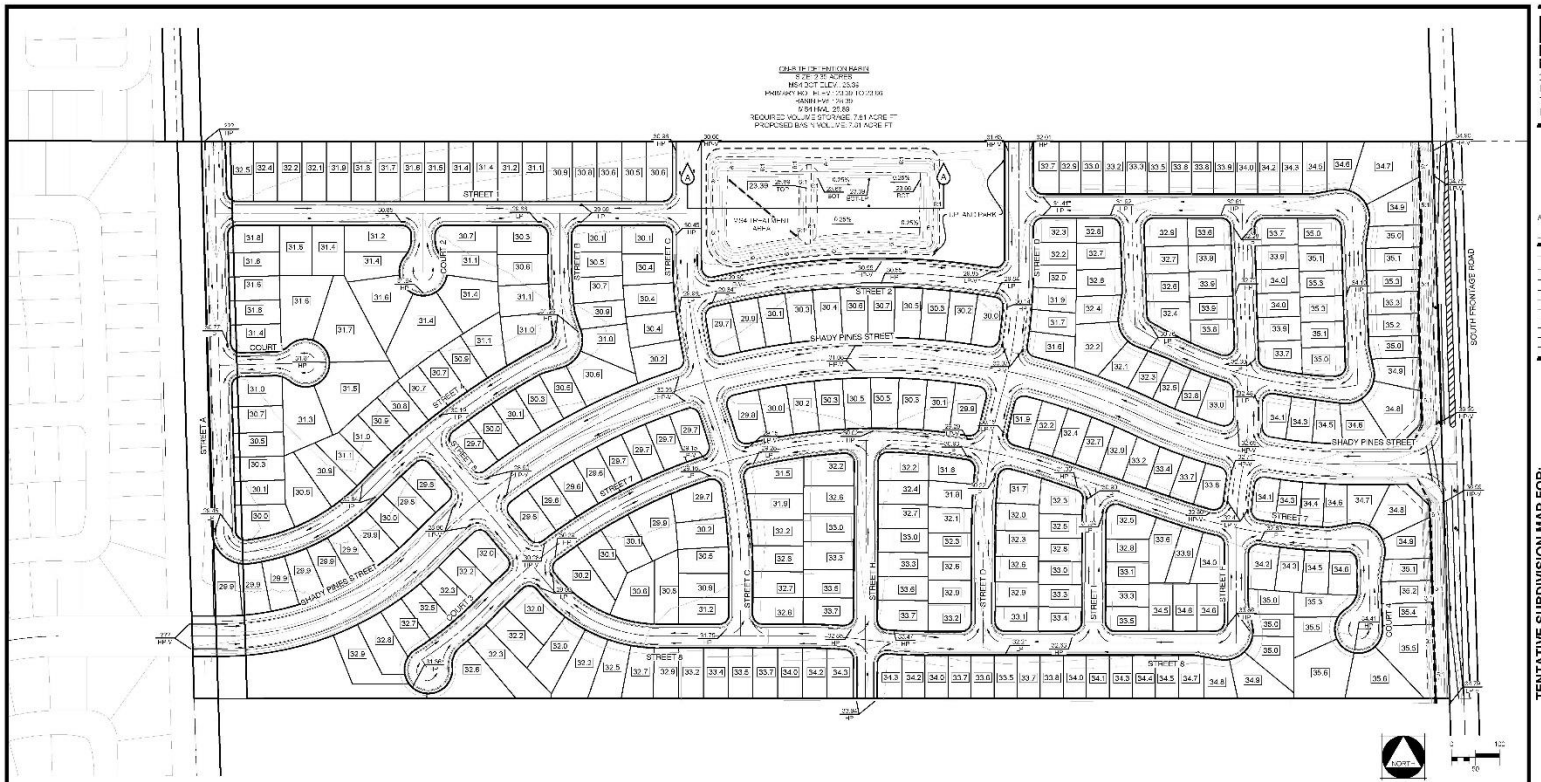
MANTECA, CA

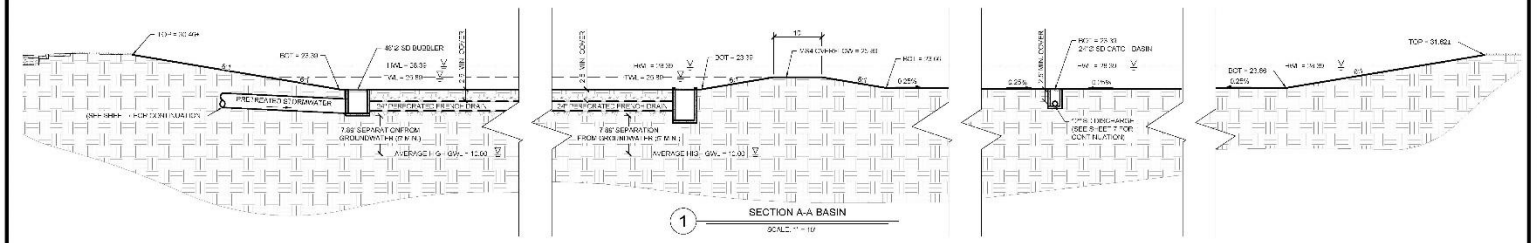
STAGECOACH AT M & E

811 Know what's below. Call before you dig. 811 / 800-227-2600

JOB NO.: 20-047
DATE: 10/8/2021
SCALE: AS S TOWN
DR. BY: CB, RP
CK. BY: R. R

SHEET NO.
4
OF 7 SHEET





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FAX : (209) 239 - 8839

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TENTATIVE SUBDIVISION MAP FOR:
STAGECOACH AT M & E

GRADING PLAN

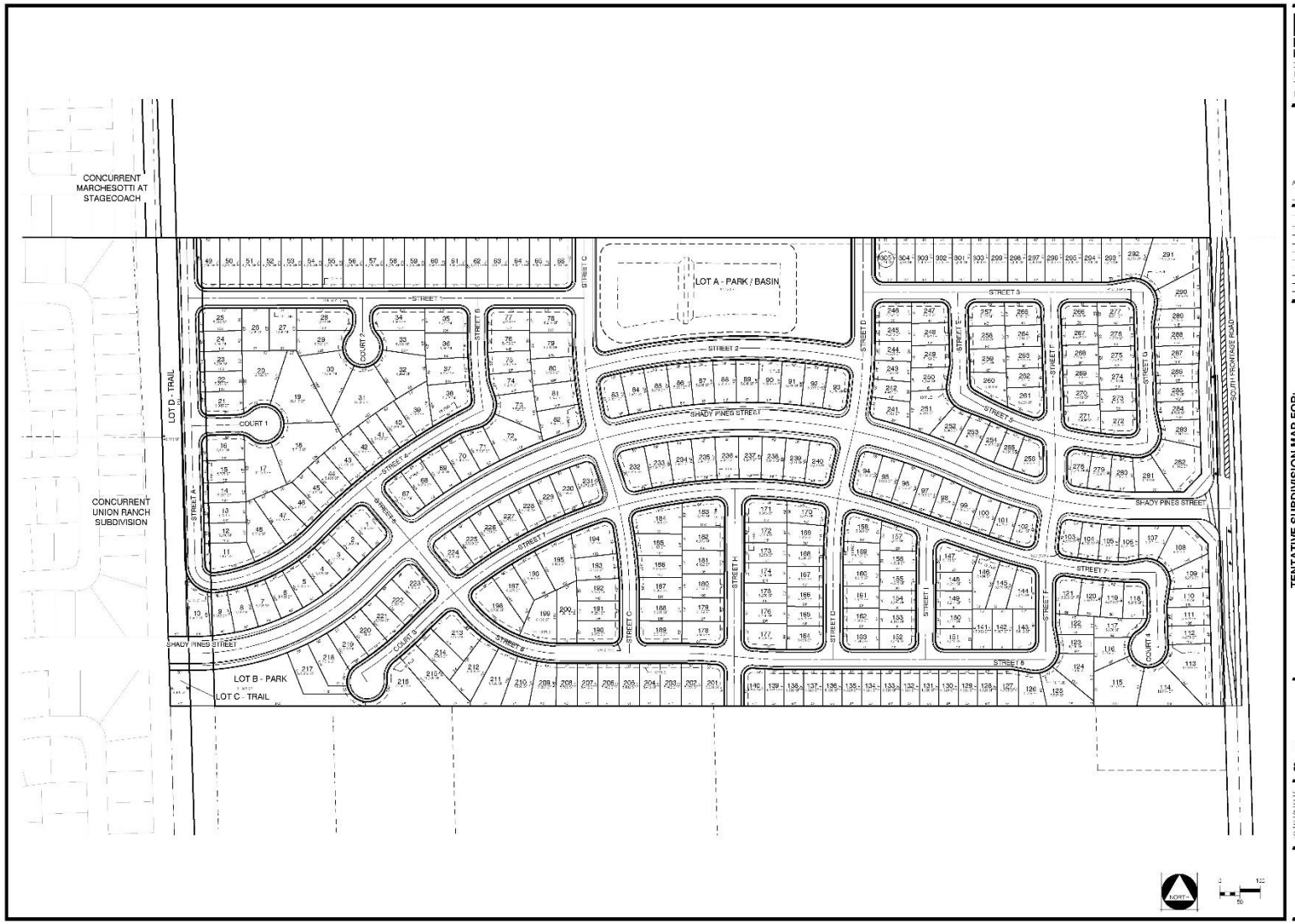
MANTECA, CA

STAGECOACH AT M & E

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JOB NO.: 20-047
DATE: 10/8/2021
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DR. BY: JB, RP
CK. BY: R R

SHEET NO.
5
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TENTATIVE SUBDIVISION MAP FOR:
STAGECOACH AT M & E

DIMENSION PLAN

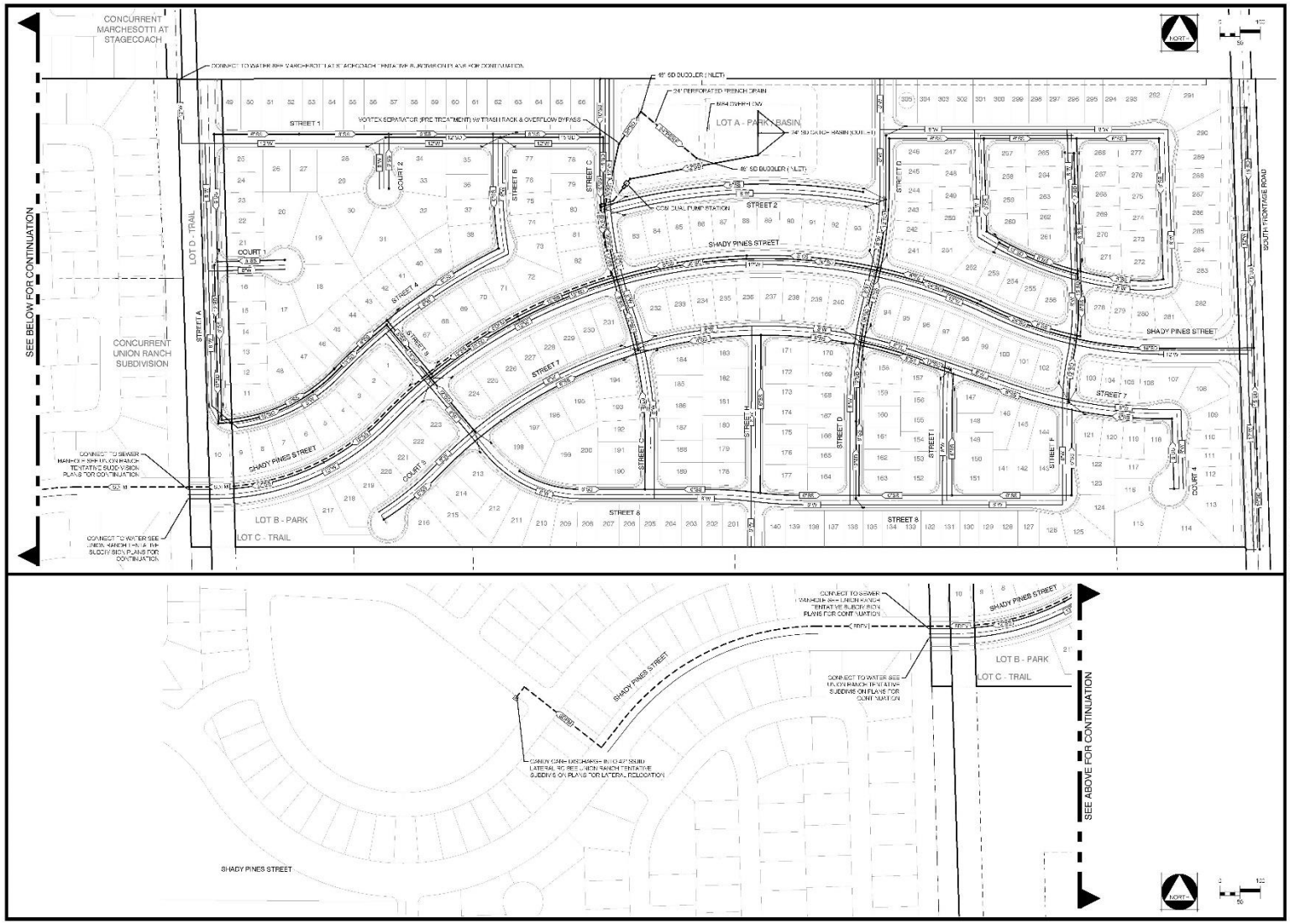
MANTECA, CA

STAGECOACH AT M & E

811
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811 / 800-227-2600

JOB NO.: 20-047
DATE: 10/8/2021
SCALE: AS S TOWN
DR. BY: CB, RP
CK. BY: R. R

SHEET NO.
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TENTATIVE SUBDIVISION MAP FOR:
STAGECOACH AT M & E

UTILITY PLAN

MANTECA, CA

STAGECOACH AT M & E

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JOB NO.: 20-047
DATE: 10/8/2021
SCALE: AS S TOWN
DR. BY: JB, RP
CK. BY: R R

SHEET NO.
7
OF 7 SHEET

HERUM \ CRABTREE \ SUNTAG
ATTORNEYS

Steven A. Herum
sherum@herumcrabtree.com

May 5, 2021

VIA EMAIL & U.S. MAIL

City of Manteca
1001 W. Center Street
Manteca, CA 95337
Email: jhightower@ci.manteca.ca.us

Re: DRAFT ENVIRONMENTAL IMPACT REPORT
FOR THE MANTECA GENERAL PLAN UPDATE
(SCH: 2020019010)
MARCH 2021

To Whom It May Concern:

This office represents Delicato Wineries concerning the City of Manteca General Plan update. Delicato has actively participated in all aspects of the Manteca General Plan update, including but not limited to making numerous presentations to the Citizens' advisory committee[1], the Manteca Planning Commission and the Manteca City Council. Delicato also supplied written comments to the City during the Notice of Preparation public comment period.

Delicato owns and operates one of the five largest wineries in the United States and employs over 850 people. The operation is located in the Manteca area and provides important family wage jobs to numerous Manteca residents and contributes substantially to the local economy by buying goods and services from local businesses and professional service companies. Delicato's direct and indirect economic impact to Manteca's economy is substantial.

Accordingly, Delicato holds a vital and substantial interest in working collaboratively with the City of Manteca to adopt a General Plan update achieving Manteca's objectives for environmental sensitive and sustainable growth without unjustly damaging Delicato's operation or otherwise impairing its ability to continue to operate the winery.

[1] The G-PAC composition was odd in the extreme. A business partner, the son and employee, and a former consulting engineer of one of the developers proposing housing developments adjacent to the Delicato property were G-PAC members. Each fully participated in the decision about designating land uses next to the Delicato property and actively spoke against Delicato's arguments and evidence that supported designating these territories for non-residential land uses. None of these individuals pointed out the statutory conflict of interest created by their association with the developer.

To the extent Manteca aspires to attain a vibrant jobs/housing balance it is vital for the General Plan to protect significant job creating businesses in the Manteca area such as the Delicato winery.

The California Environmental Quality Act (CEQA) performs a vital function in considering these land use decisions. CEQA is to be expansively interpreted in order to provide maximum evaluation and consideration of potential direct and indirect environmental effects of a proposed project. Title 14 California Code of Regulation § 15003(f) (hereinafter CEQA Guidelines); *Friends of Mammoth v. Board of Supervisors* (1972) 8 Cal.3d 247, 259. In keeping with this expansive statutory mandate the "EIR requirement is the heart of CEQA", CEQA Guidelines § 15003(a); *County of Inyo v. Yorty* (1973) 32 Cal.App.3d 795; indeed, the Legislature has found and declared that "maintenance of a quality environment for all people of this state is now and in the future is a matter of statewide concern." Pub.Res. C. §2100(b).

As a result a major reason to prepare EIRs is to generate data and information and "inform other governmental agencies and the public generally of the environmental impact of the proposed project." CEQA Guideline §15003(c). "An EIR is an informational document." CEQA Guideline §15121(a). The analysis presented in an EIR shall be supported by Substantial Evidence which is defined as "*facts*, reasonable assumptions predicated upon f*acts*, and expert opinion supported by *facts*." *Id*. at §15385 (italics added). Naked conclusions without evidentiary support form no basis for a public agency or the public to sufficiently review potential environmental effects of a land use proposal.

Being treated as an information document represents an important concept because EIR conclusions untethered to substantial evidence are not evidence that an agency may rely on in formulating land use and environmental decisions. *Placerville Preservation League v. Judicial Council* (2017) 16 Cal.App.5th 187, 193 n6. (In connection to this draft EIR, as explained later, several important EIR conclusions are offered without data, information or facts.)

More specifically, an Environmental Impact Report must consider both direct and indirect environmental effects (CEQA Guidelines § 15064(e)) including secondary environmental effects resulting from direct economic effects. Delicato offers the following comments concerning the draft EIR, expressly reserving the right to supply additional comments during the noticed public hearing process.

1. A potential environmental impact in the form of land use conflicts is identified in the EIR. Under CEQA the EIR must identify all feasible mitigation measures and the city must impose all of these mitigation measures. The General Plan policies directed toward the land use conflict are BOTH mandatory general policies and feasible mitigation measures. These policies cannot be removed or lessened

during the approval process or otherwise the EIR and the General Plan will be legally inadequate.

Based on public comments submitted during the Notice of Preparation period, the draft EIR devotes substantial space to the significant environmental impact of potential land use conflicts between agricultural/agricultural processing land uses, including the Delicato operation,[2] and proposed residential land uses. Under CEQA an EIR shall identify all feasible mitigation measures and the public agency shall impose all feasible mitigation measures, even if the environmental impact remains significant after imposing mitigation measures.

This approach is consistent with the direction provided by the CEQA Guidelines. CEQA Appendix G Section XI (b) requires evaluation of whether a General Plan could "[c]ause a significant impact due to a conflict with any land use plan, policy, or regulation". Similarly, Section (e) requires an analysis of the proposal's potential to indirectly through a chain of events result in a conversion of agricultural lands.

The preferred General Plan diagram mitigates the significant environmental effect of land use conflicts by designating most land abutting the Delicato operation as non-residential. This operates as both a General Plan designation and a mitigation measure to lessen the intensity of the significant environmental land use conflict impact.

However, we find the draft EIR legally deficient to the extent it inadequately analyzes and mitigates the situation at the southwest corner of the Delicato real property. At that point the preferred General Plan designates abutting real property as residential, setting up a potentially significant land use conflict without imposing all feasible mitigation.

The most practical and feasible mitigation is ignored: imposing a non-residential land use designation on this real property. Thus the EIR fails to discharge its duty under CEQA by failing to analyze, with information and data, why designating this portion of land

[2] As used herein and hereinafter during future public hearings the term "Delicato operation" includes not just the physical buildings involved in wine production and processing but also the adjoining agricultural lands owned by Delicato and designated as Agriculture on the preferred General Plan. The Delicato owned Agriculture designated real property is integrated into and plays a critical role in the winery operation. This is because the winery operation depends upon satisfying a water discharge permit issued by the Regional Water Quality board and these agricultural lands serve as discharge lands under the permit. In addition, a basin collects and cleans the process water and then pumps it on to the agricultural land for irrigation purposes. Even with the best available technology and practices the discharge (acreage or area) has the capacity to emit odors during certain times of the year.

At a General Plan workshop it was implied that the agricultural designated land constituted a "buffer" to the wine operation. But this statement is not true. The correct statement is that the agriculturally designated land owned by Delicato is part and parcel and an integrated part of the winery operation. As a part of the integrated waste discharge system these lands cannot offer a buffer from potential land use conflicts. Instead a buffer must be imposed to create an area of separation from the Delicato agricultural lands used as part of the Regional Board discharge permit and potentially conflicting residential housing.

abutting Delicato with a non-residential designation, which creates an area of separation between potentially conflicting land uses, does not represent a feasible mitigation measure. This represents serious legal deficiencies for the draft EIR.

We also comment that the draft EIR dispensed without discussion another feasible mitigation measure: designating the land around the Delicato property for parkland. In its letter submitted during the Notice of Preparation Delicato advocated that the land in question be assigned a non-residential designation but observed the City through its expansive police power had a duty to consider a parkland designation with just compensation for the property owners as a valid alternative from a land use perspective and a feasible mitigation measure from a CEQA perspective. Delicato wrote:

> Throughout the public hearing process Delicato has not advocated that adjoining property be designated open space. However, the City of Manteca, possessing elastic and ambulatory police power to assign land use designations to the City's General Plan is legally required to consider as part of a legal sufficient environmental impact report analysis the suitability of open space designation from a planning perspective and the feasibility for open space designations of the property adjoining the Winery Property. Omitting this analysis produces a legally deficient environmental impact report.

(Underlining added.)

Unfortunately the City ignored this written suggestion and dispensed with considering the area as parkland. Besides representing a defective approach under CEQA, this is strange action since the City has a long term goal of developing a regional park in the northeast quadrant of the city. In short, the draft EIR cannot dispense with an Open Space or Parkland designation since either designation represents feasible mitigation to lessen the potentially significant environmental effect of conflicting land uses. Or, stated slightly differently, the draft EIR does not produce information and data to support an implied conclusion that an open space or parkland general plan designation is infeasible. See CEQA Guideline § 15364 (CEQA definition of feasibility).

Finally, General Plan policies reflect mitigation measures identified in the draft EIR.[3] The relevant General Plan policies represent both *mandatory* General Plan policies and

[3] The consistency of a General Plan and a Project is both a CEQA issue and a land use issue that must be dealt with in detail by the City when considering this application on its merits. Black letter land use law teaches us the General Plan sits atop a hierarchy of land use regulations and is the "constitution" for community growth and development. As a result, comprehensive statutory requirements as broadly interpreted by controlling decisional law leave no doubt that a city lacks authority to approve a land use application that is inconsistent with the general plan. Hence, issues raised about a conflict between General Plan policies concerning the reduction of land use conflicts through buffers and other measures and a proposed residential subdivision represents both a CEQA and land use issue and renders the General Plan policies *as a land use issue and a CEQA issue*.

feasible CEQA mitigation measures. Removing or watering down these policies during the public hearing process renders the EIR legally deficient in that all feasible mitigation measures will not be imposed. Accordingly, the draft EIR at page 3.2-12 states in relevant part:

> **The proposed General Plan includes policies and action, identified below, that are intended to** reduce the conversion of farmlands…to non-agricultural uses. These include policies that encourage the development of vacant lands within City boundaries prior to conversion of agricultural lands and **ensure that urban development near existing agricultural lands will not unnecessarily constrain agricultural practices or adversely affect the economic viability of nearby agricultural operations**.

(Bolding added.)

At a minimum, the following General Plan policies also operate as mitigation measures to lessen the intensity of the significant environmental effect of land use conflicts:

> LU-1.2, Lu-1.3, LU-2.6, LU-3.8, LU-3.9, LU-3c, LU-3d, Lu-11c, CD-6.1, CD-6.2, CD-6.3, CD-6b, CD-8a, RC-6.2, RC-8, RC-8.4, RC-8.6, RC-8.9, RC-8.11, RC-8c, and RC-8e.

In summary, changes to the land use designations assigned to property abutting the Delicato property by the preferred General Plan, except for the small area where an improper residential designation abuts the Delicato property, and changes to General Plan policies mitigating the significant environmental effect of land use conflicts cannot change during the public hearing process without rendering the EIR legally deficient.

2. <u>The so-called environmentally superior Alternative, Alternative B, changes the land around the Delicato property from industrial to residential thereby exacerbating the land use conflict. Thus Alternative B is not environmentally superior unless the non-residential designation assigned by the preferred General Plan is restored</u>.

Alternative B substitutes a residential designation for the preferred General Plan's non-residential designation for substantial amounts of land abutting the Delicato property. This change brings the significant environmental impact of land use conflicts into direct conflict:

(A) It does not supply information or data regarding the basis for this change and does not form a conclusion that providing non-residential land use designation for land abutting the Delicato property is an infeasible mitigation measure.

(2) It does not supply information or data to support this change is land use designation.[4]

(3) It does not supply information and data concerning the adequate width of a buffer to lessen potential significant environmental impacts from conflicting land uses.

Under this circumstance Alternative B is not environmentally superior to the preferred General Plan. Or, in the alternative, Alternative B could substitute non-residential land use designations for the residential land use designation assigned to real property abutting the Delicato property and become even more environmentally superior for CEQA purposes. In short, Alternative B can be environmentally superior and restore a non-residential designation to the abutting real property.

3. Even if the industrially designated land as depicted on the preferred plan remains, there is still a serious land use conflict at the south west corner of the Delicato property. This needs to be addressed in the EIR and in the General Plan.

The preferred General Plan diagram designates most land surrounding the Delicato property as non-residential, thereby imposing a feasible mitigation measure in the form of more compatible land uses that lessen the environmental effect caused by land use conflicts. Thereafter, General Plan policies on multiple occasions require mandatory areas of separation between agricultural and residential uses.

Yet, notwithstanding multiple General Plan policies requiring a buffer, Alternative B designates land adjacent to the Delicato property and near the wastewater basin as residential. The EIR supplies no information or data to explain this decision. Nor does the EIR supply information or data to explain why designating this territory as non-residential is not a viable alternative from a land use perspective or a feasible mitigation measure from a CEQA perspective. The absence of information and data to support adopting a residential land use designation and rejecting a non-residential land use designation as a feasible mitigation measure renders the draft EIR legally deficient.

To put a finer point on it, what information or data presented in the draft EIR supports an implied conclusion that a non-residential or open space designation is infeasible?

4. The mitigation to the Lovelace Transfer station is illusory. There is no evidence that the County intends to spend millions of dollars to relocate the transfer station. There is no evidence that a 100 foot buffer is sufficient to lessen the land

[4] As to this and all other comments pointing out the absence of sufficient information and data to make the draft EIR legally sufficient, we respectful observe that this omitted evidence cannot be added to the final EIR without also providing for recirculation of the EIR for additional public comments. "Informed public participation is essential to environmental review under the California Environmental Quality Act". *Washoe Meadows Community v. Department of Parks & Recreation* (2017) 17 Cal.App.5th 277, 285. Public policy and the CEQA Guidelines dictate that recirculation is required to meet CEQA's mandate.

> use conflicts which include odors, rodents and heavy traffic using neighborhood roads.

Page 2-27 of the General Plan states in part:

> LU-8.6 Policy Area 4 is the Lovelace Materials Recovery Facility and Transfer Station area, with boundaries as shown in Figure LU- 7. This policy area is intended to provide for the long-term relocation of the facility and subsequent transition of the facility to a residential use. Residential, parks, and similar uses located near Policy Area 4 should include appropriate transitions and buffers within 100 feet of the policy area to reduce potential conflicts between uses while the facility is active. Implementation
>
> LU-8b. Reduce conflicts between Policy Area 4 (Lovelace Materials Recovery Facility and Transfer Station) through requiring residential parcels, parks, and other sensitive uses to be set back at least 100 feet from the policy area while the facility is in operation. The 100-foot setback shall not be required following closure of the facility.

The draft EIR's evaluation of General Plan Policies LU-8.6 and LU-8b is legally deficient as a matter of law. The EIR does not provide a scintilla of data or information to explain why this area will "provide for long-term relocation" of the Lovelace Materials Recovery Facility and Transfer Station. Indeed the policy does not "provide" in any meaning of the word.

The County owns and operates the Lovelace Transfer Station. The County has not decided to relocate Lovelace nor is such a decision pending nor has the County created an account to fund relocating Lovelace. The transfer station relocation cost is estimated in the millions of dollars.

Hence the General Plan implied assumption is that land use conflicts caused by building homes next to a transfer station are mitigated because the General Plan creates an area that "provide(s) for (the transfer station's) long term relocation". No evidence supports this assumption. Indeed the Manteca General Plan creating an "area" is irrelevant to a County decision to dedicate millions of dollars to relocate a transfer station.

Moreover, if the transfer station is not decommissioned (and there is no evidence it will be relocated) then Policy LU-8b does not mitigate a conflicting land use situation inherent in building homes next to a transfer station. The draft EIR recommends a 100 foot buffer from the transfer station's property line. However, the draft EIR provides no information or data to support the efficacy of a 100 foot buffer. Is a 100 foot buffer sufficient to reduce impacts such as rodents, vermin and odors to less than significant?

The draft EIR does not give the reader any information and data to determine whether a 100 foot buffer is sufficient. Simply stated, does a 100 foot buffer mitigate the impact?

Finally, the draft EIR dispenses with any analysis of a conflict between cars and the significant number of trucks entering and departing the transfer station on a daily basis. In fact, the draft EIR does not even disclose the average number of trucks visiting the transfer station on a daily, weekly or monthly basis. Thus it is impossible to evaluate the significance of the potential traffic conflict and traffic congestion caused by building homes next to a transfer station. Dispensing with information and data renders the draft EIR legally deficient as a matter of law.

In conclusion my client appreciates this opportunity to comment on the draft EIR for the Manteca General Plan Update.

Very truly yours,

Steven A. Herum

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June 8, 2021

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Re: DRAFT ENVIRONMENTAL IMPACT REPORT FOR THE MANTECA GENERAL PLAN UPDATE (SCH: 2020019010) MARCH 2021

To Whom It May Concern:

This office represents Delicato Wineries concerning the City of Manteca General Plan update. Delicato has actively participated in all aspects of the Manteca General Plan update, including but not limited to making numerous presentations to the Citizens' advisory committee, the Manteca Planning Commission and the Manteca City Council. Delicato also supplied written comments to the City during the Notice of Preparation public comment period.

Earlier Delicato submitted a letter commenting on the draft Environmental Impact Report prepared for the General Plan Update. Subsequently the City extended the period of time to submit comments on the draft Environmental Impact Report and this letter is intended to supplement Delicato's earlier letter. Delicato's supplemental comments are presented subsequently herein.

Delicato owns and operates one of the five largest wineries in the United States and employs over 850 people. The operation is located in the Manteca area and provides important family wage jobs to numerous Manteca residents and contributes substantially to the local economy by buying goods and services from local businesses and professional service companies. Delicato's direct and indirect economic impact to Manteca's economy is substantial.

Accordingly, Delicato holds a vital and substantial interest in working collaboratively with the City of Manteca to adopt a General Plan update achieving Manteca's objectives for environmental sensitive and sustainable growth without unjustly damaging Delicato's operation or otherwise impairing its ability to continue to operate the winery.

The California Environmental Quality Act (CEQA) performs a vital function in considering these land use decisions. CEQA is to be expansively interpreted in order to provide maximum evaluation and consideration of potential direct and indirect environmental effects of a proposed project. Title 14 California Code of Regulation § 15003(f) (hereinafter CEQA Guidelines); *Friends of Mammoth v. Board of Supervisors* (1972) 8 Cal.3d 247, 259. In keeping with this expansive statutory mandate the "EIR requirement is the heart of CEQA", CEQA Guidelines § 15003(a); *County of Inyo v. Yorty* (1973) 32 Cal.App.3d 795; indeed, the Legislature has found and declared that "maintenance of a quality environment for all people of this state is now and in the future is a matter of statewide concern." Pub.Res. C. §2100(b).

As a result a major reason to prepare EIRs is to generate data and information and "inform other governmental agencies and the public generally of the environmental impact of the proposed project." CEQA Guideline §15003(c). "An EIR is an informational document." CEQA Guideline §15121(a). The analysis presented in an EIR shall be supported by Substantial Evidence which is defined as "*facts*, reasonable assumptions predicated upon f*acts*, and expert opinion supported by *facts*." *Id*. at §15385 (italics added). Naked conclusions without evidentiary support form no basis for a public agency or the public to sufficiently review potential environmental effects of a land use proposal.

Being treated as an information document represents an important concept because EIR conclusions untethered to substantial evidence are not evidence that an agency may rely on in formulating land use and environmental decisions. *Placerville Preservation League v. Judicial Council* (2017) 16 Cal.App.5th 187, 193 n6.

1. <u>The draft EIR presents numerous mandatory General Plan policies requiring buffer areas to separate land use</u>.

These mandatory General Plan policies include but are not necessarily limited to:

> LU-1.2, LU-1.3, LU-2.6, LU-3.8, LU-3.9, LU-3c, LU-3d, CD-6.1, CD-6.2, CD-6.3, CD-6b, CD-8a, RC-6.2, RC-8, RC-8.4, RC-8.6, RC-8.9, RC-8.11, RC-8c, and RC-8e

2. <u>General Plan policy LU-11c should be revised to read consistently with the list of General Plan policies present at comment 1</u>.

While the policies listed at comment one are mandatory, LU-11c compels Manteca to "consider" a buffer. General Plan policy LU-11c should be revised to read consistently with the other twenty policies listed in comment 1.

3. <u>Impact 3.2-1 should list all buffer policies</u>.

4. <u>Impact 3.2-2 should cross reference the buffer policies that serve as mitigation.</u>

5. Impact 3.2-4 is less than significant only because the buffer policies mitigate this otherwise potentially significant impact.

Impact 3.2-4 is rendered less than significant only because of the bundle of mitigation measures requiring Manteca to impose meaningful and effective buffer areas as a condition to urban development. The removal or lessening of these mitigation measures would make the land use conflict significant but avoidable. This is because buffer mitigation measures are feasible. This creates an internal conflict with CEQA rules since a public agency may not approve a project with significant environmental effects if feasible mitigation measures are available.

6. Scope and intent of Agricultural Mitigation Fee.

A clear and declarative statement should be added to the EIR explaining that an Agricultural mitigation fee is imposed to mitigate the loss of farmland but imposing the fee is fully unrelated to the potentially significant land use conflict impact.

7. The Delicato operation is an integrated agricultural processing operation encompassing all of the surrounding agricultural lands owned by Delicato.

A radically mistaken comment made at a public workshop suggested agricultural lands surrounding the Delicato agricultural processing buildings offered a buffer between residential and non-residential uses. This statement is highly misdirected. The agricultural processing operation depends upon the discharge of processed water regulated by a state agency. The surrounding agricultural lands are an integrated and pivotal part of the process water discharge permit. Therefore the outer property boundaries of the Delicato land holdings, which are part of the process water discharge permit, should be regarded as the physical area of the Delicato agricultural processing operation.

Very truly yours,

Steven A Herum

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cc: client

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VIA EMAIL & U.S. MAIL

November 17, 2021

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Re: Notice of Preparation of an Environmental Impact Report (EIR) for the Proposed North Manteca Annexation #2 Project

Dear Ms. Simvoulakis:

This office represents Delicato Winery and we respectfully provide to the City of Manteca the following comments regarding the Notice of Preparation (NOP). These comments are not exhaustive and Delicato reserves the right to provide additional comments during the NOP public comment period and/or during the administrative process. In advance we appreciate this opportunity to comment.

By way of overview before presenting specific comments, my client does not understand why Manteca is processing a large residential development project under the old general plan while a substantial and important General Plan Update is actively in process and the process has been substantially completed. We note a draft General Plan and draft EIR have been prepared and public comments have been received. It is neither logical nor consistent with effective public policy to process a large development project under an old general plan at this belated stage of the general plan update process. It leads to a distinct possibility that if approved this large residential development project will contradict or conflict with land use designations and/or policies, standards and objectives enacted by the pending General Plan Update.

Therefore, Delicato urges the City to suspend processing a large development project under the old general plan until the pending General Plan Update is completed. Otherwise approving such a massive residential development project immediately prior to completing a comprehensive General Plan Update will only result in chaos and mischief, all to the detriment of the city and the citizens who deserve and expect a stable and effective General Plan to guide future development activity. Simply stated, "future growth…should be guided by an effective planning process". Government

Code §65030.1. A process that could defeat the policies, standards and objectives of the new General Plan is not an "effective planning process."

However, if the City intends to continue this wasteful and ineffective process it should, at a bare minimum, insist the project conform to both the old general plan and the proposed general plan, including land use designations and policies, standards and objectives as presented for public review and comment. Otherwise unwise processing may undermine and defeat the purposes for conducting this general plan update. The City must add to the process an effective system to assure the public that the designations and policies, standards and objective of the updated General Plan are fully observed.

With this overarching observation in mind, Delicato offers the following comments.

1. Delicato incorporates by reference comments submitted to the City concerning the draft Environmental Impact Report for the General Plan update.

These comments were presented in a comment letter dated May 5, 2021 and a supplemental comment letter dated June 8, 2021. Most if not all comments presented in these two comment letters apply with equal dignity to the proposed project and environmental concerns that need to be meaningfully addressed in the EIR. True and correct copies of the two comment letters are attached to this letter.

2. The Project NOP is legally deficient by providing an insufficient description of the dominant land uses in the surrounding area.

A legally sufficient Environmental Setting requires "a description of the physical environmental condition in the vicinity of the project. This environmental setting will normally constitute the baseline physical conditions by which a Lead Agency determines whether an impact is significant." CEQA Guideline §15125(a). Physical environmental conditions shall be described "from both a local regional perspective." *Id*. at §15125(a)(1).

The purpose of preparing an Environmental Setting "is to give the public and decision makers the most accurate and understandable picture practically possible of the project's likely near-term and long-term impacts." *Id.* at §15125(a) (underlining added). Hence, [k]nowledge of the regional setting is critical to the assessment of environmental impacts." *Id.* at §15125(c) (underlining added). In a NOP context a NOP "shall provide…sufficient information describing the project and potential environmental effects to enable the responsible agencies to make meaningful response." *Id.* at §15082(a)(1). A "description of the physical environmental condition in the vicinity of the project" (*Id*. at §15125(a)) is dispositive to enabling public agencies and the public to make informed and meaningful comments.

Presently four major non-residential uses locally and regionally dominate the territory:

A. Delicato Winery. Delicato Winery is the fifth largest winery in the United States. It has substantial large truck traffic year round with the truck traffic substantially greater during the grape harvest season. Delicato secured a STAA designated road leading to the winery.

B. George Perry and Sons. George Perry and Sons is the largest export of melons in the United States. It too has substantial truck traffic year round with truck traffic substantially greater during the melon harvest season. The Delicato grape harvest season and the George Perry and Son melon harvest season tend to be consecutive but not overlapping.

C. The San Joaquin County Transfer Station. The County operates a major transfer station in the territory. The General Plan Update dismissed this use, claiming the County intended to relocate the transfer station. (See General Plan Update LU-8.6 Policy Area 4.) This provoked a letter from the County explaining it has no plans to relocate the transfer station and indeed anticipates increased use of the transfer station in the future.[1] Currently the transfer station experiences huge delays on weekends with cars and commercial trucks seeking to access the transfer station backed up on the public streets.

D. The San Joaquin Delta Junior College Agriculture Farm. Delta College has constructed substantial improvements to the vocational agriculture farm in recent

[1] "[T]he proposed land use near Policy Area 4 (Lovelace Materials Recovery Facility and Transfer Station) contained in the city's General Plan Update may conflict with current solid waste operations at the Lovelace facility and presents the following concerns:

1. Increased Traffic: **The potential presence o**f new low, medium and high-density **residential dwellings near Policy Area 4 would increase traffic along Union Road, Airport Way and Lovelace Avenue. This plan would further strain the existing traffic conditions** which, at times, pose challenges. Additional **traffic congestion will mean a greater time required for solid waste 2 equipment, vehicles, and customers to enter and leave the site, thus disrupting the main function of the facility - the transfer of waste to processors, recyclers and landfills**.

2. Public Safety: Increased traffic from new residents near Policy Area 4 would **create a dangerous mix of large commercial refuse trucks and small vehicles from the nearby residents**. In addition to daily customer traffic, Lovelace averages 50 outgoing truckloads of waste per day. These are **65-foot long semi-tractor-trailer trucks**, which **would then be forced to exit and re-enter the site amidst the increased traffic flow**. The total exit/re-enter count for transfer vehicles averages 100 per day."

San Joaquin County Community Development Department letter to City of Manteca dated June 24, 2021 (bolding and underlining added).

years.[2] The farming operation involves farm equipment and vehicles generally incompatible with residential vehicles and bicycle riders using bicycle lanes on busy streets.

The NOP's legally deficient Environmental Setting precludes meaningful public participation at the NOP step of the EIR process. In particular the NOP fails to identify and explain the relationship of four major existing non-residential uses to the Environmental Setting. Since an Environmental Setting normally constitutes the "existing conditions baseline" (*Id.* at §15125(a)(3)) failing to properly identify and recognize these four major existing non-residential uses within the existing conditions baseline thwarts full public participation at the NOP stage of the EIR process. This is important, of course, because "[p]ublic participation is an essential part of the CEQA process." CEQA Guideline §15201. Government Code section 65033 "recognizes the importance of public participation at *every level* of the planning process." Here a deficient "existing conditions baseline" thwarts meaningful and effect public involvement. The Environmental Setting should be corrected and the NOP should be recirculated for purposes of obtaining meaningful public review and comment.

3. <u>The EIR must comprehensively address congestion, health and safety issues related to introducing incompatible traffic into the area</u>.

San Joaquin County informed Manteca that "[i]ncreased traffic from new residents near Policy Area 4 would create a dangerous mix of large commercial refuse trucks and small vehicles from the nearby residents." San Joaquin County Community Development Department letter to City of Manteca dated June 24, 2021. Manteca should give great weight to the testimony of a brethren public agency with expertise in traffic issues.

And, this conclusion applies with equal dignity to the other non-residential users—Delicato, George Perry and Delta—listed and described in comment two. Each existing non-residential users generates substantial commercial truck traffic. Introducing significant residential vehicular and bicycle traffic creates congestion, health and safety concerns.

It creates congestion because commercial trucks generally travel at different rates of speed, have different deceleration and acceleration movements and require a greater radius when conducting certain traffic movements.

[2] Manteca Center is 155-acre site dedicated to agricultural education. Located 15 miles southeast of the Stockton campus, this self-sustaining farm operates as an instructional facility for students to learn about horticulture, agribusiness, animal husbandry and more. The pastures, gardens and nurseries equip students with on-the-job training for a career in plant or animal sciences. Delta College recently planted almonds at this location (a 20+ year investment) and just finished a 13,125 SF farm building with office and farm storage space, animal pens, and parking.

It creates a health issue because traffic will move slower thereby creating more vehicular emissions that are not captured in traditional air quality models.

It creates a safety issue because there will be more vehicular collisions due to the unacceptable mix of commercial and residential vehicular and bicycle traffic.

A typical traffic study, whether the Level of Service or Vehicle Miles Traveled methodology is used, does not recognize and/or address these three environmental issues. Instead Manteca needs to separately evaluate these significant impacts through a study capturing and evaluating significant impacts and proposing specific mitigation measures. This study needs to consider whether sound public policy supports introducing substantial residential uses into this area.

To put a finer point on it, a decision consistent with public policy and the public good may support designating this area for non-residential uses or a more logical mix of non-residential uses and very low density residential uses.

4. Land Use Conflicts with Existing Major Non-Residential Uses.

The project will create conflicts with existing major non-residential uses. As a preliminary step to addressing and evaluating methods to lessen the land use conflict, the following policies proposed in the General Plan update should be applied to the project: LU-1.2, Lu-1.3, LU-2.6, LU-3.8, LU-3.9, LU-3c, LU-3d, Lu-11c, CD-6.1, CD-6.2, CD-6.3, CD-6b, CD-8a, RC-6.2, RC-8, RC-8.4, RC-8.6, RC-8.9, RC-8.11, RC-8c, and RC-8e. After incorporating these mitigation measures into the project design then the land use conflicts should be studied and evaluated.

5. A project with substantial non-residential uses and very low density residential uses should be evaluated as the environmentally superior alternative.

CEQA requires an EIR to consider environmental superior alternatives. CEQA Guideline §15126.6(a). Please be mindful that an alternative is feasible "even if…(it) would impede to some degree the attainment of the project objectives, or would be more costly." CEQA Guideline §15126.6(b). Thus, a project with substantial non-residential uses and very low density residential uses should be evaluated as the environmentally superior alternative.

Also, because this is a legislative action—an amendment to the City's General Plan—the City should consider alternative locations for this project. CEQA Guideline §15126.6(b) ["the discussion of alternatives shall focus on alternatives to the project or its location".] Directing substantial residential growth away from existing major non-residential operations to areas where the project would not trigger significant land use conflicts represents a feasible alternative.

6. The pending four party truck traffic study should be incorporated into the EIR.

Presently four entities—the County, COG, Lathrop and Manteca—are collaboratively working on a comprehensive truck traffic study. The need for this study was established by current problems posed by the interaction of commercial truck traffic and residential traffic. It appears that both residents and business operations have been harmed by this serious land use conflict.

The pending large residential development project exacerbates the problem and ultimately makes it more difficult to impose meaningful solutions to this public policy concern. Therefore, provisions should be made to prevent release of the draft EIR for public review until the four entity study has been completed and ventilated by the four public entities.

Very truly yours,

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Encls.

November 19, 2021

Lea C. Simvoulakis, Senior Planner
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Dear Ms. Simvoulakis,

We live across from the proposed residential project, and annexation, on 13577 Union Road and received a letter on October 22, 2021 sent to “interested parties,” stating that if we had comments, a written copy of such should be sent or emailed to you before the due date of November 22, 2021.

First of all, we are not in favor of being annexed into the city; we do understand the rationale of expanding the city of Manteca, and find such rationale flawed at best. That being said, we also understand the futility of such protest on our part, and hope that the developers and the city will consider the “concerns of the few” in moving forward.

We have talked with a few of our neighbors and would appreciate the developers, or their representatives, along with the appropriate city representatives, to meet with those of us who will be impacted by this growth. Our hope would be that this in-person meeting is held soon and at one of our homes. It would give us a chance to voice any concerns, while also hearing the plans from the developers themselves.

Some of our concerns and thoughts are as follows:

There have been about five wrecks in and about our area in the year that we have lived here. My wife has lived on Union Road most of her life, and has told stories of terrible wrecks that have resulted in loss-of-life…one that occurred at the property we now live! We hope that the road in front of our house remains one lane going each way, with a dedicated turn lane in the middle of these two lanes.

We also would like to have stop lights placed strategically on Union Road in order to reduce the high speeds that drivers currently reach.

We hope that any widening of the road in front of our house would not be such as to result in the removal of the 50 year-old trees that the previous owners planted, which provides beauty to our residence, and to that of the area.

We are also very concerned that you consider the fact that we, like all of our neighbors, have a well, a septic tank/leach line system, propane power source, and heating by a wood burning fireplace. We also irrigate our property through irrigation provided through South San Joaquin Irrigation District.SSJID. We expect this to continue and we expect that should repairs or replacement be needed, we would have the ability to do so with support from any Manteca City Codes, or the lack thereof.

We would like our property usage that we have currently through San Joaquin County, either be grandfathered in, or be assigned appropriate City Zoning. An example would be that we have the ability under County Zoning to build another home on our property should we choose to do so.

Our major concern is the widening of Union Road. We have beautiful 200 foot cyprus trees, two irrigation gates, and an electric iron gate. We in no way want a five lane thoroughfare in front of our house, especially with the number of wrecks that we have seen due to excessive speed and alcohol/drugs in just one year. It would seem that a precedence has been set for two one lane roads with a turning lane, in undeveloped, non-subdeveloped areas, which is what we would like to see: one lane going south, one lane going north, and one lane as a median for any landscaping and turn access for those of us who are negatively impacted by this continuing expansion… an expansion that further negatively impacts our water, our energy, our environment, our schools.

Also, we do not want sidewalks in front of our property.

We would expect the City, and/or developers, to pay for any impact to us, the worth of our property, our existing benefits of SSJID irrigation and the use of a wood burning fireplace…and on-street parking. We would expect that in an imminent domain situation, that consideration as to the value of each of our properties, augmented by any improvements or landscaping issues, would be the basis for renumeration.

I hope that the city and developers will convene an in-person meeting with those of us who are negatively implicated by this annexation.

Sincerely,

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Appendix B

Air Quality, GHG, and Energy Calcs

APPENDIX B –AIR QUALITY, GREENHOUSES GASES, & ENERGY MODELING

Appendix Contents

1. Analysis of Models and Tools for Correlating Project-Generated Emissions to Health End Points
2. CalEEMod Modeling Results
3. Energy Consumption Estimates
4. GHG Calculation Methodology

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APPENDIX B.1

Analysis of Models and Tools for Correlating Project-Generated Emissions to Health End Points

APPENDIX B

Appendix B of the Draft EIR includes additional information regarding models and tools for correlating project-generated criteria pollutant emissions to health end points. The following table is an addition to Appendix B.

ANALYSIS OF MODELS AND TOOLS TO CORRELATE PROJECT-GENERATED CRITERIA POLLUTANT EMISSIONS TO HEALTH END POINTS

TOOL	CREATED BY	DESCRIPTION	RESOLUTION	POLLUTANTS ANALYZED	PROJECT-LEVEL CEQA APPLICABILITY
AERMOD Modeling System[1,2]	AERMIC	A steady-state plume model that incorporates air dispersion based on planetary boundary layer turbulence structure and scaling concepts, including treatment of both surface and elevated sources, and both simple and complex terrain. The modeling system incorporates air dispersion based on a planetary boundary layer turbulence structure and scaling concepts, including treatment of both surface and elevated sources, and both simple and complex terrain.	Project-level	SO_2, ROG, NO_2, Lead, $PM_{2.5}$, PM_{10}, NH_3	This model operates at the project-level and provides air dispersion modeling for a project's emissions on the surrounding environment. However, even with supplementary (i.e. additional software), the model cannot estimate specific health effects on receptors from the air dispersion modeling. Moreover, it cannot model the (complex) chemical reactions that occur between the ozone precursors (e.g. NOx and ROG) that generate ozone. Therefore, this model is not recommended for project-level CEQA analysis.
AirCounts[3]	Abt Assoc.	Online tool that helps large and medium-sized cities quickly estimate the health benefits of $PM_{2.5}$ emission reductions and economic value of those benefits. The tool estimates the number of deaths (mortality) avoided and economic value related to user-specified regional, annual $PM_{2.5}$ emissions reduction.	City-level	Primary $PM_{2.5}$	This tool is only illustrative, as it is limited to certain cities and does not target specific sectors. The tool is not sector specific, and includes limited California data. It cannot provide results at a project-level. Therefore, the tool is not recommended for project-level CEQA analysis.
Air Pollution Emission Experiments and Policy analysis (APEEP) model[4]	Mueller and Mendelsohn2006, 2009	The Air Pollution Emission Experiments and Policy (APEEP) analysis model (Muller and Mendelsohn 2006, 2009) is a traditional integrated assessment model. Like other integrated assessment models, APEEP connects emissions of air pollution through air-quality modeling to exposures, physical effects, and monetary damages. Making these links requires the use of findings reported in the peer-reviewed literature across several scientific disciplines. The air-quality models in APEEP use the emission data provided by EPA to estimate corresponding ambient concentrations in each county in the coterminous states.	National or county-level	SO_2, ROG, NO_x, Ozone, $PM_{2.5}$, PM_{10}	The model operates at the national scale but may be applied at the county-level (although it is not clear how this adjustment should be made). It cannot provide results at a project-level. The tool is also not commercially available. Therefore, the tool is not recommended for project-level CEQA analysis.

[1] See: https://www.epa.gov/scram/air-quality-dispersion-modeling-preferred-and-recommended-models

[2] Note: May require additional software to estimate the level of each specific pollutant at the modeled receptors.

[3] See: https://www.abtassociates.com/tools

[4] See: https://public.tepper.cmu.edu/nmuller/APModel.aspx

TOOL	CREATED BY	DESCRIPTION	RESOLUTION	POLLUTANTS ANALYZED	PROJECT-LEVEL CEQA APPLICABILITY
CALINE3/ CAL3QHC/ CAL3QHCR[1, 2]	USEPA	A steady-state Gaussian dispersion model designed to determine air pollution concentrations at receptor locations downwind of highways located in relatively uncomplicated terrain. CALINE3 is incorporated into the more refined CAL3QHC and CAL3QHCR models. CAL3QHCR is a more refined version based on CAL3QHC that requires local meteorological data.	Project-level	SO_2, ROG, NO_2, Lead, $PM_{2.5}$, PM_{10}	This model operates at the project-level and provides air dispersion modeling for a project's emissions on the surrounding environment. However, even with supplementary (i.e. additional software), the model cannot estimate specific health effects on receptors from the air dispersion modeling. Moreover, it cannot model the (complex) chemical reactions that occur between the ozone precursors (e.g. NOx and ROG) that generate ozone. Therefore, this model is not recommended for project-level CEQA analysis.
Complex Terrain Dispersion Model Plus Algorithms for Unstable Situations (CTDMPLUS)[1, 2]	USEPA	A refined point source gaussian air quality model for use in all stability conditions for complex terrain. The purpose of the model is to provide a practical, refined plum model for elevated point sources near complex terrain.	Project-level	SO_2, ROG, NO_2, Lead, $PM_{2.5}$, PM_{10}	This model operates at the project-level and provides air dispersion modeling for a project's emissions on the surrounding environment. However, even with supplementary (i.e. additional software), the model cannot estimate specific health effects on receptors from the air dispersion modeling. Moreover, it cannot model the (complex) chemical reactions that occur between the ozone precursors (e.g. NOx and ROG) that generate ozone. Therefore, this model is not recommended for project-level CEQA analysis.
Co-Benefits Risk Assessment (COBRA)[5]	USEPA	Preliminary screening tool that contains baseline emission estimates of a variety of air pollutants for a single year. COBRA is targeted to state and local governments as a screening assessment for clean energy policies. EPA's CO–Benefits Risk Assessment (COBRA) screening model is a free tool that helps state and local governments: • Explore how changes in air pollution from clean energy policies and programs; • Estimate the economic value of the health benefits associated with clean energy policies and programs to compare against program costs; • Map and visually represent the air quality, human health, and health-related economic benefits from reductions in emissions of particulate matter ($PM_{2.5}$), sulfur dioxide ($S0_2$), nitrogen oxides (NO_X), ammonia (NH_3), and volatile organic compounds (VOCs) that result from clean energy policies and programs.	National, regional, state, or county-levels	$PM_{2.5}$, SO_2, NO_x, NH_3, and ROG	COBRA is a preliminary screening tool only and cannot be used at sub-county resolution. It cannot provide results at a project-level. It also does not account for secondary emission changes resulting from market responses. Accordingly, the tool is not recommended for project-level CEQA analysis.

[5] See: https://www.epa.gov/statelocalenergy/co-benefits-risk-assessment-cobra-health-impacts-screening-and-mapping-tool

TOOL	CREATED BY	DESCRIPTION	RESOLUTION	POLLUTANTS ANALYZED	PROJECT-LEVEL CEQA APPLICABILITY
Environmental Benefits and Mapping Program-Community Edition (BenMAP-CE)[6]	USEPA	The USEPA's detailed model for estimating the health impacts from air pollution. It relies on input concentrations and applies concentration-response (C-R) health impact functions, which relate a change in the concentration of a pollutant with a change in the incidence of a health endpoint, including premature mortality, heart attacks, chronic respiratory illnesses, asthma exacerbation and other adverse health effects. Detailed inputs are required for air quality changes (concentrations from AERMOD), population, baseline incidence rates, and effect estimates.	National, County, City, and sub-regional levels	Ozone, PM, NO_2, SO_2, CO	This tool is not well suited to analyze small or localized changes in pollutant concentrations associated with individual projects. Although this tool is under consideration by some California air districts for use towards project-level analysis, no air district in California has promulgated a methodology (using this tool or any other) that would correlate the expected air quality emissions of projects to the likely health consequences of the increased emissions. Accordingly, the tool is not recommended.
Fast Scenario Screening Tool (TM5-FASST)[7]	Joint Research Centre (Italy)	A tool that allows users to evaluate how air pollutant emissions affect large scale pollutant concentrations and their impact on human health (mortality and years of life lost) and crop yield from national to regional air quality policies, such as climate policies. The target policy domains are national to regional air quality policies, or air pollutant scenarios linked to other policy domains (e.g. climate policy). The tool is web-based and does not require coding or modelling. Users must gain access through publishers.	Global and national-levels	$PM_{2.5}$, Ozone, NO_x, NH_3, CO, ROG, CH_4, SO_2	This tool is applicable at national to global scales. It cannot provide results a project-level. Accordingly, the tool is not recommended for project-level CEQA analysis.
Long-range Energy Alternatives Planning System-Integrated Benefits Calculator (LEAP-IBC)[8]	Climate and Clean Air Coalition (CCAC)	A calculator that allows users to rapidly estimate the impacts of reducing emissions on health, climate, and agriculture. The tool uses sensitivity coefficients that link gridded emissions of air pollutants and precursors to health, climate and agricultural impacts at a national level. The tool is primarily used for policy analysis. The tool is currently Excel-based and is available through the developers only. A web-based interface is currently under development.	National-level	$PM_{2.5}$, Ozone, NO_2	This tool is applicable at national scale. Accordingly, the tool is not recommended for project-level CEQA analysis.
Methodology for Estimating Premature Deaths Associated with Long-Term Exposure to Fine Airborne Particulate Matter in California[9]	California Air Resources Board	The staff report identifies a relative risk of premature death associated with $PM_{2.5}$ exposure based on a review of all relevant scientific literature, and a new relative risk factor was developed. This new factor is a 10% increase in risk of premature death per 10 $\mu g/m^3$ increase in exposure to $PM_{2.5}$ concentrations (uncertainty interval: 3% to 20%)	National	$PM_{2.5}$	The primary author of the CARB staff report notes that the analysis method is not suited for small projects and may yield unreliable results due to various uncertainties. The tool also cannot provide results on a project-level. Accordingly, the tool is not recommended for project-level CEQA analysis.

[6] See: https://www.epa.gov/benmap

[7] See: http://tm5-fasst.jrc.ec.europa.eu/

[8] See: https://www.ccacoalition.org/en/resources/long-range-energy-alternatives-planning-integrated-benefits-calculator-leap-ibc-factsheet

[9] See: https://ww3.arb.ca.gov/research/health/pm-mort/pmmortalityreportfinalr10-24-08.pdf

Tool	Created by	Description	Resolution	Pollutants Analyzed	Project-level CEQA Applicability
Multi-Pollutant Evaluation Method (MPEM)[10]	BAAQMD	Estimates the impacts of control measures on pollutant concentration, population exposures, and health outcomes for criteria, toxic, and GHG pollutants. Monetizes the value of total health benefits from reductions in $PM_{2.5}$, ozone, and certain carcinogens, and the social value of GHG reductions. MPEM was designed for development of a Clean Air Plan for the San Francisco Bay Area. The inputs are specific to the SF region and are not appropriate for projects outside BAAQMD.	Regional level in the SFBAAB	Ozone, PM, air toxics, GHG	This tool is designed to support the BAAQMD in regional planning and emissions analysis within the San Francisco Bay Area Air Basin (SFBAAB). The model applies changes in pollutant concentrations over a four-square kilometer grid. The tool also cannot provide results on a project-level. Additionally, this tool is only applicable for the SFBAAB. Accordingly, the tool is not recommended for project-level CEQA analysis.
Offshore and Coastal Dispersion Model Version 5 (OCD)[1, 2]	USEPA	A straight-line Gaussian model developed to determine the impact of offshore emissions from point, area or line sources on the air quality of coastal regions. OCD incorporates overwater plume transport and dispersion as well as changes that occur as the plume crosses the shoreline. Hourly meteorological data are needed from both offshore and onshore locations.	Project-level	SO_2, ROG, NO_2, Lead, $PM_{2.5}$, PM_{10}	This model operates at the project-level and provides air dispersion modeling for a project's emissions on the surrounding environment. However, even with supplementary (i.e. additional software), the model cannot estimate specific health effects on receptors from the air dispersion modeling. Moreover, it cannot model the (complex) chemical reactions that occur between the ozone precursors (e.g. NOx and ROG) that generate ozone. Therefore, this model is not recommended for project-level CEQA analysis.
Response Surface Model (RSM)-based Benefit-per-Ton Estimates[11]	USEPA	Consists of tables reporting the monetized $PM_{2.5}$-related health benefits from reducing $PM_{2.5}$ precursors from certain source types nationally and for 9 US cities/regions. Applying these estimates simply involves multiplying the emissions reduction by the relevant benefit per-ton metric. The resulting value is the PM mortality risk estimate at a 3% discount rate.	National or regional (San Joaquin County only) levels	SOx, VOC, NH_3, NO_x	RSM includes regional values specific to San Joaquin County. The values are also dated. Accordingly, the tool is not recommended for project-level CEQA analysis.
Sector-based Benefit-per-Ton Estimates[12]	USEPA	Two specific sets of Benefit-per-ton (BPT) estimates for 17 key source categories are available. Both are a reduced-form approach based on BenMAP modeling. Applying these factors involves multiplying the emissions reduction (in tons) by the relevant benefit (economic value) or incidence (rates of mortality and morbidity) per-ton metric. The resulting value is the economics, mortality, and morbidity of direct and indirect $PM_{2.5}$ emissions.	National-scale	$PM_{2.5}$, SO_2, NO_x	The BPT estimates do not account for project-specific emissions or receptor locations, local dispersion characteristics, or regional photochemistry. The resultant health effects are therefore reflective of national averages and may not be accurate when applied to the project-level. Accordingly, the tool is not recommended for project-level CEQA analysis.

[10] See: http://www.baaqmd.gov/~/media/files/planning-and-research/plans/2017-clean-air-plan/mpem_nov_dec_2016-pdf.pdf?la=en

[11] See: https://www.epa.gov/benmap/response-surface-model-rsm-based-benefit-ton-estimates

[12] See: https://www.epa.gov/benmap/sector-based-pm25-benefit-ton-estimates. The updated Technical Support Document (February 2018) is available at: https://www.epa.gov/sites/production/files/2018-02/documents/sourceapportionmentbpttsd_2018.pdf

APPENDIX B.2

CalEEMod Modeling Results

Manteca Annexation #1 - San Joaquin County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

Manteca Annexation #1

San Joaquin County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
City Park	10.37	Acre	10.37	451,717.20	0
Single Family Housing	715.00	Dwelling Unit	152.80	1,287,000.00	2268
Condo/Townhouse	200.00	Dwelling Unit	12.50	200,000.00	642

1.2 Other Project Characteristics

Urbanization	Urban	**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 - 2025 assumed as final buildout year.

Land Use - Total development lot acreage = 175.67 acres. Total residents estimated at 2,910 residents.

Construction Phase - Buildout assumed to occur by year 2025.

Demolition - Four small buildings to be demolished at the northwest corner of the Project site. Estimated at 5000 sf total.

Grading - Site is relatively flat.

Architectural Coating - Assumes maximum of 100 g/L for interior coatings (per non-specialty coating limitations providded in SJVAPCD Rule 4601)

Vehicle Trips - Trip rates as provided by Traffic Impact Analysis (Fehr & Peers).

Woodstoves - Assumes no hearths.

Area Coating - Assumes maximum of 50 g/L after 1/1/2022, for interior and exterior coatings (per non-specialty coating limitations providded in SJVAPCD Rule 4601)

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EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

Energy Use -

Land Use Change - Assumes removal of 'grassland' land use type over the entire development area (175.67 acres).

Construction Off-road Equipment Mitigation - Water Exposed Area 2x daily; Clean Paved Road (9% fugitive dust PM reduction); Unpaved road mitigation: Limit on-site construction vehicle speeds to 5 mph; Soil Stabilizer for unpaved (10% reduction)

Fleet Mix -

Mobile Land Use Mitigation - Increase Density (915 units/175 acres = 5.23)'; Improve Destination Accessibility - 2.75 miles to downtown Job centre; Improve pedestrian network (project site and connecting off-site).

Area Mitigation - No hearths; Assumes maximum of 50 g/L after 1/1/2022, for interior and exterior coatings (per non-specialty coating limitations provided in SJVAPCD Rule 4601).

Consumer Products - CARB total statewide year 2016 ROG emissions is 208.71 tons/year, 12.89% less than the amount estimated for 2008 (239.6 tons/year). General Category consumer projects emissions factor adjusted to reflect.

Table Name	Column Name	Default Value	New Value
tblArchitecturalCoating	EF_Nonresidential_Interior	150.00	100.00
tblArchitecturalCoating	EF_Residential_Interior	150.00	100.00
tblAreaCoating	Area_EF_Nonresidential_Exterior	150	50
tblAreaCoating	Area_EF_Nonresidential_Interior	150	50
tblAreaCoating	Area_EF_Residential_Exterior	150	50
tblAreaCoating	Area_EF_Residential_Interior	150	50
tblConstDustMitigation	CleanPavedRoadPercentReduction	0	9
tblConstDustMitigation	WaterUnpavedRoadVehicleSpeed	0	5
tblConstructionPhase	NumDays	200.00	10.00
tblConstructionPhase	NumDays	120.00	60.00
tblConstructionPhase	NumDays	310.00	60.00
tblConstructionPhase	NumDays	3,100.00	600.00
tblConstructionPhase	NumDays	220.00	100.00
tblConstructionPhase	NumDays	220.00	100.00
tblConstructionPhase	PhaseEndDate	6/7/2022	9/14/2021
tblConstructionPhase	PhaseEndDate	11/22/2022	12/7/2021
tblConstructionPhase	PhaseEndDate	1/30/2024	3/1/2022
tblConstructionPhase	PhaseEndDate	12/18/2035	6/18/2024

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tblConstructionPhase	PhaseEndDate	10/21/2036	11/5/2024
tblConstructionPhase	PhaseEndDate	8/25/2037	3/25/2025
tblConstructionPhase	PhaseStartDate	6/8/2022	9/15/2021
tblConstructionPhase	PhaseStartDate	11/23/2022	12/8/2021
tblConstructionPhase	PhaseStartDate	1/31/2024	3/2/2022
tblConstructionPhase	PhaseStartDate	12/19/2035	6/19/2024
tblConstructionPhase	PhaseStartDate	10/22/2036	11/6/2024
tblConsumerProducts	ROG_EF	2.14E-05	1.84E-05
tblFireplaces	FireplaceDayYear	82.00	0.00
tblFireplaces	FireplaceDayYear	82.00	0.00
tblFireplaces	FireplaceHourDay	3.00	0.00
tblFireplaces	FireplaceHourDay	3.00	0.00
tblFireplaces	FireplaceWoodMass	3,078.40	0.00
tblFireplaces	FireplaceWoodMass	3,078.40	0.00
tblFireplaces	NumberGas	393.25	0.00
tblFireplaces	NumberGas	110.00	0.00
tblFireplaces	NumberNoFireplace	321.75	0.00
tblFireplaces	NumberNoFireplace	90.00	0.00
tblLandUse	LotAcreage	232.14	152.80
tblLandUse	Population	634.00	642.00
tblWoodstoves	NumberCatalytic	152.80	0.00
tblWoodstoves	NumberCatalytic	12.50	0.00
tblWoodstoves	NumberNoncatalytic	152.80	0.00
tblWoodstoves	NumberNoncatalytic	12.50	0.00
tblWoodstoves	WoodstoveDayYear	82.00	0.00
tblWoodstoves	WoodstoveDayYear	82.00	0.00
tblWoodstoves	WoodstoveWoodMass	3,019.20	0.00
tblWoodstoves	WoodstoveWoodMass	3,019.20	0.00

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

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					
2021	0.1730	1.7938	1.0425	1.9600e-003	0.7484	0.0870	0.8354	0.3453	0.0801	0.4254	0.0000	172.3595	172.3595	0.0533	2.8000e-004	173.7752
2022	0.5067	3.6943	4.2914	0.0127	0.8623	0.1366	0.9988	0.2529	0.1279	0.3808	0.0000	1,161.7873	1,161.7873	0.1140	0.0696	1,185.3718
2023	0.4512	3.0069	4.1505	0.0132	0.7597	0.1003	0.8601	0.2054	0.0944	0.2998	0.0000	1,213.0409	1,213.0409	0.0885	0.0789	1,238.7748
2024	4.4456	1.8512	2.7113	7.5000e-003	0.3813	0.0665	0.4478	0.1030	0.0622	0.1651	0.0000	682.2910	682.2910	0.0738	0.0366	695.0259
2025	6.2945	0.0397	0.1234	3.1000e-004	0.0282	1.6700e-003	0.0299	7.5000e-003	1.6600e-003	9.1600e-003	0.0000	28.3247	28.3247	9.6000e-004	5.5000e-004	28.5115
Maximum	**6.2945**	**3.6943**	**4.2914**	**0.0132**	**0.8623**	**0.1366**	**0.9988**	**0.3453**	**0.1279**	**0.4254**	**0.0000**	**1,213.0409**	**1,213.0409**	**0.1140**	**0.0789**	**1,238.7748**

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EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

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					
2021	0.1730	1.7938	1.0425	1.9600e-003	0.3399	0.0870	0.4269	0.1562	0.0801	0.2363	0.0000	172.3593	172.3593	0.0533	2.8000e-004	173.7750
2022	0.5067	3.6943	4.2914	0.0127	0.6922	0.1366	0.8287	0.1972	0.1279	0.3251	0.0000	1,161.7869	1,161.7869	0.1140	0.0696	1,185.3713
2023	0.4512	3.0069	4.1505	0.0132	0.7027	0.1003	0.8030	0.1914	0.0944	0.2858	0.0000	1,213.0405	1,213.0405	0.0885	0.0789	1,238.7744
2024	4.4456	1.8512	2.7113	7.5000e-003	0.3526	0.0665	0.4191	0.0959	0.0622	0.1581	0.0000	682.2907	682.2907	0.0738	0.0366	695.0256
2025	6.2945	0.0397	0.1234	3.1000e-004	0.0260	1.6700e-003	0.0277	6.9600e-003	1.6600e-003	8.6200e-003	0.0000	28.3247	28.3247	9.6000e-004	5.5000e-004	28.5115
Maximum	**6.2945**	**3.6943**	**4.2914**	**0.0132**	**0.7027**	**0.1366**	**0.8287**	**0.1972**	**0.1279**	**0.3251**	**0.0000**	**1,213.0405**	**1,213.0405**	**0.1140**	**0.0789**	**1,238.7744**

	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**	**23.98**	**0.00**	**21.01**	**29.14**	**0.00**	**20.80**	**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	**9-1-2021**	**11-30-2021**	1.3993	1.3993
2	**12-1-2021**	**2-28-2022**	1.4433	1.4433
3	**3-1-2022**	**5-31-2022**	0.9994	0.9994
4	**6-1-2022**	**8-31-2022**	0.9874	0.9874
5	**9-1-2022**	**11-30-2022**	0.9920	0.9920
6	**12-1-2022**	**2-28-2023**	0.9090	0.9090
7	**3-1-2023**	**5-31-2023**	0.8735	0.8735

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

8	**6-1-2023**	**8-31-2023**	0.8670	0.8670
9	**9-1-2023**	**11-30-2023**	0.8704	0.8704
10	**12-1-2023**	**2-29-2024**	0.8482	0.8482
11	**3-1-2024**	**5-31-2024**	0.8300	0.8300
12	**6-1-2024**	**8-31-2024**	0.4408	0.4408
13	**9-1-2024**	**11-30-2024**	2.1361	2.1361
14	**12-1-2024**	**2-28-2025**	6.7891	6.7891
15	**3-1-2025**	**5-31-2025**	1.8855	1.8855
		Highest	6.7891	6.7891

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	5.6666	0.0782	6.7876	3.6000e-004		0.0377	0.0377		0.0377	0.0377	0.0000	11.0980	11.0980	0.0106	0.0000	11.3637
Energy	0.1116	0.9534	0.4057	6.0900e-003		0.0771	0.0771		0.0771	0.0771	0.0000	1,717.4645	1,717.4645	0.1204	0.0323	1,730.0906
Mobile	3.6256	5.7663	34.8583	0.0839	8.7875	0.0680	8.8555	2.3495	0.0637	2.4132	0.0000	7,751.3515	7,751.3515	0.4119	0.4022	7,881.5054
Waste						0.0000	0.0000		0.0000	0.0000	184.5939	0.0000	184.5939	10.9092	0.0000	457.3236
Water						0.0000	0.0000		0.0000	0.0000	18.9134	46.0186	64.9320	1.9500	0.0468	127.6205
Total	**9.4038**	**6.7979**	**42.0517**	**0.0903**	**8.7875**	**0.1827**	**8.9702**	**2.3495**	**0.1784**	**2.5279**	**203.5073**	**9,525.9326**	**9,729.4398**	**13.4022**	**0.4812**	**10,207.9038**

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EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

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	5.6666	0.0782	6.7876	3.6000e-004		0.0377	0.0377		0.0377	0.0377	0.0000	11.0980	11.0980	0.0106	0.0000	11.3637
Energy	0.1116	0.9534	0.4057	6.0900e-003		0.0771	0.0771		0.0771	0.0771	0.0000	1,717.4645	1,717.4645	0.1204	0.0323	1,730.0906
Mobile	3.5144	5.4542	33.0128	0.0782	8.1812	0.0637	8.2448	2.1874	0.0597	2.2470	0.0000	7,231.9952	7,231.9952	0.3947	0.3802	7,355.1611
Waste						0.0000	0.0000		0.0000	0.0000	184.5939	0.0000	184.5939	10.9092	0.0000	457.3236
Water						0.0000	0.0000		0.0000	0.0000	18.9134	46.0186	64.9320	1.9500	0.0468	127.6205
Total	**9.2926**	**6.4857**	**40.2061**	**0.0847**	**8.1812**	**0.1784**	**8.3596**	**2.1874**	**0.1744**	**2.3618**	**203.5073**	**9,006.5763**	**9,210.0836**	**13.3849**	**0.4592**	**9,681.5595**

	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	**1.18**	**4.59**	**4.39**	**6.22**	**6.90**	**2.35**	**6.81**	**6.90**	**2.26**	**6.57**	**0.00**	**5.45**	**5.34**	**0.13**	**4.57**	**5.16**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

2.3 Vegetation

Vegetation

	CO2e
Category	MT
Vegetation Land Change	-757.1377
Total	**-757.1377**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Demolition	Demolition	9/1/2021	9/14/2021	5	10	
2	Site Preparation	Site Preparation	9/15/2021	12/7/2021	5	60	
3	Grading	Grading	12/8/2021	3/1/2022	5	60	
4	Building Construction	Building Construction	3/2/2022	6/18/2024	5	600	
5	Paving	Paving	6/19/2024	11/5/2024	5	100	
6	Architectural Coating	Architectural Coating	11/6/2024	3/25/2025	5	100	

Acres of Grading (Site Preparation Phase): 90

Acres of Grading (Grading Phase): 180

Acres of Paving: 0

Residential Indoor: 3,011,175; Residential Outdoor: 1,003,725; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0 (Architectural Coating – sqft)

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EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Demolition	Concrete/Industrial Saws	1	8.00	81	0.73
Demolition	Excavators	3	8.00	158	0.38
Demolition	Rubber Tired Dozers	2	8.00	247	0.40
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
Demolition	6	15.00	0.00	23.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Site Preparation	7	18.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Grading	8	20.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

Building Construction	9	591.00	172.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Paving	6	15.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	118.00	0.00	0.00	10.80	7.30	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 Demolition - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					2.5000e-003	0.0000	2.5000e-003	3.8000e-004	0.0000	3.8000e-004	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0158	0.1572	0.1078	1.9000e-004		7.7600e-003	7.7600e-003		7.2100e-003	7.2100e-003	0.0000	17.0004	17.0004	4.7800e-003	0.0000	17.1200
Total	**0.0158**	**0.1572**	**0.1078**	**1.9000e-004**	**2.5000e-003**	**7.7600e-003**	**0.0103**	**3.8000e-004**	**7.2100e-003**	**7.5900e-003**	**0.0000**	**17.0004**	**17.0004**	**4.7800e-003**	**0.0000**	**17.1200**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.2 Demolition - 2021

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	7.0000e-005	2.0500e-003	4.0000e-004	1.0000e-005	2.0000e-004	3.0000e-005	2.3000e-004	5.0000e-005	3.0000e-005	8.0000e-005	0.0000	0.6984	0.6984	1.0000e-005	1.1000e-004	0.7313
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	2.6000e-004	1.9000e-004	2.0500e-003	1.0000e-005	6.0000e-004	0.0000	6.0000e-004	1.6000e-004	0.0000	1.6000e-004	0.0000	0.5008	0.5008	2.0000e-005	2.0000e-005	0.5060
Total	**3.3000e-004**	**2.2400e-003**	**2.4500e-003**	**2.0000e-005**	**8.0000e-004**	**3.0000e-005**	**8.3000e-004**	**2.1000e-004**	**3.0000e-005**	**2.4000e-004**	**0.0000**	**1.1992**	**1.1992**	**3.0000e-005**	**1.3000e-004**	**1.2373**

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					1.1200e-003	0.0000	1.1200e-003	1.7000e-004	0.0000	1.7000e-004	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0158	0.1572	0.1078	1.9000e-004		7.7600e-003	7.7600e-003		7.2100e-003	7.2100e-003	0.0000	17.0004	17.0004	4.7800e-003	0.0000	17.1200
Total	**0.0158**	**0.1572**	**0.1078**	**1.9000e-004**	**1.1200e-003**	**7.7600e-003**	**8.8800e-003**	**1.7000e-004**	**7.2100e-003**	**7.3800e-003**	**0.0000**	**17.0004**	**17.0004**	**4.7800e-003**	**0.0000**	**17.1200**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.2 Demolition - 2021

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	7.0000e-005	2.0500e-003	4.0000e-004	1.0000e-005	1.8000e-004	3.0000e-005	2.1000e-004	5.0000e-005	3.0000e-005	8.0000e-005	0.0000	0.6984	0.6984	1.0000e-005	1.1000e-004	0.7313
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	2.6000e-004	1.9000e-004	2.0500e-003	1.0000e-005	5.5000e-004	0.0000	5.5000e-004	1.5000e-004	0.0000	1.5000e-004	0.0000	0.5008	0.5008	2.0000e-005	2.0000e-005	0.5060
Total	**3.3000e-004**	**2.2400e-003**	**2.4500e-003**	**2.0000e-005**	**7.3000e-004**	**3.0000e-005**	**7.6000e-004**	**2.0000e-004**	**3.0000e-005**	**2.3000e-004**	**0.0000**	**1.1992**	**1.1992**	**3.0000e-005**	**1.3000e-004**	**1.2373**

3.3 Site Preparation - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.5897	0.0000	0.5897	0.3031	0.0000	0.3031	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.1167	1.2149	0.6346	1.1400e-003		0.0613	0.0613		0.0564	0.0564	0.0000	100.3072	100.3072	0.0324	0.0000	101.1182
Total	**0.1167**	**1.2149**	**0.6346**	**1.1400e-003**	**0.5897**	**0.0613**	**0.6510**	**0.3031**	**0.0564**	**0.3595**	**0.0000**	**100.3072**	**100.3072**	**0.0324**	**0.0000**	**101.1182**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.3 Site Preparation - 2021

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.8700e-003	1.3700e-003	0.0148	4.0000e-005	4.3000e-003	2.0000e-005	4.3300e-003	1.1400e-003	2.0000e-005	1.1700e-003	0.0000	3.6055	3.6055	1.3000e-004	1.2000e-004	3.6432
Total	**1.8700e-003**	**1.3700e-003**	**0.0148**	**4.0000e-005**	**4.3000e-003**	**2.0000e-005**	**4.3300e-003**	**1.1400e-003**	**2.0000e-005**	**1.1700e-003**	**0.0000**	**3.6055**	**3.6055**	**1.3000e-004**	**1.2000e-004**	**3.6432**

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					0.2654	0.0000	0.2654	0.1364	0.0000	0.1364	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.1167	1.2149	0.6346	1.1400e-003		0.0613	0.0613		0.0564	0.0564	0.0000	100.3070	100.3070	0.0324	0.0000	101.1181
Total	**0.1167**	**1.2149**	**0.6346**	**1.1400e-003**	**0.2654**	**0.0613**	**0.3267**	**0.1364**	**0.0564**	**0.1928**	**0.0000**	**100.3070**	**100.3070**	**0.0324**	**0.0000**	**101.1181**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.3 Site Preparation - 2021

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.8700e-003	1.3700e-003	0.0148	4.0000e-005	3.9700e-003	2.0000e-005	3.9900e-003	1.0600e-003	2.0000e-005	1.0800e-003	0.0000	3.6055	3.6055	1.3000e-004	1.2000e-004	3.6432
Total	**1.8700e-003**	**1.3700e-003**	**0.0148**	**4.0000e-005**	**3.9700e-003**	**2.0000e-005**	**3.9900e-003**	**1.0600e-003**	**2.0000e-005**	**1.0800e-003**	**0.0000**	**3.6055**	**3.6055**	**1.3000e-004**	**1.2000e-004**	**3.6432**

3.4 Grading - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.1496	0.0000	0.1496	0.0401	0.0000	0.0401	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0377	0.4176	0.2779	5.6000e-004		0.0179	0.0179		0.0164	0.0164	0.0000	49.0455	49.0455	0.0159	0.0000	49.4420
Total	**0.0377**	**0.4176**	**0.2779**	**5.6000e-004**	**0.1496**	**0.0179**	**0.1675**	**0.0401**	**0.0164**	**0.0565**	**0.0000**	**49.0455**	**49.0455**	**0.0159**	**0.0000**	**49.4420**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.4 Grading - 2021

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	6.2000e-004	4.6000e-004	4.9300e-003	1.0000e-005	1.4300e-003	1.0000e-005	1.4400e-003	3.8000e-004	1.0000e-005	3.9000e-004	0.0000	1.2018	1.2018	4.0000e-005	4.0000e-005	1.2144
Total	**6.2000e-004**	**4.6000e-004**	**4.9300e-003**	**1.0000e-005**	**1.4300e-003**	**1.0000e-005**	**1.4400e-003**	**3.8000e-004**	**1.0000e-005**	**3.9000e-004**	**0.0000**	**1.2018**	**1.2018**	**4.0000e-005**	**4.0000e-005**	**1.2144**

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					0.0673	0.0000	0.0673	0.0180	0.0000	0.0180	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0377	0.4176	0.2779	5.6000e-004		0.0179	0.0179		0.0164	0.0164	0.0000	49.0454	49.0454	0.0159	0.0000	49.4420
Total	**0.0377**	**0.4176**	**0.2779**	**5.6000e-004**	**0.0673**	**0.0179**	**0.0852**	**0.0180**	**0.0164**	**0.0345**	**0.0000**	**49.0454**	**49.0454**	**0.0159**	**0.0000**	**49.4420**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.4 Grading - 2021

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	6.2000e-004	4.6000e-004	4.9300e-003	1.0000e-005	1.3200e-003	1.0000e-005	1.3300e-003	3.5000e-004	1.0000e-005	3.6000e-004	0.0000	1.2018	1.2018	4.0000e-005	4.0000e-005	1.2144
Total	**6.2000e-004**	**4.6000e-004**	**4.9300e-003**	**1.0000e-005**	**1.3200e-003**	**1.0000e-005**	**1.3300e-003**	**3.5000e-004**	**1.0000e-005**	**3.6000e-004**	**0.0000**	**1.2018**	**1.2018**	**4.0000e-005**	**4.0000e-005**	**1.2144**

3.4 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					0.2219	0.0000	0.2219	0.0798	0.0000	0.0798	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0761	0.8157	0.6099	1.3000e-003		0.0343	0.0343		0.0316	0.0316	0.0000	114.5227	114.5227	0.0370	0.0000	115.4486
Total	**0.0761**	**0.8157**	**0.6099**	**1.3000e-003**	**0.2219**	**0.0343**	**0.2562**	**0.0798**	**0.0316**	**0.1114**	**0.0000**	**114.5227**	**114.5227**	**0.0370**	**0.0000**	**115.4486**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.4 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	1.3300e-003	9.3000e-004	0.0105	3.0000e-005	3.3500e-003	2.0000e-005	3.3600e-003	8.9000e-004	2.0000e-005	9.1000e-004	0.0000	2.7165	2.7165	9.0000e-005	8.0000e-005	2.7432
Total	**1.3300e-003**	**9.3000e-004**	**0.0105**	**3.0000e-005**	**3.3500e-003**	**2.0000e-005**	**3.3600e-003**	**8.9000e-004**	**2.0000e-005**	**9.1000e-004**	**0.0000**	**2.7165**	**2.7165**	**9.0000e-005**	**8.0000e-005**	**2.7432**

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					0.0999	0.0000	0.0999	0.0359	0.0000	0.0359	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0761	0.8157	0.6099	1.3000e-003		0.0343	0.0343		0.0316	0.0316	0.0000	114.5225	114.5225	0.0370	0.0000	115.4485
Total	**0.0761**	**0.8157**	**0.6099**	**1.3000e-003**	**0.0999**	**0.0343**	**0.1342**	**0.0359**	**0.0316**	**0.0675**	**0.0000**	**114.5225**	**114.5225**	**0.0370**	**0.0000**	**115.4485**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.4 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	1.3300e-003	9.3000e-004	0.0105	3.0000e-005	3.0900e-003	2.0000e-005	3.1000e-003	8.3000e-004	2.0000e-005	8.4000e-004	0.0000	2.7165	2.7165	9.0000e-005	8.0000e-005	2.7432
Total	**1.3300e-003**	**9.3000e-004**	**0.0105**	**3.0000e-005**	**3.0900e-003**	**2.0000e-005**	**3.1000e-003**	**8.3000e-004**	**2.0000e-005**	**8.4000e-004**	**0.0000**	**2.7165**	**2.7165**	**9.0000e-005**	**8.0000e-005**	**2.7432**

3.5 Building Construction - 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					
Off-Road	0.1860	1.7021	1.7836	2.9400e-003		0.0882	0.0882		0.0830	0.0830	0.0000	252.5805	252.5805	0.0605	0.0000	254.0933
Total	**0.1860**	**1.7021**	**1.7836**	**2.9400e-003**		**0.0882**	**0.0882**		**0.0830**	**0.0830**	**0.0000**	**252.5805**	**252.5805**	**0.0605**	**0.0000**	**254.0933**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.5 Building Construction - 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	0.0395	1.0336	0.2850	3.9100e-003	0.1239	0.0113	0.1352	0.0358	0.0109	0.0467	0.0000	375.3223	375.3223	2.6700e-003	0.0569	392.3393
Worker	0.2037	0.1419	1.6025	4.5400e-003	0.5131	2.6900e-003	0.5158	0.1364	2.4700e-003	0.1389	0.0000	416.6453	416.6453	0.0137	0.0126	420.7474
Total	**0.2432**	**1.1756**	**1.8875**	**8.4500e-003**	**0.6370**	**0.0140**	**0.6510**	**0.1722**	**0.0133**	**0.1856**	**0.0000**	**791.9677**	**791.9677**	**0.0164**	**0.0695**	**813.0867**

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	0.1860	1.7021	1.7836	2.9400e-003		0.0882	0.0882		0.0830	0.0830	0.0000	252.5802	252.5802	0.0605	0.0000	254.0930
Total	**0.1860**	**1.7021**	**1.7836**	**2.9400e-003**		**0.0882**	**0.0882**		**0.0830**	**0.0830**	**0.0000**	**252.5802**	**252.5802**	**0.0605**	**0.0000**	**254.0930**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.5 Building Construction - 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	0.0395	1.0336	0.2850	3.9100e-003	0.1160	0.0113	0.1274	0.0339	0.0109	0.0447	0.0000	375.3223	375.3223	2.6700e-003	0.0569	392.3393
Worker	0.2037	0.1419	1.6025	4.5400e-003	0.4732	2.6900e-003	0.4759	0.1266	2.4700e-003	0.1291	0.0000	416.6453	416.6453	0.0137	0.0126	420.7474
Total	**0.2432**	**1.1756**	**1.8875**	**8.4500e-003**	**0.5892**	**0.0140**	**0.6032**	**0.1605**	**0.0133**	**0.1738**	**0.0000**	**791.9677**	**791.9677**	**0.0164**	**0.0695**	**813.0867**

3.5 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	0.2045	1.8700	2.1117	3.5000e-003		0.0910	0.0910		0.0856	0.0856	0.0000	301.3462	301.3462	0.0717	0.0000	303.1383
Total	**0.2045**	**1.8700**	**2.1117**	**3.5000e-003**		**0.0910**	**0.0910**		**0.0856**	**0.0856**	**0.0000**	**301.3462**	**301.3462**	**0.0717**	**0.0000**	**303.1383**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.5 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	0.0236	0.9893	0.2911	4.4900e-003	0.1478	6.3200e-003	0.1541	0.0427	6.0500e-003	0.0488	0.0000	430.8092	430.8092	2.1200e-003	0.0651	450.2710
Worker	0.2231	0.1476	1.7476	5.2400e-003	0.6120	3.0200e-003	0.6150	0.1627	2.7800e-003	0.1655	0.0000	480.8856	480.8856	0.0146	0.0138	485.3655
Total	**0.2467**	**1.1369**	**2.0388**	**9.7300e-003**	**0.7597**	**9.3400e-003**	**0.7691**	**0.2054**	**8.8300e-003**	**0.2142**	**0.0000**	**911.6947**	**911.6947**	**0.0168**	**0.0789**	**935.6365**

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	0.2045	1.8700	2.1117	3.5000e-003		0.0910	0.0910		0.0856	0.0856	0.0000	301.3458	301.3458	0.0717	0.0000	303.1380
Total	**0.2045**	**1.8700**	**2.1117**	**3.5000e-003**		**0.0910**	**0.0910**		**0.0856**	**0.0856**	**0.0000**	**301.3458**	**301.3458**	**0.0717**	**0.0000**	**303.1380**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.5 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	0.0236	0.9893	0.2911	4.4900e-003	0.1384	6.3200e-003	0.1447	0.0404	6.0500e-003	0.0465	0.0000	430.8092	430.8092	2.1200e-003	0.0651	450.2710
Worker	0.2231	0.1476	1.7476	5.2400e-003	0.5643	3.0200e-003	0.5674	0.1510	2.7800e-003	0.1538	0.0000	480.8856	480.8856	0.0146	0.0138	485.3655
Total	**0.2467**	**1.1369**	**2.0388**	**9.7300e-003**	**0.7027**	**9.3400e-003**	**0.7121**	**0.1914**	**8.8300e-003**	**0.2002**	**0.0000**	**911.6947**	**911.6947**	**0.0168**	**0.0789**	**935.6365**

3.5 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	0.0898	0.8201	0.9862	1.6400e-003		0.0374	0.0374		0.0352	0.0352	0.0000	141.4280	141.4280	0.0334	0.0000	142.2641
Total	**0.0898**	**0.8201**	**0.9862**	**1.6400e-003**		**0.0374**	**0.0374**		**0.0352**	**0.0352**	**0.0000**	**141.4280**	**141.4280**	**0.0334**	**0.0000**	**142.2641**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.5 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	0.0108	0.4645	0.1340	2.0700e-003	0.0693	2.9900e-003	0.0723	0.0200	2.8600e-003	0.0229	0.0000	199.0085	199.0085	9.5000e-004	0.0301	207.9878
Worker	0.0966	0.0608	0.7583	2.3800e-003	0.2872	1.3300e-003	0.2885	0.0764	1.2300e-003	0.0776	0.0000	217.8243	217.8243	6.1600e-003	5.9800e-003	219.7601
Total	**0.1074**	**0.5253**	**0.8922**	**4.4500e-003**	**0.3565**	**4.3200e-003**	**0.3608**	**0.0964**	**4.0900e-003**	**0.1005**	**0.0000**	**416.8329**	**416.8329**	**7.1100e-003**	**0.0360**	**427.7479**

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	0.0898	0.8201	0.9862	1.6400e-003		0.0374	0.0374		0.0352	0.0352	0.0000	141.4278	141.4278	0.0334	0.0000	142.2639
Total	**0.0898**	**0.8201**	**0.9862**	**1.6400e-003**		**0.0374**	**0.0374**		**0.0352**	**0.0352**	**0.0000**	**141.4278**	**141.4278**	**0.0334**	**0.0000**	**142.2639**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.5 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	0.0108	0.4645	0.1340	2.0700e-003	0.0649	2.9900e-003	0.0679	0.0190	2.8600e-003	0.0218	0.0000	199.0085	199.0085	9.5000e-004	0.0301	207.9878
Worker	0.0966	0.0608	0.7583	2.3800e-003	0.2648	1.3300e-003	0.2661	0.0709	1.2300e-003	0.0721	0.0000	217.8243	217.8243	6.1600e-003	5.9800e-003	219.7601
Total	**0.1074**	**0.5253**	**0.8922**	**4.4500e-003**	**0.3297**	**4.3200e-003**	**0.3341**	**0.0898**	**4.0900e-003**	**0.0939**	**0.0000**	**416.8329**	**416.8329**	**7.1100e-003**	**0.0360**	**427.7479**

3.6 Paving - 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	0.0494	0.4762	0.7313	1.1400e-003		0.0234	0.0234		0.0216	0.0216	0.0000	100.1327	100.1327	0.0324	0.0000	100.9423
Paving	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0494**	**0.4762**	**0.7313**	**1.1400e-003**		**0.0234**	**0.0234**		**0.0216**	**0.0216**	**0.0000**	**100.1327**	**100.1327**	**0.0324**	**0.0000**	**100.9423**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.6 Paving - 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	2.0100e-003	1.2700e-003	0.0158	5.0000e-005	5.9700e-003	3.0000e-005	6.0000e-003	1.5900e-003	3.0000e-005	1.6100e-003	0.0000	4.5316	4.5316	1.3000e-004	1.2000e-004	4.5719
Total	**2.0100e-003**	**1.2700e-003**	**0.0158**	**5.0000e-005**	**5.9700e-003**	**3.0000e-005**	**6.0000e-003**	**1.5900e-003**	**3.0000e-005**	**1.6100e-003**	**0.0000**	**4.5316**	**4.5316**	**1.3000e-004**	**1.2000e-004**	**4.5719**

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	0.0494	0.4762	0.7313	1.1400e-003		0.0234	0.0234		0.0216	0.0216	0.0000	100.1325	100.1325	0.0324	0.0000	100.9422
Paving	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0494**	**0.4762**	**0.7313**	**1.1400e-003**		**0.0234**	**0.0234**		**0.0216**	**0.0216**	**0.0000**	**100.1325**	**100.1325**	**0.0324**	**0.0000**	**100.9422**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.6 Paving - 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	2.0100e-003	1.2700e-003	0.0158	5.0000e-005	5.5100e-003	3.0000e-005	5.5400e-003	1.4700e-003	3.0000e-005	1.5000e-003	0.0000	4.5316	4.5316	1.3000e-004	1.2000e-004	4.5719
Total	**2.0100e-003**	**1.2700e-003**	**0.0158**	**5.0000e-005**	**5.5100e-003**	**3.0000e-005**	**5.5400e-003**	**1.4700e-003**	**3.0000e-005**	**1.5000e-003**	**0.0000**	**4.5316**	**4.5316**	**1.3000e-004**	**1.2000e-004**	**4.5719**

3.7 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	4.1870					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	3.6200e-003	0.0244	0.0362	6.0000e-005		1.2200e-003	1.2200e-003		1.2200e-003	1.2200e-003	0.0000	5.1065	5.1065	2.9000e-004	0.0000	5.1137
Total	**4.1907**	**0.0244**	**0.0362**	**6.0000e-005**		**1.2200e-003**	**1.2200e-003**		**1.2200e-003**	**1.2200e-003**	**0.0000**	**5.1065**	**5.1065**	**2.9000e-004**	**0.0000**	**5.1137**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.7 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	6.3200e-003	3.9800e-003	0.0496	1.6000e-004	0.0188	9.0000e-005	0.0189	5.0000e-003	8.0000e-005	5.0800e-003	0.0000	14.2594	14.2594	4.0000e-004	3.9000e-004	14.3861
Total	**6.3200e-003**	**3.9800e-003**	**0.0496**	**1.6000e-004**	**0.0188**	**9.0000e-005**	**0.0189**	**5.0000e-003**	**8.0000e-005**	**5.0800e-003**	**0.0000**	**14.2594**	**14.2594**	**4.0000e-004**	**3.9000e-004**	**14.3861**

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	4.1870					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	3.6200e-003	0.0244	0.0362	6.0000e-005		1.2200e-003	1.2200e-003		1.2200e-003	1.2200e-003	0.0000	5.1065	5.1065	2.9000e-004	0.0000	5.1137
Total	**4.1907**	**0.0244**	**0.0362**	**6.0000e-005**		**1.2200e-003**	**1.2200e-003**		**1.2200e-003**	**1.2200e-003**	**0.0000**	**5.1065**	**5.1065**	**2.9000e-004**	**0.0000**	**5.1137**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.7 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	6.3200e-003	3.9800e-003	0.0496	1.6000e-004	0.0173	9.0000e-005	0.0174	4.6400e-003	8.0000e-005	4.7200e-003	0.0000	14.2594	14.2594	4.0000e-004	3.9000e-004	14.3861
Total	**6.3200e-003**	**3.9800e-003**	**0.0496**	**1.6000e-004**	**0.0173**	**9.0000e-005**	**0.0174**	**4.6400e-003**	**8.0000e-005**	**4.7200e-003**	**0.0000**	**14.2594**	**14.2594**	**4.0000e-004**	**3.9000e-004**	**14.3861**

3.7 Architectural Coating - 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					
Archit. Coating	6.2806					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	5.1300e-003	0.0344	0.0543	9.0000e-005		1.5500e-003	1.5500e-003		1.5500e-003	1.5500e-003	0.0000	7.6598	7.6598	4.2000e-004	0.0000	7.6702
Total	**6.2857**	**0.0344**	**0.0543**	**9.0000e-005**		**1.5500e-003**	**1.5500e-003**		**1.5500e-003**	**1.5500e-003**	**0.0000**	**7.6598**	**7.6598**	**4.2000e-004**	**0.0000**	**7.6702**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.7 Architectural Coating - 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	0.0000	0.0000	0.0000	0.0000	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	8.8000e-003	5.3000e-003	0.0691	2.3000e-004	0.0282	1.2000e-004	0.0283	7.5000e-003	1.1000e-004	7.6100e-003	0.0000	20.6650	20.6650	5.5000e-004	5.5000e-004	20.8413
Total	**8.8000e-003**	**5.3000e-003**	**0.0691**	**2.3000e-004**	**0.0282**	**1.2000e-004**	**0.0283**	**7.5000e-003**	**1.1000e-004**	**7.6100e-003**	**0.0000**	**20.6650**	**20.6650**	**5.5000e-004**	**5.5000e-004**	**20.8413**

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	6.2806					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	5.1300e-003	0.0344	0.0543	9.0000e-005		1.5500e-003	1.5500e-003		1.5500e-003	1.5500e-003	0.0000	7.6598	7.6598	4.2000e-004	0.0000	7.6702
Total	**6.2857**	**0.0344**	**0.0543**	**9.0000e-005**		**1.5500e-003**	**1.5500e-003**		**1.5500e-003**	**1.5500e-003**	**0.0000**	**7.6598**	**7.6598**	**4.2000e-004**	**0.0000**	**7.6702**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.7 Architectural Coating - 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	0.0000	0.0000	0.0000	0.0000	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	8.8000e-003	5.3000e-003	0.0691	2.3000e-004	0.0260	1.2000e-004	0.0261	6.9600e-003	1.1000e-004	7.0700e-003	0.0000	20.6650	20.6650	5.5000e-004	5.5000e-004	20.8413
Total	**8.8000e-003**	**5.3000e-003**	**0.0691**	**2.3000e-004**	**0.0260**	**1.2000e-004**	**0.0261**	**6.9600e-003**	**1.1000e-004**	**7.0700e-003**	**0.0000**	**20.6650**	**20.6650**	**5.5000e-004**	**5.5000e-004**	**20.8413**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

Increase Density

Improve Destination Accessibility

Improve Pedestrian Network

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not 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	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	3.5144	5.4542	33.0128	0.0782	8.1812	0.0637	8.2448	2.1874	0.0597	2.2470	0.0000	7,231.9952	7,231.9952	0.3947	0.3802	7,355.1611
Unmitigated	3.6256	5.7663	34.8583	0.0839	8.7875	0.0680	8.8555	2.3495	0.0637	2.4132	0.0000	7,751.3515	7,751.3515	0.4119	0.4022	7,881.5054

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
City Park	8.09	20.33	22.71	25,459	23,703
Single Family Housing	6,749.60	6,821.10	6113.25	19,325,271	17,991,827
Condo/Townhouse	1,464.00	1,628.00	1256.00	4,224,189	3,932,720
Total	8,221.69	8,469.43	7,391.96	23,574,919	21,948,249

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
City Park	9.50	7.30	7.30	33.00	48.00	19.00	66	28	6
Single Family Housing	10.80	7.30	7.50	45.60	19.00	35.40	86	11	3
Condo/Townhouse	10.80	7.30	7.50	45.60	19.00	35.40	86	11	3

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
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
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

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

Condo/Townhouse	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	613.3432	613.3432	0.0992	0.0120	619.4081
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000	0.0000	613.3432	613.3432	0.0992	0.0120	619.4081
NaturalGas Mitigated	0.1116	0.9534	0.4057	6.0900e-003		0.0771	0.0771		0.0771	0.0771	0.0000	1,104.1213	1,104.1213	0.0212	0.0202	1,110.6825
NaturalGas Unmitigated	0.1116	0.9534	0.4057	6.0900e-003		0.0771	0.0771		0.0771	0.0771	0.0000	1,104.1213	1,104.1213	0.0212	0.0202	1,110.6825

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

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
Condo/Townhouse	3.7744e+006	0.0204	0.1739	0.0740	1.1100e-003		0.0141	0.0141		0.0141	0.0141	0.0000	201.4165	201.4165	3.8600e-003	3.6900e-003	202.6134
Single Family Housing	1.6916e+007	0.0912	0.7795	0.3317	4.9800e-003		0.0630	0.0630		0.0630	0.0630	0.0000	902.7048	902.7048	0.0173	0.0166	908.0691
Total		**0.1116**	**0.9534**	**0.4057**	**6.0900e-003**		**0.0771**	**0.0771**		**0.0771**	**0.0771**	**0.0000**	**1,104.1213**	**1,104.1213**	**0.0212**	**0.0202**	**1,110.6825**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

5.2 Energy by Land Use - NaturalGas

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	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
Condo/Townhouse	3.7744e+006	0.0204	0.1739	0.0740	1.1100e-003		0.0141	0.0141		0.0141	0.0141	0.0000	201.4165	201.4165	3.8600e-003	3.6900e-003	202.6134
Single Family Housing	1.6916e+007	0.0912	0.7795	0.3317	4.9800e-003		0.0630	0.0630		0.0630	0.0630	0.0000	902.7048	902.7048	0.0173	0.0166	908.0691
Total		**0.1116**	**0.9534**	**0.4057**	**6.0900e-003**		**0.0771**	**0.0771**		**0.0771**	**0.0771**	**0.0000**	**1,104.1213**	**1,104.1213**	**0.0212**	**0.0202**	**1,110.6825**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

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
Condo/Townhouse	975250	90.2338	0.0146	1.7700e-003	91.1261
Single Family Housing	5.65378e+006	523.1094	0.0846	0.0103	528.2820
Total		**613.3432**	**0.0992**	**0.0120**	**619.4081**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

5.3 Energy by Land Use - Electricity

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
Condo/Townhouse	975250	90.2338	0.0146	1.7700e-003	91.1261
Single Family Housing	5.65378e+006	523.1094	0.0846	0.0103	528.2820
Total		**613.3432**	**0.0992**	**0.0120**	**619.4081**

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

No Hearths Installed

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not 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	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	5.6666	0.0782	6.7876	3.6000e-004		0.0377	0.0377		0.0377	0.0377	0.0000	11.0980	11.0980	0.0106	0.0000	11.3637
Unmitigated	5.6666	0.0782	6.7876	3.6000e-004		0.0377	0.0377		0.0377	0.0377	0.0000	11.0980	11.0980	0.0106	0.0000	11.3637

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	0.4652					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	4.9976					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Hearth	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	0.2038	0.0782	6.7876	3.6000e-004		0.0377	0.0377		0.0377	0.0377	0.0000	11.0980	11.0980	0.0106	0.0000	11.3637
Total	**5.6666**	**0.0782**	**6.7876**	**3.6000e-004**		**0.0377**	**0.0377**		**0.0377**	**0.0377**	**0.0000**	**11.0980**	**11.0980**	**0.0106**	**0.0000**	**11.3637**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

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	0.4652					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	4.9976					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Hearth	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	0.2038	0.0782	6.7876	3.6000e-004		0.0377	0.0377		0.0377	0.0377	0.0000	11.0980	11.0980	0.0106	0.0000	11.3637
Total	**5.6666**	**0.0782**	**6.7876**	**3.6000e-004**		**0.0377**	**0.0377**		**0.0377**	**0.0377**	**0.0000**	**11.0980**	**11.0980**	**0.0106**	**0.0000**	**11.3637**

7.0 Water Detail

7.1 Mitigation Measures Water

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated	64.9320	1.9500	0.0468	127.6205
Unmitigated	64.9320	1.9500	0.0468	127.6205

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
City Park	0 / 12.3557	4.0012	6.5000e-004	8.0000e-005	4.0407
Condo/Townhouse	13.0308 / 8.21507	13.3182	0.4261	0.0102	27.0120
Single Family Housing	46.5851 / 29.3689	47.6126	1.5233	0.0365	96.5678
Total		**64.9320**	**1.9500**	**0.0468**	**127.6205**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

7.2 Water by Land Use

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
City Park	0 / 12.3557	4.0012	6.5000e-004	8.0000e-005	4.0407
Condo/Townhouse	13.0308 / 8.21507	13.3182	0.4261	0.0102	27.0120
Single Family Housing	46.5851 / 29.3689	47.6126	1.5233	0.0365	96.5678
Total		**64.9320**	**1.9500**	**0.0468**	**127.6205**

8.0 Waste Detail

8.1 Mitigation Measures Waste

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated	184.5939	10.9092	0.0000	457.3236
Unmitigated	184.5939	10.9092	0.0000	457.3236

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
City Park	0.89	0.1807	0.0107	0.0000	0.4476
Condo/Townhouse	92	18.6752	1.1037	0.0000	46.2669
Single Family Housing	816.48	165.7381	9.7948	0.0000	410.6090
Total		**184.5939**	**10.9092**	**0.0000**	**457.3236**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

8.2 Waste by Land Use

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
City Park	0.89	0.1807	0.0107	0.0000	0.4476
Condo/Townhouse	92	18.6752	1.1037	0.0000	46.2669
Single Family Housing	816.48	165.7381	9.7948	0.0000	410.6090
Total		**184.5939**	**10.9092**	**0.0000**	**457.3236**

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

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

11.0 Vegetation

	Total CO2	CH4	N2O	CO2e
Category	MT			
Unmitigated	-757.1377	0.0000	0.0000	-757.1377

11.1 Vegetation Land Change

Vegetation Type

	Initial/Final	Total CO2	CH4	N2O	CO2e
	Acres	MT			
Grassland	175.67 / 0	-757.1377	0.0000	0.0000	-757.1377
Total		**-757.1377**	**0.0000**	**0.0000**	**-757.1377**

Manteca Annexation #1 - San Joaquin County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

Manteca Annexation #1

San Joaquin County, Summer

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
City Park	10.37	Acre	10.37	451,717.20	0
Single Family Housing	715.00	Dwelling Unit	152.80	1,287,000.00	2268
Condo/Townhouse	200.00	Dwelling Unit	12.50	200,000.00	642

1.2 Other Project Characteristics

Urbanization	Urban	**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 - 2025 assumed as final buildout year.

Land Use - Total development lot acreage = 175.67 acres. Total residents estimated at 2,910 residents.

Construction Phase - Buildout assumed to occur by year 2025.

Demolition - Four small buildings to be demolished at the northwest corner of the Project site. Estimated at 5000 sf total.

Grading - Site is relatively flat.

Architectural Coating - Assumes maximum of 100 g/L for interior coatings (per non-specialty coating limitations providded in SJVAPCD Rule 4601)

Vehicle Trips - Trip rates as provided by Traffic Impact Analysis (Fehr & Peers).

Woodstoves - Assumes no hearths.

Area Coating - Assumes maximum of 50 g/L after 1/1/2022, for interior and exterior coatings (per non-specialty coating limitations providded in SJVAPCD Rule 4601)

Manteca Annexation #1 - San Joaquin County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

Energy Use -

Land Use Change - Assumes removal of 'grassland' land use type over the entire development area (175.67 acres).

Construction Off-road Equipment Mitigation - Water Exposed Area 2x daily; Clean Paved Road (9% fugitive dust PM reduction); Unpaved road mitigation: Limit on-site construction vehicle speeds to 5 mph; Soil Stabilizer for unpaved (10% reduction)

Fleet Mix -

Mobile Land Use Mitigation - Increase Density (915 units/175 acres = 5.23)'; Improve Destination Accessibility - 2.75 miles to downtown Job centre; Improve pedestrian network (project site and connecting off-site).

Area Mitigation - No hearths; Assumes maximum of 50 g/L after 1/1/2022, for interior and exterior coatings (per non-specialty coating limitations provided in SJVAPCD Rule 4601).

Consumer Products - CARB total statewide year 2016 ROG emissions is 208.71 tons/year, 12.89% less than the amount estimated for 2008 (239.6 tons/year). General Category consumer projects emissions factor adjusted to reflect.

Table Name	Column Name	Default Value	New Value
tblArchitecturalCoating	EF_Nonresidential_Interior	150.00	100.00
tblArchitecturalCoating	EF_Residential_Interior	150.00	100.00
tblAreaCoating	Area_EF_Nonresidential_Exterior	150	50
tblAreaCoating	Area_EF_Nonresidential_Interior	150	50
tblAreaCoating	Area_EF_Residential_Exterior	150	50
tblAreaCoating	Area_EF_Residential_Interior	150	50
tblConstDustMitigation	CleanPavedRoadPercentReduction	0	9
tblConstDustMitigation	WaterUnpavedRoadVehicleSpeed	0	5
tblConstructionPhase	NumDays	200.00	10.00
tblConstructionPhase	NumDays	120.00	60.00
tblConstructionPhase	NumDays	310.00	60.00
tblConstructionPhase	NumDays	3,100.00	600.00
tblConstructionPhase	NumDays	220.00	100.00
tblConstructionPhase	NumDays	220.00	100.00
tblConstructionPhase	PhaseEndDate	6/7/2022	9/14/2021
tblConstructionPhase	PhaseEndDate	11/22/2022	12/7/2021
tblConstructionPhase	PhaseEndDate	1/30/2024	3/1/2022
tblConstructionPhase	PhaseEndDate	12/18/2035	6/18/2024

Manteca Annexation #1 - San Joaquin County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

tblConstructionPhase	PhaseEndDate	10/21/2036	11/5/2024
tblConstructionPhase	PhaseEndDate	8/25/2037	3/25/2025
tblConstructionPhase	PhaseStartDate	6/8/2022	9/15/2021
tblConstructionPhase	PhaseStartDate	11/23/2022	12/8/2021
tblConstructionPhase	PhaseStartDate	1/31/2024	3/2/2022
tblConstructionPhase	PhaseStartDate	12/19/2035	6/19/2024
tblConstructionPhase	PhaseStartDate	10/22/2036	11/6/2024
tblConsumerProducts	ROG_EF	2.14E-05	1.84E-05
tblFireplaces	FireplaceDayYear	82.00	0.00
tblFireplaces	FireplaceDayYear	82.00	0.00
tblFireplaces	FireplaceHourDay	3.00	0.00
tblFireplaces	FireplaceHourDay	3.00	0.00
tblFireplaces	FireplaceWoodMass	3,078.40	0.00
tblFireplaces	FireplaceWoodMass	3,078.40	0.00
tblFireplaces	NumberGas	393.25	0.00
tblFireplaces	NumberGas	110.00	0.00
tblFireplaces	NumberNoFireplace	321.75	0.00
tblFireplaces	NumberNoFireplace	90.00	0.00
tblLandUse	LotAcreage	232.14	152.80
tblLandUse	Population	634.00	642.00
tblWoodstoves	NumberCatalytic	152.80	0.00
tblWoodstoves	NumberCatalytic	12.50	0.00
tblWoodstoves	NumberNoncatalytic	152.80	0.00
tblWoodstoves	NumberNoncatalytic	12.50	0.00
tblWoodstoves	WoodstoveDayYear	82.00	0.00
tblWoodstoves	WoodstoveDayYear	82.00	0.00
tblWoodstoves	WoodstoveWoodMass	3,019.20	0.00
tblWoodstoves	WoodstoveWoodMass	3,019.20	0.00

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

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					
2021	4.2689	46.4459	31.4952	0.0636	19.8049	2.0453	21.8501	10.1417	1.8816	12.0233	0.0000	6,166.0063	6,166.0063	1.9478	0.0275	6,216.0221
2022	4.1729	38.8834	35.4452	0.1078	9.3679	1.6357	11.0036	3.6973	1.5049	5.2022	0.0000	10,897.5750	10,897.5750	1.9487	0.6943	11,123.7411
2023	3.6843	22.7015	33.4958	0.1050	6.0206	0.7715	6.7921	1.6234	0.7263	2.3496	0.0000	10,606.3518	10,606.3518	0.7432	0.6613	10,822.0056
2024	209.8865	21.6394	32.2037	0.1029	6.0206	0.6842	6.7048	1.6234	0.6439	2.2673	0.0000	10,396.5632	10,396.5632	0.7265	0.6437	10,606.5571
2025	209.8506	1.3060	4.3751	0.0111	0.9693	0.0557	1.0250	0.2571	0.0553	0.3125	0.0000	1,100.6271	1,100.6271	0.0341	0.0188	1,107.0902
Maximum	**209.8865**	**46.4459**	**35.4452**	**0.1078**	**19.8049**	**2.0453**	**21.8501**	**10.1417**	**1.8816**	**12.0233**	**0.0000**	**10,897.5750**	**10,897.5750**	**1.9487**	**0.6943**	**11,123.7411**

Manteca Annexation #1 - San Joaquin County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

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					
2021	4.2689	46.4459	31.4952	0.0636	8.9820	2.0453	11.0272	4.5825	1.8816	6.4641	0.0000	6,166.0063	6,166.0063	1.9478	0.0275	6,216.0221
2022	4.1729	38.8834	35.4452	0.1078	5.5661	1.6357	6.5037	1.6846	1.5049	3.1895	0.0000	10,897.5750	10,897.5750	1.9487	0.6943	11,123.7411
2023	3.6843	22.7015	33.4958	0.1050	5.5661	0.7715	6.3376	1.5118	0.7263	2.2381	0.0000	10,606.3518	10,606.3518	0.7432	0.6613	10,822.0056
2024	209.8865	21.6394	32.2037	0.1029	5.5661	0.6842	6.2503	1.5118	0.6439	2.1557	0.0000	10,396.5632	10,396.5632	0.7265	0.6437	10,606.5571
2025	209.8506	1.3060	4.3751	0.0111	0.8935	0.0557	0.9492	0.2385	0.0553	0.2938	0.0000	1,100.6271	1,100.6271	0.0341	0.0188	1,107.0902
Maximum	**209.8865**	**46.4459**	**35.4452**	**0.1078**	**8.9820**	**2.0453**	**11.0272**	**4.5825**	**1.8816**	**6.4641**	**0.0000**	**10,897.5750**	**10,897.5750**	**1.9487**	**0.6943**	**11,123.7411**

	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**	**37.00**	**0.00**	**34.42**	**45.05**	**0.00**	**35.27**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Manteca Annexation #1 - San Joaquin County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

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	32.1977	0.8687	75.4182	3.9900e-003		0.4185	0.4185		0.4185	0.4185	0.0000	135.9276	135.9276	0.1302	0.0000	139.1819
Energy	0.6113	5.2240	2.2230	0.0333		0.4224	0.4224		0.4224	0.4224		6,668.9609	6,668.9609	0.1278	0.1223	6,708.5912
Mobile	24.2120	30.7317	207.7603	0.5084	51.8004	0.3889	52.1893	13.8155	0.3646	14.1801		51,767.3818	51,767.3818	2.4586	2.4456	52,557.6429
Total	**57.0211**	**36.8245**	**285.4014**	**0.5457**	**51.8004**	**1.2297**	**53.0302**	**13.8155**	**1.2054**	**15.0209**	**0.0000**	**58,572.2703**	**58,572.2703**	**2.7166**	**2.5679**	**59,405.4159**

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	32.1977	0.8687	75.4182	3.9900e-003		0.4185	0.4185		0.4185	0.4185	0.0000	135.9276	135.9276	0.1302	0.0000	139.1819
Energy	0.6113	5.2240	2.2230	0.0333		0.4224	0.4224		0.4224	0.4224		6,668.9609	6,668.9609	0.1278	0.1223	6,708.5912
Mobile	23.5823	29.0730	196.0687	0.4742	48.2262	0.3643	48.5905	12.8623	0.3415	13.2037		48,291.7965	48,291.7965	2.3485	2.3112	49,039.2361
Total	**56.3913**	**35.1658**	**273.7098**	**0.5116**	**48.2262**	**1.2051**	**49.4313**	**12.8623**	**1.1823**	**14.0446**	**0.0000**	**55,096.6850**	**55,096.6850**	**2.6064**	**2.4334**	**55,887.0092**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not 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	1.10	4.50	4.10	6.26	6.90	2.00	6.79	6.90	1.92	6.50	0.00	5.93	5.93	4.06	5.24	5.92

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Demolition	Demolition	9/1/2021	9/14/2021	5	10	
2	Site Preparation	Site Preparation	9/15/2021	12/7/2021	5	60	
3	Grading	Grading	12/8/2021	3/1/2022	5	60	
4	Building Construction	Building Construction	3/2/2022	6/18/2024	5	600	
5	Paving	Paving	6/19/2024	11/5/2024	5	100	
6	Architectural Coating	Architectural Coating	11/6/2024	3/25/2025	5	100	

Acres of Grading (Site Preparation Phase): 90

Acres of Grading (Grading Phase): 180

Acres of Paving: 0

Residential Indoor: 3,011,175; Residential Outdoor: 1,003,725; 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
Demolition	Concrete/Industrial Saws	1	8.00	81	0.73
Demolition	Excavators	3	8.00	158	0.38
Demolition	Rubber Tired Dozers	2	8.00	247	0.40
Site Preparation	Rubber Tired Dozers	3	8.00	247	0.40
Site Preparation	Tractors/Loaders/Backhoes	4	8.00	97	0.37

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

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
Demolition	6	15.00	0.00	23.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Site Preparation	7	18.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Grading	8	20.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	9	591.00	172.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Paving	6	15.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	118.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Use Soil Stabilizer

Water Exposed Area

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

Reduce Vehicle Speed on Unpaved Roads

Clean Paved Roads

3.2 Demolition - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.4999	0.0000	0.4999	0.0757	0.0000	0.0757			0.0000			0.0000
Off-Road	3.1651	31.4407	21.5650	0.0388		1.5513	1.5513		1.4411	1.4411		3,747.9449	3,747.9449	1.0549		3,774.3174
Total	**3.1651**	**31.4407**	**21.5650**	**0.0388**	**0.4999**	**1.5513**	**2.0512**	**0.0757**	**1.4411**	**1.5168**		**3,747.9449**	**3,747.9449**	**1.0549**		**3,774.3174**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.2 Demolition - 2021

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0140	0.3918	0.0792	1.4500e-003	0.0403	6.1000e-003	0.0464	0.0110	5.8300e-003	0.0169		153.9452	153.9452	1.3300e-003	0.0242	161.1937
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	0.0583	0.0345	0.4626	1.1800e-003	0.1232	6.7000e-004	0.1239	0.0327	6.1000e-004	0.0333		119.2221	119.2221	3.7500e-003	3.3200e-003	120.3065
Total	**0.0723**	**0.4263**	**0.5418**	**2.6300e-003**	**0.1635**	**6.7700e-003**	**0.1703**	**0.0437**	**6.4400e-003**	**0.0502**		**273.1673**	**273.1673**	**5.0800e-003**	**0.0275**	**281.5002**

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					0.2250	0.0000	0.2250	0.0341	0.0000	0.0341			0.0000			0.0000
Off-Road	3.1651	31.4407	21.5650	0.0388		1.5513	1.5513		1.4411	1.4411	0.0000	3,747.9449	3,747.9449	1.0549		3,774.3174
Total	**3.1651**	**31.4407**	**21.5650**	**0.0388**	**0.2250**	**1.5513**	**1.7763**	**0.0341**	**1.4411**	**1.4752**	**0.0000**	**3,747.9449**	**3,747.9449**	**1.0549**		**3,774.3174**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.2 Demolition - 2021

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0140	0.3918	0.0792	1.4500e-003	0.0375	6.1000e-003	0.0436	0.0104	5.8300e-003	0.0162		153.9452	153.9452	1.3300e-003	0.0242	161.1937
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	0.0583	0.0345	0.4626	1.1800e-003	0.1136	6.7000e-004	0.1143	0.0303	6.1000e-004	0.0309		119.2221	119.2221	3.7500e-003	3.3200e-003	120.3065
Total	**0.0723**	**0.4263**	**0.5418**	**2.6300e-003**	**0.1511**	**6.7700e-003**	**0.1579**	**0.0407**	**6.4400e-003**	**0.0471**		**273.1673**	**273.1673**	**5.0800e-003**	**0.0275**	**281.5002**

3.3 Site Preparation - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					19.6570	0.0000	19.6570	10.1025	0.0000	10.1025			0.0000			0.0000
Off-Road	3.8882	40.4971	21.1543	0.0380		2.0445	2.0445		1.8809	1.8809		3,685.6569	3,685.6569	1.1920		3,715.4573
Total	**3.8882**	**40.4971**	**21.1543**	**0.0380**	**19.6570**	**2.0445**	**21.7015**	**10.1025**	**1.8809**	**11.9834**		**3,685.6569**	**3,685.6569**	**1.1920**		**3,715.4573**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.3 Site Preparation - 2021

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	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	0.0699	0.0414	0.5551	1.4200e-003	0.1479	8.0000e-004	0.1487	0.0392	7.4000e-004	0.0400		143.0666	143.0666	4.5000e-003	3.9900e-003	144.3678
Total	**0.0699**	**0.0414**	**0.5551**	**1.4200e-003**	**0.1479**	**8.0000e-004**	**0.1487**	**0.0392**	**7.4000e-004**	**0.0400**		**143.0666**	**143.0666**	**4.5000e-003**	**3.9900e-003**	**144.3678**

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	3.8882	40.4971	21.1543	0.0380		2.0445	2.0445		1.8809	1.8809	0.0000	3,685.6569	3,685.6569	1.1920		3,715.4573
Total	**3.8882**	**40.4971**	**21.1543**	**0.0380**	**8.8457**	**2.0445**	**10.8901**	**4.5461**	**1.8809**	**6.4270**	**0.0000**	**3,685.6569**	**3,685.6569**	**1.1920**		**3,715.4573**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.3 Site Preparation - 2021

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	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	0.0699	0.0414	0.5551	1.4200e-003	0.1363	8.0000e-004	0.1371	0.0364	7.4000e-004	0.0371		143.0666	143.0666	4.5000e-003	3.9900e-003	144.3678
Total	**0.0699**	**0.0414**	**0.5551**	**1.4200e-003**	**0.1363**	**8.0000e-004**	**0.1371**	**0.0364**	**7.4000e-004**	**0.0371**		**143.0666**	**143.0666**	**4.5000e-003**	**3.9900e-003**	**144.3678**

3.4 Grading - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					9.2036	0.0000	9.2036	3.6538	0.0000	3.6538			0.0000			0.0000
Off-Road	4.1912	46.3998	30.8785	0.0620		1.9853	1.9853		1.8265	1.8265		6,007.0434	6,007.0434	1.9428		6,055.6134
Total	**4.1912**	**46.3998**	**30.8785**	**0.0620**	**9.2036**	**1.9853**	**11.1889**	**3.6538**	**1.8265**	**5.4803**		**6,007.0434**	**6,007.0434**	**1.9428**		**6,055.6134**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.4 Grading - 2021

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	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	0.0777	0.0460	0.6168	1.5700e-003	0.1643	8.9000e-004	0.1652	0.0436	8.2000e-004	0.0444		158.9628	158.9628	5.0000e-003	4.4300e-003	160.4087
Total	**0.0777**	**0.0460**	**0.6168**	**1.5700e-003**	**0.1643**	**8.9000e-004**	**0.1652**	**0.0436**	**8.2000e-004**	**0.0444**		**158.9628**	**158.9628**	**5.0000e-003**	**4.4300e-003**	**160.4087**

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	4.1912	46.3998	30.8785	0.0620		1.9853	1.9853		1.8265	1.8265	0.0000	6,007.0434	6,007.0434	1.9428		6,055.6134
Total	**4.1912**	**46.3998**	**30.8785**	**0.0620**	**4.1416**	**1.9853**	**6.1270**	**1.6442**	**1.8265**	**3.4707**	**0.0000**	**6,007.0434**	**6,007.0434**	**1.9428**		**6,055.6134**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.4 Grading - 2021

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	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	0.0777	0.0460	0.6168	1.5700e-003	0.1514	8.9000e-004	0.1523	0.0404	8.2000e-004	0.0412		158.9628	158.9628	5.0000e-003	4.4300e-003	160.4087
Total	**0.0777**	**0.0460**	**0.6168**	**1.5700e-003**	**0.1514**	**8.9000e-004**	**0.1523**	**0.0404**	**8.2000e-004**	**0.0412**		**158.9628**	**158.9628**	**5.0000e-003**	**4.4300e-003**	**160.4087**

3.4 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**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.4 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	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	0.0710	0.0400	0.5586	1.5200e-003	0.1643	8.3000e-004	0.1651	0.0436	7.7000e-004	0.0444		153.9427	153.9427	4.4500e-003	4.0500e-003	155.2596
Total	**0.0710**	**0.0400**	**0.5586**	**1.5200e-003**	**0.1643**	**8.3000e-004**	**0.1651**	**0.0436**	**7.7000e-004**	**0.0444**		**153.9427**	**153.9427**	**4.4500e-003**	**4.0500e-003**	**155.2596**

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**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.4 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	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	0.0710	0.0400	0.5586	1.5200e-003	0.1514	8.3000e-004	0.1523	0.0404	7.7000e-004	0.0412		153.9427	153.9427	4.4500e-003	4.0500e-003	155.2596
Total	**0.0710**	**0.0400**	**0.5586**	**1.5200e-003**	**0.1514**	**8.3000e-004**	**0.1523**	**0.0404**	**7.7000e-004**	**0.0412**		**153.9427**	**153.9427**	**4.4500e-003**	**4.0500e-003**	**155.2596**

3.5 Building Construction - 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					
Off-Road	1.7062	15.6156	16.3634	0.0269		0.8090	0.8090		0.7612	0.7612		2,554.3336	2,554.3336	0.6120		2,569.6322
Total	**1.7062**	**15.6156**	**16.3634**	**0.0269**		**0.8090**	**0.8090**		**0.7612**	**0.7612**		**2,554.3336**	**2,554.3336**	**0.6120**		**2,569.6322**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.5 Building Construction - 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	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	0.3677	9.0813	2.5744	0.0359	1.1656	0.1039	1.2696	0.3356	0.0994	0.4351		3,794.2338	3,794.2338	0.0272	0.5747	3,966.1875
Worker	2.0990	1.1812	16.5075	0.0450	4.8549	0.0247	4.8796	1.2878	0.0227	1.3104		4,549.0076	4,549.0076	0.1314	0.1196	4,587.9214
Total	**2.4666**	**10.2625**	**19.0818**	**0.0809**	**6.0206**	**0.1286**	**6.1491**	**1.6234**	**0.1221**	**1.7455**		**8,343.2415**	**8,343.2415**	**0.1586**	**0.6943**	**8,554.1089**

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	1.7062	15.6156	16.3634	0.0269		0.8090	0.8090		0.7612	0.7612	0.0000	2,554.3336	2,554.3336	0.6120		2,569.6322
Total	**1.7062**	**15.6156**	**16.3634**	**0.0269**		**0.8090**	**0.8090**		**0.7612**	**0.7612**	**0.0000**	**2,554.3336**	**2,554.3336**	**0.6120**		**2,569.6322**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.5 Building Construction - 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	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	0.3677	9.0813	2.5744	0.0359	1.0909	0.1039	1.1949	0.3173	0.0994	0.4167		3,794.2338	3,794.2338	0.0272	0.5747	3,966.1875
Worker	2.0990	1.1812	16.5075	0.0450	4.4752	0.0247	4.4998	1.1945	0.0227	1.2172		4,549.0076	4,549.0076	0.1314	0.1196	4,587.9214
Total	**2.4666**	**10.2625**	**19.0818**	**0.0809**	**5.5661**	**0.1286**	**5.6947**	**1.5118**	**0.1221**	**1.6339**		**8,343.2415**	**8,343.2415**	**0.1586**	**0.6943**	**8,554.1089**

3.5 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**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.5 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	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	0.1873	7.2859	2.2064	0.0345	1.1656	0.0486	1.2142	0.3356	0.0465	0.3821		3,650.0548	3,650.0548	0.0182	0.5516	3,814.8771
Worker	1.9243	1.0307	15.0453	0.0435	4.8549	0.0232	4.8781	1.2878	0.0214	1.3091		4,401.0871	4,401.0871	0.1172	0.1098	4,436.7225
Total	**2.1116**	**8.3166**	**17.2518**	**0.0781**	**6.0206**	**0.0718**	**6.0924**	**1.6234**	**0.0678**	**1.6912**		**8,051.1419**	**8,051.1419**	**0.1354**	**0.6613**	**8,251.5995**

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**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.5 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	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	0.1873	7.2859	2.2064	0.0345	1.0909	0.0486	1.1395	0.3173	0.0465	0.3638		3,650.0548	3,650.0548	0.0182	0.5516	3,814.8771
Worker	1.9243	1.0307	15.0453	0.0435	4.4752	0.0232	4.4984	1.1945	0.0214	1.2159		4,401.0871	4,401.0871	0.1172	0.1098	4,436.7225
Total	**2.1116**	**8.3166**	**17.2518**	**0.0781**	**5.5661**	**0.0718**	**5.6379**	**1.5118**	**0.0678**	**1.5797**		**8,051.1419**	**8,051.1419**	**0.1354**	**0.6613**	**8,251.5995**

3.5 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**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.5 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	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	0.1830	7.2903	2.1630	0.0340	1.1656	0.0490	1.2146	0.3356	0.0469	0.3825		3,593.3326	3,593.3326	0.0174	0.5424	3,755.4013
Worker	1.7721	0.9054	13.8738	0.0420	4.8549	0.0219	4.8768	1.2878	0.0201	1.3079		4,247.5316	4,247.5316	0.1048	0.1013	4,280.3481
Total	**1.9551**	**8.1957**	**16.0368**	**0.0760**	**6.0206**	**0.0709**	**6.0914**	**1.6234**	**0.0670**	**1.6904**		**7,840.8643**	**7,840.8643**	**0.1222**	**0.6437**	**8,035.7494**

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**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.5 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	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	0.1830	7.2903	2.1630	0.0340	1.0909	0.0490	1.1399	0.3173	0.0469	0.3642		3,593.3326	3,593.3326	0.0174	0.5424	3,755.4013
Worker	1.7721	0.9054	13.8738	0.0420	4.4752	0.0219	4.4971	1.1945	0.0201	1.2147		4,247.5316	4,247.5316	0.1048	0.1013	4,280.3481
Total	**1.9551**	**8.1957**	**16.0368**	**0.0760**	**5.5661**	**0.0709**	**5.6370**	**1.5118**	**0.0670**	**1.5788**		**7,840.8643**	**7,840.8643**	**0.1222**	**0.6437**	**8,035.7494**

3.6 Paving - 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	0.9882	9.5246	14.6258	0.0228		0.4685	0.4685		0.4310	0.4310		2,207.5472	2,207.5472	0.7140		2,225.3963
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**0.9882**	**9.5246**	**14.6258**	**0.0228**		**0.4685**	**0.4685**		**0.4310**	**0.4310**		**2,207.5472**	**2,207.5472**	**0.7140**		**2,225.3963**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.6 Paving - 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	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	0.0450	0.0230	0.3521	1.0700e-003	0.1232	5.6000e-004	0.1238	0.0327	5.1000e-004	0.0332		107.8054	107.8054	2.6600e-003	2.5700e-003	108.6383
Total	**0.0450**	**0.0230**	**0.3521**	**1.0700e-003**	**0.1232**	**5.6000e-004**	**0.1238**	**0.0327**	**5.1000e-004**	**0.0332**		**107.8054**	**107.8054**	**2.6600e-003**	**2.5700e-003**	**108.6383**

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	0.9882	9.5246	14.6258	0.0228		0.4685	0.4685		0.4310	0.4310	0.0000	2,207.5472	2,207.5472	0.7140		2,225.3963
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**0.9882**	**9.5246**	**14.6258**	**0.0228**		**0.4685**	**0.4685**		**0.4310**	**0.4310**	**0.0000**	**2,207.5472**	**2,207.5472**	**0.7140**		**2,225.3963**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.6 Paving - 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	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	0.0450	0.0230	0.3521	1.0700e-003	0.1136	5.6000e-004	0.1141	0.0303	5.1000e-004	0.0308		107.8054	107.8054	2.6600e-003	2.5700e-003	108.6383
Total	**0.0450**	**0.0230**	**0.3521**	**1.0700e-003**	**0.1136**	**5.6000e-004**	**0.1141**	**0.0303**	**5.1000e-004**	**0.0308**		**107.8054**	**107.8054**	**2.6600e-003**	**2.5700e-003**	**108.6383**

3.7 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	209.3519					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	**209.5327**	**1.2188**	**1.8101**	**2.9700e-003**		**0.0609**	**0.0609**		**0.0609**	**0.0609**		**281.4481**	**281.4481**	**0.0159**		**281.8443**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.7 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	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	0.3538	0.1808	2.7701	8.3900e-003	0.9693	4.3700e-003	0.9737	0.2571	4.0200e-003	0.2611		848.0689	848.0689	0.0209	0.0202	854.6211
Total	**0.3538**	**0.1808**	**2.7701**	**8.3900e-003**	**0.9693**	**4.3700e-003**	**0.9737**	**0.2571**	**4.0200e-003**	**0.2611**		**848.0689**	**848.0689**	**0.0209**	**0.0202**	**854.6211**

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	209.3519					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	**209.5327**	**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**

Manteca Annexation #1 - San Joaquin County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.7 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	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	0.3538	0.1808	2.7701	8.3900e-003	0.8935	4.3700e-003	0.8979	0.2385	4.0200e-003	0.2425		848.0689	848.0689	0.0209	0.0202	854.6211
Total	**0.3538**	**0.1808**	**2.7701**	**8.3900e-003**	**0.8935**	**4.3700e-003**	**0.8979**	**0.2385**	**4.0200e-003**	**0.2425**		**848.0689**	**848.0689**	**0.0209**	**0.0202**	**854.6211**

3.7 Architectural Coating - 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					
Archit. Coating	209.3519					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.1709	1.1455	1.8091	2.9700e-003		0.0515	0.0515		0.0515	0.0515		281.4481	281.4481	0.0154		281.8319
Total	**209.5228**	**1.1455**	**1.8091**	**2.9700e-003**		**0.0515**	**0.0515**		**0.0515**	**0.0515**		**281.4481**	**281.4481**	**0.0154**		**281.8319**

Manteca Annexation #1 - San Joaquin County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.7 Architectural Coating - 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	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	0.3278	0.1605	2.5660	8.1000e-003	0.9693	4.1500e-003	0.9735	0.2571	3.8200e-003	0.2609		819.1791	819.1791	0.0188	0.0188	825.2584
Total	**0.3278**	**0.1605**	**2.5660**	**8.1000e-003**	**0.9693**	**4.1500e-003**	**0.9735**	**0.2571**	**3.8200e-003**	**0.2609**		**819.1791**	**819.1791**	**0.0188**	**0.0188**	**825.2584**

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	209.3519					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.1709	1.1455	1.8091	2.9700e-003		0.0515	0.0515		0.0515	0.0515	0.0000	281.4481	281.4481	0.0154		281.8319
Total	**209.5228**	**1.1455**	**1.8091**	**2.9700e-003**		**0.0515**	**0.0515**		**0.0515**	**0.0515**	**0.0000**	**281.4481**	**281.4481**	**0.0154**		**281.8319**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.7 Architectural Coating - 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	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	0.3278	0.1605	2.5660	8.1000e-003	0.8935	4.1500e-003	0.8977	0.2385	3.8200e-003	0.2423		819.1791	819.1791	0.0188	0.0188	825.2584
Total	**0.3278**	**0.1605**	**2.5660**	**8.1000e-003**	**0.8935**	**4.1500e-003**	**0.8977**	**0.2385**	**3.8200e-003**	**0.2423**		**819.1791**	**819.1791**	**0.0188**	**0.0188**	**825.2584**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

Increase Density

Improve Destination Accessibility

Improve Pedestrian Network

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not 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	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	23.5823	29.0730	196.0687	0.4742	48.2262	0.3643	48.5905	12.8623	0.3415	13.2037		48,291.7965	48,291.7965	2.3485	2.3112	49,039.2361
Unmitigated	24.2120	30.7317	207.7603	0.5084	51.8004	0.3889	52.1893	13.8155	0.3646	14.1801		51,767.3818	51,767.3818	2.4586	2.4456	52,557.6429

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
City Park	8.09	20.33	22.71	25,459	23,703
Single Family Housing	6,749.60	6,821.10	6113.25	19,325,271	17,991,827
Condo/Townhouse	1,464.00	1,628.00	1256.00	4,224,189	3,932,720
Total	8,221.69	8,469.43	7,391.96	23,574,919	21,948,249

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
City Park	9.50	7.30	7.30	33.00	48.00	19.00	66	28	6
Single Family Housing	10.80	7.30	7.50	45.60	19.00	35.40	86	11	3
Condo/Townhouse	10.80	7.30	7.50	45.60	19.00	35.40	86	11	3

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
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
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

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

Condo/Townhouse	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	0.6113	5.2240	2.2230	0.0333		0.4224	0.4224		0.4224	0.4224		6,668.9609	6,668.9609	0.1278	0.1223	6,708.5912
NaturalGas Unmitigated	0.6113	5.2240	2.2230	0.0333		0.4224	0.4224		0.4224	0.4224		6,668.9609	6,668.9609	0.1278	0.1223	6,708.5912

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

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
Condo/Townhouse	10340.8	0.1115	0.9530	0.4055	6.0800e-003		0.0771	0.0771		0.0771	0.0771		1,216.5679	1,216.5679	0.0233	0.0223	1,223.7974
Single Family Housing	46345.3	0.4998	4.2710	1.8175	0.0273		0.3453	0.3453		0.3453	0.3453		5,452.3930	5,452.3930	0.1045	0.1000	5,484.7938
Total		**0.6113**	**5.2240**	**2.2230**	**0.0333**		**0.4224**	**0.4224**		**0.4224**	**0.4224**		**6,668.9609**	**6,668.9609**	**0.1278**	**0.1223**	**6,708.5912**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

5.2 Energy by Land Use - NaturalGas

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
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
Condo/Townhouse	10.3408	0.1115	0.9530	0.4055	6.0800e-003		0.0771	0.0771		0.0771	0.0771		1,216.5679	1,216.5679	0.0233	0.0223	1,223.7974
Single Family Housing	46.3453	0.4998	4.2710	1.8175	0.0273		0.3453	0.3453		0.3453	0.3453		5,452.3930	5,452.3930	0.1045	0.1000	5,484.7938
Total		**0.6113**	**5.2240**	**2.2230**	**0.0333**		**0.4224**	**0.4224**		**0.4224**	**0.4224**		**6,668.9609**	**6,668.9609**	**0.1278**	**0.1223**	**6,708.5912**

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

No Hearths Installed

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not 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	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	32.1977	0.8687	75.4182	3.9900e-003		0.4185	0.4185		0.4185	0.4185	0.0000	135.9276	135.9276	0.1302	0.0000	139.1819
Unmitigated	32.1977	0.8687	75.4182	3.9900e-003		0.4185	0.4185		0.4185	0.4185	0.0000	135.9276	135.9276	0.1302	0.0000	139.1819

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	2.5492					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	27.3841					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Hearth	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	2.2645	0.8687	75.4182	3.9900e-003		0.4185	0.4185		0.4185	0.4185		135.9276	135.9276	0.1302		139.1819
Total	**32.1977**	**0.8687**	**75.4182**	**3.9900e-003**		**0.4185**	**0.4185**		**0.4185**	**0.4185**	**0.0000**	**135.9276**	**135.9276**	**0.1302**	**0.0000**	**139.1819**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

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	2.5492					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	27.3841					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Hearth	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	2.2645	0.8687	75.4182	3.9900e-003		0.4185	0.4185		0.4185	0.4185		135.9276	135.9276	0.1302		139.1819
Total	**32.1977**	**0.8687**	**75.4182**	**3.9900e-003**		**0.4185**	**0.4185**		**0.4185**	**0.4185**	**0.0000**	**135.9276**	**135.9276**	**0.1302**	**0.0000**	**139.1819**

7.0 Water Detail

7.1 Mitigation Measures Water

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

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

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

Manteca Annexation #1

San Joaquin County, Winter

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
City Park	10.37	Acre	10.37	451,717.20	0
Single Family Housing	715.00	Dwelling Unit	152.80	1,287,000.00	2268
Condo/Townhouse	200.00	Dwelling Unit	12.50	200,000.00	642

1.2 Other Project Characteristics

Urbanization	Urban	**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 - 2025 assumed as final buildout year.

Land Use - Total development lot acreage = 175.67 acres. Total residents estimated at 2,910 residents.

Construction Phase - Buildout assumed to occur by year 2025.

Demolition - Four small buildings to be demolished at the northwest corner of the Project site. Estimated at 5000 sf total.

Grading - Site is relatively flat.

Architectural Coating - Assumes maximum of 100 g/L for interior coatings (per non-specialty coating limitations providded in SJVAPCD Rule 4601)

Vehicle Trips - Trip rates as provided by Traffic Impact Analysis (Fehr & Peers).

Woodstoves - Assumes no hearths.

Area Coating - Assumes maximum of 50 g/L after 1/1/2022, for interior and exterior coatings (per non-specialty coating limitations providded in SJVAPCD Rule 4601)

Manteca Annexation #1 - San Joaquin County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

Energy Use -

Land Use Change - Assumes removal of 'grassland' land use type over the entire development area (175.67 acres).

Construction Off-road Equipment Mitigation - Water Exposed Area 2x daily; Clean Paved Road (9% fugitive dust PM reduction); Unpaved road mitigation: Limit on-site construction vehicle speeds to 5 mph; Soil Stabilizer for unpaved (10% reduction)

Fleet Mix -

Mobile Land Use Mitigation - Increase Density (915 units/175 acres = 5.23)'; Improve Destination Accessibility - 2.75 miles to downtown Job centre; Improve pedestrian network (project site and connecting off-site).

Area Mitigation - No hearths; Assumes maximum of 50 g/L after 1/1/2022, for interior and exterior coatings (per non-specialty coating limitations provided in SJVAPCD Rule 4601).

Consumer Products - CARB total statewide year 2016 ROG emissions is 208.71 tons/year, 12.89% less than the amount estimated for 2008 (239.6 tons/year). General Category consumer projects emissions factor adjusted to reflect.

Table Name	Column Name	Default Value	New Value
tblArchitecturalCoating	EF_Nonresidential_Interior	150.00	100.00
tblArchitecturalCoating	EF_Residential_Interior	150.00	100.00
tblAreaCoating	Area_EF_Nonresidential_Exterior	150	50
tblAreaCoating	Area_EF_Nonresidential_Interior	150	50
tblAreaCoating	Area_EF_Residential_Exterior	150	50
tblAreaCoating	Area_EF_Residential_Interior	150	50
tblConstDustMitigation	CleanPavedRoadPercentReduction	0	9
tblConstDustMitigation	WaterUnpavedRoadVehicleSpeed	0	5
tblConstructionPhase	NumDays	200.00	10.00
tblConstructionPhase	NumDays	120.00	60.00
tblConstructionPhase	NumDays	310.00	60.00
tblConstructionPhase	NumDays	3,100.00	600.00
tblConstructionPhase	NumDays	220.00	100.00
tblConstructionPhase	NumDays	220.00	100.00
tblConstructionPhase	PhaseEndDate	6/7/2022	9/14/2021
tblConstructionPhase	PhaseEndDate	11/22/2022	12/7/2021
tblConstructionPhase	PhaseEndDate	1/30/2024	3/1/2022
tblConstructionPhase	PhaseEndDate	12/18/2035	6/18/2024

Manteca Annexation #1 - San Joaquin County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

tblConstructionPhase	PhaseEndDate	10/21/2036	11/5/2024
tblConstructionPhase	PhaseEndDate	8/25/2037	3/25/2025
tblConstructionPhase	PhaseStartDate	6/8/2022	9/15/2021
tblConstructionPhase	PhaseStartDate	11/23/2022	12/8/2021
tblConstructionPhase	PhaseStartDate	1/31/2024	3/2/2022
tblConstructionPhase	PhaseStartDate	12/19/2035	6/19/2024
tblConstructionPhase	PhaseStartDate	10/22/2036	11/6/2024
tblConsumerProducts	ROG_EF	2.14E-05	1.84E-05
tblFireplaces	FireplaceDayYear	82.00	0.00
tblFireplaces	FireplaceDayYear	82.00	0.00
tblFireplaces	FireplaceHourDay	3.00	0.00
tblFireplaces	FireplaceHourDay	3.00	0.00
tblFireplaces	FireplaceWoodMass	3,078.40	0.00
tblFireplaces	FireplaceWoodMass	3,078.40	0.00
tblFireplaces	NumberGas	393.25	0.00
tblFireplaces	NumberGas	110.00	0.00
tblFireplaces	NumberNoFireplace	321.75	0.00
tblFireplaces	NumberNoFireplace	90.00	0.00
tblLandUse	LotAcreage	232.14	152.80
tblLandUse	Population	634.00	642.00
tblWoodstoves	NumberCatalytic	152.80	0.00
tblWoodstoves	NumberCatalytic	12.50	0.00
tblWoodstoves	NumberNoncatalytic	152.80	0.00
tblWoodstoves	NumberNoncatalytic	12.50	0.00
tblWoodstoves	WoodstoveDayYear	82.00	0.00
tblWoodstoves	WoodstoveDayYear	82.00	0.00
tblWoodstoves	WoodstoveWoodMass	3,019.20	0.00
tblWoodstoves	WoodstoveWoodMass	3,019.20	0.00

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

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					
2021	4.2636	46.4556	31.4271	0.0634	19.8049	2.0453	21.8501	10.1417	1.8816	12.0233	0.0000	6,150.5764	6,150.5764	1.9484	0.0280	6,200.7906
2022	4.0283	38.8919	33.8078	0.1035	9.3679	1.6357	11.0036	3.6973	1.5049	5.2022	0.0000	10,460.8429	10,460.8429	1.9492	0.7117	10,692.6191
2023	3.5549	23.4227	32.0699	0.1009	6.0206	0.7717	6.7922	1.6234	0.7264	2.3498	0.0000	10,188.9549	10,188.9549	0.7588	0.6778	10,409.9207
2024	209.8659	22.3335	30.9532	0.0990	6.0206	0.6843	6.7049	1.6234	0.6441	2.2674	0.0000	9,995.0875	9,995.0875	0.7410	0.6590	10,209.9903
2025	209.8324	1.3397	4.1395	0.0103	0.9693	0.0557	1.0250	0.2571	0.0553	0.3125	0.0000	1,022.0828	1,022.0828	0.0369	0.0214	1,029.3773
Maximum	**209.8659**	**46.4556**	**33.8078**	**0.1035**	**19.8049**	**2.0453**	**21.8501**	**10.1417**	**1.8816**	**12.0233**	**0.0000**	**10,460.8429**	**10,460.8429**	**1.9492**	**0.7117**	**10,692.6191**

Manteca Annexation #1 - San Joaquin County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

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					
2021	4.2636	46.4556	31.4271	0.0634	8.9820	2.0453	11.0272	4.5825	1.8816	6.4641	0.0000	6,150.5764	6,150.5764	1.9484	0.0280	6,200.7906
2022	4.0283	38.8919	33.8078	0.1035	5.5661	1.6357	6.5040	1.6846	1.5049	3.1895	0.0000	10,460.8429	10,460.8429	1.9492	0.7117	10,692.6191
2023	3.5549	23.4227	32.0699	0.1009	5.5661	0.7717	6.3378	1.5118	0.7264	2.2382	0.0000	10,188.9549	10,188.9549	0.7588	0.6778	10,409.9207
2024	209.8659	22.3335	30.9532	0.0990	5.5661	0.6843	6.2505	1.5118	0.6441	2.1559	0.0000	9,995.0875	9,995.0875	0.7410	0.6590	10,209.9903
2025	209.8324	1.3397	4.1395	0.0103	0.8935	0.0557	0.9492	0.2385	0.0553	0.2938	0.0000	1,022.0828	1,022.0828	0.0369	0.0214	1,029.3773
Maximum	**209.8659**	**46.4556**	**33.8078**	**0.1035**	**8.9820**	**2.0453**	**11.0272**	**4.5825**	**1.8816**	**6.4641**	**0.0000**	**10,460.8429**	**10,460.8429**	**1.9492**	**0.7117**	**10,692.6191**

	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**	**37.00**	**0.00**	**34.42**	**45.05**	**0.00**	**35.27**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

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	32.1977	0.8687	75.4182	3.9900e-003		0.4185	0.4185		0.4185	0.4185	0.0000	135.9276	135.9276	0.1302	0.0000	139.1819
Energy	0.6113	5.2240	2.2230	0.0333		0.4224	0.4224		0.4224	0.4224		6,668.9609	6,668.9609	0.1278	0.1223	6,708.5912
Mobile	20.1544	34.7192	209.5910	0.4714	51.8004	0.3891	52.1896	13.8155	0.3648	14.1803		48,040.7111	48,040.7111	2.7653	2.6257	48,892.2975
Total	**52.9635**	**40.8119**	**287.2322**	**0.5087**	**51.8004**	**1.2300**	**53.0304**	**13.8155**	**1.2057**	**15.0212**	**0.0000**	**54,845.5996**	**54,845.5996**	**3.0233**	**2.7480**	**55,740.0706**

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	32.1977	0.8687	75.4182	3.9900e-003		0.4185	0.4185		0.4185	0.4185	0.0000	135.9276	135.9276	0.1302	0.0000	139.1819
Energy	0.6113	5.2240	2.2230	0.0333		0.4224	0.4224		0.4224	0.4224		6,668.9609	6,668.9609	0.1278	0.1223	6,708.5912
Mobile	19.4995	32.8494	198.9443	0.4398	48.2262	0.3645	48.5908	12.8623	0.3417	13.2040		44,825.2382	44,825.2382	2.6551	2.4831	45,631.5769
Total	**52.3086**	**38.9421**	**276.5855**	**0.4772**	**48.2262**	**1.2054**	**49.4316**	**12.8623**	**1.1826**	**14.0448**	**0.0000**	**51,630.1267**	**51,630.1267**	**2.9130**	**2.6054**	**52,479.3499**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not 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	1.24	4.58	3.71	6.20	6.90	2.00	6.79	6.90	1.92	6.50	0.00	5.86	5.86	3.65	5.19	5.85

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Demolition	Demolition	9/1/2021	9/14/2021	5	10	
2	Site Preparation	Site Preparation	9/15/2021	12/7/2021	5	60	
3	Grading	Grading	12/8/2021	3/1/2022	5	60	
4	Building Construction	Building Construction	3/2/2022	6/18/2024	5	600	
5	Paving	Paving	6/19/2024	11/5/2024	5	100	
6	Architectural Coating	Architectural Coating	11/6/2024	3/25/2025	5	100	

Acres of Grading (Site Preparation Phase): 90

Acres of Grading (Grading Phase): 180

Acres of Paving: 0

Residential Indoor: 3,011,175; Residential Outdoor: 1,003,725; 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
Demolition	Concrete/Industrial Saws	1	8.00	81	0.73
Demolition	Excavators	3	8.00	158	0.38
Demolition	Rubber Tired Dozers	2	8.00	247	0.40
Site Preparation	Rubber Tired Dozers	3	8.00	247	0.40
Site Preparation	Tractors/Loaders/Backhoes	4	8.00	97	0.37

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

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
Demolition	6	15.00	0.00	23.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Site Preparation	7	18.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Grading	8	20.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	9	591.00	172.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Paving	6	15.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	118.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Use Soil Stabilizer

Water Exposed Area

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

Reduce Vehicle Speed on Unpaved Roads

Clean Paved Roads

3.2 Demolition - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.4999	0.0000	0.4999	0.0757	0.0000	0.0757			0.0000			0.0000
Off-Road	3.1651	31.4407	21.5650	0.0388		1.5513	1.5513		1.4411	1.4411		3,747.9449	3,747.9449	1.0549		3,774.3174
Total	**3.1651**	**31.4407**	**21.5650**	**0.0388**	**0.4999**	**1.5513**	**2.0512**	**0.0757**	**1.4411**	**1.5168**		**3,747.9449**	**3,747.9449**	**1.0549**		**3,774.3174**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.2 Demolition - 2021

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0137	0.4179	0.0809	1.4500e-003	0.0403	6.1000e-003	0.0464	0.0110	5.8400e-003	0.0169		154.0138	154.0138	1.3100e-003	0.0242	161.2653
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	0.0544	0.0419	0.4115	1.0700e-003	0.1232	6.7000e-004	0.1239	0.0327	6.1000e-004	0.0333		107.6497	107.6497	4.2200e-003	3.7800e-003	108.8829
Total	**0.0680**	**0.4598**	**0.4924**	**2.5200e-003**	**0.1635**	**6.7700e-003**	**0.1703**	**0.0437**	**6.4500e-003**	**0.0502**		**261.6635**	**261.6635**	**5.5300e-003**	**0.0280**	**270.1482**

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					0.2250	0.0000	0.2250	0.0341	0.0000	0.0341			0.0000			0.0000
Off-Road	3.1651	31.4407	21.5650	0.0388		1.5513	1.5513		1.4411	1.4411	0.0000	3,747.9449	3,747.9449	1.0549		3,774.3174
Total	**3.1651**	**31.4407**	**21.5650**	**0.0388**	**0.2250**	**1.5513**	**1.7763**	**0.0341**	**1.4411**	**1.4752**	**0.0000**	**3,747.9449**	**3,747.9449**	**1.0549**		**3,774.3174**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.2 Demolition - 2021

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0137	0.4179	0.0809	1.4500e-003	0.0375	6.1000e-003	0.0437	0.0104	5.8400e-003	0.0162		154.0138	154.0138	1.3100e-003	0.0242	161.2653
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	0.0544	0.0419	0.4115	1.0700e-003	0.1136	6.7000e-004	0.1143	0.0303	6.1000e-004	0.0309		107.6497	107.6497	4.2200e-003	3.7800e-003	108.8829
Total	**0.0680**	**0.4598**	**0.4924**	**2.5200e-003**	**0.1511**	**6.7700e-003**	**0.1579**	**0.0407**	**6.4500e-003**	**0.0471**		**261.6635**	**261.6635**	**5.5300e-003**	**0.0280**	**270.1482**

3.3 Site Preparation - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					19.6570	0.0000	19.6570	10.1025	0.0000	10.1025			0.0000			0.0000
Off-Road	3.8882	40.4971	21.1543	0.0380		2.0445	2.0445		1.8809	1.8809		3,685.6569	3,685.6569	1.1920		3,715.4573
Total	**3.8882**	**40.4971**	**21.1543**	**0.0380**	**19.6570**	**2.0445**	**21.7015**	**10.1025**	**1.8809**	**11.9834**		**3,685.6569**	**3,685.6569**	**1.1920**		**3,715.4573**

Manteca Annexation #1 - San Joaquin County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.3 Site Preparation - 2021

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	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	0.0652	0.0502	0.4938	1.2800e-003	0.1479	8.0000e-004	0.1487	0.0392	7.4000e-004	0.0400		129.1797	129.1797	5.0600e-003	4.5400e-003	130.6595
Total	**0.0652**	**0.0502**	**0.4938**	**1.2800e-003**	**0.1479**	**8.0000e-004**	**0.1487**	**0.0392**	**7.4000e-004**	**0.0400**		**129.1797**	**129.1797**	**5.0600e-003**	**4.5400e-003**	**130.6595**

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	3.8882	40.4971	21.1543	0.0380		2.0445	2.0445		1.8809	1.8809	0.0000	3,685.6569	3,685.6569	1.1920		3,715.4573
Total	**3.8882**	**40.4971**	**21.1543**	**0.0380**	**8.8457**	**2.0445**	**10.8901**	**4.5461**	**1.8809**	**6.4270**	**0.0000**	**3,685.6569**	**3,685.6569**	**1.1920**		**3,715.4573**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.3 Site Preparation - 2021

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	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	0.0652	0.0502	0.4938	1.2800e-003	0.1363	8.0000e-004	0.1371	0.0364	7.4000e-004	0.0371		129.1797	129.1797	5.0600e-003	4.5400e-003	130.6595
Total	**0.0652**	**0.0502**	**0.4938**	**1.2800e-003**	**0.1363**	**8.0000e-004**	**0.1371**	**0.0364**	**7.4000e-004**	**0.0371**		**129.1797**	**129.1797**	**5.0600e-003**	**4.5400e-003**	**130.6595**

3.4 Grading - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					9.2036	0.0000	9.2036	3.6538	0.0000	3.6538			0.0000			0.0000
Off-Road	4.1912	46.3998	30.8785	0.0620		1.9853	1.9853		1.8265	1.8265		6,007.0434	6,007.0434	1.9428		6,055.6134
Total	**4.1912**	**46.3998**	**30.8785**	**0.0620**	**9.2036**	**1.9853**	**11.1889**	**3.6538**	**1.8265**	**5.4803**		**6,007.0434**	**6,007.0434**	**1.9428**		**6,055.6134**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.4 Grading - 2021

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	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	0.0725	0.0558	0.5487	1.4200e-003	0.1643	8.9000e-004	0.1652	0.0436	8.2000e-004	0.0444		143.5330	143.5330	5.6200e-003	5.0500e-003	145.1772
Total	**0.0725**	**0.0558**	**0.5487**	**1.4200e-003**	**0.1643**	**8.9000e-004**	**0.1652**	**0.0436**	**8.2000e-004**	**0.0444**		**143.5330**	**143.5330**	**5.6200e-003**	**5.0500e-003**	**145.1772**

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	4.1912	46.3998	30.8785	0.0620		1.9853	1.9853		1.8265	1.8265	0.0000	6,007.0434	6,007.0434	1.9428		6,055.6134
Total	**4.1912**	**46.3998**	**30.8785**	**0.0620**	**4.1416**	**1.9853**	**6.1270**	**1.6442**	**1.8265**	**3.4707**	**0.0000**	**6,007.0434**	**6,007.0434**	**1.9428**		**6,055.6134**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.4 Grading - 2021

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	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	0.0725	0.0558	0.5487	1.4200e-003	0.1514	8.9000e-004	0.1523	0.0404	8.2000e-004	0.0412		143.5330	143.5330	5.6200e-003	5.0500e-003	145.1772
Total	**0.0725**	**0.0558**	**0.5487**	**1.4200e-003**	**0.1514**	**8.9000e-004**	**0.1523**	**0.0404**	**8.2000e-004**	**0.0412**		**143.5330**	**143.5330**	**5.6200e-003**	**5.0500e-003**	**145.1772**

3.4 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**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.4 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	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	0.0664	0.0484	0.5001	1.3800e-003	0.1643	8.3000e-004	0.1651	0.0436	7.7000e-004	0.0444		139.0515	139.0515	5.0300e-003	4.6000e-003	140.5490
Total	**0.0664**	**0.0484**	**0.5001**	**1.3800e-003**	**0.1643**	**8.3000e-004**	**0.1651**	**0.0436**	**7.7000e-004**	**0.0444**		**139.0515**	**139.0515**	**5.0300e-003**	**4.6000e-003**	**140.5490**

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**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.4 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	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	0.0664	0.0484	0.5001	1.3800e-003	0.1514	8.3000e-004	0.1523	0.0404	7.7000e-004	0.0412		139.0515	139.0515	5.0300e-003	4.6000e-003	140.5490
Total	**0.0664**	**0.0484**	**0.5001**	**1.3800e-003**	**0.1514**	**8.3000e-004**	**0.1523**	**0.0404**	**7.7000e-004**	**0.0412**		**139.0515**	**139.0515**	**5.0300e-003**	**4.6000e-003**	**140.5490**

3.5 Building Construction - 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					
Off-Road	1.7062	15.6156	16.3634	0.0269		0.8090	0.8090		0.7612	0.7612		2,554.3336	2,554.3336	0.6120		2,569.6322
Total	**1.7062**	**15.6156**	**16.3634**	**0.0269**		**0.8090**	**0.8090**		**0.7612**	**0.7612**		**2,554.3336**	**2,554.3336**	**0.6120**		**2,569.6322**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.5 Building Construction - 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	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	0.3589	9.6804	2.6661	0.0359	1.1656	0.1042	1.2698	0.3356	0.0997	0.4353		3,797.5373	3,797.5373	0.0267	0.5757	3,969.7640
Worker	1.9632	1.4312	14.7783	0.0407	4.8549	0.0247	4.8796	1.2878	0.0227	1.3104		4,108.9721	4,108.9721	0.1486	0.1360	4,153.2229
Total	**2.3220**	**11.1116**	**17.4444**	**0.0766**	**6.0206**	**0.1289**	**6.1494**	**1.6234**	**0.1224**	**1.7458**		**7,906.5093**	**7,906.5093**	**0.1754**	**0.7117**	**8,122.9869**

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	1.7062	15.6156	16.3634	0.0269		0.8090	0.8090		0.7612	0.7612	0.0000	2,554.3336	2,554.3336	0.6120		2,569.6322
Total	**1.7062**	**15.6156**	**16.3634**	**0.0269**		**0.8090**	**0.8090**		**0.7612**	**0.7612**	**0.0000**	**2,554.3336**	**2,554.3336**	**0.6120**		**2,569.6322**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.5 Building Construction - 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	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	0.3589	9.6804	2.6661	0.0359	1.0909	0.1042	1.1951	0.3173	0.0997	0.4170		3,797.5373	3,797.5373	0.0267	0.5757	3,969.7640
Worker	1.9632	1.4312	14.7783	0.0407	4.4752	0.0247	4.4998	1.1945	0.0227	1.2172		4,108.9721	4,108.9721	0.1486	0.1360	4,153.2229
Total	**2.3220**	**11.1116**	**17.4444**	**0.0766**	**5.5661**	**0.1289**	**5.6950**	**1.5118**	**0.1224**	**1.6342**		**7,906.5093**	**7,906.5093**	**0.1754**	**0.7117**	**8,122.9869**

3.5 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**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.5 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	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	0.1764	7.7897	2.2813	0.0346	1.1656	0.0487	1.2144	0.3356	0.0466	0.3823		3,657.0042	3,657.0042	0.0177	0.5531	3,822.2557
Worker	1.8057	1.2481	13.5446	0.0393	4.8549	0.0232	4.8781	1.2878	0.0214	1.3091		3,976.7408	3,976.7408	0.1333	0.1248	4,017.2589
Total	**1.9822**	**9.0378**	**15.8259**	**0.0739**	**6.0206**	**0.0720**	**6.0925**	**1.6234**	**0.0680**	**1.6914**		**7,633.7450**	**7,633.7450**	**0.1509**	**0.6778**	**7,839.5146**

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**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.5 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	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	0.1764	7.7897	2.2813	0.0346	1.0909	0.0487	1.1397	0.3173	0.0466	0.3639		3,657.0042	3,657.0042	0.0177	0.5531	3,822.2557
Worker	1.8057	1.2481	13.5446	0.0393	4.4752	0.0232	4.4984	1.1945	0.0214	1.2159		3,976.7408	3,976.7408	0.1333	0.1248	4,017.2589
Total	**1.9822**	**9.0378**	**15.8259**	**0.0739**	**5.5661**	**0.0720**	**5.6381**	**1.5118**	**0.0680**	**1.5798**		**7,633.7450**	**7,633.7450**	**0.1509**	**0.6778**	**7,839.5146**

3.5 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**

Manteca Annexation #1 - San Joaquin County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.5 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	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	0.1721	7.7939	2.2374	0.0340	1.1656	0.0492	1.2148	0.3356	0.0470	0.3827		3,600.2178	3,600.2178	0.0169	0.5438	3,762.7021
Worker	1.6687	1.0958	12.5490	0.0380	4.8549	0.0219	4.8768	1.2878	0.0201	1.3079		3,839.1708	3,839.1708	0.1198	0.1152	3,876.4805
Total	**1.8407**	**8.8897**	**14.7864**	**0.0720**	**6.0206**	**0.0710**	**6.0916**	**1.6234**	**0.0672**	**1.6905**		**7,439.3886**	**7,439.3886**	**0.1367**	**0.6590**	**7,639.1826**

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**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.5 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	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	0.1721	7.7939	2.2374	0.0340	1.0909	0.0492	1.1401	0.3173	0.0470	0.3643		3,600.2178	3,600.2178	0.0169	0.5438	3,762.7021
Worker	1.6687	1.0958	12.5490	0.0380	4.4752	0.0219	4.4971	1.1945	0.0201	1.2147		3,839.1708	3,839.1708	0.1198	0.1152	3,876.4805
Total	**1.8407**	**8.8897**	**14.7864**	**0.0720**	**5.5661**	**0.0710**	**5.6372**	**1.5118**	**0.0672**	**1.5790**		**7,439.3886**	**7,439.3886**	**0.1367**	**0.6590**	**7,639.1826**

3.6 Paving - 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	0.9882	9.5246	14.6258	0.0228		0.4685	0.4685		0.4310	0.4310		2,207.5472	2,207.5472	0.7140		2,225.3963
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**0.9882**	**9.5246**	**14.6258**	**0.0228**		**0.4685**	**0.4685**		**0.4310**	**0.4310**		**2,207.5472**	**2,207.5472**	**0.7140**		**2,225.3963**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.6 Paving - 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	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	0.0424	0.0278	0.3185	9.6000e-004	0.1232	5.6000e-004	0.1238	0.0327	5.1000e-004	0.0332		97.4409	97.4409	3.0400e-003	2.9200e-003	98.3878
Total	**0.0424**	**0.0278**	**0.3185**	**9.6000e-004**	**0.1232**	**5.6000e-004**	**0.1238**	**0.0327**	**5.1000e-004**	**0.0332**		**97.4409**	**97.4409**	**3.0400e-003**	**2.9200e-003**	**98.3878**

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	0.9882	9.5246	14.6258	0.0228		0.4685	0.4685		0.4310	0.4310	0.0000	2,207.5472	2,207.5472	0.7140		2,225.3963
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**0.9882**	**9.5246**	**14.6258**	**0.0228**		**0.4685**	**0.4685**		**0.4310**	**0.4310**	**0.0000**	**2,207.5472**	**2,207.5472**	**0.7140**		**2,225.3963**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.6 Paving - 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	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	0.0424	0.0278	0.3185	9.6000e-004	0.1136	5.6000e-004	0.1141	0.0303	5.1000e-004	0.0308		97.4409	97.4409	3.0400e-003	2.9200e-003	98.3878
Total	**0.0424**	**0.0278**	**0.3185**	**9.6000e-004**	**0.1136**	**5.6000e-004**	**0.1141**	**0.0303**	**5.1000e-004**	**0.0308**		**97.4409**	**97.4409**	**3.0400e-003**	**2.9200e-003**	**98.3878**

3.7 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	209.3519					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	**209.5327**	**1.2188**	**1.8101**	**2.9700e-003**		**0.0609**	**0.0609**		**0.0609**	**0.0609**		**281.4481**	**281.4481**	**0.0159**		**281.8443**

Manteca Annexation #1 - San Joaquin County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.7 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	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	0.3332	0.2188	2.5056	7.5800e-003	0.9693	4.3700e-003	0.9737	0.2571	4.0200e-003	0.2611		766.5350	766.5350	0.0239	0.0230	773.9843
Total	**0.3332**	**0.2188**	**2.5056**	**7.5800e-003**	**0.9693**	**4.3700e-003**	**0.9737**	**0.2571**	**4.0200e-003**	**0.2611**		**766.5350**	**766.5350**	**0.0239**	**0.0230**	**773.9843**

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	209.3519					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	**209.5327**	**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**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.7 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	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	0.3332	0.2188	2.5056	7.5800e-003	0.8935	4.3700e-003	0.8979	0.2385	4.0200e-003	0.2425		766.5350	766.5350	0.0239	0.0230	773.9843
Total	**0.3332**	**0.2188**	**2.5056**	**7.5800e-003**	**0.8935**	**4.3700e-003**	**0.8979**	**0.2385**	**4.0200e-003**	**0.2425**		**766.5350**	**766.5350**	**0.0239**	**0.0230**	**773.9843**

3.7 Architectural Coating - 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					
Archit. Coating	209.3519					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.1709	1.1455	1.8091	2.9700e-003		0.0515	0.0515		0.0515	0.0515		281.4481	281.4481	0.0154		281.8319
Total	**209.5228**	**1.1455**	**1.8091**	**2.9700e-003**		**0.0515**	**0.0515**		**0.0515**	**0.0515**		**281.4481**	**281.4481**	**0.0154**		**281.8319**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.7 Architectural Coating - 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	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	0.3096	0.1942	2.3304	7.3300e-003	0.9693	4.1500e-003	0.9735	0.2571	3.8200e-003	0.2609		740.6348	740.6348	0.0216	0.0214	747.5454
Total	**0.3096**	**0.1942**	**2.3304**	**7.3300e-003**	**0.9693**	**4.1500e-003**	**0.9735**	**0.2571**	**3.8200e-003**	**0.2609**		**740.6348**	**740.6348**	**0.0216**	**0.0214**	**747.5454**

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	209.3519					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.1709	1.1455	1.8091	2.9700e-003		0.0515	0.0515		0.0515	0.0515	0.0000	281.4481	281.4481	0.0154		281.8319
Total	**209.5228**	**1.1455**	**1.8091**	**2.9700e-003**		**0.0515**	**0.0515**		**0.0515**	**0.0515**	**0.0000**	**281.4481**	**281.4481**	**0.0154**		**281.8319**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.7 Architectural Coating - 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	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	0.3096	0.1942	2.3304	7.3300e-003	0.8935	4.1500e-003	0.8977	0.2385	3.8200e-003	0.2423		740.6348	740.6348	0.0216	0.0214	747.5454
Total	**0.3096**	**0.1942**	**2.3304**	**7.3300e-003**	**0.8935**	**4.1500e-003**	**0.8977**	**0.2385**	**3.8200e-003**	**0.2423**		**740.6348**	**740.6348**	**0.0216**	**0.0214**	**747.5454**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

Increase Density

Improve Destination Accessibility

Improve Pedestrian Network

Manteca Annexation #1 - San Joaquin County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not 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	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	19.4995	32.8494	198.9443	0.4398	48.2262	0.3645	48.5908	12.8623	0.3417	13.2040		44,825.2382	44,825.2382	2.6551	2.4831	45,631.5769
Unmitigated	20.1544	34.7192	209.5910	0.4714	51.8004	0.3891	52.1896	13.8155	0.3648	14.1803		48,040.7111	48,040.7111	2.7653	2.6257	48,892.2975

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
City Park	8.09	20.33	22.71	25,459	23,703
Single Family Housing	6,749.60	6,821.10	6113.25	19,325,271	17,991,827
Condo/Townhouse	1,464.00	1,628.00	1256.00	4,224,189	3,932,720
Total	8,221.69	8,469.43	7,391.96	23,574,919	21,948,249

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
City Park	9.50	7.30	7.30	33.00	48.00	19.00	66	28	6
Single Family Housing	10.80	7.30	7.50	45.60	19.00	35.40	86	11	3
Condo/Townhouse	10.80	7.30	7.50	45.60	19.00	35.40	86	11	3

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
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
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

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

Condo/Townhouse	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	0.6113	5.2240	2.2230	0.0333		0.4224	0.4224		0.4224	0.4224		6,668.9609	6,668.9609	0.1278	0.1223	6,708.5912
NaturalGas Unmitigated	0.6113	5.2240	2.2230	0.0333		0.4224	0.4224		0.4224	0.4224		6,668.9609	6,668.9609	0.1278	0.1223	6,708.5912

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

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
Condo/Townhouse	10340.8	0.1115	0.9530	0.4055	6.0800e-003		0.0771	0.0771		0.0771	0.0771		1,216.5679	1,216.5679	0.0233	0.0223	1,223.7974
Single Family Housing	46345.3	0.4998	4.2710	1.8175	0.0273		0.3453	0.3453		0.3453	0.3453		5,452.3930	5,452.3930	0.1045	0.1000	5,484.7938
Total		**0.6113**	**5.2240**	**2.2230**	**0.0333**		**0.4224**	**0.4224**		**0.4224**	**0.4224**		**6,668.9609**	**6,668.9609**	**0.1278**	**0.1223**	**6,708.5912**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

5.2 Energy by Land Use - NaturalGas

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
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
Condo/Townhouse	10.3408	0.1115	0.9530	0.4055	6.0800e-003		0.0771	0.0771		0.0771	0.0771		1,216.5679	1,216.5679	0.0233	0.0223	1,223.7974
Single Family Housing	46.3453	0.4998	4.2710	1.8175	0.0273		0.3453	0.3453		0.3453	0.3453		5,452.3930	5,452.3930	0.1045	0.1000	5,484.7938
Total		**0.6113**	**5.2240**	**2.2230**	**0.0333**		**0.4224**	**0.4224**		**0.4224**	**0.4224**		**6,668.9609**	**6,668.9609**	**0.1278**	**0.1223**	**6,708.5912**

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

No Hearths Installed

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not 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	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	32.1977	0.8687	75.4182	3.9900e-003		0.4185	0.4185		0.4185	0.4185	0.0000	135.9276	135.9276	0.1302	0.0000	139.1819
Unmitigated	32.1977	0.8687	75.4182	3.9900e-003		0.4185	0.4185		0.4185	0.4185	0.0000	135.9276	135.9276	0.1302	0.0000	139.1819

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	2.5492					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	27.3841					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Hearth	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	2.2645	0.8687	75.4182	3.9900e-003		0.4185	0.4185		0.4185	0.4185		135.9276	135.9276	0.1302		139.1819
Total	**32.1977**	**0.8687**	**75.4182**	**3.9900e-003**		**0.4185**	**0.4185**		**0.4185**	**0.4185**	**0.0000**	**135.9276**	**135.9276**	**0.1302**	**0.0000**	**139.1819**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

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	2.5492					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	27.3841					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Hearth	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	2.2645	0.8687	75.4182	3.9900e-003		0.4185	0.4185		0.4185	0.4185		135.9276	135.9276	0.1302		139.1819
Total	**32.1977**	**0.8687**	**75.4182**	**3.9900e-003**		**0.4185**	**0.4185**		**0.4185**	**0.4185**	**0.0000**	**135.9276**	**135.9276**	**0.1302**	**0.0000**	**139.1819**

7.0 Water Detail

7.1 Mitigation Measures Water

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

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

APPENDIX B.3

Energy Consumption Estimates

Source: EMFAC2021 (v1.0.1) Emissions Inventory
Region Type: County
Region: San Joaquin
Calendar Year: 2025
Season: Annual
Vehicle Classification: EMFAC202x Categories
Units: miles/day for CVMT and EVMT, trips/day for Trips, kWh/day for Energy Consumption, tons/day for Emissions, 1000 gallons/day for Fuel Consumption

Region	Calendar Year	Vehicle Category	Model Year	Speed	Fuel	Population	Total VMT	Trips	Fuel Consumption	MPG		
San Joaquin	2025	All Other Buses	Aggregate	Aggregate	Diesel	67.92171408	3454.279589	604.5033	0.395338932	**8.737514**		
San Joaquin	2025	LDA	Aggregate	Aggregate	Gasoline	247812.193	10065418.68	1143377	340.6379829	**29.54873**		
San Joaquin	2025	LDA	Aggregate	Aggregate	Diesel	620.8563183	19917.73747	2643.071	0.459921869	**43.30678**		
San Joaquin	2025	LDT1	Aggregate	Aggregate	Gasoline	20969.62889	704503.5262	90823.62	28.55436416	**24.67236**		
San Joaquin	2025	LDT1	Aggregate	Aggregate	Diesel	5.057977491	54.79857187	14.33247	0.002232746	**24.54313**		
San Joaquin	2025	LDT2	Aggregate	Aggregate	Gasoline	105887.2734	4297523.941	491668.9	179.0193905	**24.00591**		
San Joaquin	2025	LDT2	Aggregate	Aggregate	Diesel	305.5941154	13558.41861	1463.962	0.410704288	**33.01261**		
San Joaquin	2025	LHD1	Aggregate	Aggregate	Gasoline	9450.489324	335570.0181	140798.2	34.90157426	**9.614753**		
San Joaquin	2025	LHD1	Aggregate	Aggregate	Diesel	8447.684296	292201.982	106261.2	18.38163512	**15.89641**		
San Joaquin	2025	LHD2	Aggregate	Aggregate	Gasoline	1129.168714	39496.24366	16822.93	4.600897482	**8.584465**		
San Joaquin	2025	LHD2	Aggregate	Aggregate	Diesel	3098.911716	112092.227	38980.41	8.493201579	**13.19788**		
San Joaquin	2025	MCY	Aggregate	Aggregate	Gasoline	12009.69999	64631.08274	24019.4	1.598967718	**40.42051**		
San Joaquin	2025	MDV	Aggregate	Aggregate	Gasoline	92446.53152	3253692.896	417141.1	169.0306745	**19.24913**		
San Joaquin	2025	MDV	Aggregate	Aggregate	Diesel	1393.091492	51951.9772	6420.978	2.139013823	**24.28782**		
San Joaquin	2025	MH	Aggregate	Aggregate	Gasoline	1345.73466	11738.09809	134.6273	2.660033836	**4.412763**		
San Joaquin	2025	MH	Aggregate	Aggregate	Diesel	631.6240768	5453.241177	63.16241	0.580283559	**9.397546**		
San Joaquin	2025	Motor Coach	Aggregate	Aggregate	Diesel	18.80772922	2514.515014	432.2016	0.452917647	**5.551815**		
San Joaquin	2025	OBUS	Aggregate	Aggregate	Gasoline	170.8324994	7309.030244	3418.017	1.52248184	**4.800734**		
San Joaquin	2025	PTO	Aggregate	Aggregate	Diesel	0	20105.42266	0	3.98427046	**5.046199**		
San Joaquin	2025	SBUS	Aggregate	Aggregate	Gasoline	131.6189784	7271.294677	526.4759	0.71341232	**10.19228**		
San Joaquin	2025	SBUS	Aggregate	Aggregate	Diesel	490.2787139	10849.65479	7099.236	1.320741795	**8.214819**		
San Joaquin	2025	T6 CAIRP Class 4	Aggregate	Aggregate	Diesel	10.57610418	697.7424445	243.0389	0.077548733	**8.997471**		
San Joaquin	2025	T6 CAIRP Class 5	Aggregate	Aggregate	Diesel	14.00551629	958.7557722	321.8468	0.106617779	**8.992457**		
San Joaquin	2025	T6 CAIRP Class 6	Aggregate	Aggregate	Diesel	47.29566683	2488.355306	1086.854	0.272426579	**9.13404**		
San Joaquin	2025	T6 CAIRP Class 7	Aggregate	Aggregate	Diesel	78.11014265	15772.0773	1794.971	1.605687139	**9.822634**	**MHD**	
San Joaquin	2025	T6 Instate Delivery C	Aggregate	Aggregate	Diesel	252.424868	8475.971926	3602.103	1.019116289	**8.316982**	**8.43811**	
San Joaquin	2025	T6 Instate Delivery C	Aggregate	Aggregate	Diesel	162.4907366	5516.894157	2318.743	0.666350411	**8.279269**		
San Joaquin	2025	T6 Instate Delivery C	Aggregate	Aggregate	Diesel	708.1406495	23932.07474	10105.17	2.87788442	**8.315857**		
San Joaquin	2025	T6 Instate Delivery C	Aggregate	Aggregate	Diesel	127.2799027	6929.155343	1816.284	0.825964977	**8.389164**		
San Joaquin	2025	T6 Instate Other Clas	Aggregate	Aggregate	Diesel	457.3843802	18839.14605	5287.363	2.200026822	**8.563144**		
San Joaquin	2025	T6 Instate Other Clas	Aggregate	Aggregate	Diesel	1233.945904	53254.29452	14264.41	6.208167542	**8.578102**		
San Joaquin	2025	T6 Instate Other Clas	Aggregate	Aggregate	Diesel	939.5521797	39531.72195	10861.22	4.582174014	**8.627285**		
San Joaquin	2025	T6 Instate Other Clas	Aggregate	Aggregate	Diesel	601.2468734	26326.73814	6950.414	3.002944814	**8.766974**		
San Joaquin	2025	T6 Instate Tractor Cl	Aggregate	Aggregate	Diesel	11.09411194	521.2715645	128.2479	0.060836197	**8.568444**		
San Joaquin	2025	T6 Instate Tractor Cl	Aggregate	Aggregate	Diesel	742.8431118	44239.50123	8587.266	4.878765067	**9.067766**		
San Joaquin	2025	T6 OOS Class 4	Aggregate	Aggregate	Diesel	6.191325924	405.5154841	142.2767	0.044545776	**9.103343**		
San Joaquin	2025	T6 OOS Class 5	Aggregate	Aggregate	Diesel	8.158025029	556.2943228	187.4714	0.061223253	**9.086324**		
San Joaquin	2025	T6 OOS Class 6	Aggregate	Aggregate	Diesel	27.75525515	1453.612981	637.8158	0.156720574	**9.275189**		
San Joaquin	2025	T6 OOS Class 7	Aggregate	Aggregate	Diesel	42.05361037	10569.57393	966.392	1.066856767	**9.90721**		
San Joaquin	2025	T6 Public Class 4	Aggregate	Aggregate	Diesel	30.96340517	1050.77782	158.8423	0.137051326	**7.667039**		
San Joaquin	2025	T6 Public Class 5	Aggregate	Aggregate	Diesel	77.40598482	2785.909757	397.0927	0.357713881	**7.788095**		
San Joaquin	2025	T6 Public Class 6	Aggregate	Aggregate	Diesel	124.4648645	4446.562533	638.5048	0.566454177	**7.849819**		
San Joaquin	2025	T6 Public Class 7	Aggregate	Aggregate	Diesel	148.2002736	6742.466603	760.2674	0.856702113	**7.870258**		
San Joaquin	2025	T6 Utility Class 5	Aggregate	Aggregate	Diesel	33.80713566	1371.26265	432.7313	0.154052822	**8.90125**		
San Joaquin	2025	T6 Utility Class 6	Aggregate	Aggregate	Diesel	6.404694197	258.7537932	81.98009	0.028984726	**8.927246**		
San Joaquin	2025	T6 Utility Class 7	Aggregate	Aggregate	Diesel	7.233394318	359.3994629	92.58745	0.039964166	**8.993043**		
San Joaquin	2025	T6TS	Aggregate	Aggregate	Gasoline	531.0756316	27321.53996	10625.76	5.695995374	**4.796623**		
San Joaquin	2025	T7 CAIRP Class 8	Aggregate	Aggregate	Diesel	1559.383676	317454.1448	35834.64	51.17555421	**6.203238**	**HHD**	
San Joaquin	2025	T7 NNOOS Class 8	Aggregate	Aggregate	Diesel	1399.986354	379791.5025	32171.69	59.50406302	**6.382615**	**5.735417**	
San Joaquin	2025	T7 NOOS Class 8	Aggregate	Aggregate	Diesel	592.9033383	137971.5067	13624.92	22.13949036	**6.231919**		
San Joaquin	2025	T7 Other Port Class 8	Aggregate	Aggregate	Diesel	31.09466321	5773.393667	508.7087	0.965450648	**5.979999**		
San Joaquin	2025	T7 POAK Class 8	Aggregate	Aggregate	Diesel	137.4284865	13680.63658	2248.33	2.333991731	**5.861476**		
San Joaquin	2025	T7 POLA Class 8	Aggregate	Aggregate	Diesel	157.478818	19849.82204	2576.353	3.419583803	**5.804748**		
San Joaquin	2025	T7 Public Class 8	Aggregate	Aggregate	Diesel	386.4284577	16615.45101	1982.378	3.157962941	**5.261446**		
San Joaquin	2025	T7 Single Concrete/T	Aggregate	Aggregate	Diesel	121.0999578	8533.431514	1140.762	1.428680336	**5.972947**		
San Joaquin	2025	T7 Single Dump Class	Aggregate	Aggregate	Diesel	518.3758674	30855.22167	4883.101	5.328325632	**5.790791**		
San Joaquin	2025	T7 Single Other Class	Aggregate	Aggregate	Diesel	1163.187559	58572.11237	10957.23	9.897066107	**5.918129**		
San Joaquin	2025	T7 SWCV Class 8	Aggregate	Aggregate	Diesel	167.5568448	10862.33675	770.7615	4.227120943	**2.569677**		
San Joaquin	2025	T7 Tractor Class 8	Aggregate	Aggregate	Diesel	2947.082282	219605.8439	42821.11	35.73125002	**6.146044**		
San Joaquin	2025	T7 Utility Class 8	Aggregate	Aggregate	Diesel	24.5522509	1096.545731	314.2688	0.187591616	**5.845388**		
San Joaquin	2025	T7IS	Aggregate	Aggregate	Gasoline	1.372290651	54.29517764	27.45679	0.014900233	**3.643915**		
San Joaquin	2025	UBUS	Aggregate	Aggregate	Gasoline	50.67993554	3818.163154	202.7197	0.812722391	**4.697992**		
San Joaquin	2025	UBUS	Aggregate	Aggregate	Diesel	73.34639924	4977.172652	293.3856	0.526331001	**9.456355**		

On-road Mobile (Operational) Energy Usage

Unmitigated:

Step 1:

Therefore:

Average Daily VMT:

60,132	Source: CalEEMod Output File (21,948,249 annual VMT divided by 365 days/year)

Step 2: Given:

Fleet Mix (CalEEMod Output)

LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
54.1920%	5.2620%	16.9871%	14.6633%	2.5153%	0.6100%	1.2627%	1.6953%	0.0467%	0.0322%	2.2878%	0.1103%	0.3353%

And:

Gasoline MPG Factors for each Vehicle Class - Year 2025 (EMFAC2021 Output)

LDA	LDT1	LDT2	MDV	MCY	MH
29.54872675	24.67236	24.00591	19.24912686	40.42050507	4.412762698

Diesel MPG Factors for each Vehicle Class - Year 2025 (EMFAC2021 Output)

LHD1	LHD2	MHD	HHD	OBUS	UBUS	SBUS
15.89640857	13.19788	8.43811	5.735417341	4.80073394	9.45635473	8.214819

Therefore:

Weighted Average MPG Factors

Gasoline: **26.8** Diesel: **11.1**

Step 3: **Therefore:**

2,100	**daily gallons of gasoline**	**341**	**daily gallons of diesel**

or

766,608	**annual gallons of gasoline**	**124,573**	**annual gallons of diesel**

Off-road 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. Demolition (if applicable), Site preparation and grading off-road mobile vehicle on-site gallons of fuel are calculated below.

Given Factor:	**389.7**	**metric tons**	**CO2**	**(provided in CalEEMod Output File)**	
Conversion Factor:	2204.6262	pounds	per metric ton		
Intermediate Result:	**859,237**	**pounds**	**CO2**		
Conversion Factor:	22.38	pounds	CO2 per 1 gallon of diesel fuel	Source: U.S. EIA, 2016	
Final Result:	**38,393**	**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)
Demolition -	17.12
Site Preparation - 2021	101.12
Grading - 2023	288.62

On-road Mobile (Construction) Energy Usage - Demolition

Note: Year 2021 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)

14.7

Therefore:

Average Worker Daily VMT:

221

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 - Year 2025 (EMFAC2021 Output)

LDA	LDT1	LDT2
29.548727	24.67236	24.00591

Therefore:

Weighted Average Worker MPG Factor

26.94

Step 3:

Therefore:

8 **Worker daily gallons of gasoline (all workers)**

Step 4:

10 **# of Days (CalEEMod ouput)**

Therefore:

Result: **82** **Total gallons of gasoline (all workers)**

Total Hauler Trips (CalEEMod Output)

23

Note: Hauler trips are total values (not daily).

Hauler Trip Length (miles) (CalEEMod Output)

20

Average Hauler Daily VMT:

460

Fleet Mix for Workers (CalEEMod Output)

MHD	HHD
0%	100%

Diesel MPG Factors for each Vehicle Class - Year 2025 (EMFAC2021 Output)

MHD	HHD
8.43811	5.735417

Therefore:

Weighted Average Hauler (Diesel) MPG Factor

5.74

Therefore:

80 **Worker daily gallons of gasoline (all workers)**

Therefore:

Result: **80** **Hauler gallons of diesel**

On-road Mobile (Construction) Energy Usage - Site Preparation

Note: Year 2021 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)

10.8

Therefore:

Average Worker Daily VMT:

194

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 - Year 2025 (EMFAC2021 Output)

LDA	**LDT1**	**LDT2**
29.548727	24.672359	24.005913

Therefore:

Weighted Average Worker MPG Factor

26.9

Step 3: **Therefore:**

7.2 **Worker daily gallons of gasoline**

Step 4: 60 **# of Days (CalEEMod Output)**

Therefore:

Result: **433** **Total gallons of gasoline**

On-road Mobile (Construction) Energy Usage - Grading

Note: Year 2021 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)

10.8

Therefore:

Average Worker Daily VMT:

216

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 - Year 2025 (EMFAC2021 Output)

LDA	LDT1	LDT2
29.548727	24.672359	24.005913

Therefore:

Weighted Average Worker MPG Factor

26.9

Step 3: **Therefore:**

8.0 **Worker daily gallons of gasoline**

Step 4: 60 **# of Days (CalEEMod Output)**

Therefore:

Result: **481** **Total gallons of gasoline**

On-road Mobile (Construction) Energy Usage - Building Construction

Note: Year 2021 MPG factors were derived for construction-releated energy consumption (for the sake of a conservative estimate).

Step 1:

Total Daily Worker Trips (CalEEMod Output)

591	5%	**30**

Total Daily Vendor Trips (CalEEMod Output)

172	5%	**9**

Note: Assumes 5% of Plan Area under construction at given point in time (on average) until buildout.

Worker Trip Length (miles) (CalEEMod Output)

10.8

Vendor Trip Length (miles) (CalEEMod Output)

7.3

Therefore:

Average Worker Daily VMT:

319

Average Vendor Daily VMT:

63

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

Fleet Mix for Workers (CalEEMod Output)

MHD	**HHD**
0%	100%

Assumed Fleet Mix for Vendors

And:

MPG Factors for each Vehicle Class - Year 2025 (EMFAC2021 Output)

Gasoline:

LDA	**LDT1**	**LDT2**
29.5487267	24.672359	24.005913

Diesel:

MHD	**HHD**
8.438110222	5.7354173

Therefore:

Weighted Average Worker (Gasoline) MPG Factor

26.9

Weighted Average Vendor (Diesel) MPG Factor

5.7

Step 3:

Therefore:

12 **Worker daily gallons of gasoline**

Therefore:

11 **Vendor daily gallons of diesel**

Step 4:

600 **# of Days (CalEEMod Output)**

Therefore:

7,107 **Total gallons of gasoline**

Therefore:

6,568 **Total gallons of diesel**

On-road Mobile (Construction) Energy Usage - Paving

Note: Year 2021 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)

10.8

Therefore:

Average Worker Daily VMT:

162

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 - Year 2025 (EMFAC2021 Output)

LDA	LDT1	LDT2
29.548727	24.672359	24.005913

Therefore:

Weighted Average Worker MPG Factor

26.9

Step 3: **Therefore:**

6.0 **Worker daily gallons of gasoline**

Step 4: 100 **# of Days (CalEEMod Output)**

Therefore:

Result: **601** **Total gallons of gasoline**

On-road Mobile (Construction) Energy Usage - Architectural Coating

Note: Year 2021 MPG factors were derived for construction-releated energy consumption (for the sake of a conservative estimate).

Step 1: **Total Daily Worker Trips (CalEEMod Output)**

118	5%	6

Note: Assumes 5% of Plan Area under construction at given point in time (on average) until buildout.

Worker Trip Length (miles) (CalEEMod Output)

10.8

Therefore:

Average Worker Daily VMT:

64

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 - Year 2025 (EMFAC2021 Output)

LDA	LDT1	LDT2
29.548727	24.672359	24.005913

Therefore:

Weighted Average Worker MPG Factor

26.9

Step 3: **Therefore:**

2.4 **Worker daily gallons of gasoline**

Step 4: 100 **# of Days (CalEEMod Output)**

Therefore:

Result: **236** **Total gallons of gasoline**

APPENDIX B.4

GHG Calculation Methodology

Greenhouse Gas Efficiency Metric Calculation Methodology – Manteca Annexation #1 Project

The methodology used for assessing the proposed project's consistency with GHG targets established in AB 32 is the use of GHG efficiency metrics to assess the GHG efficiency of the project on a "service population (SP)" basis (the sum of the number of jobs and the number of residents provided by a project). These metrics represent the rate of emissions needed to achieve a fair share of the state's emissions mandate embodied in AB 32. The use of "fair share" in this instance indicates the GHG efficiency level that, if applied statewide, would meet the AB 32 emissions target and support efforts to reduce emissions beyond 2020.

GHG efficiency metrics for the project were developed based on emissions rates for the land use-driven emission sectors in the CARB's GHG inventory. The GHG efficiency metric is only based on sectors that would accommodate projected growth (as indicated by population and employment growth) while allowing for consistency with the goals of AB 32 (i.e., 1990 GHG emissions levels by 2020). The per service population efficiency target is based on the AB 32 GHG reduction target and GHG emissions inventory prepared for the CARB's 2008 Scoping Plan.

To develop the efficiency metric for 2020, land-use driven sectors in the CARB's 1990 GHG inventory were identified and separated to tailor the inventory to land use projects. This process removes emission sources that would not be applicable to the project area. For example, emissions associated with ships and commercial boats, aviation, rail, industrial sources, agriculture and forestry, and unspecified sectors were removed from the CARB's 1990 inventory in order to exclude non-land use sectors. The exceptions for the industrial sector are the landfill and domestic wastewater sub-sectors which were included in development of the GHG efficiency metric because emissions from these sectors are included in the project's emissions profile. Isolating the land use-driven sectors from the CARB's overall inventory ensures that the threshold is directly applicable to land use projects, whereby emission sectors included in the inventory used for developing the GHG efficiency metric can be mapped to a project's emissions data. For example, emissions associated with on-road transportation, electricity, natural gas, wastewater treatment, and solid waste are included in both the inventory used to develop the GHG efficiency metric and the project's operational emissions. The CARB's complete 1990 inventory and the adjusted land use-driven emissions inventory are shown on the following pages.

The land-use sector driven inventory for 1990 was divided by the population and employment projections for California in 2020. Detailed calculations showing derivation of the efficiency metrics are shown on the following pages. The efficiency metric allows the threshold to be applied evenly to all project types (residential, commercial/retail and mixed use) and uses an emissions inventory comprised only of sources from land-use related sectors. The efficiency approach allows lead agencies to assess whether any given project or plan would accommodate population and employment growth in a way that is consistent with the emissions limit established under AB 32. The resultant GHG efficiency metric would be (approximately) 4.84 MT CO_2e/SP/year for 2020 (as provided below).

The proposed project is anticipated to be built out in year 2025. The CARB has indicated that an average statewide GHG reduction of 5.2 percent per year would be necessary to achieve the 2030 target[1,2]. Therefore, a GHG efficiency goal in terms of metric tons per service population, similar to the one developed for 2020, were estimated for year 2025, allow evaluation of the project's GHG emissions in the post-2020 landscape. The equivalent goal for 2025 computes to approximately 3.56 MT CO_2e/SP/year. This targets was estimated by applying a uniform reduction from the CARB's 1990 emissions inventory and dividing the resultant value by the projected population and employment in these future years.

These GHG efficiency metric were derived based on the reduction trajectory the state needs to maintain to achieve its 2030 and 2050 goals (an approximately 5.2 percent reduction per year) (CARB, 2016b). All calculations are based on the IPCC Second Assessment Report's Global Warming Potentials to allow consistent comparison between the ARB 1990 inventory and the California Emissions Estimator Model (CalEEMod; used to estimate project emissions).

[1] California Air Resources Board. 2016. California Climate Strategy. January 29, 2016. Available at: http://docketpublic.energy.ca.gov/PublicDocuments/15-RETI-02/TN210091_20160129T154626_California_Climate_Strategy_CARB_for_RETI_20_Plenary_Meeting_on.pdf

[2] California Air Resources Board. 2015. 2030 Target Scoping Plan Workshop Slides. (October 1, 2015). Available at: http://www.arb.ca.gov/cc/scopingplan/meetings/10_1_15slides/2015slides.pdf

California Greenhouse Gas Inventory for 1990 – by Sector and Activity (Land Use-driven sectors only)
Million metric tons of CO_2-equiavlent (CO_2e) – (based on IPCC Second Assessment Report's Global Warming Potentials) (CARB, 2007).

Year 1990

Transportation	
On Road	
Passenger Cars	63.77
Light Duty Trucks	44.75
Motorcycles	0.43
Heavy Duty Trucks	29.03
Freight	0.02
Electricity Generation In-State	
CHP: Commercial	***0.70***
Merchant Owned	***2.33***
Transmission and Distribution	***1.56***
Utility Owned	***29.92***
Electricity Generation In-State	
Specified Imports	***29.61***
Transmission and Distribution	***1.02***
Unspecified Imports	***30.96***
Commercial	
CHP: Commercial	***0.40***
Communication	***0.07***
Domestic Utilities	***0.34***
Education	***1.42***
Food Services	***1.89***
Healthcare	***1.32***
Hotels	***0.67***
Not Specified Commercial	***5.58***
Offices	***1.46***
Retail & Wholesale	***0.68***
Transportation Services	***0.03***
Residential	
Household Use	***29.66***
Industrial	
Landfills	***6.26***
Wastewater Treatment	
Domestic Wastewater	2.83
Total Emissions	**286.70**

Future Year Service Population Thresholds

	2020	2025	2030	2040	2050
Population	40,719,999	42,369,923	44,019,846	46,884,801	49,158,401
Employment	18,511,200	19,261,251	20,011,301*	21,313,702*	22,347,274*
Service Population	59,231,199	61,631,173	64,031,147	68,198,503	71,505,675
Emissions (Million Metric Tons)	286.70	219.25	167.67	98.06	57.35
MT/SP	**4.84**	**3.56**	**2.62**	**1.44**	**0.80**

Notes:

SP = service population.

*Assumes proportion of employed persons to the overall population remains equal to that as was applicable in 2020.

Post-2020 Emissions are based on an annual 5.2% reduction from 2020 (CARB, 2016).

Sources:

California Air Resources Board (CARB). 2007. Staff Report: California 1990 Greenhouse Gas Emissions Level and 2020 Emissions Limit. Public Release Date: November 16, 2007. Available: https://www.arb.ca.gov/cc/inventory/1990level/1990level.htm

California Air Resources Board (CARB). 2015. 2030 Target Scoping Plan Workshop Slides. (October 1, 2015). Available: http://www.arb.ca.gov/cc/scopingplan/meetings/10_1_15slides/2015slides.pdf

California Air Resources Board (CARB). 2016. California Climate Strategy. January 29, 2016. Available at: http://docketpublic.energy.ca.gov/PublicDocuments/15-RETI-02/TN210091_20160129T154626_California_Climate_Strategy_CARB_for_RETI_20_Plenary_Meeting_on.pdf

California Department of Finance, Demographics Research Unit (Total Estimated and Projected Population for California and Counties: July 1, 2010 to July 1, 2060 in 5-year Increments. Published February, 2017.

California Department of Finance Employment Development Department. Industry Employment Projections Labor Market Information Division 2010-2020. Published 5/23/2012.

Appendix C

Cultural Resources Investigation
(Confidential)

Appendix D

Noise Study

Environmental Noise Assessment

North Manteca Annexation 1

City of Manteca, California

January 7, 2022

Project #211002

Prepared for:

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Appendix A: Acoustical Terminology
Appendix B: Continuous Ambient Noise Measurement Results
Appendix C: Traffic Noise Calculation Inputs and Results
Appendix D: FHWA Barrier Calculations
Appendix E: Interior Noise Reduction Calculations

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.

3.10.1 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 3.10-1 lists several examples of the noise levels associated with common situations.

TABLE 3.10-1: 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: Proposed residential developments and farmland border the north side of the overall project site.

East: Highway 99 and the Highway 99 Frontage road border the eastern boundary.

South: The George Perry and Sons produce warehouse and single-family residences border the southern boundary of the overall project site.

West: Union Road borders the western boundary of the overall 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 10th –November 11th , 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 3.10-2: 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	Eastern side of project site, 42 yds to Hwy 99 Median	11/10/2021-11/11/2021	78	74	72	87	71	67	86
LT-2	Southern side of project site, North of Shipping Yard	11/10/2021-11/11/2021	65	59	57	70	58	55	69
LT-3	Western side of project site, 12 yds to Union Road Median	11/10/2021-11/11/2021	73	69	59	86	66	48	85

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 noise analysis was conducted for roadways which would affect sensitive receptors within the project area as well as receptors which lie outside of the overall project site. Traffic noise level changes are presented by roadway rather than by planning boundary.

Traffic volumes for existing conditions were obtained from the traffic data prepared for the project (Fehr & Peers, 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 3.10-3 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 3.10-3: EXISTING TRAFFIC NOISE LEVELS

ROADWAY	*SEGMENT*	*EXTERIOR TRAFFIC NOISE LEVEL, DB L_{DN}*
Union Road	South of French Camp Road	60.9
Union Road	South of Lovelace Road	63.4
Union Road	South of Shady Pines Street	56.4
Union Road	North of Shady Pines Street	60.3
Union Road	South of Del Webb Blvd	57.5
Union Road	South of Lathrop Road	61.3
Lathrop Road	East of Union Road	68.0
Lathrop Road	West of Union Road	62.7
Lathrop Road	East of Harlan Road	52.6
Lathrop Road	East of Airport Way	60.2
Airport Way	North of Lathrop Road	62.2
Airport Way	South of Lovelace Road	59.6
Airport Way	North of Roth Road	61.1
Airport Way	South of Roth Road	53.1
NB I-5 Off Ramp	South of Roth Road	49.6
NB I-5 On Ramp	North of Lathrop Road	53.1
French Camp Road	East of Union Road	66.6
Roth Road	East of I-5 NB Ramps	64.3
Hwy 99 & Frontage Road	North of Brunswick Road	76.4
Hwy 99 & Frontage Road	South of French Camp Road	76.2

SOURCE: FHWA-RD-77-108 WITH INPUTS FROM FEHR & PEERS 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 3.10-4 and 3.10-5 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 3.10-4: EXISTING AND EXISTING PLUS PROJECT TRAFFIC NOISE LEVELS

		NOISE LEVELS (L_{DN}, dB) AT NEAREST SENSITIVE RECEPTORS				
		EXISTING	*EXISTING + PROJECT*	*CHANGE*	*EX. GP CRITERIA[1]*	*SIGNIFICANT UNDER EX. GP?*
ROADWAY	*SEGMENT*				*PROPOSED GP CRITERIA[2]*	*SIGNIFICANT UNDER GP UPDATE?*
Union Road	South of French Camp Road	60.9	61.6	0.7	+5-10 dBA	No
					+3 dBA	No
Union Road	South of Lovelace Road	63.4	65.1	1.7	+5-10 dBA	No
					+ 3 dBA	No
Union Road	South of Shady Pines Street	56.4	58.0	1.6	>60 dBA	No
					+ 5 dBA	No
Union Road	North of Shady Pines Street	60.3	61.2	0.9	+5-10 dBA	No
					+ 3 dBA	No
Union Road	South of Del Webb Blvd	57.5	58.8	1.3	>60 dBA	No
					+ 5 dBA	No
Union Road	South of Lathrop Road	61.3	61.9	0.6	+5-10 dBA	No
					+ 3 dBA	No
Lathrop Road	East of Union Road	68.0	68.4	0.4	+5-10 dBA	No
					+1.5 dBA	No
Lathrop Road	West of Union Road	62.7	62.8	0.1	+5-10 dBA	No
					+ 3 dBA	No
Lathrop Road	East of Harlan Road	52.6	53.1	0.5	>60 dBA	No
					+ 5dBA	No
Lathrop Road	East of Airport Way	60.2	60.6	0.4	+5-10 dBA	No
					+3 dBA	No
Airport Way	North of Lathrop Road	62.2	62.6	0.4	+5-10 dBA	No
					+3 dBA	No
Airport Way	South of Lovelace Road	59.6	60.2	0.6	>60 dBA	No
					+5 dBA	No
Airport Way	North of Roth Road	61.1	61.3	0.2	+5-10 dBA	No
					+3 dBA	No
Airport Way	South of Roth Road	53.1	53.9	0.8	>60 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?
					+ 5 dBA	No
NB I-5 Off Ramp	South of Roth Road	49.6	49.9	0.3	>60 dBA	No
					+ 5 dBA	No
NB I-5 On Ramp	North of Lathrop Road	53.1	53.3	0.2	>60 dBA	No
					+ 5 dBA	No
French Camp Road	East of Union Road	66.6	66.8	0.2	+5-10 dBA	No
					+1.5 dBA	No
Roth Road	East of I-5 NB Ramps	64.3	65.0	0.7	+5-10 dBA	No
					+3 dBA	No
Hwy 99 & Frontage Road	North of Brunswick Road	76.4	76.4	0.0	+5-10 dBA	No
					+1.5 dBA	No
Hwy 99 & Frontage Road	South of French Camp Road	76.2	76.2	0.0	+5-10 dBA	No
					+1.5 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 Fehr & Peers and Saxelby Acoustics. 2022.

TABLE 3.10-5: 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]	SIGNIFICANT UNDER EX. GP?
					PROPOSED GP CRITERIA[2]	SIGNIFICANT UNDER GP UPDATE?
Union Road	South of French Camp Road	61.5	62.5	1.0	+5-10 dBA	No
					+3 dBA	No
Union Road	South of Lovelace Road	64.8	66.0	1.2	+5-10 dBA	No
					+ 3 dBA	No
Union Road	South of Shady Pines Street	58.2	59.8	1.6	+5-10 dBA	No
					+5 dBA	No
Union Road	North of Shady Pines Street	61.8	62.9	1.1	+5-10 dBA	No
					+ 3 dBA	No
Union Road	South of Del Webb Blvd	59.5	60.8	1.3	>60 dBA	No
					+ 5 dBA	No
Union Road	South of Lathrop Road	62.3	62.8	0.5	+5-10 dBA	No
					+3 dBA	No
Lathrop Road	East of Union Road	70.9	71.2	0.3	+5-10 dBA	No
					+ 1.5 dBA	No
Lathrop Road	West of Union Road	65.3	65.4	0.1	+5-10 dBA	No
					+ 1.5 dBA	No
Lathrop Road	East of Harlan Road	55.2	55.4	0.2	>60 dBA	No
					+ 5 dBA	No
Lathrop Road	East of Airport Way	63.8	63.8	0.0	+5-10 dBA	No
					+3 dBA	No
Airport Way	North of Lathrop Road	64.9	65.3	0.4	+5-10 dBA	No
					+3 dBA	No
Airport Way	South of Lovelace Road	62.1	62.6	0.5	+5-10 dBA	No
					+3 dBA	No
Airport Way	North of Roth Road	63.7	63.9	0.2	+5-10 dBA	No
					+3 dBA	No
Airport Way	South of Roth Road	55.2	55.4	0.2	>60 dBA	No
					+ 5 dBA	No
NB I-5 Off Ramp	South of Roth Road	51.7	51.7	0.0	>60 dBA	No
					+ 5 dBA	No

Roadway	Segment	Noise Levels (L_{DN}, dB) at Nearest Sensitive Receptors				
		Cumulative	Cumulative + Project	Change	Ex. GP Criteria[1]	Significant Under Ex. GP?
					Proposed GP Criteria[2]	Significant Under GP Update?
NB I-5 On Ramp	North of Lathrop Road	56.8	56.9	0.1	>60 dBA	No
					+ 5 dBA	No
French Camp Road	East of Union Road	67.2	67.6	0.4	+5-10 dBA	No
					+1.5 dBA	No
Roth Road	East of I-5 NB Ramps	66.0	66.3	0.3	+5-10 dBA	No
					+1.5 dBA	No
Hwy 99 & Frontage Road	North of Brunswick Road	77.5	77.5	0.0	>60 dBA	No
					+1.5 dBA	No
Hwy 99 & Frontage Road	South of French Camp Road	77.2	77.2	0.0	>60 dBA	No
					+1.5 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 Fehr & Peers and Saxelby Acoustics. 2021.

Based upon data in Tables 3.10-4 and 3.10-5, the proposed project is predicted to result in a maximum traffic noise level increase of 1.7 dB.

EVALUATION OF TRANSPORTATION NOISE ON OVERALL PROJECT SITE

Traffic Noise Levels

Union Road

Cumulative plus project traffic noise levels are predicted to be 72 dB L_{dn} at a distance of approximately 60 feet from the centerline of Union Road, assuming no shielding from intervening buildings or sound walls. The proposed residential uses are located approximately 60 feet from the centerline of Union Road. Therefore, maximum exterior noise levels of 72 dB L_{dn} are predicted for these uses.

Highway 99

Cumulative plus project traffic noise levels are predicted to be 79 dB L_{dn} at a distance of 110 feet from the centerline of Highway 99, assuming no shielding from intervening buildings or sound walls. The proposed residential uses are located approximately 110 feet from the centerline Highway 99. Therefore, maximum exterior noise levels of 79 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 3.10-6, activities involved in construction would generate maximum noise levels ranging from 76 to 90 dB at a distance of 50 feet.

TABLE 3.10-6: 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 3.10-7 shows the typical vibration levels produced by construction placement.

TABLE 3.10-7: 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

3.10.2 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 3.10-8].

TABLE 3.10-8: 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 3.10-9]. Noise mitigation may be required to meet Table 9-2 [Table 3.10-9] performance standards.

TABLE 3.10-9: 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 3.10-9] 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 goals and policies of the proposed General Plan are also considered in this document. The City of Manteca General Plan Update noise goals, policies, and implementation measures are included below:

GOALS

Goal S-5: Protect the quality of life by protecting the community from harmful and excessive noise.

POLICIES

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

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 7 AM TO 10 PM	NIGHTTIME 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 3.10-10 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 3.10-10: 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.

3.10.3 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 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.*

IMPACTS AND MITIGATION MEASURES

IMPACT 1: WOULD THE PROJECT 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?

TRAFFIC NOISE INCREASES UNDER EXISTING (2003) GENERAL PLAN STANDARDS

As shown in Tables 3.10-4 and 3.10-5, 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 Union Road, south of Lovelace Road experience an exterior noise level of approximately 63.4 dB L_{dn}. Under Existing + Project conditions, exterior traffic noise levels are predicted to be approximately 65.1 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 1.7 dB would not exceed the City's increase criteria of 5-10 dB. 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}, or 3.0 dB or more where existing noise levels are between 60-65 dB L_{dn}.

According to Tables 3.10-4 and 3.10-5, the maximum noise level increase due to project traffic is predicted to be 1.7 dBA L_{dn}. For this segment of Union Road, the existing ambient noise level at the nearest sensitive receptor is 63.4 dBA. Therefore, an increase of 3 dB would be required to be considered a significant impact. All other roadway segments analyzed in the traffic study do not exceed the Proposed General Plan Standards for significant impacts. Therefore, this would be a ***less than significant*** impact.

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.). Proposed neighborhood parks are located internal to the project site and would not impact off-site residential uses. Therefore, operational noise by the proposed project is not analyzed further.

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 3.10-6, 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 3.10-1, temporary construction noise impacts would be reduced to less than significant.

EXTERIOR TRAFFIC NOISE AT PROPOSED USES

Tables 3.10-11 and 3.10-12 show the predicted traffic noise levels at the proposed residential uses adjacent to the major project-area arterial roadways and highways. Based upon Tables 3.10-11 and 3.10-12, exterior noise levels would exceed the City's 60 dBA L_{dn} normally acceptable exterior noise standard. The 60 dBA L_{dn} noise contours for Union Road and Highway 99 were found to extend to an approximate distance of 159 feet and 2,037 feet from the roadway centerlines, respectively. This would encroach into the outdoor activity areas of proposed residences. Therefore, use of a physical barrier would be the only feasible method to reduce exterior noise levels to within the City's allowable exterior noise standard range.

Tables 3.10-11 and 3.10-12 also indicate the property line noise barrier heights required to achieve compliance with an exterior noise level standard of 60 dB L_{dn}.

TABLE 3.10-11: CUMULATIVE + PROJECT TRANSPORTATION NOISE LEVELS AT PROPOSED RESIDENTIAL USES – UNION RANCH NORTH

SEGMENT	APPROXIMATE RESIDENTIAL SETBACK, FEET[1]	PREDICTED NOISE LEVELS, DB L_{DN}[2]					
		NO BARRIER	6' BARRIER	7' BARRIER	8' BARRIER	9' BARRIER	10' BARRIER
Union Road	60	72	66	64	63	62	60

NOTES:

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

[2] THE MODELED NOISE BARRIERS ASSUME FLAT SITE CONDITIONS WHERE ROADWAY ELEVATIONS, BASE OF WALL ELEVATIONS, AND BUILDING PAD ELEVATIONS ARE APPROXIMATELY EQUIVALENT. SOUND BARRIER HEIGHT MAY BE ACHIEVED THROUGH THE USE A WALL AND EARTHEN BERM TO ACHIEVE THE TOTAL HEIGHT (I.E. 6-FOOT WALL ON 2-FOOT BERM IS EQUIVALENT TO AN 8-FOOT TALL BARRIER).

SOURCE: SAXELBY ACOUSTICS. 2022.

TABLE 3.10-12: CUMULATIVE + PROJECT TRANSPORTATION NOISE LEVELS AT PROPOSED RESIDENTIAL USES – STAGECOACH M&E

SEGMENT	APPROXIMATE RESIDENTIAL SETBACK, FEET[1]	PREDICTED NOISE LEVELS, DB L_{DN}[2]					
		NO BARRIER	12' BARRIER	13' BARRIER	14' BARRIER	15' BARRIER	16' BARRIER
Highway 99	110	79	68	67	66	66	65

NOTES:

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

[2] THE MODELED NOISE BARRIERS ASSUME FLAT SITE CONDITIONS WHERE ROADWAY ELEVATIONS, BASE OF WALL ELEVATIONS, AND BUILDING PAD ELEVATIONS ARE APPROXIMATELY EQUIVALENT. SOUND BARRIER HEIGHT MAY BE ACHIEVED THROUGH THE USE A WALL AND EARTHEN BERM TO ACHIEVE THE TOTAL HEIGHT (I.E. 6-FOOT WALL ON 2-FOOT BERM IS EQUIVALENT TO AN 8-FOOT TALL BARRIER).

SOURCE: SAXELBY ACOUSTICS. 2022.

The modeled noise barriers assume flat site conditions where roadway elevations, base of wall elevations, and building pad elevations are approximately equivalent. Appendix D of Appendix F shows the full barrier height calculations.

Union Ranch North

The data in Table 3.10-11 indicate that a noise barrier 10-feet in height would be required to achieve compliance with the City of Manteca 60 dB L_{dn} exterior noise level standard for the proposed residential uses in the Union Ranch North subdivision. It should be noted that Table 9-1 (Table 3.10-8) of the City's General Plan notes that residential uses are conditionally compatible with exterior noise levels of up to 65 dB L_{dn}, assuming that interior noise levels are in compliance with the City's interior noise level standards. The adjacent residential development to the south employs an 8-foot tall masonry wall for traffic noise protection. Therefore, it is expected that the Union Ranch North subdivision would also include construction of an 8-foot tall masonry wall or a 6-foot tall masonry wall on a 2-foot tall earthen berm, for a total barrier height of 8-feet. Based upon Table 3.10-11, an

8-foot tall barrier would achieve an exterior noise level of 63 dBA L_{dn} which is within the City's conditionally compatible exterior noise standard of up to 65 dB L_{dn}.

Stagecoach M&E

Based upon the data in Table 3.10-12, the project would need to construct a barrier of a height greater than 16 feet to achieve the City of Manteca 60 dBA L_{dn} outdoor noise level standard. However, the use of a 16-foot-tall barrier may be used to achieve compliance with the City's conditionally acceptable noise level standard of 65 dBA L_{dn}. Therefore, the Stagecoach M&E subdivision would require the construction of a barrier 16 feet in height between the boundary of the proposed residential uses and Highway 99 in order to meet the City's 65 dBA Ldn conditionally acceptable exterior noise level standard.

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}.

It should be noted that noise barriers do not typically reduce exterior noise levels at second floor locations. The proposed residential uses are predicted to be exposed to unmitigated first-floor exterior transportation noise levels up to 72 dBA L_{dn} at the Union Ranch North subdivision and 78 dBA L_{dn} at the Stagecoach M&E subdivision. Mitigated first-floor noise levels of 63-65 dBA L_{dn} are expected after construction of sound barriers. The second floor locations are not expected to receive adequate shielding from the proposed sound walls and may be exposed to noise levels 2-3 dB higher than ground floor receivers. Therefore, noise levels of 74 dB L_{dn} are expected at the second floor facades of the Union Ranch North subdivision residences and 80 dBA L_{dn} at the Stagecoach M&E subdivision residences.

Based upon a 25-dB exterior-to-interior noise level reduction, interior noise levels are predicted to be up to 47-55 dB L_{dn} at second floors and 38-40 dBA L_{dn} at first floors. Accordingly, predicted interior noise levels along the first row of residential uses along Union Road and Highway 99 are predicted to exceed the City's 45 dB L_{dn} interior noise level standard at second floor locations.

Appendix E (See Appendix F of this EIR) shows an estimate of the interior noise control measures required to meet the City's interior noise level standards.

EXTERIOR NON-TRANSPORTATION NOISE AT PROPOSED USES

The southeast corner of the Stagecoach at M&E site is adjacent to the George Perry & Sons agricultural use which include a large trucking yard. Saxelby Acoustics estimates that peak hour trucking operations could average approximately 25 trucks trips in a busy hour. A typical truck passby generates a sound exposure level (SEL) of 84 dBA. This would equate to an estimated hourly

average noise level of 55.7 dBA at the adjacent proposed residential property line. This would exceed the City of Manteca daytime noise standard of 50 dBA L_{eq} daytime noise standard, as well as the 45 dBA L_{eq} nighttime noise standard. In order to comply with the City's daytime and nighttime noise standards, a 12-foot tall masonry sound wall would be required along the boundary of the proposed residential uses.

Appendix F (See Appendix F of this EIR) shows the noise barrier calculations for the George Perry & Sons operations.

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 3.10-1A: *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 3.10-1B: *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 3.10-2: *An 8-foot tall barrier shall be constructed along the Union Road Frontage, adjacent to proposed project residential uses, in order to achieve the City's exterior noise standards. Noise barrier walls shall be constructed of concrete panels, concrete masonry units, earthen berms, or any combination of these materials that achieve the required total height. Wood is not recommended due to eventual warping and degradation of acoustical performance. These requirements shall be included in the improvements plans prior to their approval by the City's Public Works Department. Figure 3.10-2 shows the recommended sound wall locations.*

Mitigation Measure 3.10-3: *A 16-foot tall barrier shall be constructed along the boundary of the proposed residential uses and Highway 99, in order to achieve the City's exterior noise standards. The barriers may gradually transition from the 16-foot height down to a final height of 8-feet for the sections of wall wrapping towards the west, as shown on Figure 3.10-3. Noise barrier walls shall be constructed of concrete panels, concrete masonry units, earthen berms, or any combination of these materials that achieve the required total height. Wood is not recommended due to eventual warping and degradation of acoustical performance. These requirements shall be included in the improvements plans prior to their approval by the City's Public Works Department. Figure 3.10-3 shows the recommended sound wall locations.*

Mitigation Measure 3.10-4: *For the first rows of lots on the Union Ranch North subdivision adjacent to the Union Road right of way, second floor exterior facades with a view of Union Road would need the following noise control measures:*

- *Windows shall have a sound transmission class (STC) rating of 34.*

- *Interior gypsum at exterior walls shall be 5/8";*
- *Ceiling gypsum shall be 5/8";*
- *Exterior finish shall be stucco, fiber cement lap siding, or system with equivalent weight per square foot;*
- *Mechanical ventilation shall be installed in all residential uses to allow residents to keep doors and windows closed, as desired for acoustical isolation.*
- *As an alternative to the above-listed interior noise control measures, the applicant may provide a detailed analysis of interior noise control measures once building plans become available. The analysis should be prepared by a qualified noise control engineer and shall outline the specific measures required to meet the City of Manteca 45 dB L_{dn} interior noise level standard.*

Mitigation Measure 3.10-5: *For the first rows of lots on the Stagecoach M&E subdivision adjacent to the Highway 99 and Highway 99 Frontage Road right of way, second floor exterior facades with a view of Highway 99 would need the following noise control measures:*

- *Windows shall have a sound transmission class (STC) rating of 40.*
- *Interior gypsum at exterior walls shall be 5/8" hung on resilient channels;*
- *Ceiling gypsum shall be 5/8";*
- *Exterior finish shall be stucco with sheathing, fiber cement lap siding with sheathing, or system with equivalent weight per square foot;*
- *Mechanical ventilation shall be installed in all residential uses to allow residents to keep doors and windows closed, as desired for acoustical isolation.*
- *As an alternative to the above-listed interior noise control measures, the applicant may provide a detailed analysis of interior noise control measures once building plans become available. The analysis should be prepared by a qualified noise control engineer and shall outline the specific measures required to meet the City of Manteca 45 dB L_{dn} interior noise level standard.*

Mitigation Measure 3.10-6: *A 12-foot-tall barrier shall be constructed along the south boundary of the Stagecoach at M&E project site, adjacent to the George Perry & Sons agricultural operations, in order to achieve the City's exterior noise standards. Noise barrier walls shall be constructed of concrete panels, concrete masonry units, earthen berms, or any combination of these materials that achieve the required total height. Wood is not recommended due to eventual warping and degradation of acoustical performance. These requirements shall be included in the improvements plans prior to their approval by the City's Public Works Department. Figure 3.10-3 shows the recommended sound wall locations.*

IMPACT 2: WOULD THE PROJECT GENERATE EXCESSIVE GROUNDBORNE VIBRATION OR GROUNDBORNE NOISE LEVELS?

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 3.10-7 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.

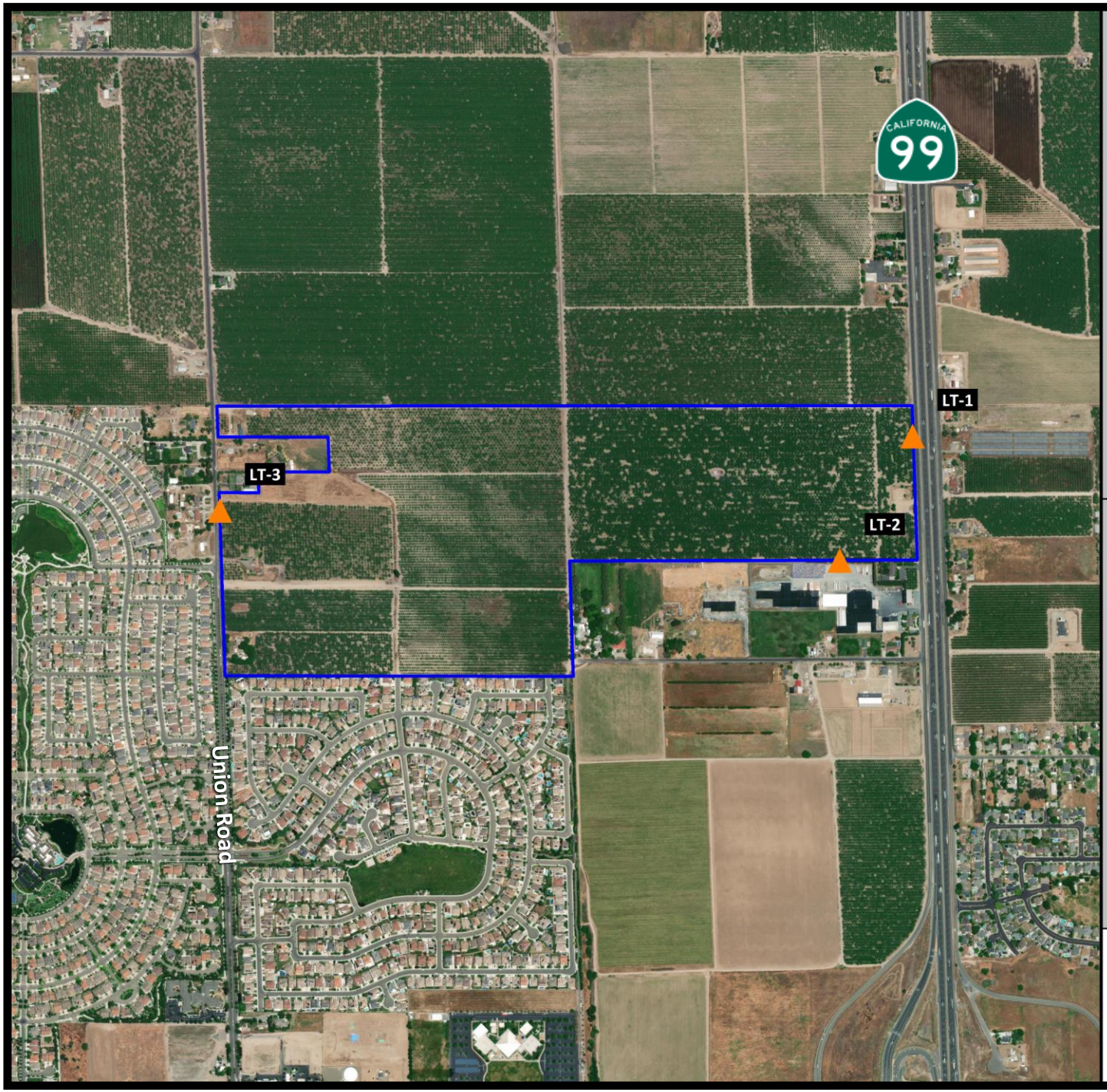
Implementation of the following mitigation measure will ensure that these potential impacts are reduced to a ***less-than-significant*** level.

MITIGATION MEASURE(S)

Mitigation Measure 3.10-6: *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: 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?

There are no airports within two miles of the project vicinity. Therefore, this impact is not applicable to the proposed project.



N.Manteca Annexation 1

Manteca, California

Figure 3.10-1

Noise Measurement Sites

Legend

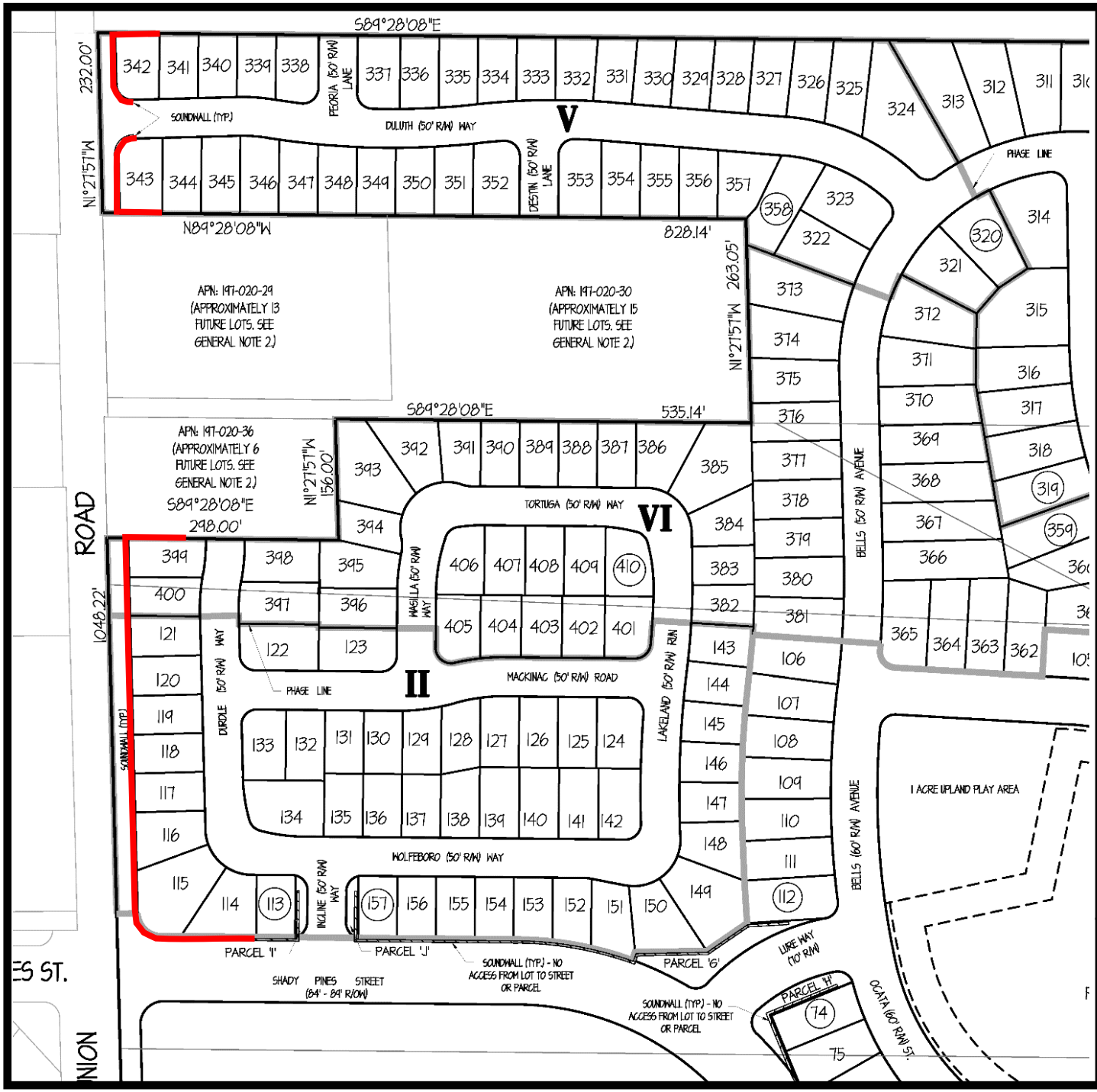
- Project Site
- Noise Measurement Site - Long Term

250 ft 1000 ft 1750 ft

Projection: Mercator / WGS84 / meters
Rev. Date: 11/12/2021

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N. Manteca Annexation 1

City of Manteca, California

Figure 3.10-2

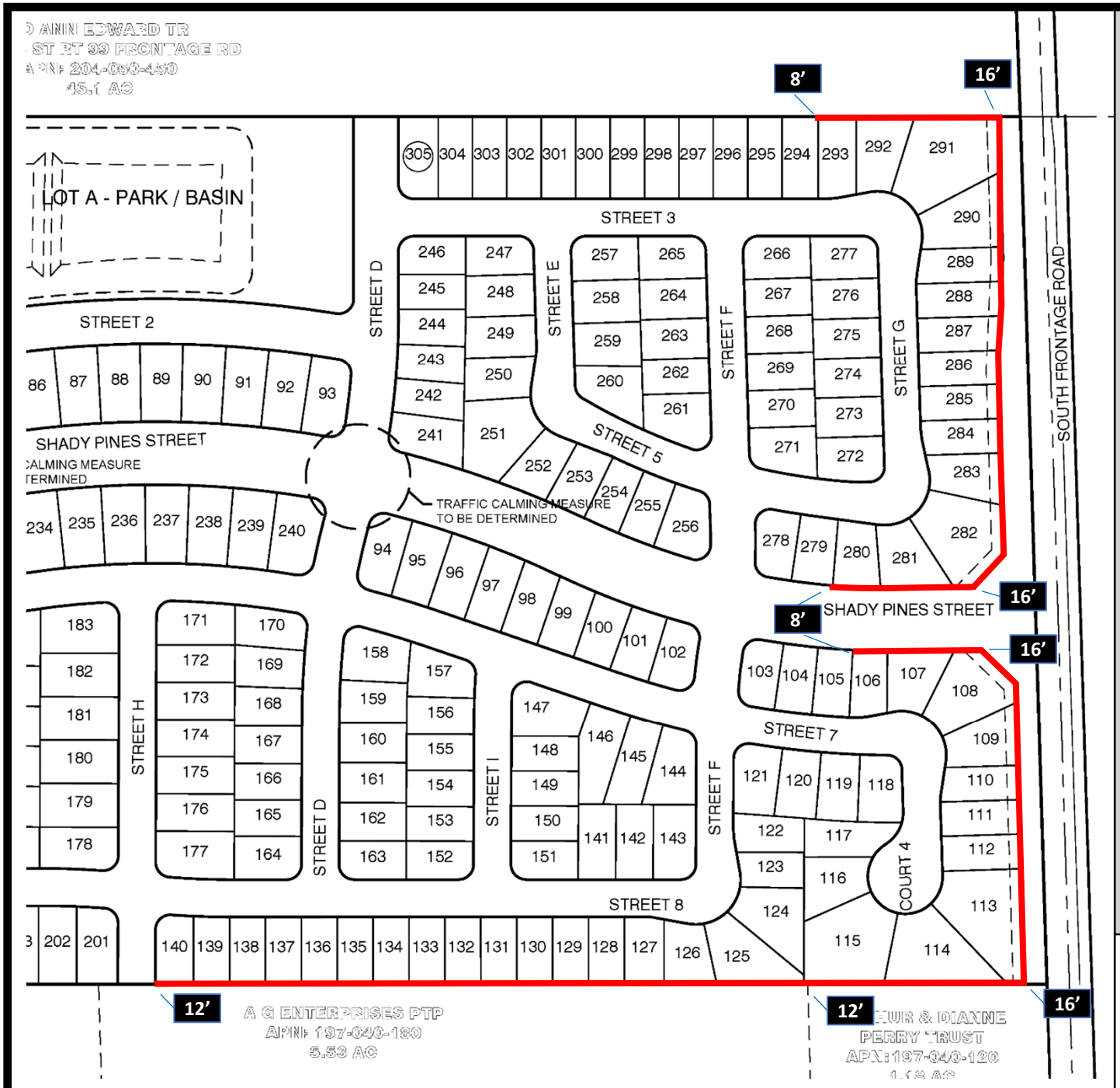
Required Wall Locations - Union Ranch North

Legend

Required 8-Foot Barrier

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N. Manteca Annexation 1

City of Manteca, California

Figure 3.10-3

Required Sound Wall Locations – Stagecoach M&E

Legend

Required Sound Barrier and Height

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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.

Appendix B: Continuous Ambient Noise Measurement Results

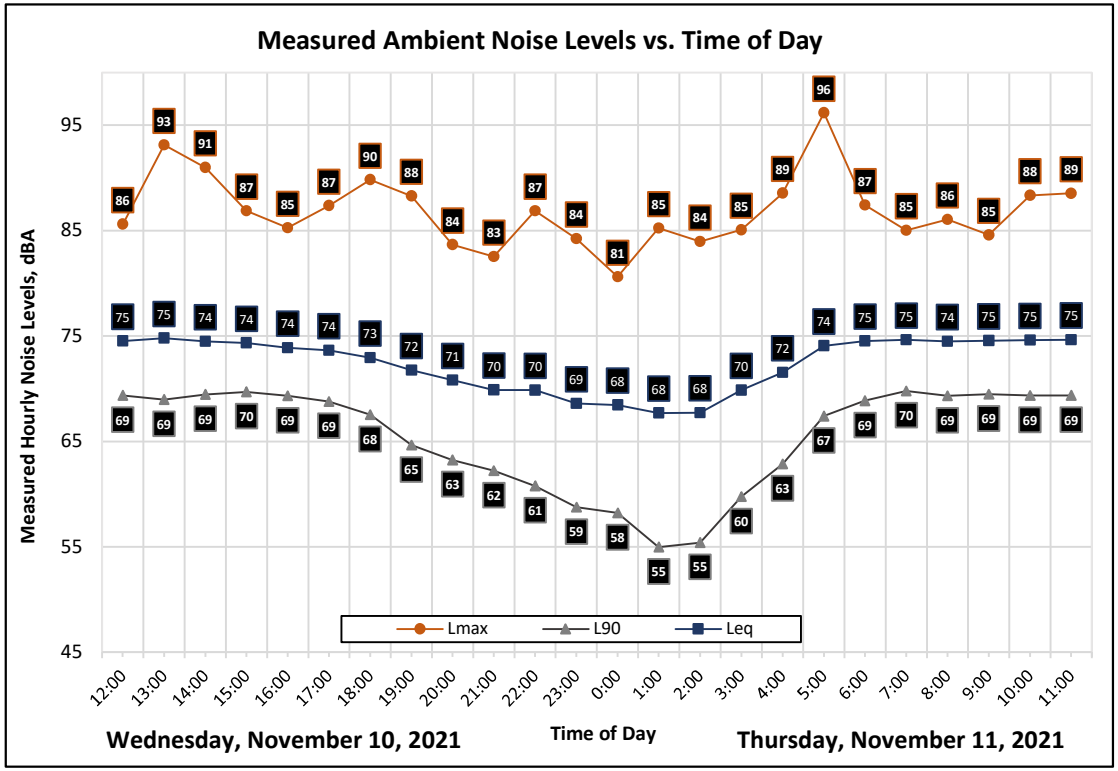


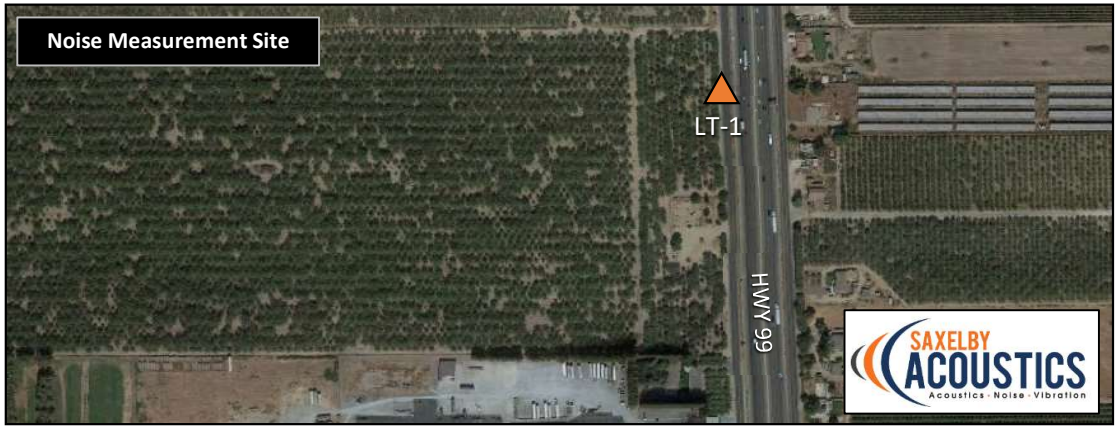
Appendix B1: Continuous Noise Monitoring Results

Site: LT-1
Project: Manteca Annexation 1 — **Meter:** LDL 820-5
Location: Eastern Project Boundary — **Calibrator:** CAL200
Coordinates: 37.8403472°, -121.2182881°

Date	Time	Measured Level, dBA			
		L_{eq}	L_{max}	L_{50}	L_{90}
Wednesday, November 10, 2021	12:00	75	86	73	69
Wednesday, November 10, 2021	13:00	75	93	74	69
Wednesday, November 10, 2021	14:00	74	91	73	69
Wednesday, November 10, 2021	15:00	74	87	73	70
Wednesday, November 10, 2021	16:00	74	85	73	69
Wednesday, November 10, 2021	17:00	74	87	72	69
Wednesday, November 10, 2021	18:00	73	90	72	68
Wednesday, November 10, 2021	19:00	72	88	70	65
Wednesday, November 10, 2021	20:00	71	84	69	63
Wednesday, November 10, 2021	21:00	70	83	68	62
Wednesday, November 10, 2021	22:00	70	87	67	61
Wednesday, November 10, 2021	23:00	69	84	66	59
Thursday, November 11, 2021	0:00	68	81	66	58
Thursday, November 11, 2021	1:00	68	85	64	55
Thursday, November 11, 2021	2:00	68	84	63	55
Thursday, November 11, 2021	3:00	70	85	66	60
Thursday, November 11, 2021	4:00	72	89	69	63
Thursday, November 11, 2021	5:00	74	96	72	67
Thursday, November 11, 2021	6:00	75	87	73	69
Thursday, November 11, 2021	7:00	75	85	74	70
Thursday, November 11, 2021	8:00	74	86	74	69
Thursday, November 11, 2021	9:00	75	85	74	69
Thursday, November 11, 2021	10:00	75	88	73	69
Thursday, November 11, 2021	11:00	75	89	74	69

Statistics	Leq	Lmax	L50	L90
Day Average	74	87	72	68
Night Average	71	86	67	61
Day Low	70	83	68	62
Day High	75	93	74	70
Night Low	68	81	63	55
Night High	75	96	73	69
Ldn	78	Day %		76
CNEL	78	Night %		24



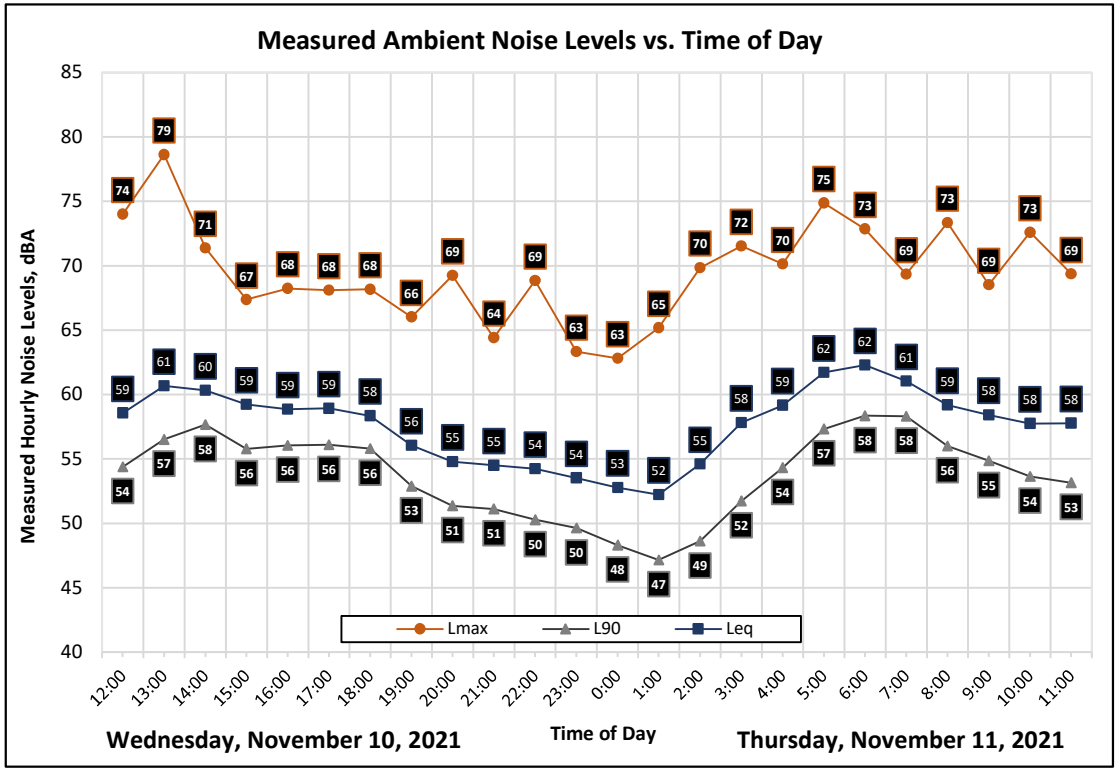


Appendix B2: Continuous Noise Monitoring Results

Site: LT-2
Project: Manteca Annexation 1 **Meter:** LDL 820-2
Location: Southern Project Boundary **Calibrator:** CAL200
Coordinates: 37.8377812°, -121.2201840°

Date	Time	Measured Level, dBA			
		L_{eq}	L_{max}	L_{50}	L_{90}
Wednesday, November 10, 2021	12:00	59	74	57	54
Wednesday, November 10, 2021	13:00	61	79	59	57
Wednesday, November 10, 2021	14:00	60	71	60	58
Wednesday, November 10, 2021	15:00	59	67	59	56
Wednesday, November 10, 2021	16:00	59	68	58	56
Wednesday, November 10, 2021	17:00	59	68	58	56
Wednesday, November 10, 2021	18:00	58	68	58	56
Wednesday, November 10, 2021	19:00	56	66	55	53
Wednesday, November 10, 2021	20:00	55	69	54	51
Wednesday, November 10, 2021	21:00	55	64	54	51
Wednesday, November 10, 2021	22:00	54	69	53	50
Wednesday, November 10, 2021	23:00	54	63	53	50
Thursday, November 11, 2021	0:00	53	63	52	48
Thursday, November 11, 2021	1:00	52	65	51	47
Thursday, November 11, 2021	2:00	55	70	53	49
Thursday, November 11, 2021	3:00	58	72	57	52
Thursday, November 11, 2021	4:00	59	70	58	54
Thursday, November 11, 2021	5:00	62	75	61	57
Thursday, November 11, 2021	6:00	62	73	62	58
Thursday, November 11, 2021	7:00	61	69	61	58
Thursday, November 11, 2021	8:00	59	73	59	56
Thursday, November 11, 2021	9:00	58	69	58	55
Thursday, November 11, 2021	10:00	58	73	57	54
Thursday, November 11, 2021	11:00	58	69	57	53

Statistics	Leq	Lmax	L50	L90
Day Average	59	70	57	55
Night Average	58	69	55	52
Day Low	55	64	54	51
Day High	61	79	61	58
Night Low	52	63	51	47
Night High	62	75	62	58
Ldn	65	Day %		66
CNEL	65	Night %		34



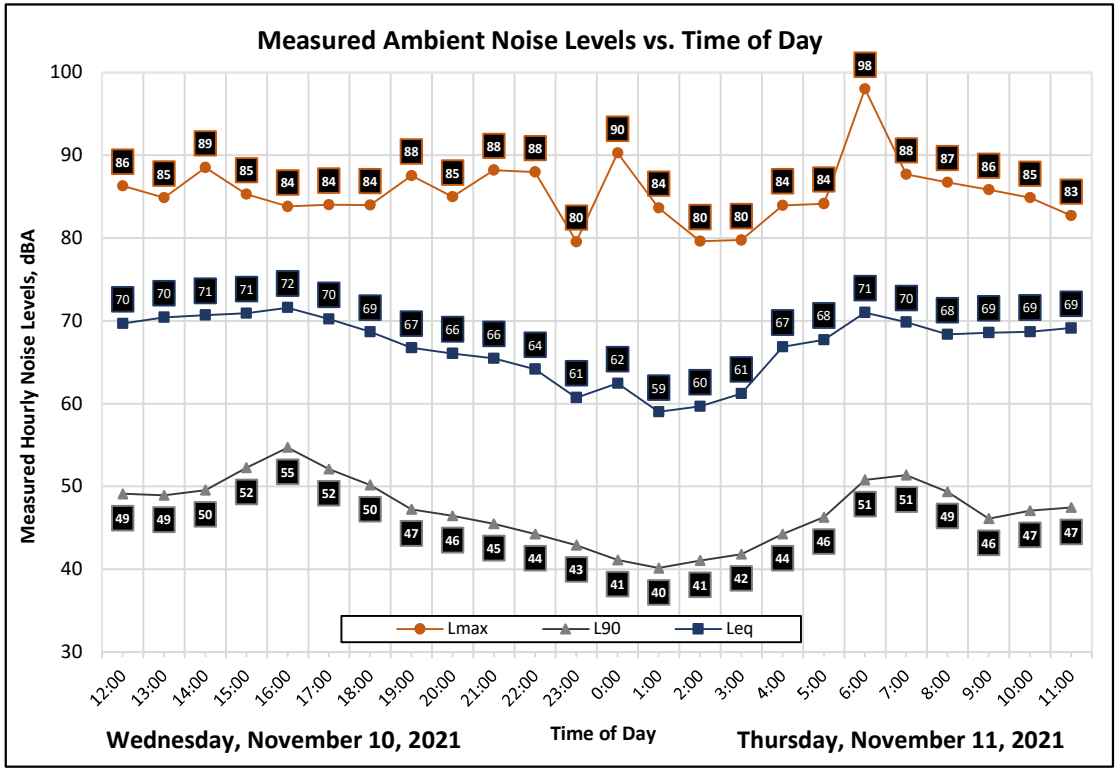


Appendix B3: Continuous Noise Monitoring Results

Site: LT-3
Project: Manteca Annexation 1 **Meter:** LDL 820-3
Location: Western Project Boundary **Calibrator:** CAL200
Coordinates: 37.8388131°, -121.2363249°

Date	Time	Measured Level, dBA			
		L_{eq}	L_{max}	L_{50}	L_{90}
Wednesday, November 10, 2021	12:00	70	86	62	49
Wednesday, November 10, 2021	13:00	70	85	64	49
Wednesday, November 10, 2021	14:00	71	89	64	50
Wednesday, November 10, 2021	15:00	71	85	66	52
Wednesday, November 10, 2021	16:00	72	84	69	55
Wednesday, November 10, 2021	17:00	70	84	65	52
Wednesday, November 10, 2021	18:00	69	84	59	50
Wednesday, November 10, 2021	19:00	67	88	52	47
Wednesday, November 10, 2021	20:00	66	85	52	46
Wednesday, November 10, 2021	21:00	66	88	50	45
Wednesday, November 10, 2021	22:00	64	88	48	44
Wednesday, November 10, 2021	23:00	61	80	46	43
Thursday, November 11, 2021	0:00	62	90	45	41
Thursday, November 11, 2021	1:00	59	84	42	40
Thursday, November 11, 2021	2:00	60	80	43	41
Thursday, November 11, 2021	3:00	61	80	45	42
Thursday, November 11, 2021	4:00	67	84	51	44
Thursday, November 11, 2021	5:00	68	84	55	46
Thursday, November 11, 2021	6:00	71	98	60	51
Thursday, November 11, 2021	7:00	70	88	60	51
Thursday, November 11, 2021	8:00	68	87	56	49
Thursday, November 11, 2021	9:00	69	86	56	46
Thursday, November 11, 2021	10:00	69	85	58	47
Thursday, November 11, 2021	11:00	69	83	61	47

Statistics	Leq	Lmax	L50	L90
Day Average	69	86	59	49
Night Average	66	85	48	44
Day Low	66	83	50	45
Day High	72	89	69	55
Night Low	59	80	42	40
Night High	71	98	60	51
Ldn	73	Day %		80
CNEL	73	Night %		20





Appendix C: Traffic Noise Calculation Inputs and Results

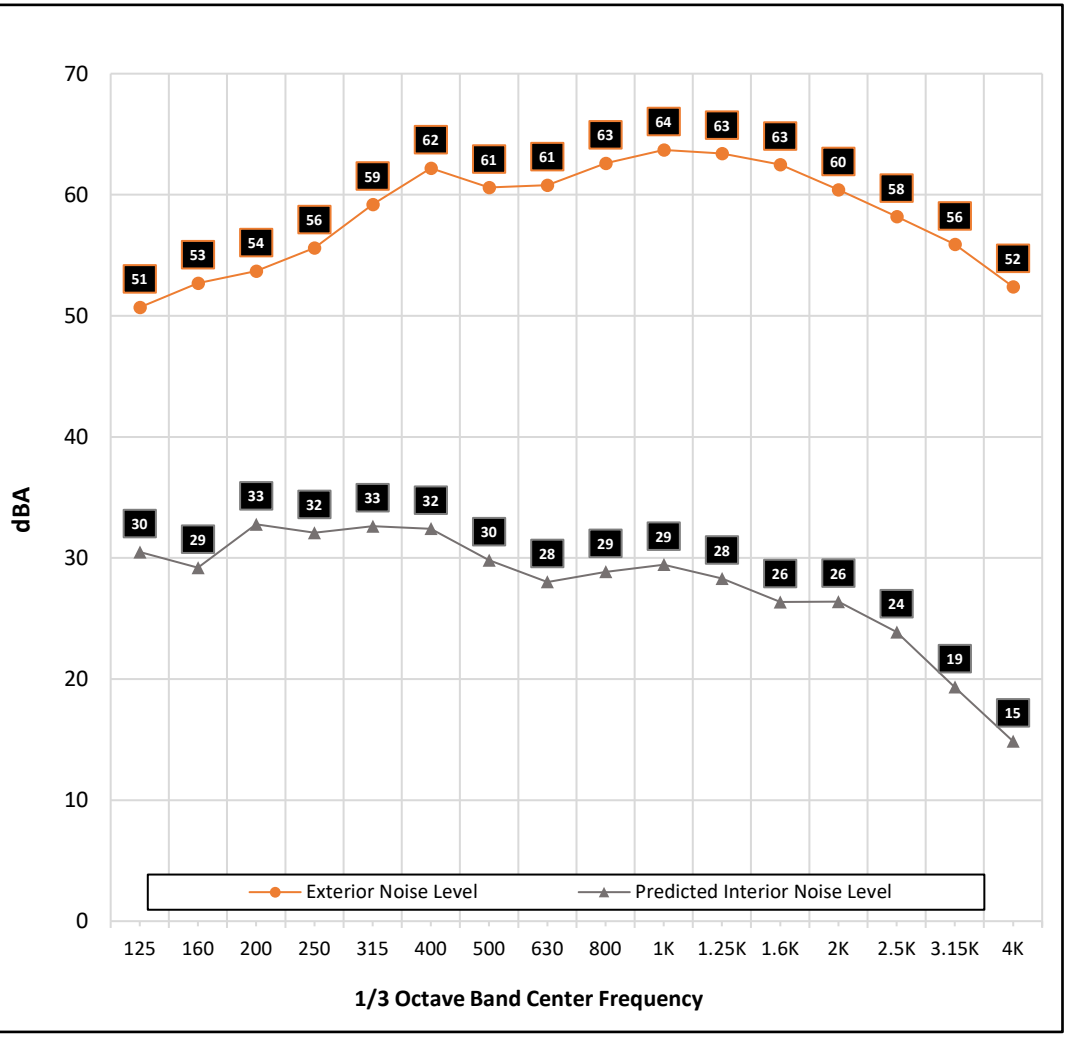


Appendix E1 : Interior Noise Calculation Sheet

Project: 211002 North Manteca Annexation 1
Room Description: Bedroom (Union Ranch North)

Inputs		
Parallel Exterior level, dBA:	72.0	Ldn
Correction Factor, dBA:	5	
Noise Source:	Arterial Traffic	
Room Perimeter, ft:	44	
Room Area, ft:	120	
Room Height, ft:	9	
Transmitting Panel Length, ft:	22	
Window Area, ft:	24	
Ceiling Finish:	Gyp Board	
Ceiling, sf:	120	
Wall Finish 1:	Gyp Board	
Wall Finish 1, sf:	372	
Wall Finish 2:	Glass	
Wall Finish 2, sf:	24	
Floor:	Carpet, on foam rubber pad	
Floor, sf:	120	
Misc. Finish:	Soft Furnishings	
Misc. Finish, sf:	25	
Transmitting Element 1:	Wall - 1-Coat Stucco, 5/8" gyp INSUL	
Element 1, sf:	174	
Transmitting Element 2:	Window - Quiet Home STC 34	
Element 2, sf:	24	
Transmitting Element 3:		
Element 3, sf:		
Transmitting Element 4:		
Element 4, sf:		

Predicted Interior Noise Level, dBA: 42
Noise Reduction, dBA: -30



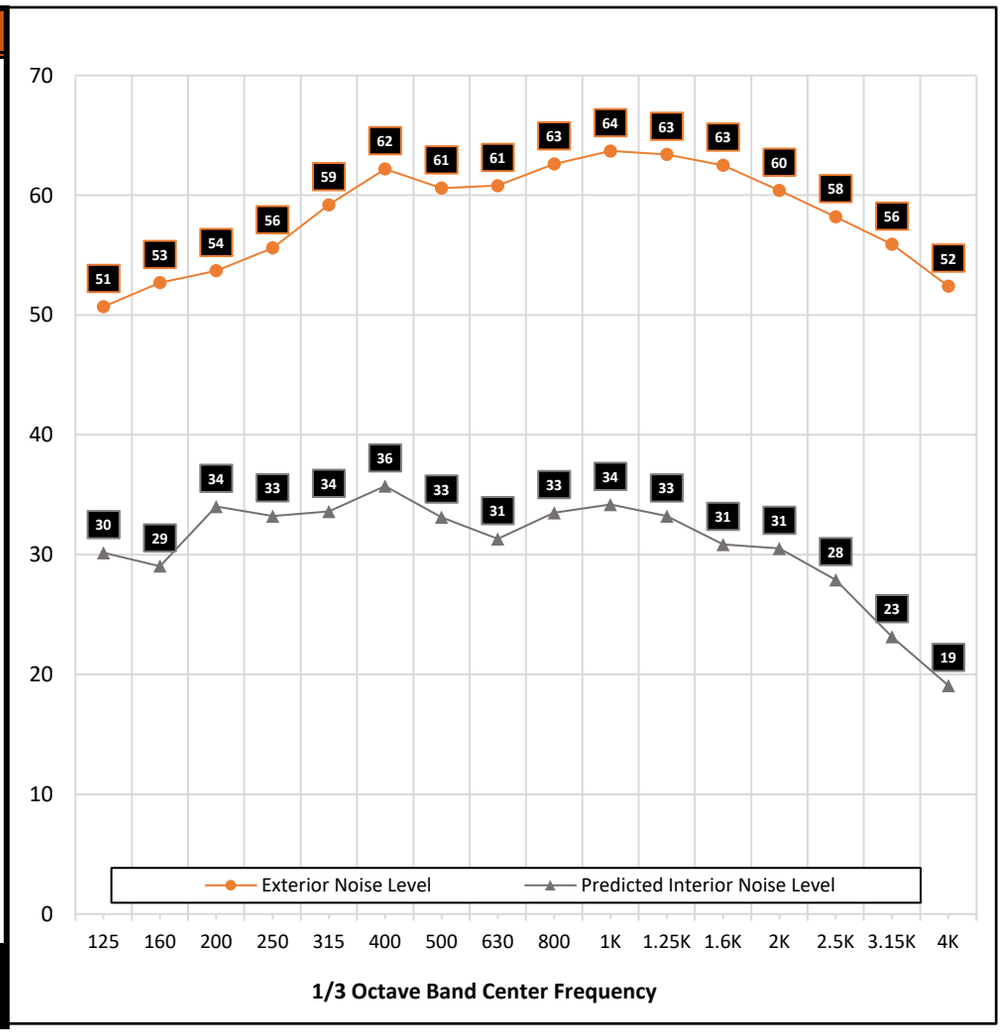
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Appendix E2 : Interior Noise Calculation Sheet

Project: 211002 North Manteca Annexation 1
Room Description: Living Room (Union Ranch North)

Inputs	
Parallel Exterior level, dBA:	72.0 Ldn
Correction Factor, dBA:	5
Noise Source:	Arterial Traffic
Room Perimeter, ft:	64
Room Area, ft:	240
Room Height, ft:	9
Transmitting Panel Length, ft:	32
Window Area, ft:	48
Ceiling Finish:	Gyp Board
Ceiling, sf:	240
Wall Finish 1:	Gyp Board
Wall Finish 1, sf:	528
Wall Finish 2:	Glass
Wall Finish 2, sf:	48
Floor:	Wood
Floor, sf:	240
Misc. Finish:	Soft Furnishings
Misc. Finish, sf:	25
Transmitting Element 1:	Wall - 1-Coat Stucco, 5/8" gyp INSUL
Element 1, sf:	240
Transmitting Element 2:	Window - Quiet Home STC 34
Element 2, sf:	48
Transmitting Element 3:	
Element 3, sf:	
Transmitting Element 4:	
Element 4, sf:	

Predicted Interior Noise Level, dBA: 44
Noise Reduction, dBA: -28



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Appendix E3 : Interior Noise Calculation Sheet

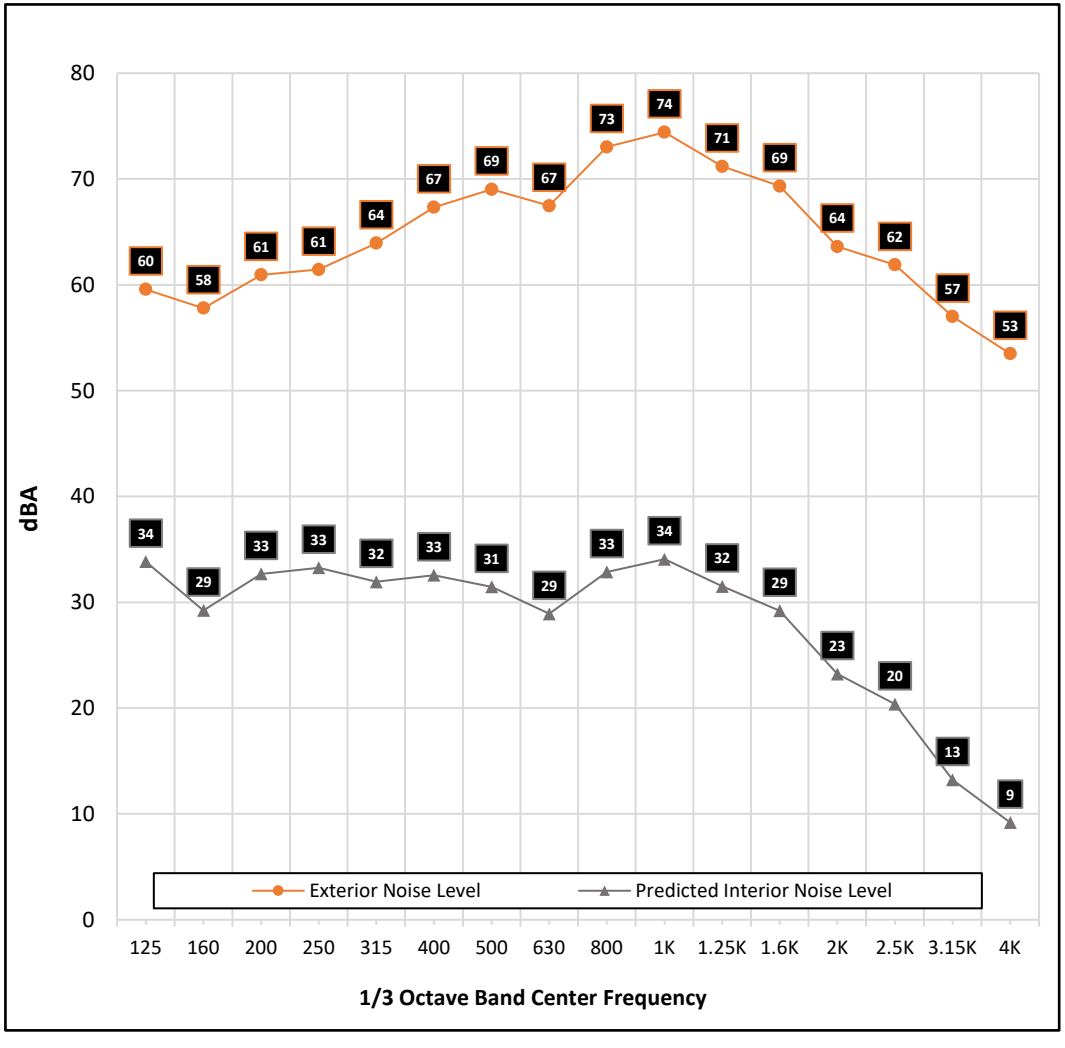
Project: 211002 North Manteca Annexation 1

Room Description: Bedroom (Stagecoach M&E)

Inputs		
Parallel Exterior level, dBA:	80.0	Ldn
Correction Factor, dBA:	5	
Noise Source:	Freeway Traffic - SR99 Turlock	
Room Perimeter, ft:	44	
Room Area, ft:	120	
Room Height, ft:	9	
Transmitting Panel Length, ft:	22	
Window Area, ft:	24	
Ceiling Finish:	Gyp Board	
Ceiling, sf:	120	
Wall Finish 1:	Gyp Board	
Wall Finish 1, sf:	372	
Wall Finish 2:	Glass	
Wall Finish 2, sf:	24	
Floor:	Carpet, on foam rubber pad	
Floor, sf:	120	
Misc. Finish:	Soft Furnishings	
Misc. Finish, sf:	25	
Transmitting Element 1:	Wall - 0.5" OSB, One Coat Stucco, RC	
Element 1, sf:	174	
Transmitting Element 2:	Window - Quiet Home STC 38	
Element 2, sf:	24	
Transmitting Element 3:		
Element 3, sf:		
Transmitting Element 4:		
Element 4, sf:		

Predicted Interior Noise Level, dBA: 43

Noise Reduction, dBA: -37



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Appendix E4 : Interior Noise Calculation Sheet

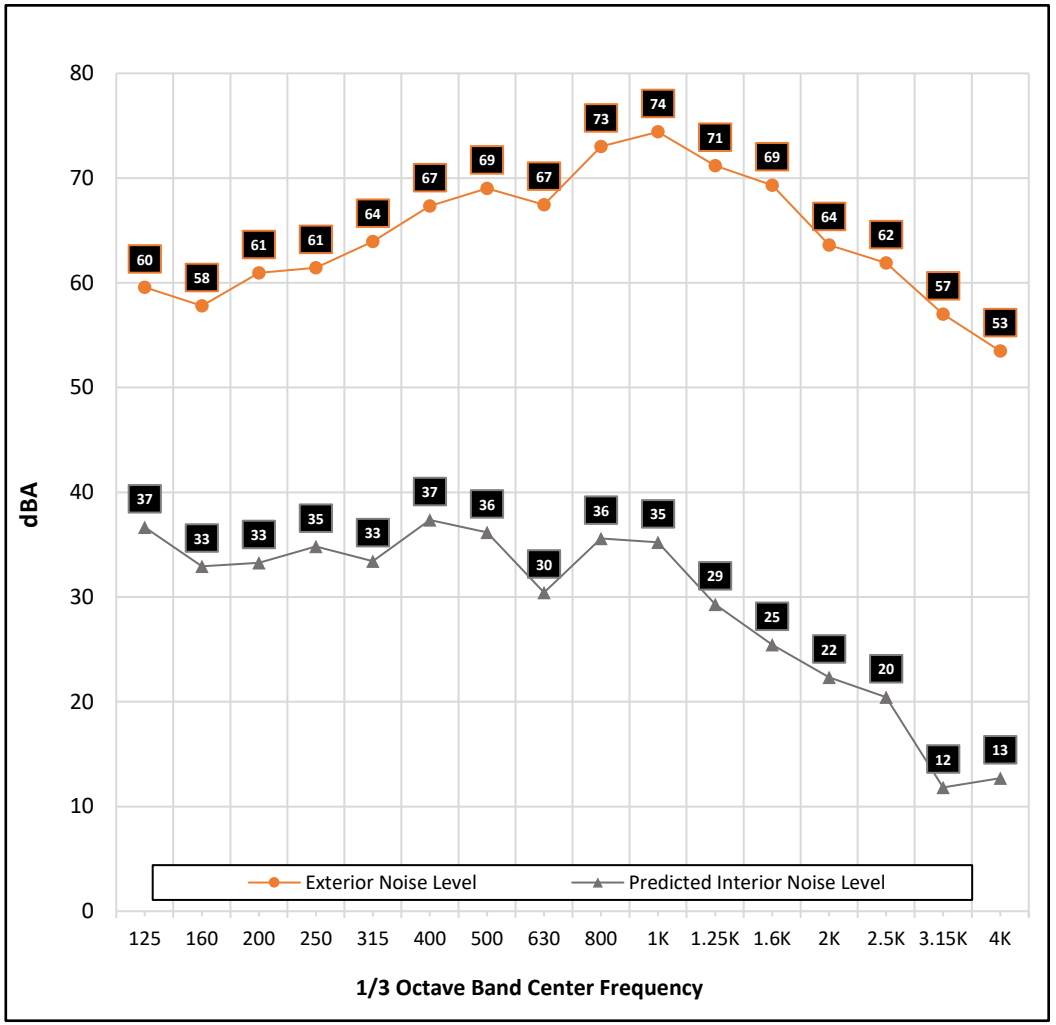
Project: 211002 North Manteca Annexation 1

Room Description: Living Room (Stagecoach M&E)

Inputs		
Parallel Exterior level, dBA:	80.0	Ldn
Correction Factor, dBA:	5	
Noise Source:	Freeway Traffic - SR99 Turlock	
Room Perimeter, ft:	64	
Room Area, ft:	240	
Room Height, ft:	9	
Transmitting Panel Length, ft:	32	
Window Area, ft:	48	
Ceiling Finish:	Gyp Board	
Ceiling, sf:	240	
Wall Finish 1:	Gyp Board	
Wall Finish 1, sf:	528	
Wall Finish 2:	Glass	
Wall Finish 2, sf:	48	
Floor:	Wood	
Floor, sf:	240	
Misc. Finish:	Soft Furnishings	
Misc. Finish, sf:	25	
Transmitting Element 1:	Wall - 0.5" OSB, One Coat Stucco, RC	
Element 1, sf:	240	
Transmitting Element 2:	Window - Millgard 7520 Casement STC 40	
Element 2, sf:	48	
Transmitting Element 3:		
Element 3, sf:		
Transmitting Element 4:		
Element 4, sf:		

Predicted Interior Noise Level, dBA: 45

Noise Reduction, dBA: -35



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Appendix D: Traffic Noise Barrier Calculations



Appendix B-1
FHWA Traffic Noise Prediction Model (FHWA-RD-77-108)
Noise Barrier Effectiveness Prediction Worksheet

Project Information:

Job Number: 211002
Description North Manteca Annexation #1
Roadway Name: Highway 99
Location(s): 1

Noise Level Data:

Year: 2021
Auto L_{dn}, dB: 75
Medium Truck L_{dn}, dB: 69
Heavy Truck L_{dn}, dB: 76

Site Geometry:

Receiver Description: Stagecoach M&E
Centerline to Barrier Distance (C_1): 90
Barrier to Receiver Distance (C_2): 20
Automobile Elevation: 0
Medium Truck Elevation: 2
Heavy Truck Elevation: 8
Pad/Ground Elevation at Receiver: 0
Receiver Elevation[1]: 5
Base of Barrier Elevation: 0
Starting Barrier Height 10

Barrier Effectiveness:

		---------- L_{dn}, dB ----------				Barrier Breaks Line of Sight to…		
Top of Barrier Elevation (ft)	Barrier Height[2] (ft)	Autos	Medium Trucks	Heavy Trucks	Total	Autos?	Medium Trucks?	Heavy Trucks?
10	10	65	59	67	69	Yes	Yes	Yes
11	11	64	58	66	69	Yes	Yes	Yes
12	12	63	58	65	68	Yes	Yes	Yes
13	13	63	57	64	67	Yes	Yes	Yes
14	14	62	56	63	66	Yes	Yes	Yes
15	15	61	55	63	66	Yes	Yes	Yes
16	16	61	55	62	65	Yes	Yes	Yes
17	17	61	55	61	65	Yes	Yes	Yes
18	18	60	54	61	64	Yes	Yes	Yes

Notes: [1] Standard receiver elevation is five feet above grade/pad elevations at the receiver location(s).

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Appendix B-2
FHWA Traffic Noise Prediction Model (FHWA-RD-77-108)
Noise Barrier Effectiveness Prediction Worksheet

Project Information:

Job Number: 211002
Description North Manteca Annexation #1
Roadway Name: Union Road
Location(s): 2

Noise Level Data:

Year: 2021
Auto L_{dn}, dB: 69
Medium Truck L_{dn}, dB: 61
Heavy Truck L_{dn}, dB: 67

Site Geometry:

Receiver Description: Union Ranch North
Centerline to Barrier Distance (C_1): 52
Barrier to Receiver Distance (C_2): 10
Automobile Elevation: 0
Medium Truck Elevation: 2
Heavy Truck Elevation: 8
Pad/Ground Elevation at Receiver: 0
Receiver Elevation[1]: 5
Base of Barrier Elevation: 0
Starting Barrier Height 6

Barrier Effectiveness:

		---------- L_{dn}, dB ----------				Barrier Breaks Line of Sight to…		
Top of Barrier Elevation (ft)	Barrier Height[2] (ft)	Autos	Medium Trucks	Heavy Trucks	Total	Autos?	Medium Trucks?	Heavy Trucks?
6	6	62	55	62	66	Yes	Yes	Yes
7	7	61	54	61	64	Yes	Yes	Yes
8	8	59	52	60	63	Yes	Yes	Yes
9	9	58	51	58	62	Yes	Yes	Yes
10	10	57	50	57	60	Yes	Yes	Yes
11	11	56	48	56	59	Yes	Yes	Yes
12	12	55	48	55	58	Yes	Yes	Yes
13	13	54	47	54	58	Yes	Yes	Yes
14	14	54	47	53	57	Yes	Yes	Yes

Notes: [1] Standard receiver elevation is five feet above grade/pad elevations at the receiver location(s).

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Appendix E: Interior Noise Reduction Calculations

Appendix E1 : Interior Noise Calculation Sheet

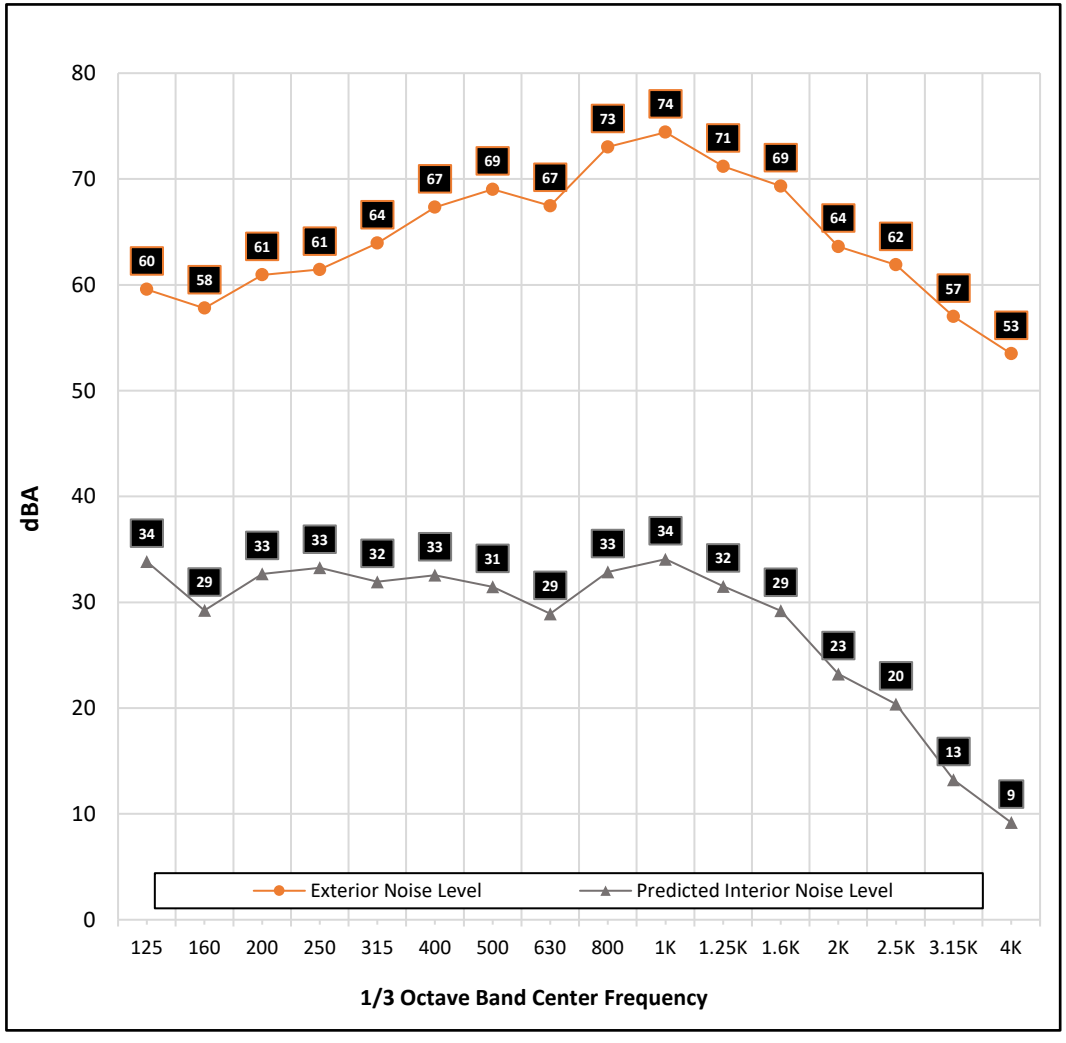
Project: 211002 North Manteca Annexation 1

Room Description: Bedroom

Inputs		
Parallel Exterior level, dBA:	80.0	Ldn
Correction Factor, dBA:	5	
Noise Source:	Freeway Traffic - SR99 Turlock	
Room Perimeter, ft:	44	
Room Area, ft:	120	
Room Height, ft:	9	
Transmitting Panel Length, ft:	22	
Window Area, ft:	24	
Ceiling Finish:	Gyp Board	
Ceiling, sf:	120	
Wall Finish 1:	Gyp Board	
Wall Finish 1, sf:	372	
Wall Finish 2:	Glass	
Wall Finish 2, sf:	24	
Floor:	Carpet, on foam rubber pad	
Floor, sf:	120	
Misc. Finish:	Soft Furnishings	
Misc. Finish, sf:	25	
Transmitting Element 1:	Wall - 0.5" OSB, One Coat Stucco, RC	
Element 1, sf:	174	
Transmitting Element 2:	Window - Quiet Home STC 38	
Element 2, sf:	24	
Transmitting Element 3:		
Element 3, sf:		
Transmitting Element 4:		
Element 4, sf:		

Predicted Interior Noise Level, dBA: 43

Noise Reduction, dBA: -37



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Appendix E2 : Interior Noise Calculation Sheet

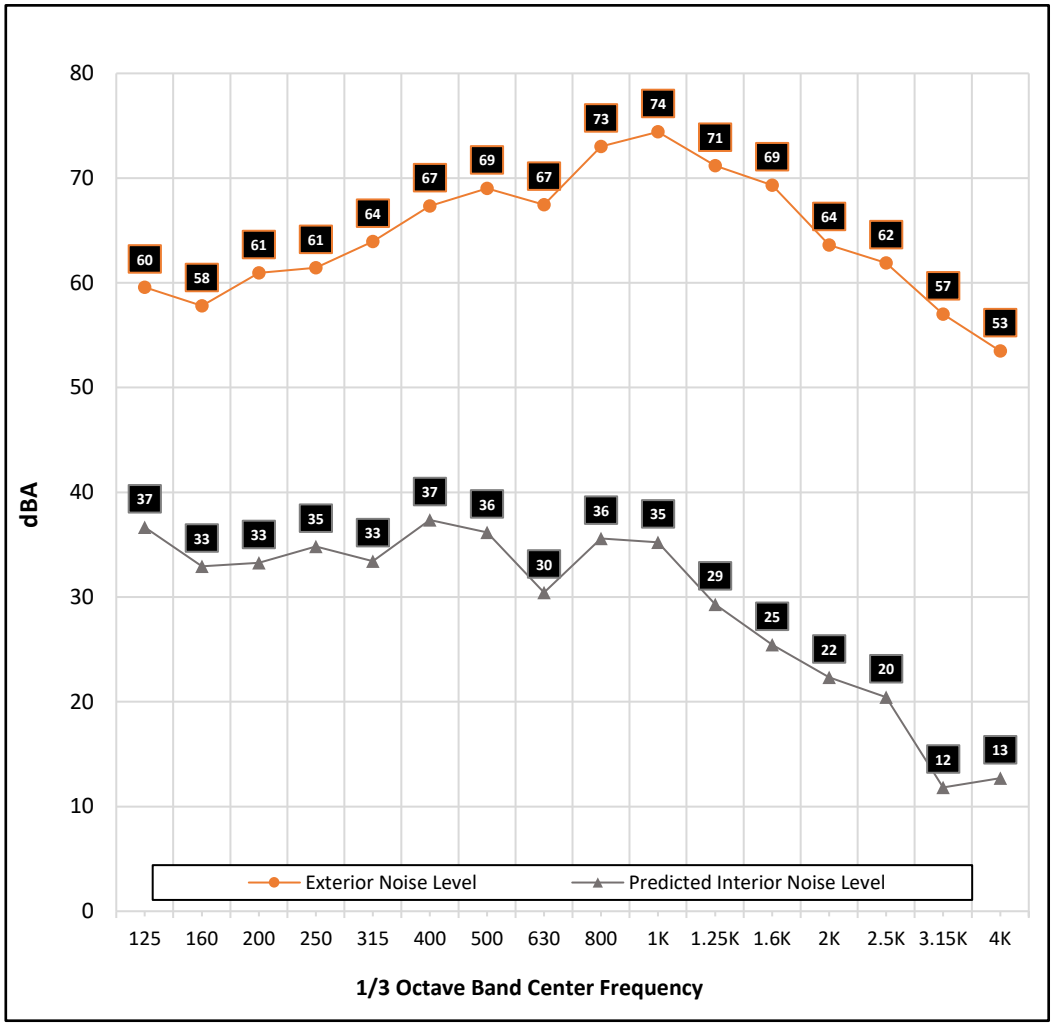
Project: 211002 North Manteca Annexation 1

Room Description: Living Room

Inputs		
Parallel Exterior level, dBA:	80.0	Ldn
Correction Factor, dBA:	5	
Noise Source:	Freeway Traffic - SR99 Turlock	
Room Perimeter, ft:	64	
Room Area, ft:	240	
Room Height, ft:	9	
Transmitting Panel Length, ft:	32	
Window Area, ft:	48	
Ceiling Finish:	Gyp Board	
Ceiling, sf:	240	
Wall Finish 1:	Gyp Board	
Wall Finish 1, sf:	528	
Wall Finish 2:	Glass	
Wall Finish 2, sf:	48	
Floor:	Wood	
Floor, sf:	240	
Misc. Finish:	Soft Furnishings	
Misc. Finish, sf:	25	
Transmitting Element 1:	Wall - 0.5" OSB, One Coat Stucco, RC	
Element 1, sf:	240	
Transmitting Element 2:	Window - Millgard 7520 Casement STC 40	
Element 2, sf:	48	
Transmitting Element 3:		
Element 3, sf:		
Transmitting Element 4:		
Element 4, sf:		

Predicted Interior Noise Level, dBA: 45

Noise Reduction, dBA: -35



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Appendix F: Non-Transportation Noise Source Barrier Calculations

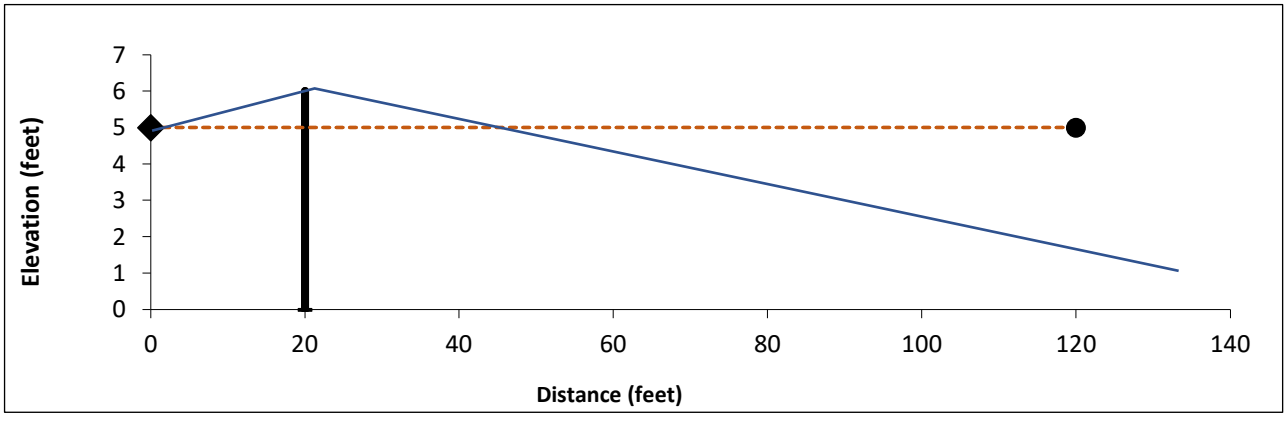
Appendix F : Barrier Insertion Loss Calculation

Project Information:	Project Name: Manteca Annexation 1 Location(s): Stagecoah at M&E
Noise Level Data:	Source Description: George Perry & Sons Source Noise Level, dBA Leq: 55.7 Source Frequency (Hz): 500 Source Height (ft): 5
Site Geometry:	Receiver Description: Adjacent Lots Source to Barrier Distance (C_1): 100 Barrier to Receiver Distance (C_2): 20 Pad/Ground Elevation at Receiver: 0 Receiver Elevation[1]: 5 Base of Barrier Elevation: 0 Starting Barrier Height 6

Barrier Effectiveness

Top of Barrier Elevation (ft)	Barrier Height (ft)	Insertion Loss, dB	Noise Level, dB	Barrier Breaks Line of Site to Source?
6	6	-5	51	Yes
7	7	-6	50	Yes
8	8	-7	49	Yes
9	9	-8	48	Yes
10	10	-9	47	Yes
11	11	-10	46	Yes
12	12	-11	45	Yes
13	13	-12	44	Yes
14	14	-12	43	Yes
15	15	-13	43	Yes
16	16	-14	42	Yes

Notes: [1] Standard receiver elevation is five feet above grade/pad elevations at the receiver location(s)



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Appendix E

Transportation Analysis

North Manteca Annexation #1 –

Transportation Analysis Report

Prepared for:
De Novo Planning Group
City of Manteca

June 1, 2022

RS21-4072

FEHR PEERS

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1. Introduction

This study addresses the potential transportation impacts associated with the proposed North Manteca Annexation #1 project located in the City of Manteca. Vehicle miles traveled, intersection operations, site access, and access to bicycle, pedestrian and transit facilities are analyzed. This report documents the methodologies, inputs, and results of the analysis.

1.1 Project Site Defined

The project site encompasses approximately 202.81 acres north of the City of Manteca city boundary, within the City's Sphere of Influence. The project site is located on the west side of State Route 99 (SR 99) and east of Union Road. The project site includes several distinct planning boundaries which are cumulatively described as the "Annexation Area". The specific planning boundaries that make up the Annexation Area are described below:

- **Annexation Area** – includes the whole of the Project site (approximately 202.81 acres), including the approximate 175.67-acre Development Area, the approximate 27.14-acre Non-Development Areas, and all public right-of-way along Union Road fronting the Development and Non-Development Areas.
- **Development Area** – includes the parcels being annexed that will be entitled for subdivision and development. This includes the Union Ranch North Project Area (Subdivision 1) and the Stagecoach at M&E Project Area (Subdivision 2).
- **Non-Development Area** – Includes the parcels being annexed that will not be entitled for subdivision or development. This includes three separate areas, each described as an Annexation SubArea. The three areas total (27.14 acres) and are further defined below:
    - Annexation SubArea 1 – 9.82 acres
    - Annexation SubArea 2 – 6.04 acres
    - Annexation SubArea 3 – 11.28 acres

Figure 1 shows the location of the project site and the distinct planning boundaries. Although the project site includes non-development areas and existing right-of-way, this traffic analysis only analyzes impacts of the proposed Development Area, as no development is currently proposed in the Non-Development Areas or the right-of-way annexation area.

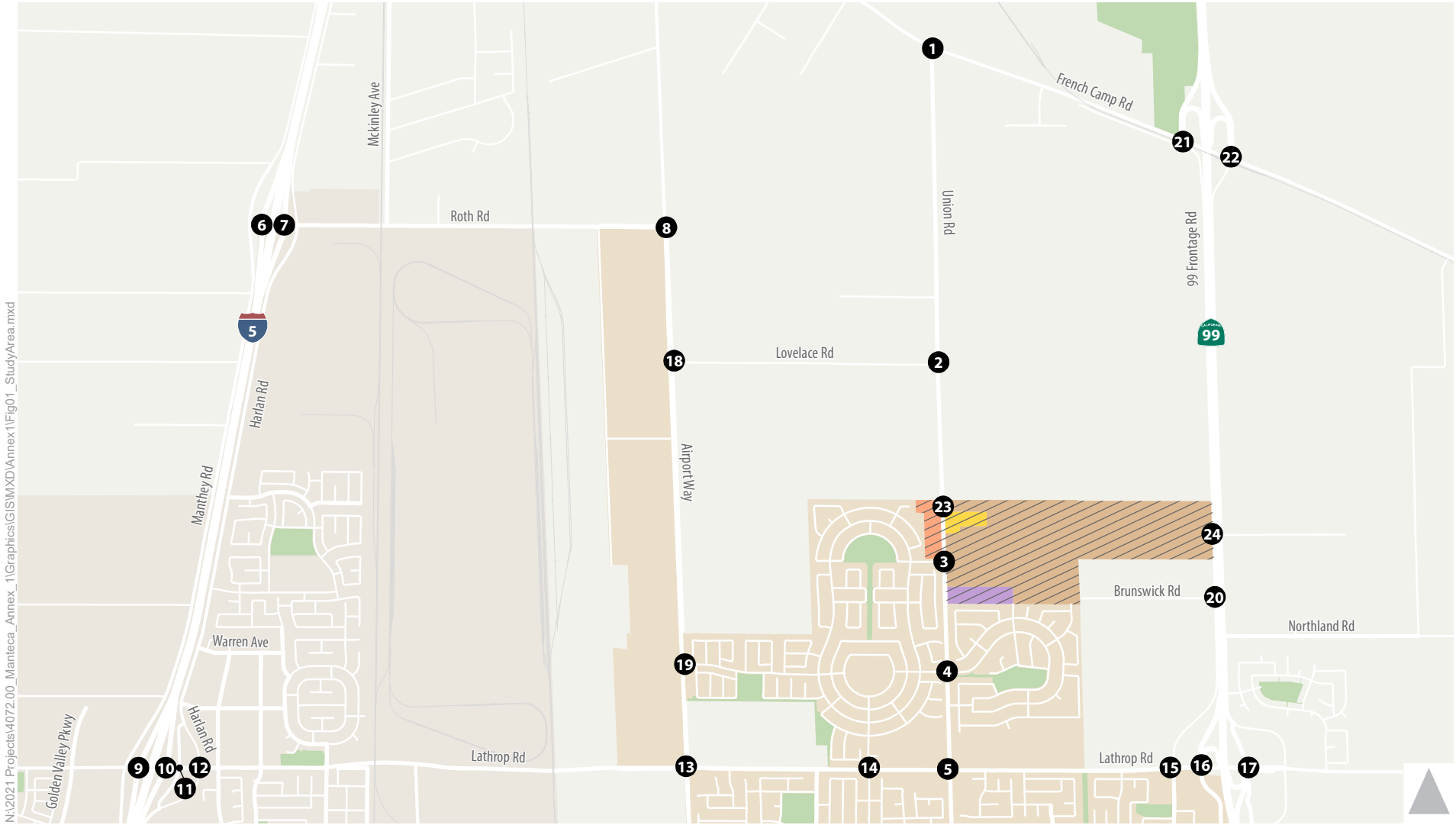


Figure 1

Study Area

1.2 Development Area Description

The Development Area will ultimately be consisted of two separate but geographically linked subdivision projects as described below:

- **Union Ranch North** – includes seven parcels totaling 106.04 acres intended for the development of 410 single family residential units, 200 multi-family residential units, and a community park. Primary access to the development would be provided by one full access intersection on Union Road (Union Road/Shady Pines Street). Secondary access would be provided by one right-in/right/out intersection on Union Road (Union Road/Duluth Way). The median will extend across the access point.

- **Stagecoach At M&E** – includes two parcels totaling 69.93 acres intended for the development of 305 single family residential units and a community park. Primary access to the subdivision would be provided by the continuation of Shady Pines Street on the west and one full access intersection on SR 99 Frontage Road (SR 99 Frontage Road/Shady Pines Street) on the east.

The Development Area will also include a 3.45-acre continuation of the existing Tidewater Bikeway, located between the two subdivisions described above.

1.3 Study Area

The study area was selected based on the development project's location, site access, and expected trip distribution and assignment. The analysis considers traffic operations at the following intersections, which are displayed on Figure 1.

Study Intersections

1. Union Road/French Camp Road
2. Union Road/Lovelace Road
3. Union Road/Shady Pines Street
4. Union Road/Del Webb Boulevard/Clearwater Creek Boulevard
5. Union Road/Lathrop Road
6. Roth Road/I-5 Southbound (SB) Ramps
7. Roth Road/I-5 Northbound (NB) Ramps
8. Roth Road/Airport Way
9. Lathrop Road/I-5 SB Ramps
10. Lathrop Road/I-5 NB Ramps
11. Lathrop Road/Old Harlan Road
12. Lathrop Road/Harlan Road
13. Lathrop Road/Airport Way
14. Lathrop Road/Madison Grove Drive
15. Lathrop Road/SR 99 Frontage Road

16. Lathrop Road/SR 99 SB Ramps/Main Street
17. Lathrop Road/SR 99 NB Ramps
18. Airport Way/Lovelace Road
19. Airport Way/Daisywood Drive
20. SR 99 Frontage Road/Brunswick Road
21. French Camp Road/SR 99 SB Ramps/SR 99 Frontage Road
22. French Camp Road/SR 99 NB Ramps/SR 99 Frontage Road

1.4 Study Scenarios

The study intersections were evaluated for the following four scenarios:

- **Existing Conditions** – Analyzes operations as they exist today.

- **Existing Plus Project Conditions** – Analyzes existing operations with the addition of trips generated by the Project.

- **Cumulative No Project Conditions** - Analyzes cumulative year (2040) volumes based on the City of Manteca, Lathrop, and Ripon Travel Forecasting Model, assuming the Development Area remains in its current undeveloped state.

- **Cumulative Plus Project Conditions** – Analyzes cumulative year volumes with the addition of trips generated by the Project.

It should be noted that the Existing Plus Project Conditions and Cumulative Plus Project Conditions include both the proposed North Manteca Annexation #1 project and the proposed North Manteca Annexation #2 project. The North Manteca Annexation #2 project is located north of the Annexation #1 project site. The Annexation #2 project proposes 560 single family residential units and 22.13 acres of Business Industrial Park that will be developed at the same time as the Annexation #1 project. Both projects are included in the With Project Conditions analyses in order to capture the interaction of project trips and VMT between these two projects. A separate Transportation Analysis Report is prepared for the Annexation #2 project.

2. Significance Criteria and Analysis Methodology

This chapter describes the significance criteria used to evaluate project impacts and the methodology used to analyze the study intersections described above, to develop traffic forecasts for study intersections, and to complete the vehicle miles traveled analysis.

2.1 Applicable Policies and Significance Criteria

Vehicle Miles Traveled

Senate Bill (SB) 743 was signed into law in 2013 and is leading to substantial changes in the way transportation impact analyses are being prepared. Notably, it precludes the use of level of service (LOS) to identify significant transportation impacts in CEQA documents for land use projects, recommending instead that VMT be used as the preferred metric. On December 28, 2018, the CEQA Guidelines were amended to add Section 15064.3, Determining the Significance of Transportation Impacts, which states that generally, VMT is the most appropriate measure of transportation impacts. According to 15064.3(a), "Except as provided in subdivision (b)(2) (regarding roadway capacity), a project's effect on automobile delay shall not constitute a significant environmental impact." Beginning on July 1, 2020, the provisions of 15064.3 applied statewide.

To aid lead agencies with SB 743 implementation, OPR produced the *Technical Advisory on Evaluating Transportation Impacts in CEQA* (December 2018).[1] The *Technical Advisory* helps lead agencies think about the variety of implementation questions they face with respect to shifting to a VMT metric. However, the guidance is not a recipe for SB 743 implementation; lead agencies must still make their own specific decisions about methodology, thresholds, and mitigation.

In July 2021, Fehr & Peers prepared the *Senate Bill 743 Implementation for the City of Manteca Memorandum* (SB 743 Memorandum) and submitted to City of Manteca. The SB 743 Memorandum identifies the thresholds of significance for VMT that Manteca may apply when analyzing the transportation impacts of land use projects that are subject to CEQA. The City of Manteca is in process of reviewing and finalizing the final thresholds. For the purpose of this study, methodology and thresholds identified in the SB 743 Memorandum will be applied.

The SB 743 Memorandum identifies "screening thresholds" to identify when a project should be expected to cause a less-than-significant impact without conducting a detailed study, consistent with guidance in the *Technical Advisory*, The SB 743 Memorandum suggests that projects meeting one or more of the following criteria should be expected to have a less-than-significant impact on VMT.

[1] http://opr.ca.gov/docs/20190122-743_Technical_Advisory.pdf

- Small projects – projects consistent with the General Plan and Regional Transportation Plan/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 (i.e., a corridor with fixed route bus services with service intervals no longer than 15 minutes during peak commute hours).
- Redevelopment Projects –redevelopment projects that lead to a net overall decrease in VMT (when compared against the VMT of the existing land uses).
- 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 SB 743 Memorandum identifies the recommended numeric VMT thresholds for residential projects. Based on the VMT thresholds, a residential project would result in a less-than-significant transportation impact if:

- Under existing (baseline) conditions, the residential development would generate home-based VMT per dwelling unit equal or below 85 percent of the existing (baseline) City of Manteca average for the same housing category (single family, multi-family, or age-restricted); AND
- Under cumulative conditions, the residential development would generate home-based VMT per dwelling equal or below 85 percent of the cumulative City of Manteca average for the same housing category (single family, multi-family, or age-restricted).

Alternatively, the project would result in a less-than-significant transportation impact if:

- The residential development would cause the total VMT in the model area to decrease under baseline AND cumulative conditions.

The Travel Demand Forecasting model developed for the City of Manteca General Plan Update was used to develop baseline (2019) and cumulative (2040) VMT per single family residential household and multi-family residential household.

Level of Service

As previously noted, level of service (LOS) may no longer be used to identify significant transportation impacts in CEQA documents for land use projects. However, this analysis includes a LOS analysis to determine if the proposed project would result in deficient intersection operations per the City of Manteca standards. Policy C-P-2 of the 2023 General Plan strives for LOS D or better while LOS E or worse is considered deficient.

2.2 Data Collection

Traffic count data was collected in fall 2021, when school was in session, and weather condition was dry. Intersection turning movement counts were conducted during the AM (7:00 to 9:00) and PM (4:00 to 6:00) peak periods. **Figures 2A through 2C** display the existing intersection turning movement counts at the study intersections.

2.3 Travel Demand Forecasting

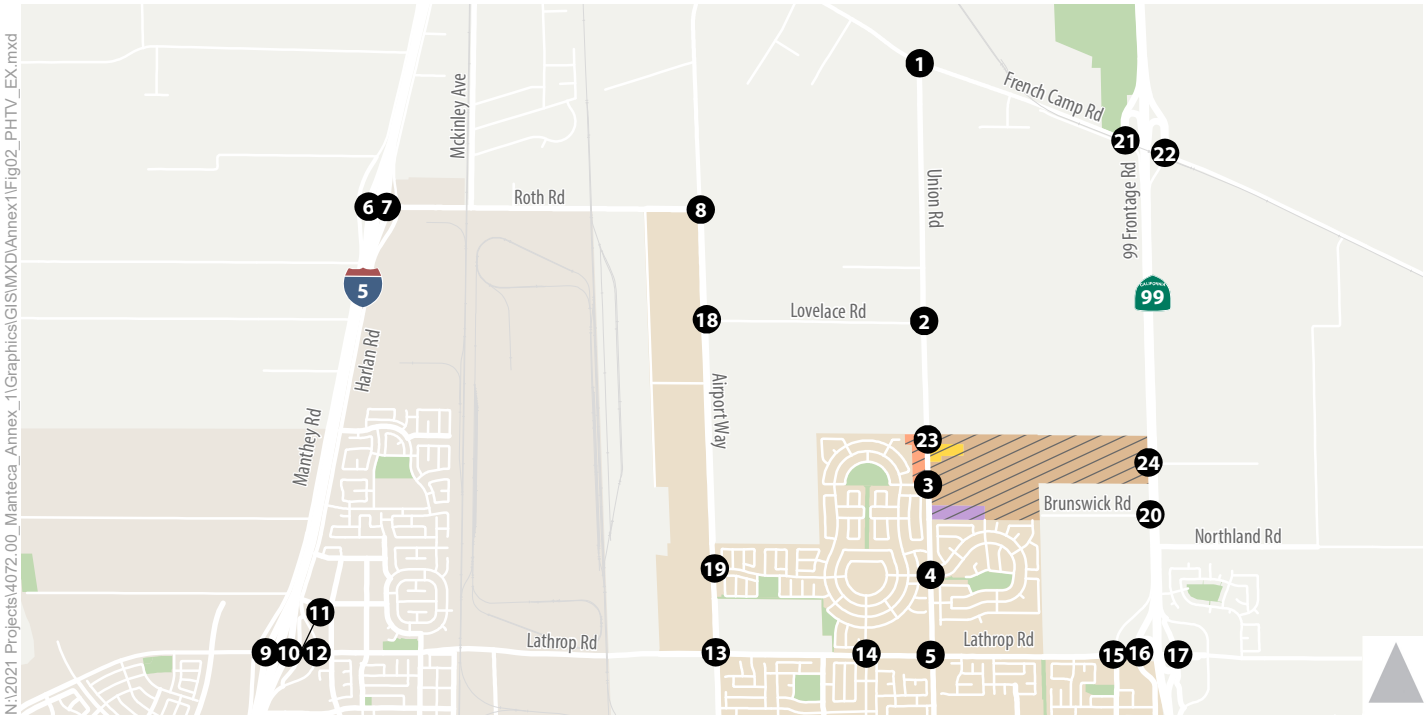
Fehr & Peers recently developed an Interim General Plan Year 2040 TFM for the City of Manteca, encompassing adjacent areas. The City of Manteca, Lathrop, and Ripon Travel Forecasting Model (TFM)is a modified version of the Three-County RTP/SCS Air Quality Conformity Model, but improved all major components of the model. The development of the TFM is described below.

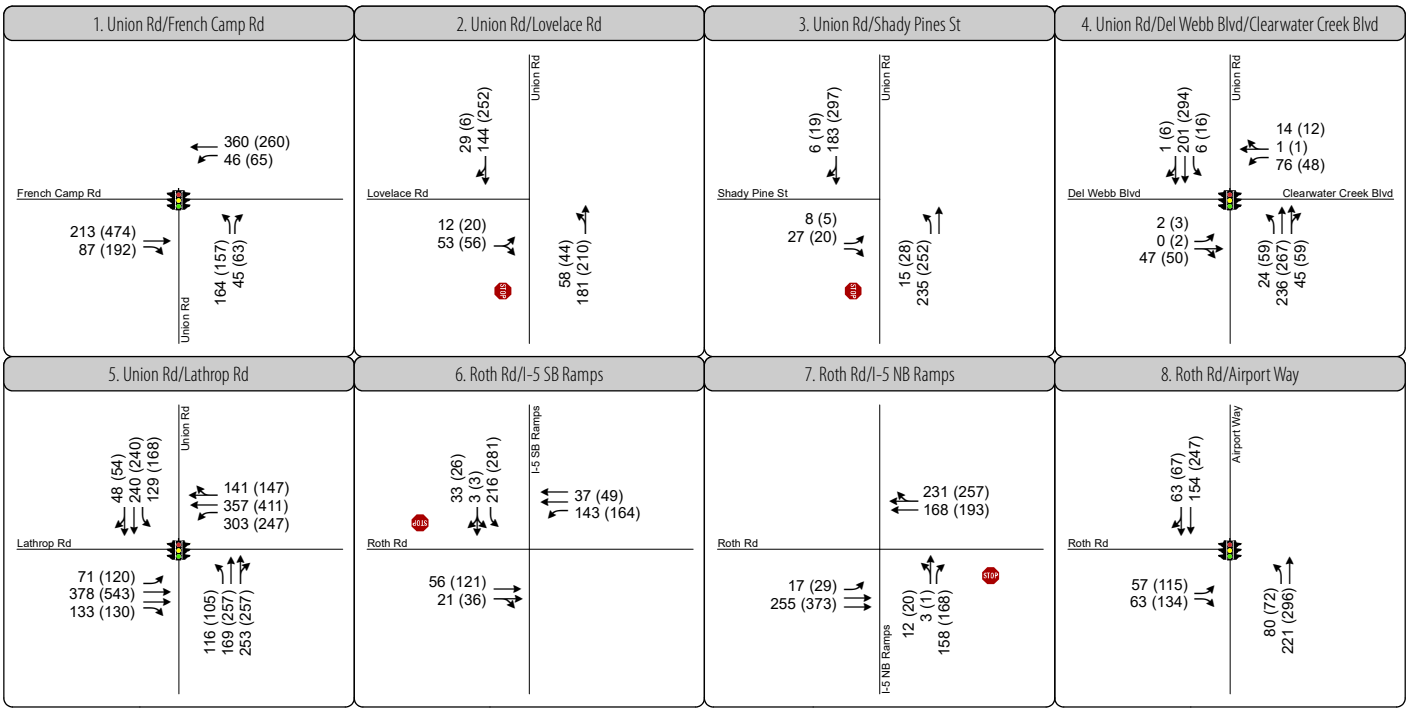
Baseline (Existing) TFM

The Base Year TFM incorporates Base Year land use data for dwelling units (single family and multi-family) and employment (food, retail, office, industrial, medical, government, and school), as well as the roadway network (lanes, speed, capacity class), based on existing (i.e., 2019) data. The TFM Trip generation rates were derived from the Institute of Transportation Engineer's Trip Generation Manual and include appropriate inbound/outbound trip generation rates for residential and employment land uses for AM and PM Peak Hour Conditions. The TFM was calibrated to reflect more accurate trip distribution for Internal-to-Internal Trips, Internal-to-External Trips, External-to-Internal Trips and External-to-External (i.e., Through) Trips based on a combination of the Caltrans Household Travel Survey (CHTS), the American Community Survey (ACS), and California Statewide Model to replicate the majority of vehicle trips to and from the west (San Francisco Bay Area) and a smaller percentage to and from the north (including Stockton and Sacramento) and lastly to and from the south.

Interim General Plan Year 2040 Model

The Cumulative Year 2040 TFM was developed based on expected future land use and transportation network for the City of Manteca and adjacent areas in 2040. Similar to other cities in the Central Valley region, the City of Manteca is projecting large amount of growth for both housing and employment in the next 20 years. The Cumulative Year 2040 model scenario was developed in coordination with both Manteca and Lathrop to ensure that the TFM represents market-based demand for future growth in both housing (population) and employment, and therefore does not underestimate or overestimate traffic demand volumes. The City of Manteca 2040 land use inputs were developed based on the City of Manteca's approved and anticipated projects that will be constructed and occupied by year 2040. The City of Lathrop 2040 land use inputs were developed based on the City's historic rate of growth in households and employment for the past 5 years (2016 to 2020). The location of the growth was allocated across the city where future growth is anticipated, including the area west of I-5 and along the SR 120 corridor.

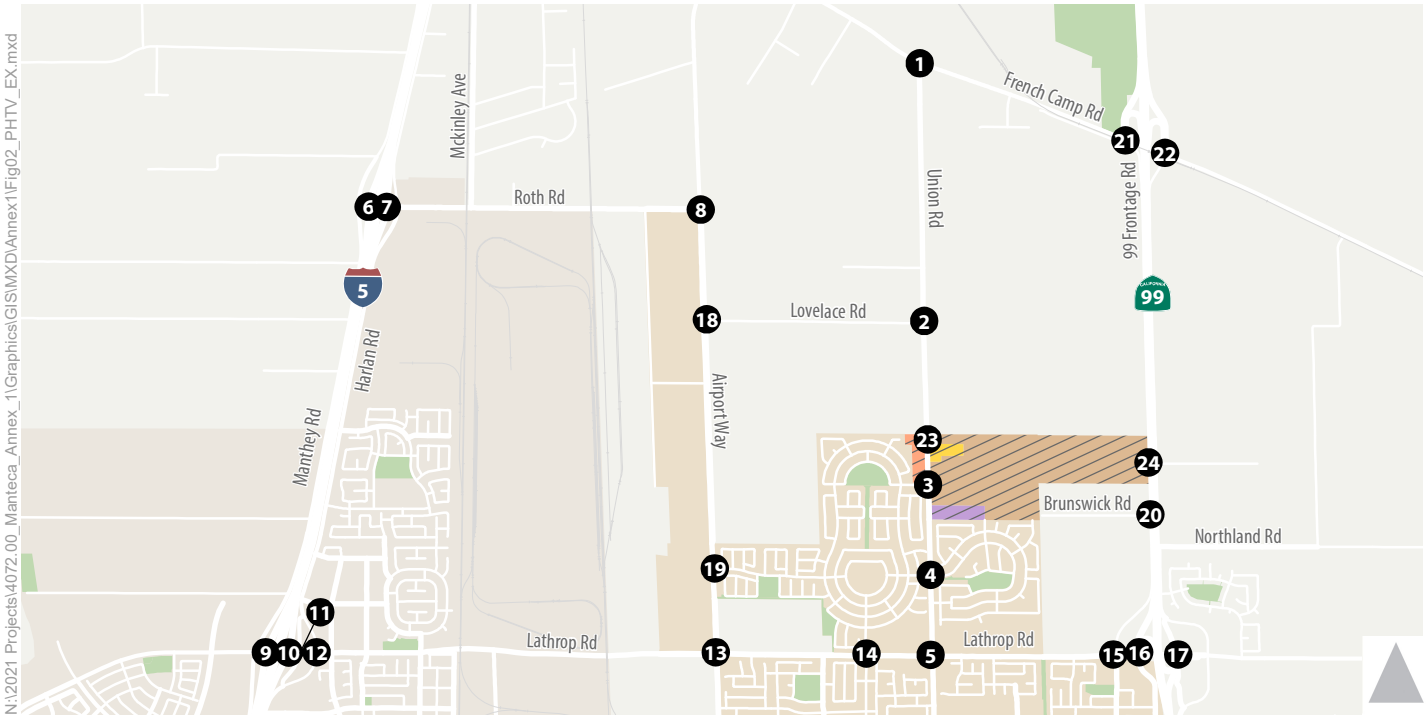


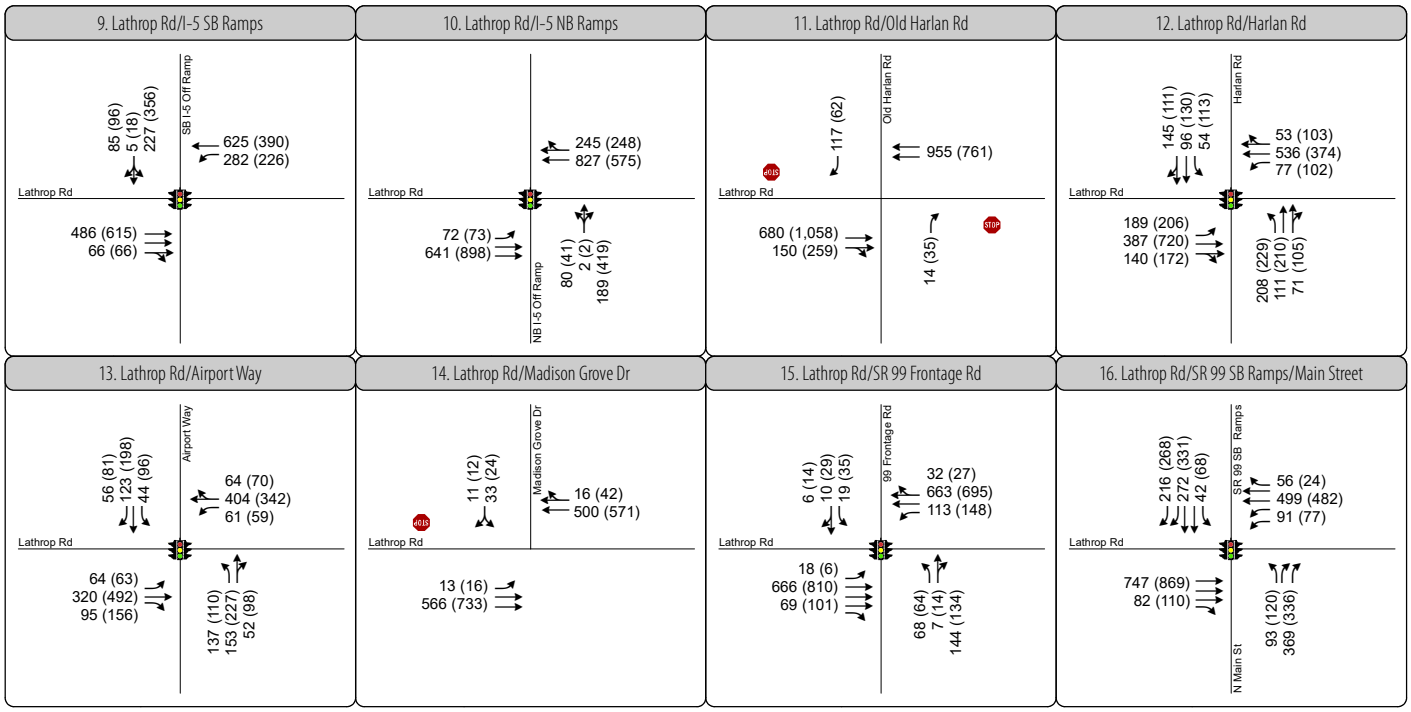


Turn Lane
AM (PM) Peak Hour Traffic Volume
Traffic Signal
Stop Sign
Study Intersection
Annexation 1 Area
Lathrop City Limits
Manteca City Limits
Development Area
Non-Development Area 1
Non-Development Area 2
Non-Development Area 3

Figure 2a

Peak Hour Traffic Volumes and Lane Configurations - Existing Conditions

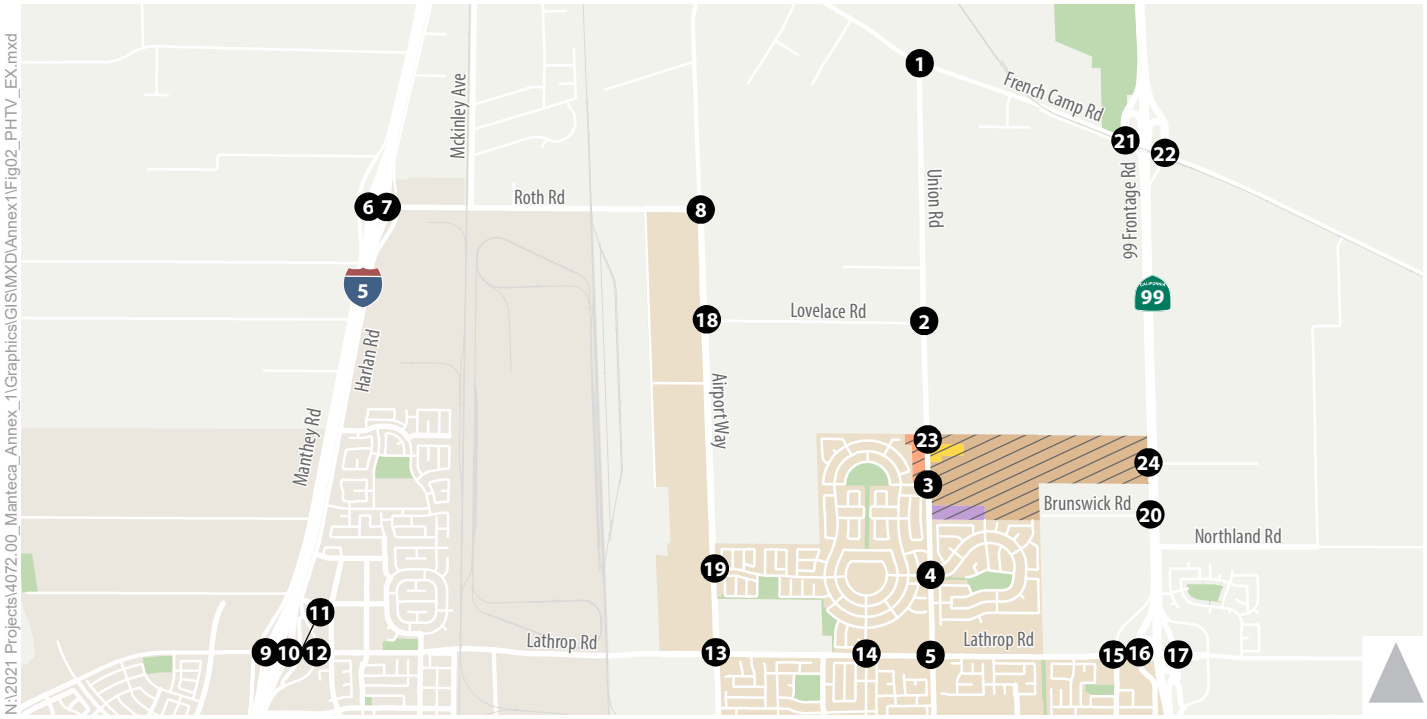


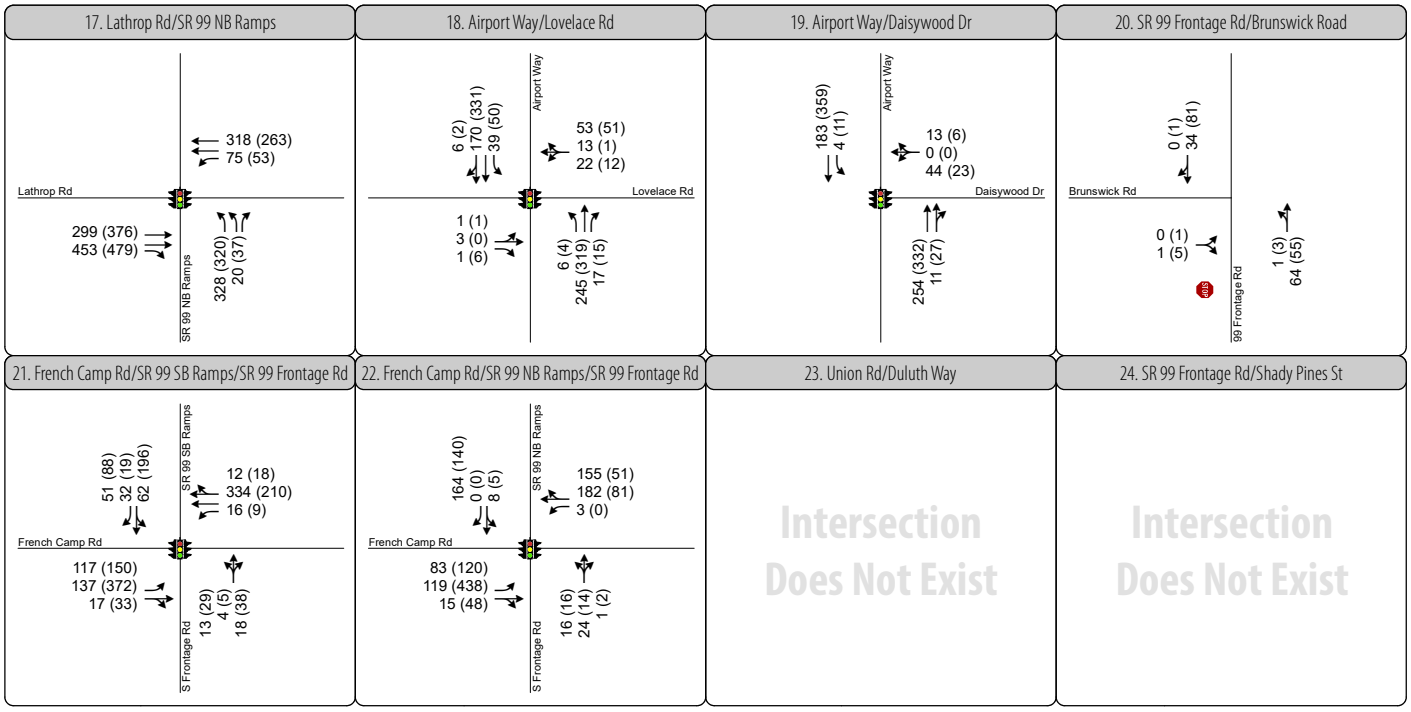


Turn Lane
AM (PM) Peak Hour Traffic Volume
Traffic Signal
Stop Sign
Study Intersection
Annexation 1 Area
Lathrop City Limits
Manteca City Limits
Development Area
Non-Development Area 1
Non-Development Area 2
Non-Development Area 3

Figure 2b

Peak Hour Traffic Volumes and Lane Configurations - Existing Conditions





Turn Lane
AM (PM) Peak Hour Traffic Volume
Traffic Signal
Stop Sign
Study Intersection
Annexation 1 Area
Lathrop City Limits
Manteca City Limits
Development Area
Non-Development Area 1
Non-Development Area 2
Non-Development Area 3

Figure 2c

Peak Hour Traffic Volumes and Lane Configurations - Existing Conditions

The TFM also includes projects identified in the City of Manteca Public Facilities Implementation Plan (PFIP) and the San Joaquin Council of Government (SJCOG) Regional Transportation Plan/Sustainable Communities Strategy (RTP/SCS) Project List for:

- Mainline Highway Improvements (Table 6-1 from SJCOG RTP);
- Interchange Improvements (Table 6-1 from SJCOG RTP); and
- Regional Roadway Improvements (Table 6-3 from SJCOG RTP).

The Base Year and Cumulative Year 2040 TFM was updated to detail out the street system in and near the Project site. The Base Year Plus Project and Cumulative Plus Project scenarios of the model incorporate the proposed residential developments.

The traffic forecasting adjustment procedure known as the "difference method" was used to develop Cumulative Year (2040) AM and PM Peak Hour traffic forecasts. For a given intersection, this forecasting procedure is calculated as follows for every movement at the study intersections:

Cumulative Year Forecast =
Existing Volume + (Cumulative Year TFM Volume – Base Year TFM Volume)

In addition to developing intersection turning movement forecasts, the Base Year and Cumulative Year scenarios were used to develop trip distribution for Existing Plus Project and Cumulative Plus Project Conditions.

2.4 VMT Analysis Methodology

As previously described, VMT is used as the primary metric for significant transportation impacts. A proposed residential development would result in a significant transportation impact if it would 1). generate vehicle travel exceeding 85 percent of the established baseline VMT under existing (baseline) or cumulative conditions, or 2). result in an increase in total VMT in the model area. This section describes the methodology used for the Baseline and Cumulative Vehicle Miles Traveled (VMT) Analysis.

VMT Defined

To help explain the different forms of VMT in **Table 1** a basic lexicon and accompanying visual representation is provided below. These metrics are directly related to how land use and transportation infrastructure influence future vehicle travel.

Table 1: Vehicle Miles Traveled Lexicon		
Home-Based VMT per Resident	• All automobile (i.e., passenger cars and light-duty trucks) vehicle-trips are traced back to the residence of the trip-maker. Non-home-based trips are excluded	
Total VMT in the model area	• All vehicle-trips (i.e., passenger and commercial vehicles) assigned on the network within a specific geographic boundary (i.e., model-wide). Vehicle volume on each link is multiplied by link distance.	

Baseline (Existing) TFM

The Base Year TFM developed for the General Plan Update was used to develop Baseline Average Weekday Daily home-based VMT per single family household and Baseline Average Weekday Daily home-based VMT per multi-family household. The Base Year TFM was also used to develop trip distribution under Existing Plus Project Conditions. The Base Year model represents 2019/2020 Pre-COVID AM peak hour, PM peak hour, and Average Daily Traffic conditions.

Baseline home-based VMT was calculated by taking the total home-based VMT generated by all households of the same housing category (single family, multi-family, or age-restricted) in the City of Manteca and dividing it by the total number of households in the respective housing category.

Interim General Plan Year 2040 Model

The Cumulative Year 2040 TFM was used to estimate the Development Area's Cumulative Average Weekday Daily VMT.

Cumulative City of Manteca average home-based VMT was calculated by taking the total home-based VMT generated by all households of the same housing category (single family, multi-family, or age-

restricted) in the City of Manteca under Cumulative Conditions and dividing it by the total number of households in the respective housing category under Cumulative Conditions.

2.5 Intersection Analysis

Study intersections were analyzed using procedures and methodologies contained in the *Highway Capacity Manual – 6th Edition* (Transportation Research Board, 2016). These methodologies were applied using Synchro 11 software which considers traffic volumes, lane configurations, signal timings, signal coordination, and other pertinent parameters of intersection operations.

Level of Service Definition

Study intersections were analyzed using the concept of Level of Service (LOS). LOS is a qualitative measure of traffic operating conditions whereby a letter grade, from A (the best) to F (the worst), is assigned. These grades represent the perspective of drivers and are an indication of the comfort and convenience associated with driving. In general, LOS A represents free-flow conditions with no congestion, and LOS F represents severe congestion and delay under stop-and-go conditions. For signalized intersections, roundabouts and all way stop control intersections, LOS is based on the average delay experienced by all vehicles passing through the intersection. For side-street stop-controlled intersections, the delay and LOS for the overall intersection is reported along with the delay for the worst-case movement. **Table 2** displays the delay range associated with each LOS category for signalized and unsignalized intersections.

Table 2: Intersection Level of Service (LOS) Criteria			
LOS	**Description (for Signalized Intersections)**	**Average Delay (Seconds/Vehicle) at Signalized Intersections**	**Average Delay (Seconds/Vehicle) at Unsignalized Intersections**
A	Operations with very low delay occurring with favorable traffic signal progression and/or short cycle lengths.	< 10.0	< 10.0
B	Operations with low delay occurring with good progression and/or short cycle lengths.	> 10.0 to 20.0	> 10.0 to 15.0
C	Operations with average delays resulting from fair progression and/or longer cycle lengths. Individual cycle failures begin to appear.	> 20.0 to 35.0	> 15.0 to 25.0
D	Operations with longer delays due to a combination of unfavorable progression, long cycle lengths, or high V/C ratios. Many vehicles stop and individual cycle failures are noticeable.	> 35.0 to 55.0	> 25.0 to 35.0
E	Operations with high delay values indicating poor progression, and long cycle lengths. Individual cycle failures are frequent occurrences. This is considered to be the limit of acceptable delay.	> 55.0 to 80.0	> 35.0 to 50.0
F	Operations with delays unacceptable to most drivers occurring due to over-saturation, poor progression, or very long cycle lengths.	> 80.0	> 50.0
Note: LOS = level of service; V/C ratio = volume-to-capacity ratio Source: Transportation Research Board, 2016			

3. Vehicle Miles Traveled Analysis

3.1 VMT Impact Analysis

The proposed development was evaluated against the screening criteria in the SB 743 Memorandum. The proposed development does not constitute a small project, is not located within ½ mile of an existing major transit stop, and is not a redevelopment project. Therefore, the development is not eligible to be screened out based on these criteria. Furthermore, the SB 743 Memorandum identifies no low VMT areas in Manteca for project screening purposes.

A detailed VMT analysis was conducted using methodology discussed in Chapter 2 of this report. The proposed residential development would result in a significant transportation impact if it would 1). generate vehicle travel exceeding 85 percent of the established baseline VMT under existing (baseline) or cumulative conditions, or 2). result in an increase in total VMT in the model area.

Table 3 presents the established Baseline Citywide VMT and the project generated VMT under existing (baseline) and cumulative conditions.

Table 3: Project Vehicle Miles Traveled Analysis – Project-Generated VMT			
Land Use	**City of Manteca Average VMT**	**Project-Generated VMT**	**Compared to City Average**
Existing (Baseline) Year			
Single Family Households	**103.3** home-based VMT per single family household	**99.5** home-based VMT per single family household	-3.7%
Multi-Family Households	**78.1** home-based VMT per multi-family household	**77.7** home-based VMT per multi-family household	-0.6%
Cumulative Year			
Single Family Households	**100.1** home-based VMT per single family household	**94.8** home-based VMT per single family household	-5.2%
Multi-Family Households	**73.2** home-based VMT per multi-family household	**73.9** home-based VMT per multi-family household	+1.0%
Source: City of Manteca Travel Demand Model - Fehr & Peers, 2021			

As displayed, under Existing Conditions, the proposed development would generate an estimated average of 99.5 home-based VMT per single family household (3.7 percent below the city-wide average), and 77.7 home-based VMT per multi-family household (0.6 percent below the city-wide average).

Under Cumulative Conditions, the proposed development would generate an estimated average of 94.8 home-based VMT per single family household (5.2 percent below the Cumulative city-wide average), and 73.9 home-based VMT per multi-family household (1 percent above the Cumulative city-wide average). The proposed development would generate fewer home-based VMT per single family and multi-family household compared to under Baseline conditions due to the fact that in the Cumulative Year, the number of jobs and the amount of commercial, retail, and recreational development in the City is anticipated to increase and residents would be able to travel shorter distances to access these types of land uses.

Because the development would generate vehicle travel exceeding 15 percent below the established city-wide average under Existing and Cumulative Conditions, this is a **significant** transportation impact.

Table 4 presents the comparison of Total VMT in the model area before and after project.

Table 4: Project Vehicle Miles Traveled Analysis – Model-wide VMT			
Model-Wide VMT Without Project	**Model-Wide VMT With Project**	**Differences**	**Differences as a percentage**
Existing (Baseline) Year			
13,853,921	14,049,346	195,426	+1.4%
Cumulative Year			
20,717,051	20,910,138	193,087	+0.9%
Source: City of Manteca Travel Demand Model - Fehr & Peers, 2021			

As displayed, under Existing Conditions, the proposed development would result in a net increase of 195,426 total VMT in the model area, representing a 1.4% increase in total VMT. Under Cumulative Conditions, the proposed development would result in a net increase of 193,087 total VMT in the model area, representing a 0.9% increase in total VMT.

Because the development would cause the total VMT in the model area to increase under Existing and Cumulative Conditions, this is a **significant** transportation impact.

3.2 Mitigation Measures

The VMT generation of a project is largely dictated by the combination of land use proximity and transportation infrastructure. Transportation Demand Management (TDM) strategies are designed to increase the transportation system efficiency and reduce vehicle demand on the multi-modal transportation system. Common TDM strategies are based on discouraging single-occupancy vehicle travel; encouraging transit, carpooled, and active modes of travel (i.e., bicycling, walking, scooter); shifting travel patterns from congested peak to less congested off-peak hours, and proximity to closer

complimentary destinations. But most importantly, the biggest of effect of TDM strategies on VMT derive from regional policies related to land use location efficiency, jobs/housing/activity balance, and infrastructure investments that support transit, walking, and bicycling. Of these strategies, only a few are likely to be effective in a suburban or rural setting such as the City of Manteca.

In August 2021, the California Air Pollution Control Officers Association (CAPCOA) released the *Draft Handbook for Analyzing Greenhouse Gas (GHG) Emission Reductions, Assessing Climate Vulnerabilities, and Advancing Health and Equity*[2] (GHG Handbook). Mitigation Measure **MM-TRA-1** summarizes transportation measures with VMT-reducing benefits that may be applicable at project or community level in the City of Manteca. However, it should be noted that some of these strategies such as increased land use density or diversity may not be feasible for the project site because it would change the nature of the project.

MM-TRA-1: Implement VMT mitigation options

Potential measures for individual development include, but are not limited to:

- Increase residential density
- Limit residential parking supply
- Unbundle residential parking cost from property cost
- Provide access to transit (Transit Oriented Development)
- Improve street connectivity
- Provide ride-share program
- Implement subsidized or discounted transit program
- Provide end-of-trip bicycle facilities
- Provide community-based travel planning
- Implement market price public on-street parking
- Provide pedestrian network improvement
- Construct or improve bike facility
- Construct or improve bike boulevard
- Expand bikeway network
- Implement conventional or electric carshare program
- Implement pedal or electric bikeshare program
- Implement scooter-share program
- Extend transit network coverage or hours
- Increase transit service frequency
- Implement transit-supportive roadway treatments

[2] http://www.airquality.org/ClimateChange/Documents/Handbook%20Public%20Draft_2021-Aug.pdf

- Reduce transit fares

It should be noted that two recent studies that included an evaluation of VMT per capita trends in California.

- *2018 Progress Report, California's Sustainable Communities and Climate Protection Act*, California Air Resources Board, November 2018[3] (Progress Report).
- *California Air Resources Board Improved Program Measurement Would Help California Work More Strategically to Meet Its Climate Change Goals*, Auditor of the State of California, February 2021[4] (Audit Report).

The Progress Report measures the effect of SB 375 revealing that VMT and GHG per capita increased in California between 2010 and 2016 and are trending upward. The Scoping Plan supports two key observations that are relevant to the findings in this EIR:

The Audit Report is a more recent assessment of California's Air Resources Board GHG reduction programs, which also found that VMT and its associated GHG emissions were trending upward through 2018. Per the Audit Report, the state is not on track to achieve 2030 GHG reduction goals, and emissions from transportation have not been declining as anticipated.

The monitoring of statewide VMT performance noted above indicates that the state needs to take further action to meet its own VMT and GHG reduction goals. Doing so would alleviate the need for further actions by local agencies. To date, the state has not increased the cost of driving, made driving less convenient, or reduced the barriers or constraints that prevent more efficient use of vehicles and greater use of transit, walking, and bicycling.

The City of Manteca can reduce future VMT generation through the TDM actions listed above, especially those related to increasing land use density and increasing multi-modal accessibility to key destinations. However, given the suburban land use context of the City combined with the City's limited ability to influence other measures that would have the largest effect on VMT (such as implementation of a VMT tax or an increase in the fuel tax), the effectiveness of these TDM measures cannot be guaranteed to reduce the project VMT or total VMT impacts to a less-than-significant level. Therefore, the proposed North Manteca Annexation #1 project VMT impact would be **significant and unavoidable**.

In addition to transportation impacts, VMT is one of the many key inputs in quantifying other environmental impacts related to air quality, greenhouse gases, and energy. Analysis and mitigation measures related to each of these topics are discussed in a dedicated chapter in this EIR.

[3] https://ww2.arb.ca.gov/resources/documents/tracking-progress
[4] http://auditor.ca.gov/pdfs/reports/2020-114.pdf

4. Existing Conditions

This chapter presents the existing bicycle, pedestrian, and transit facilities as well as intersection operations under Existing Conditions.

4.1 Existing Bicycle and Pedestrian Facilities

The City of Manteca Active Transportation Plan (adopted September 1, 2020) defines the following bicycle facility types:

Class I Bikeway: Bike Path

Bike paths, often referred to as shared-use paths or trails, are off-street facilities that provide exclusive use for non-motorized travel, including bicyclists and pedestrians. Bike paths have minimal cross flow with motorists and are typically located along landscaped corridors.

Class II Bikeway: Bike Lane

Class II bike lanes are on-street facilities that use striping, stencils, and signage to denote preferential or exclusive use by bicyclists. On-street bike lanes are located adjacent to motor vehicle traffic.

Class III Bikeway: Bike Route

Class III bike routes are streets with signage and optional pavement markings where bicyclists travel on the shoulder or share a lane with motor vehicles. Class III bike routes are utilized on low-speed and low-volume streets to connect bike lanes or paths along corridors that do not provide enough space for dedicated lanes.

Class III Bikeway: Bicycle Boulevard

Class III bicycle boulevards are similar to Class III bike routes, in that they are primarily utilized on low-speed and low-volume streets, and can close important gaps in the bicycle network where there may be insufficient space for dedicated lanes. Bicycle boulevards provide further enhancements to bike routes to encourage slow speeds and discourage non-local vehicle traffic via traffic diverters, chicanes, traffic circles, and/or speed tables.

Class IV Bikeway: Separated Bikeway

Class IV separated bikeways, commonly known as cycle tracks, are physically separated bicycle facilities that are distinct from the sidewalk and designed for exclusive use by bicyclists. They are located within the street right-of-way, but provide comfort similar to Class I bike paths.

Figure 3 presents the existing bicycle and pedestrian network in the study area. As displayed, sidewalks are present along Union Road south of Shady Pines Street, adjacent to residential subdivisions and along internal roadways within those subdivisions. The Tidewater Bikeway, a north-south Class I bike path that runs through residential areas between Union Road and SR 99, terminates just south of the Development Area. An east-west Class I bicycle and pedestrian path runs through the residential subdivision south of the Development Area and connects with the Tidewater Bikeway.

4.2 Existing Transit Facilities

Figure 4 presents the existing transit network in the study area. Manteca Transit operates a fixed-route and Dial-a-Ride bus service with stops throughout the City. The nearest bus stop is the Route 3 stop located at the intersection of Union Road and Lathrop Road, less than one mile from the Development Area. Route 3 provides weekday fixed route service. In addition to Manteca Transit, the San Joaquin Regional Transportation District provides both weekday and weekend service to the City.

4.3 Existing Intersection Operations

Table 5 displays the existing AM and PM peak hour operations at the study intersections. Traffic associated with the existing residential properties located in Non-Development Areas are included in the existing traffic counts and corresponding Existing Conditions analysis. Technical calculations are displayed in **Appendix A**. As displayed, all intersections operate acceptably at LOS A through D during both the AM and PM peak hour.

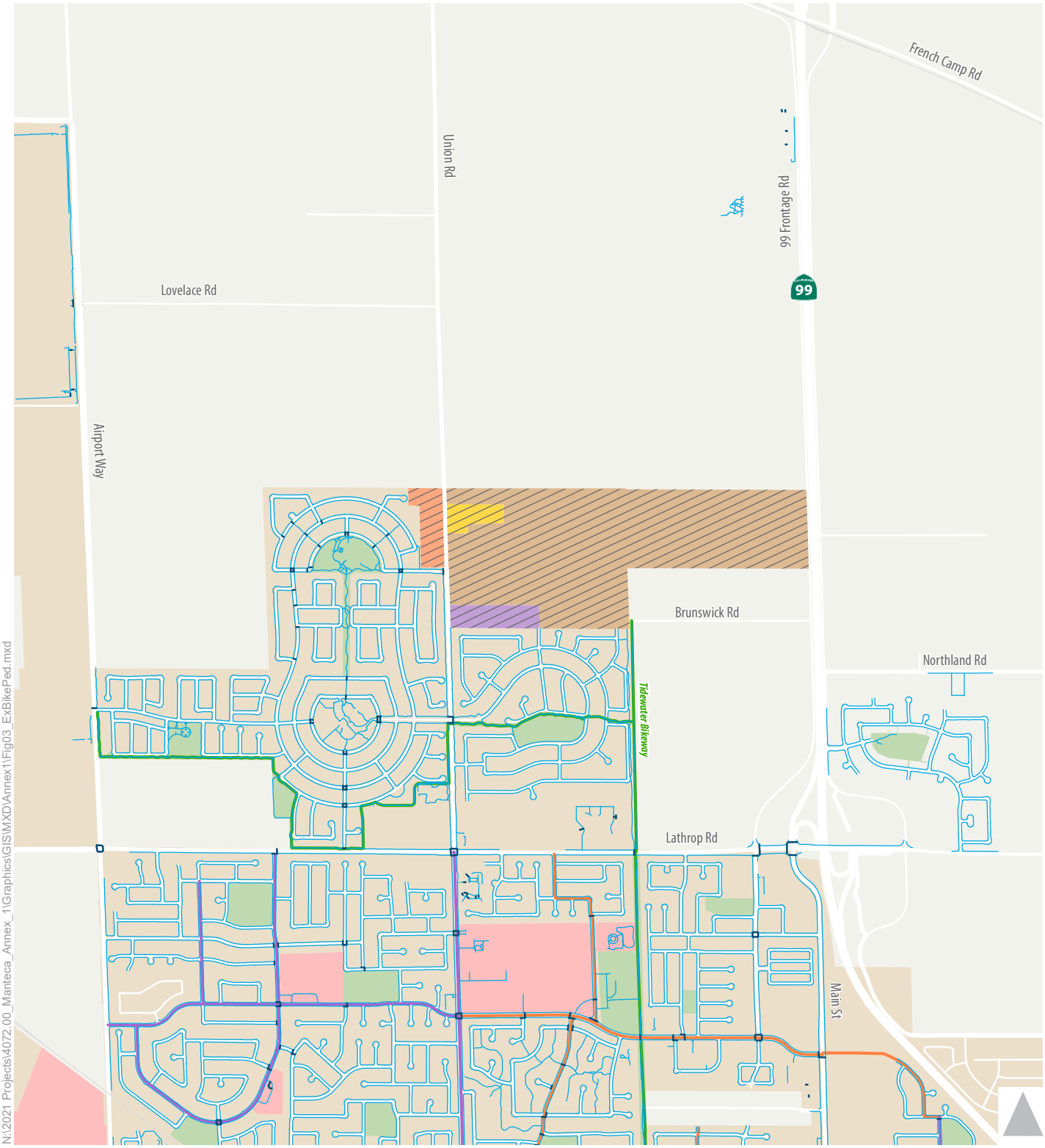


Figure 3

Existing Bicycle and Pedestrian Facilities

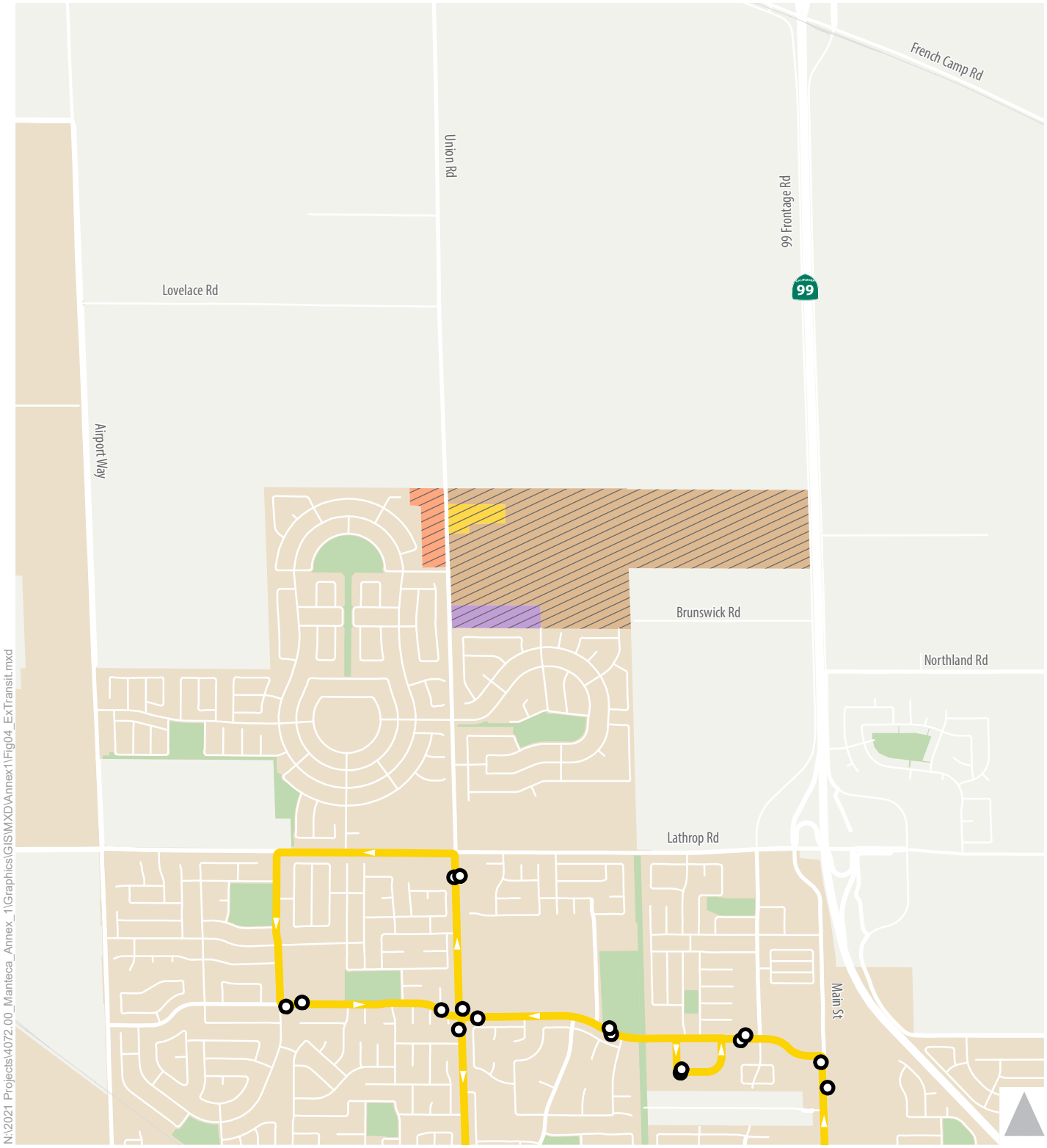


Figure 4

Existing Transit Facilities

Table 5: Intersection Operations – Existing Conditions					
Intersection	Control Type	AM Peak Hour		PM Peak Hour	
		Delay[1]	LOS	Delay[1]	LOS
1. Union Road/French Camp Road	Signal	13.0	B	15.1	B
2. Union Road/Lovelace Road	SSSC	2.4 (10.4)	A (B)	2.1 (11.9)	A (B)
3. Union Road/Shady Pines Street	SSSC	1 (12.3)	A (B)	<1 (14.2)	A (B)
4. Union Road/Del Webb Boulevard/Clearwater Creek Boulevard	Signal	12.6	B	12.4	B
5. Union Road/Lathrop Road	Signal	31.7	C	30.8	C
6. Roth Road/I-5 SB Ramps	SSSC	10.5 (18.5)	B (C)	10.9 (22.1)	B (C)
7. Roth Road/I-5 NB Ramps	SSSC	3.4 (13.1)	A (B)	3.2 (15.7)	A (C)
8. Roth Road/Airport Way	Signal	12.0	B	13.1	B
9. Lathrop Road/I-5 SB Ramps	Signal	14.4	B	17.8	B
10. Lathrop Road/I-5 NB Ramps	Signal	13.1	B	17.4	B
11. Lathrop Road/Old Harlan Road	SSSC	1.0 (15.5)	A (C)	<1 (16.3)	A (C)
12. Lathrop Road/Harlan Road	Signal	34.4	C	37.7	D
13. Lathrop Road/Airport Way	Signal	26.6	C	27.0	C
14. Lathrop Road/Madison Grove Drive	SSSC	<1 (19.9)	A (C)	<1 (19.7)	A (C)
15. Lathrop Road/SR 99 Frontage Road	Signal	13.7	B	14.0	B
16. Lathrop Road/SR 99 SB Ramps/Main Street	Signal	21.1	C	24.0	C
17. Lathrop Road/SR 99 NB Ramps	Signal	10.1	B	9.9	A
18. Airport Way/Lovelace Road	Signal	9.7	A	9.0	A
19. Airport Way/Daisywood Drive	Signal	6.7	A	5.8	A
20. SR 99 Frontage Road/Brunswick Road	SSSC	<1 (8.6)	A (A)	<1 (8.9)	A (A)
21. French Camp Road/SR 99 SB Ramps/SR 99 Frontage Road	Signal	22.5	C	28.1	C
22. French Camp Road/SR 99 NB Ramps/SR 99 Frontage Road	Signal	24.6	C	17.3	B

Notes:
SSSC = Side-Street Stop Control; LOS = Level of Service
[1] For signalized intersections and all-way stop controlled intersections, average intersection delay is reported in seconds per vehicle for all approaches. For side street stop-controlled intersections, intersection delay is reported in seconds per vehicle for the overall intersection and (worst-case) movement. Intersection delay is calculated based on the procedures and methodology contained in the Highway Capacity Manual 6th Edition (Transportation Research Board, 2016).
Source: Fehr & Peers, 2021

5. Existing Plus Project Conditions

This chapter presents the results of intersection operations analysis under Existing Plus Project Conditions.

5.1 Project Trip Generation

Project trips generated by the Development Area were estimated using trip rates published in the *Trip Generation Manual 11th Edition* (Institute of Transportation Engineers, 2021). **Table 6** displays the estimated number of daily, AM peak hour, and PM peak hour vehicle trips for the proposed development project.

Table 6: Project Trip Generation

Land Use	Quantity	Daily	AM Peak			PM Peak		
			In	Out	Total	In	Out	Total
Single Family Detached Housing (ITE 210)	715 Dwelling Units	6,742	130	371	501	423	249	672
Multi-Family Housing (ITE 220)	200 Dwelling Units	1,348	19	61	80	64	38	102
Total		**8,090**	**149**	**432**	**581**	**487**	**287**	**774**

Notes:
Trip generation is based on trip rates published in *Trip Generation Manuel 11th Edition* (Institute of Transportation Engineers, 2021).
Source: Fehr & Peers, 2021

5.2 Project Trip Distribution

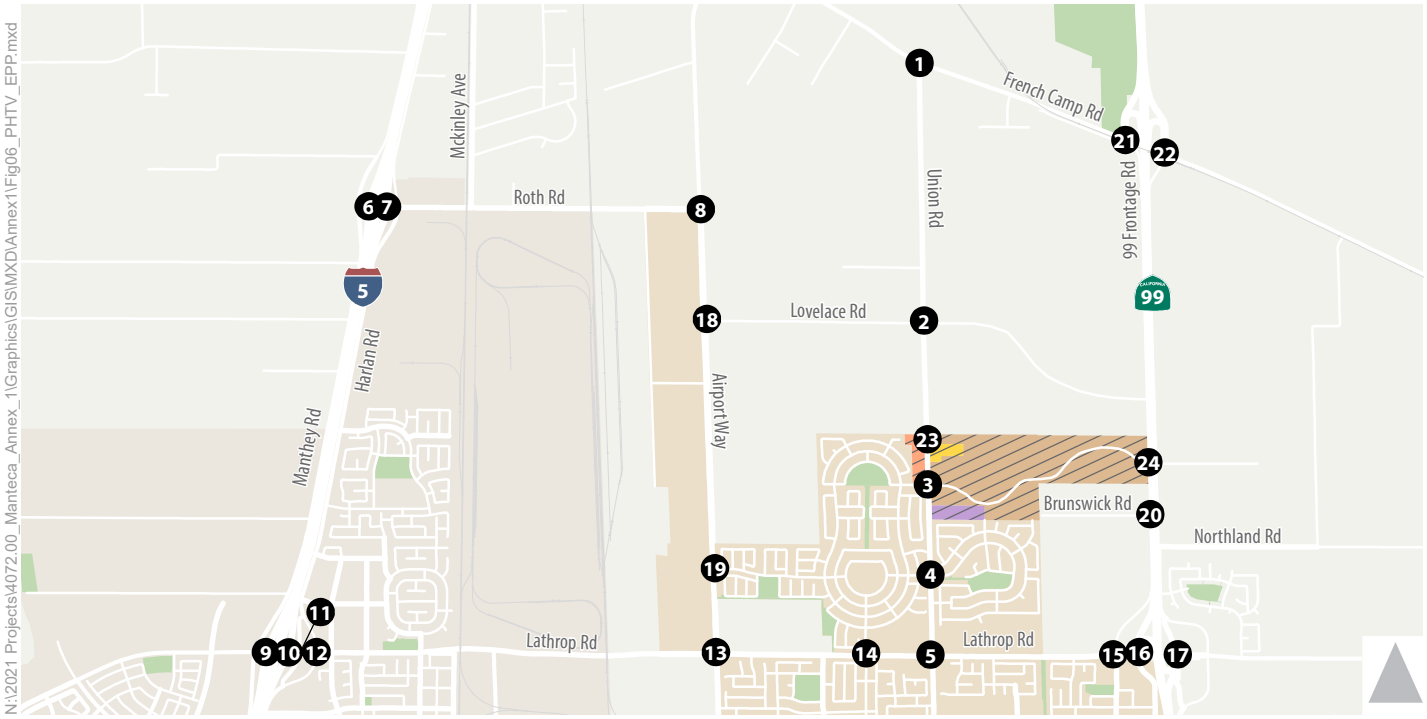
Project trips were distributed throughout the study area based the location of project access roads, existing directional patterns, and output from the base year TFM. **Figure 5** presents the trip distribution under Existing Plus Project Conditions. **Figures 6A through 6C** display the traffic volumes under Existing Plus Project Conditions.

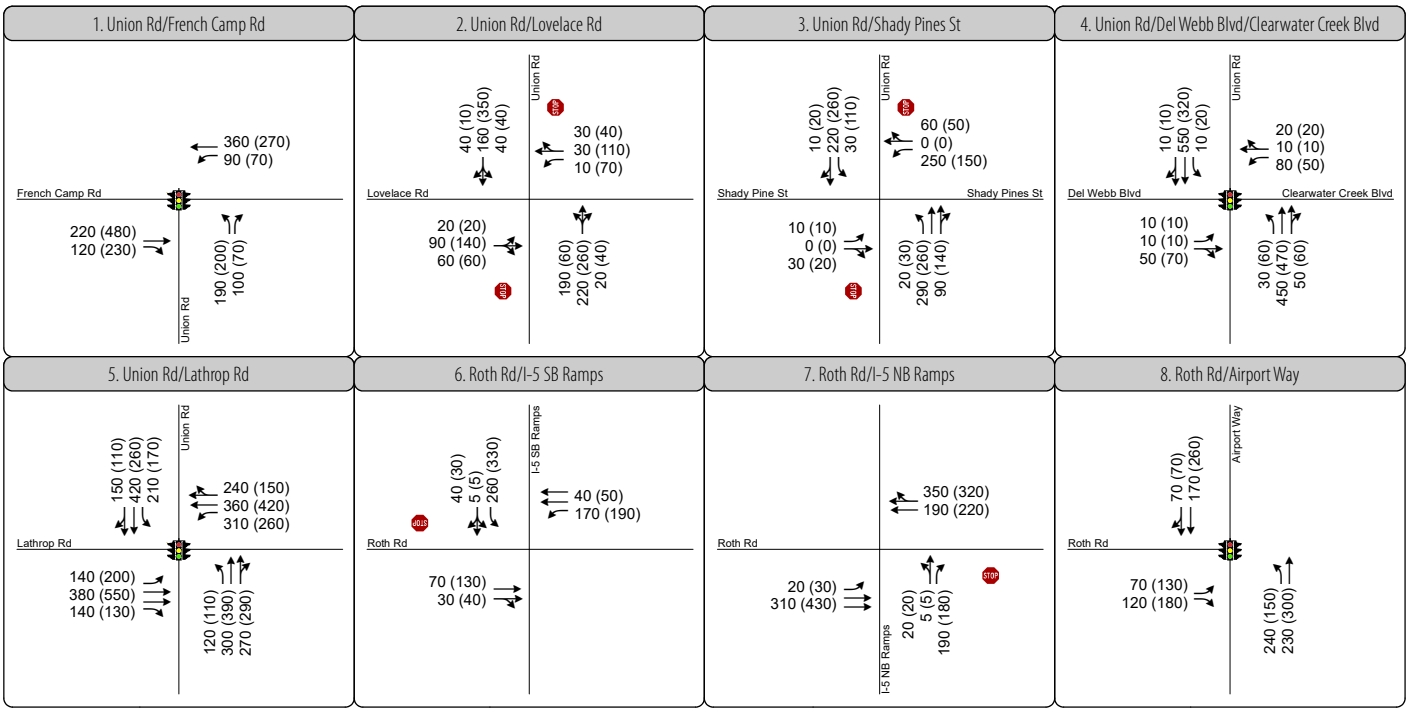


XX% Trip Distribution Percentage

Figure 5

Existing Plus Project Trip Distribution

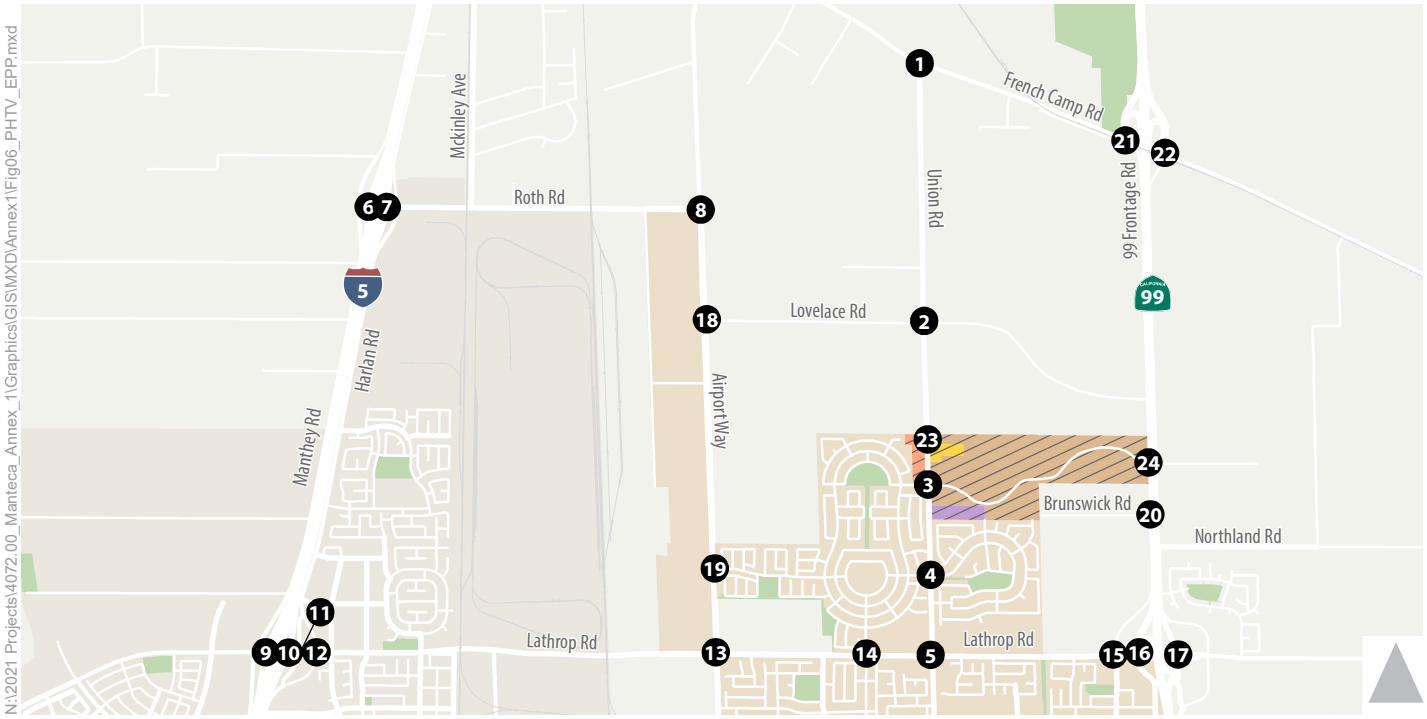


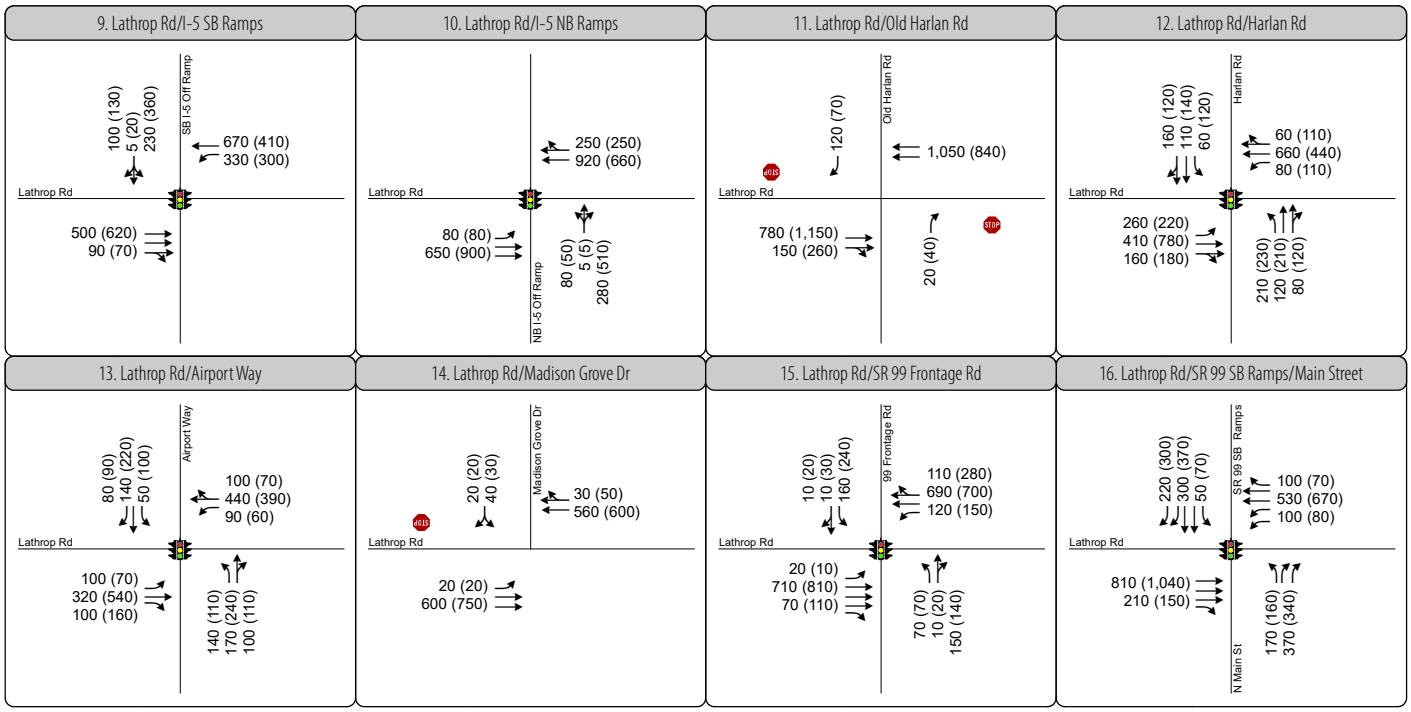


Turn Lane
AM (PM) Peak Hour Traffic Volume
Traffic Signal
Stop Sign
1 Study Intersection
Annexation 1 Area
Lathrop City Limits
Manteca City Limits
Development Area
Non-Development Area 1
Non-Development Area 2
Non-Development Area 3

Figure 6a

Peak Hour Traffic Volumes and Lane Configurations - Existing Plus Project Conditions

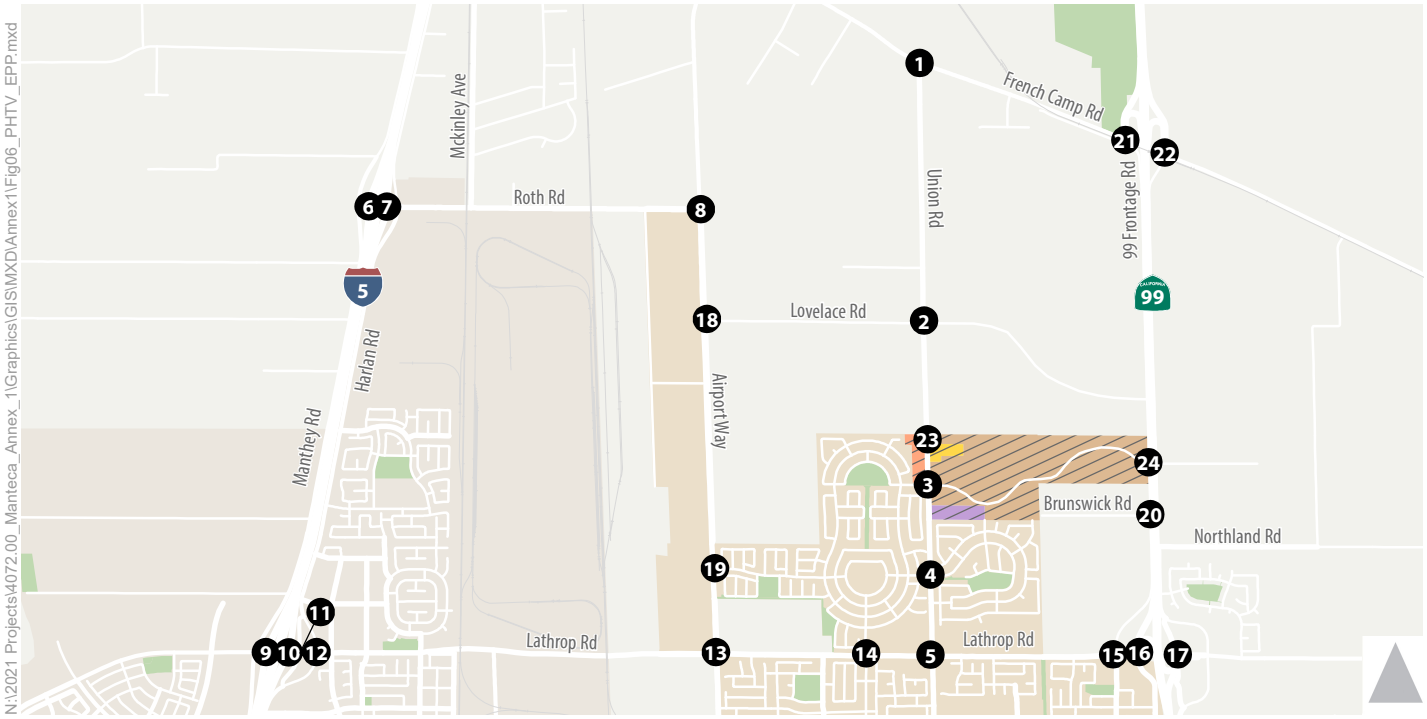


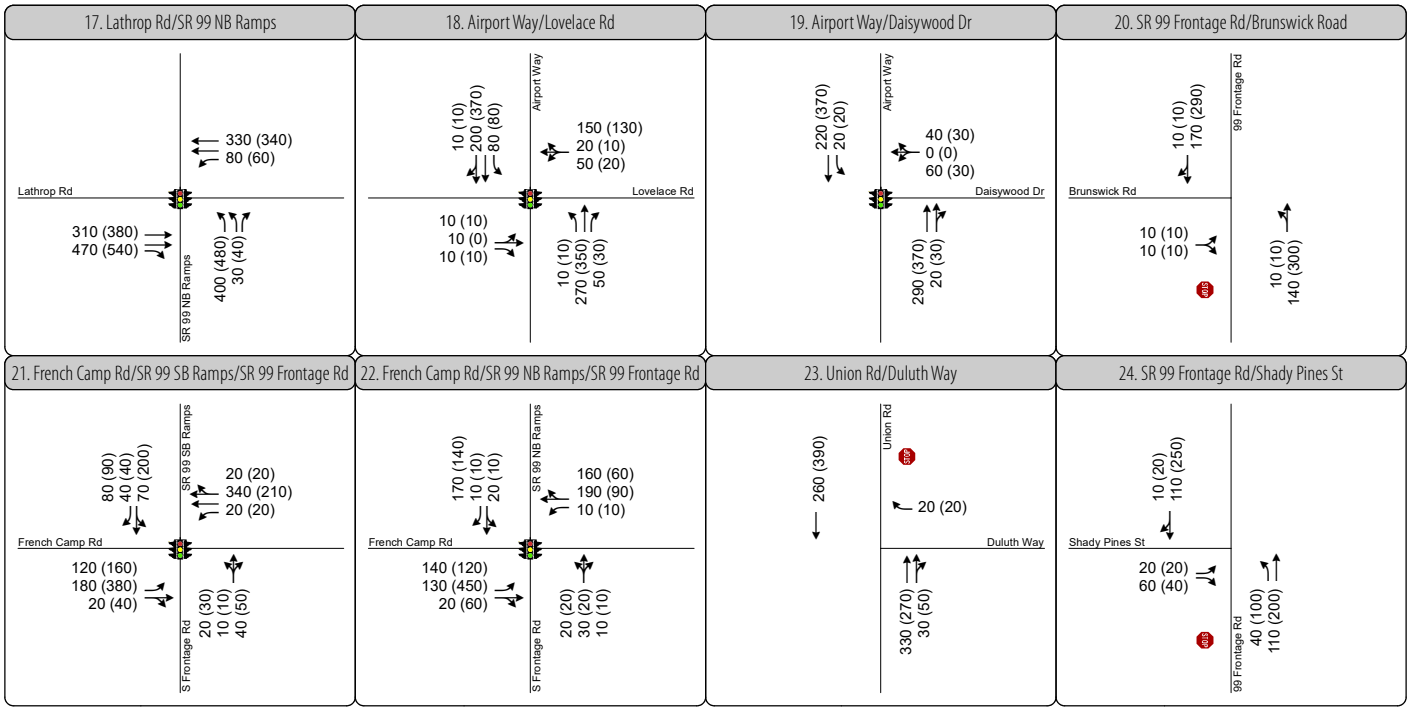


Turn Lane
AM (PM) Peak Hour Traffic Volume
Traffic Signal
Stop Sign
1 Study Intersection
Annexation 1 Area
Lathrop City Limits
Manteca City Limits
Development Area
Non-Development Area 1
Non-Development Area 2
Non-Development Area 3

Figure 6b

Peak Hour Traffic Volumes and Lane Configurations - Existing Plus Project Conditions





Turn Lane
AM (PM) Peak Hour Traffic Volume
Traffic Signal
Stop Sign
1 Study Intersection
Annexation 1 Area
Lathrop City Limits
Manteca City Limits
Development Area
Non-Development Area 1
Non-Development Area 2
Non-Development Area 3

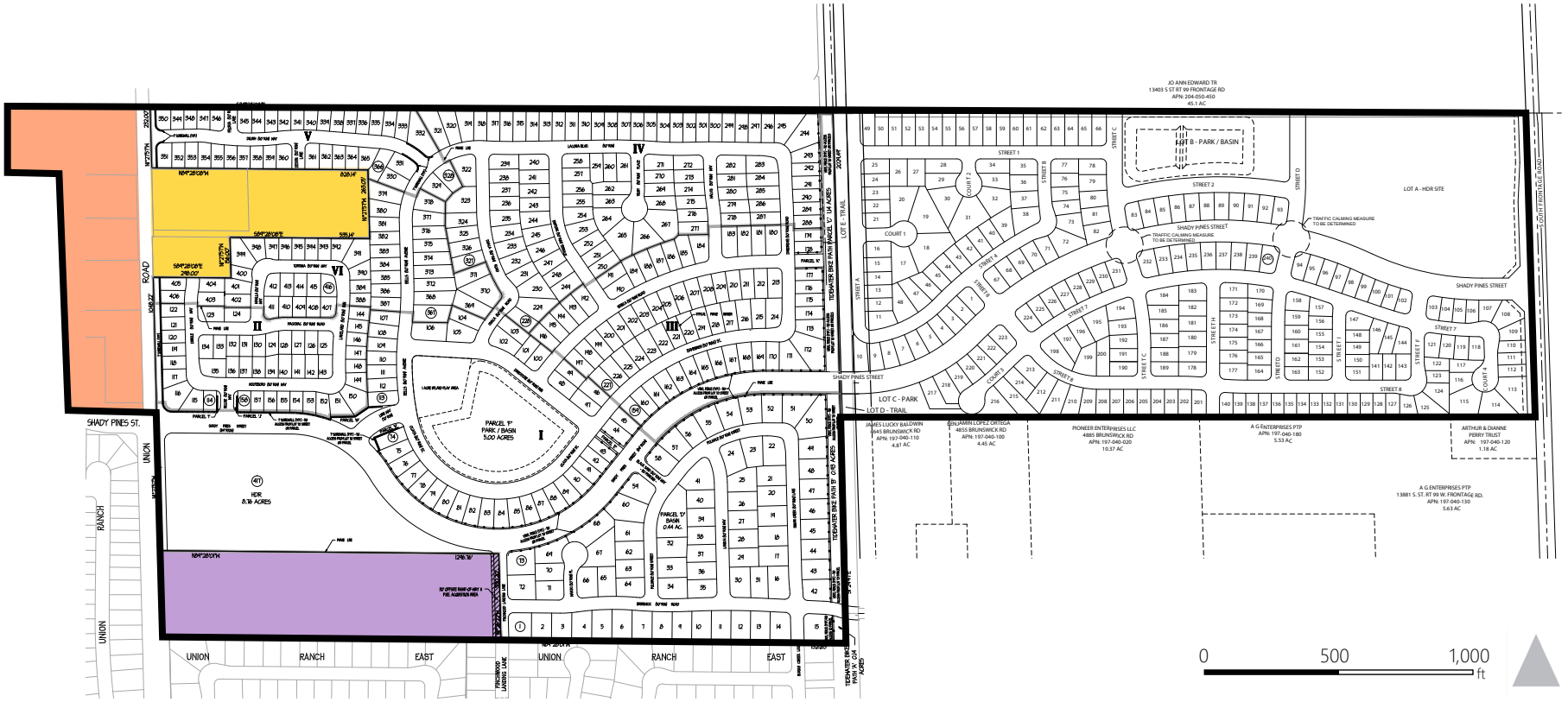
Figure 6c

Peak Hour Traffic Volumes and Lane Configurations - Existing Plus Project Conditions

5.3 Existing Plus Project Intersection Operations

As displayed on **Figure 7**, access to the proposed development project would be provided by t two full access intersections located at Union Road/Shady Pines Street and SR 99 Frontage Road/Shady Pines Street, as well as a right-in/right-out driveway at Union Road/Duluth Way. The following improvements were assumed under Existing Plus Project Conditions based on the Tentative Subdivision Map Plans (labeled Attachment A) in the Notice of Preparation dated October 22, 2021.

- **Union Road** – The existing 3-lane Union Road between Shady Pines Street and the southern Project Site boundary will be widened to 4-lanes. The widening would add a northbound lane and preserve the existing median and turn lanes.
- **Lovelace Road** – The existing 2-lane Lovelace Road that terminates at Union Road would be extended east of Union Road and terminates at SR 99 Frontage Road. Lovelace Road east of Union Road would be constructed as a 4-lane road.
- **Union Road/Lovelace Road** – The existing 3-way, side-street stop-controlled intersection would be modified to a four-way intersection with a shared left/through/right turn lane on the northbound, southbound, and eastbound approach, and a left turn lane and a shared through/right turn lane on the westbound approach. As discussed below, this intersection would be signalized.
- **Union Road/Shady Pines Street** – The existing 3-way, side-street stop-controlled intersection would be modified to a four-way intersection. The southbound and westbound approach would consist of a left turn pocket and shared through/right turn lane. The northbound approach would consist of a left-turn pocket, one through lane, and one shared through/right turn lane. No modifications are proposed to the eastbound approach. As discussed below, this intersection would be signalized.
- **Union Road/Duluth Way** – This new 3-way, side-street stop-controlled intersection would be constructed with a through lane and a shared through/right turn lane on the northbound approach, a through lane on the southbound approach, and a right turn lane on the westbound approach.
- **SR 99 South Frontage Road/Shady Pines Street** – This new 3-way, side-street stop controlled intersection would be constructed with a left turn pocket and a through lane on the northbound approach, a shared through/right turn lane on the southbound approach, and a left turn pocket and a right turn lane on the eastbound approach.



- Annexation 1 Area
- Non-Development Area 1
- Non-Development Area 2
- Non-Development Area 3

Figure 7

Site Plan

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Table 7 displays the AM and PM peak hour intersection operations under Existing Plus Project Conditions. Technical calculations are displayed in **Appendix A**.

Table 7: Intersection Operations – Existing Plus Project Conditions									
Intersection	Control Type	Existing Conditions				Existing Plus Project Conditions			
		AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour	
		Delay[1]	LOS	Delay[1]	LOS	Delay[1]	LOS	Delay[1]	LOS
1. Union Road/French Camp Road	Signal	13.0	B	15.1	B	14.6	B	16.5	B
2. Union Road/Lovelace Road	SSSC	2.4 (10.4)	A (B)	2.1 (11.9)	A (B)	**13.6 (52.3)**	**B (F)**	**39.9 (250.1)**	**E (F)**
3. Union Road/Shady Pines Street	SSSC	1 (12.3)	A (B)	<1 (14.2)	A (B)	**23.7 (76.9)**	**C (F)**	**15.3 (73.8)**	**B (F)**
4. Union Road/Del Webb Boulevard/Clearwater Creek Boulevard	Signal	12.6	B	12.4	B	13.8	B	13.6	B
5. Union Road/Lathrop Road	Signal	31.7	C	30.8	C	41.8	D	36.9	D
6. Roth Road/I-5 SB Ramps	SSSC	10.5 (18.5)	B (C)	10.9 (22.1)	B (C)	13.0 (25.4)	B (D)	14.6 (32.0)	B (D)
7. Roth Road/I-5 NB Ramps	SSSC	3.4 (13.1)	A (B)	3.2 (15.7)	A (C)	3.8 (14.5)	A (B)	3.2 (16.1)	A (C)
8. Roth Road/Airport Way	Signal	12.0	B	13.1	B	14.6	B	15.4	B
9. Lathrop Road/I-5 SB Ramps	Signal	14.4	B	17.8	B	16.4	B	31.0	C
10. Lathrop Road/I-5 NB Ramps	Signal	13.1	B	17.4	B	20.7	C	32.1	C
11. Lathrop Road/Old Harlan Road	SSSC	1.0 (15.5)	A (C)	<1 (16.3)	A (C)	1.1 (17.0)	A (C)	<1 (17.6)	A (C)
12. Lathrop Road/Harlan Road	Signal	34.4	C	37.7	D	46.1	D	45.5	D
13. Lathrop Road/Airport Way	Signal	26.6	C	27.0	C	34.0	C	30.5	C
14. Lathrop Road/Madison Grove Drive	SSSC	<1 (19.9)	A (C)	<1 (19.7)	A (C)	1.3 (23.5)	A (C)	<1 (20.9)	A (C)
15. Lathrop Road/SR 99 Frontage Road	Signal	13.7	B	14.0	B	18.7	B	21.7	C

Table 7: Intersection Operations – Existing Plus Project Conditions									
Intersection	Control Type	Existing Conditions				Existing Plus Project Conditions			
		AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour	
		Delay[1]	LOS	Delay[1]	LOS	Delay[1]	LOS	Delay[1]	LOS
16. Lathrop Road/SR 99 SB Ramps/Main Street	Signal	21.1	C	24.0	C	26.1	C	26.6	C
17. Lathrop Road/SR 99 NB Ramps	Signal	10.1	B	9.9	A	10.5	B	15.3	B
18. Airport Way/Lovelace Road	Signal	9.7	A	9.0	A	13.1	B	11.6	B
19. Airport Way/Daisywood Drive	Signal	6.7	A	5.8	A	8.3	A	7.0	A
20. SR 99 Frontage Road/Brunswick Road	SSSC	<1 (8.6)	A (A)	<1 (8.9)	A (A)	<1 (10.3)	A (B)	<1 (12.4)	A (B)
21. French Camp Road/SR 99 SB Ramps/SR 99 Frontage Road	Signal	22.5	C	28.1	C	24.9	C	32.3	C
22. French Camp Road/SR 99 NB Ramps/SR 99 Frontage Road	Signal	24.6	C	17.3	B	28.5	C	29.0	C
23. Union Road/Duluth Way	SSSC	Intersection does not exist under this scenario				0.3 (9.6)	A (A)	0.3 (10.2)	A (B)
24. SR 99 Frontage Road/Shady Pines St	SSSC					3.1 (10.9)	A (B)	2.4 (15.8)	A (C)

Notes:
Bold indicates deficient operations.
SSSC = Side-Street Stop Control; LOS = Level of Service
[1] For signalized intersections and all-way stop controlled intersections, average intersection delay is reported in seconds per vehicle for all approaches. For side street stop-controlled intersections, intersection delay is reported in seconds per vehicle for the overall intersection and (worst-case) movement. Intersection delay is calculated based on the procedures and methodology contained in the Highway Capacity Manual 6th Edition (Transportation Research Board, 2016).
Source: Fehr & Peers, 2021

As displayed, with the addition of project trips, the Union Road/Shady Pines Street and Union Road/Lovelace Road intersections would operate deficiently as side-street stop controlled intersections during both the AM and PM peak hour with the addition of project trips.

The Union Road/Shady Pines Street intersection provides primary access to the Development Area. Of the three intersections that provides ingress and egress to the Development area, this intersection is expected to have the highest usage due to its proximity to other land use destinations in Manteca and Lathrop.

An AM and PM peak hour signal warrant analysis was completed to determine if traffic volumes under Existing Plus Project Conditions satisfy the warrant for installation of a traffic signal. Results of this analysis indicate that the Union Road/Shady Pines Street intersection does not satisfy the AM and PM peak hour warrant for installation of a traffic signal under Existing Plus Project Conditions. However, as part of the proposed project, Union Road will be widened to 2 lanes in the northbound direction. At the Union Road/Shady Pines Street intersection, the northbound approach will consist of a left turn pocket, one through lane, and one shared through/right turn lane. The widening of Union Road would increase safety risks for pedestrians crossing the intersection. With consideration to safety, it is recommended that this intersection be constructed as a signalized intersection. In addition, it is recommended that the southbound approach be modified to include a left-turn pocket that will provide storage for project traffic. All technical calculations related to signal warrant analysis are provided in **Appendix B**.

The Union Road/Lovelace Road intersection is a side-street stop controlled intersection. As part of the Annexation 1 and Annexation 2 developments, Lovelace Road would be extended east to connect to SR 99 Frontage Road and provide access for the proposed industrial use in Annexation 2. The new Lovelace Road connection would divert existing traffic to Lovelace Road and the Union Road/Lovelace Road intersection. In the near-term, project trips traveling north on Union Road to access northbound SR 99 or destinations along French Camp Road lead to an increase in trips at this intersection.

Results of the signal warrant analysis indicate that the Union Road/Lovelace Road intersections satisfy Warrant 3A during the PM peak hour for installation of a traffic signal under Existing Plus Project Conditions. Therefore, this intersection is analyzed as a signalized intersection in **Table 8** below. The following improvements were assumed under Existing Plus Project with Mitigation Conditions:

- **Union Road/Lovelace Road** – The existing 3-way, side-street stop-controlled intersection would be modified to a four-way, signalized intersection. In order to operate traffic signal with a typical 8-phase signal timing with protected left-turns, each approach of the intersection would consist of a left turn pocket and shared through/right turn lane.

Table 8 displays the AM and PM peak hour intersection operations at both intersections with installation of all-way stop control. As shown, both intersections would operate acceptably during both AM and PM peak hour. Technical calculations are displayed in **Appendix A**.

Table 8: Intersection Operations – Existing Plus Project Conditions Mitigation									
Intersection	Control Type	Existing Plus Project Conditions				Existing Plus Project With Mitigation			
		AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour	
		Delay[1]	LOS	Delay[1]	LOS	Delay[1]	LOS	Delay[1]	LOS
2. Union Road/Lovelace Road	Signal	**13.6 (52.3)**	**B (F)**	**39.9 (250.1)**	**E (F)**	18.5	B	19.6	B
3. Union Road/Shady Pines Street	Signal	**23.7 (76.9)**	**C (F)**	**15.3 (73.8)**	**B (F)**	17.8	B	15.5	B

Notes:
Bold indicates deficient operations.
AWSC = All-Way Stop Control; LOS = Level of Service
[1] For signalized intersections and all-way stop controlled intersections, average intersection delay is reported in seconds per vehicle for all approaches. Intersection delay is calculated based on the procedures and methodology contained in the Highway Capacity Manual 6th Edition (Transportation Research Board, 2016).
Source: Fehr & Peers, 2021

Based on results of the intersection operations analysis, it is recommended that the following be included in the Conditions of Approval (COA) for the proposed project.

- **Traffic COA #1** – The developer shall install a traffic signal and implement intersection lane configuration improvements (i.e., add a southbound left turn pocket) at the Union Road/Shady Pines Street intersection. The design of the traffic signal and intersection improvements shall be reviewed and approved by the Director of Engineering. The developer shall pay for the total cost for the design and installation of the improvements as this intersection would provide direct access to the project site.
- **Traffic COA #2 –** The developer shall pay the current PFIP fee as determined by the City of Manteca prior to issuance of building permits to mitigate the proposed project's impact at Union Road/Lovelace Road. The project contributes to approximately 15 percent of volumes at this intersection under Existing Plus Project conditions. Therefore, the project's fair share would be 15 percent of the cost of signalizing the Union Road/Lovelace intersection. The traffic signal shall be constructed when the Lovelace Road extension is constructed.

6. Cumulative Conditions Analysis

This chapter presents the results of intersection operations analysis under Cumulative Conditions. The analysis reflects long-term development in the City of Manteca and other nearby jurisdictions using the Interim General Plan Year 2040 TFM previously described.

The Cumulative Year analysis assumes the following improvements:

- **PFIP Improvements**: Intersection lane configurations, traffic controls, and roadway improvements identified in the City of Manteca PFIP were assumed to be constructed. This results in modifications at the following locations:
    - Widening of Union Road to 4 lanes between Shady Pines Street and Lovelace Road
    - Widening of Lovelace Road to 4 lanes between Airport Way and Union Road
    - Construction of 4-lane Lovelace Road between Union Road and SR 99 Frontage Road
    - Widening of Airport Way to 4 lanes between French Camp Road and Yosemite Avenue
    - Widening of Lathrop Road to 4 lanes between western city limit and London Avenue; between Arrowsmith Drive and SR 99 Frontage Road
    - Union Road/Lovelace Road expansion and signalization
    - Airport Way/Roth Road expansion and signal modification
    - Airport Way/Lathrop Road expansion and signal modification
    - Airport Way/Lovelace Road expansion and signal modification
    - Airport Way/Daisywood Road expansion and signal modification
- **City of Manteca General Plan Improvements**: planned future roadways identified in the draft proposed City of Manteca General Plan were assumed to be constructed. This results in modifications at the following locations:
    - Construction of 4-lane Roth Road east of Airport Way
- **SJCOG RTP/SCS Improvements**: Intersection lane configurations, traffic controls, and roadway improvements identified in the SJCOG RTP were assumed to be constructed. This results in modifications at the following locations:
    - Reconstruction of the I-5/Lathrop Road interchange. The design has not been formalized; therefore, we conservatively assumed the reconstruction would be an improved tight-diamond interchange that is similar to the existing configuration.
    - Widening of Roth Road to 5 lanes between Manthey Road and Harlan Road
    - Widening of Roth Road to 4 lanes between UPRR and Airport Way
    - I-5 Southbound Ramps/Roth Road expansion and signalization

- I-5 Northbound Ramps/Roth Road expansion and signalization
- Roth Road/Harlan Road expansion and signalization

6.1 Cumulative No Project Intersection Operations

The Interim General Plan Year 2040 TFM was used to develop Cumulative No Project forecasts. **Figures 8A through 8C** display AM and PM peak hour turning movements and lane configurations at the study intersections.

Table 9 displays the AM and PM peak hour intersection operations. Technical calculations are displayed in **Appendix A**.

Table 9: Intersection Operations – Cumulative No Project Conditions

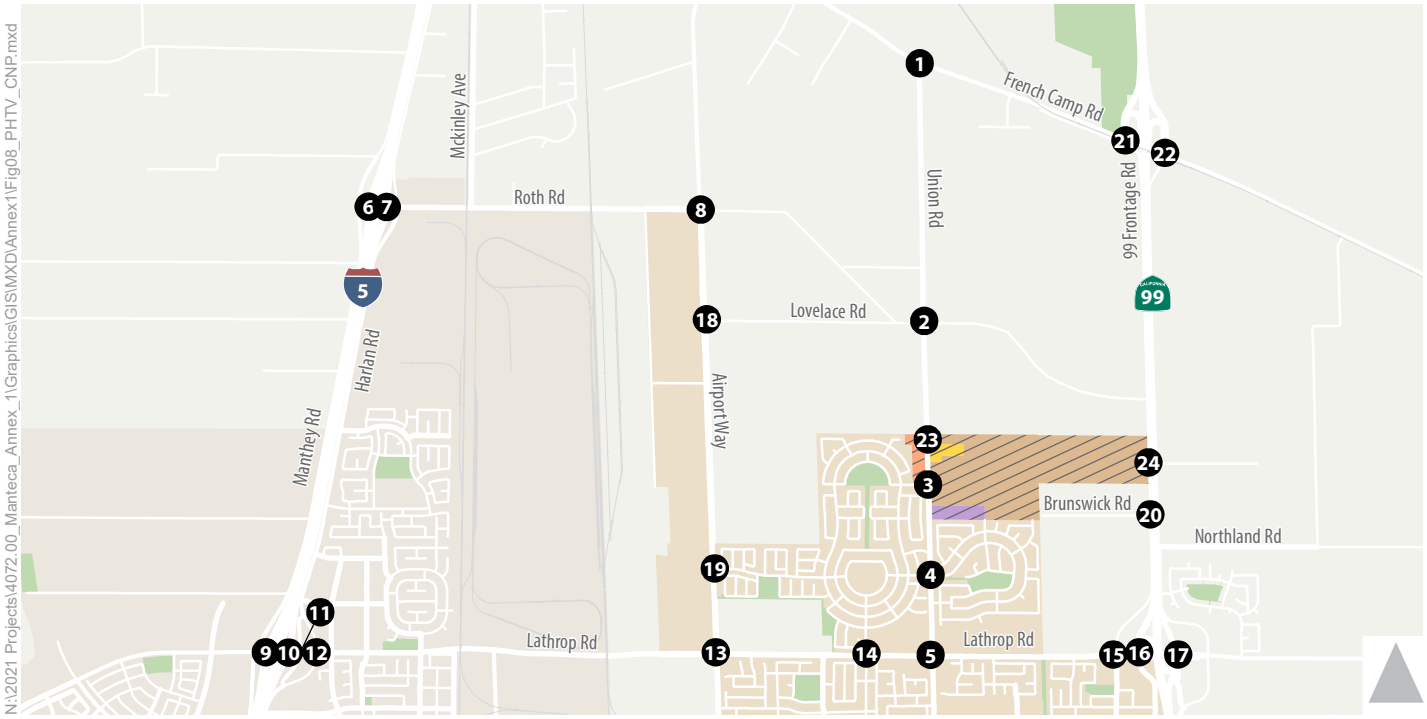
Intersection	Control Type	AM Peak Hour		PM Peak Hour	
		Delay[1]	LOS	Delay[1]	LOS
1. Union Road/French Camp Road	Signal	13.4	B	15.7	B
2. Union Road/Lovelace Road[2]	Signal	14.9	B	15.5	B
3. Union Road/Shady Pines Street[2]	SSSC	1.8 (17.8)	A (C)	1.8 (20.3)	A (C)
4. Union Road/Del Webb Boulevard/Clearwater Creek Boulevard	Signal	16.2	B	16.6	B
5. Union Road/Lathrop Road	Signal	**89.8**	**F**	**79.7**	**E**
6. Roth Road/I-5 SB Ramps[2]	Signal	13.9	B	18.0	B
7. Roth Road/I-5 NB Ramps[2]	Signal	13.2	B	14.4	B
8. Roth Road/Airport Way[2]	Signal	22.5	C	23.1	C
9. Lathrop Road/I-5 SB Ramps[2 3]	Signal	17.8	B	21.3	C
10. Lathrop Road/I-5 NB Ramps[2 3]	Signal	34.8	C	25.4	C
11. Lathrop Road/Old Harlan Road	SSSC	1.2 (29.2)	A (D)	<1 (27.1)	A (D)
12. Lathrop Road/Harlan Road	Signal	54.4	D	**71.8**	**E**
13. Lathrop Road/Airport Way[2]	Signal	33.2	C	32.6	C
14. Lathrop Road/Madison Grove Drive	SSSC	**36.8 (>300)**	**E (F)**	**16.7 (>300)**	**C (F)**
15. Lathrop Road/SR 99 Frontage Road	Signal	17.1	B	19.5	B
16. Lathrop Road/SR 99 SB Ramps/Main Street	Signal	47.4	D	45.3	D
17. Lathrop Road/SR 99 NB Ramps	Signal	11.2	B	10.8	B
18. Airport Way/Lovelace Road[2]	Signal	9.1	A	9.2	A
19. Airport Way/Daisywood Drive[2]	Signal	6.9	A	7.2	A
20. SR 99 Frontage Road/Brunswick Road	SSSC	1.3 (9.2)	A (A)	<1 (9.6)	A (A)

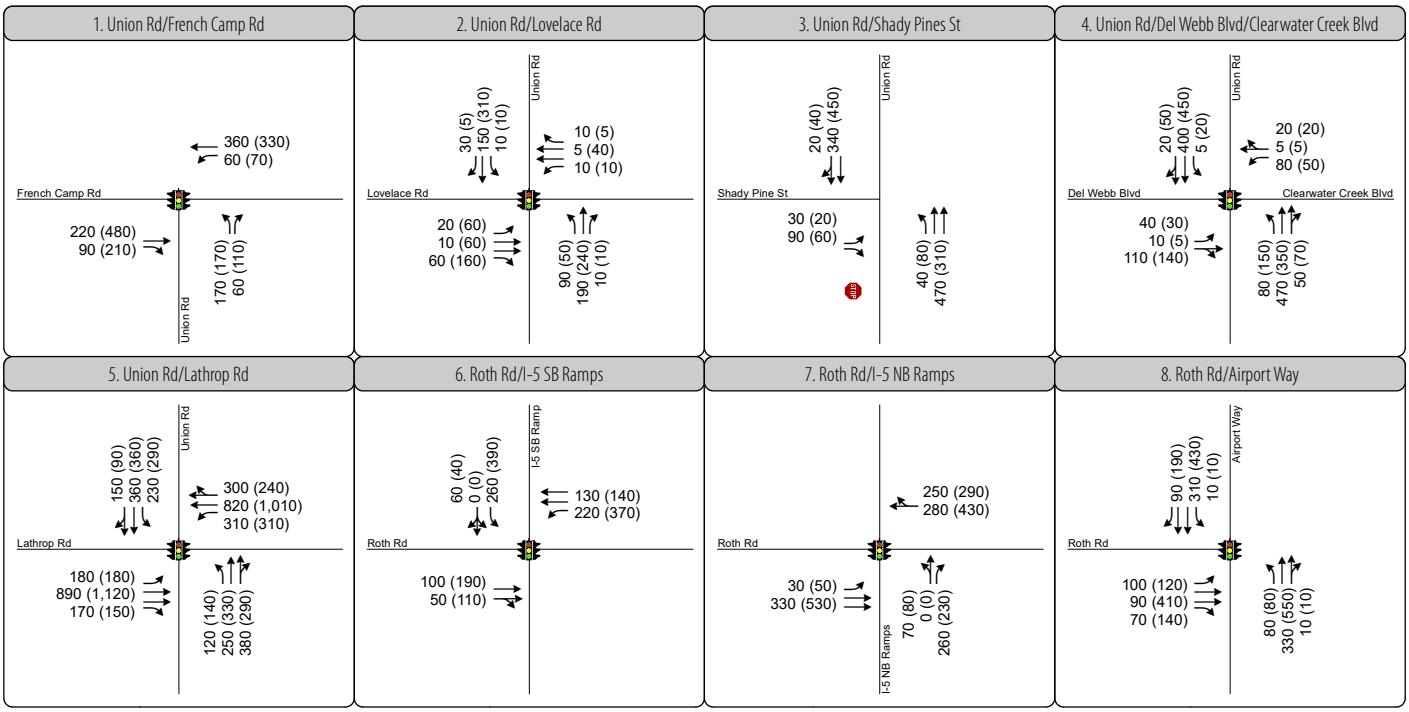
Table 9: Intersection Operations – Cumulative No Project Conditions					
Intersection	Control Type	AM Peak Hour		PM Peak Hour	
		Delay[1]	LOS	Delay[1]	LOS
21. French Camp Road/SR 99 SB Ramps/SR 99 Frontage Road	Signal	23.9	C	30.4	C
22. French Camp Road/SR 99 NB Ramps/SR 99 Frontage Road	Signal	26.3	C	18.9	B

Notes:
Bold indicates deficient operations.
SSSC = Side-Street Stop Control; LOS = Level of Service
[1] For signalized intersections, roundabouts, and all-way stop controlled intersections, average intersection delay is reported in seconds per vehicle for all approaches. For side street stop-controlled intersections, intersection delay is reported in seconds per vehicle for the overall intersection and (worst-case) movement. Intersection delay is calculated based on the procedures and methodology contained in the Highway Capacity Manual 6th Edition (Transportation Research Board, 2016).
[2] Intersection lane configuration and/or traffic control are different from Existing Conditions due to planned intersection and roadway improvements.
[3] The future interchange design has not been formalized. Delay and LOS are estimated using an improved tight-diamond interchange configuration and are subject to change.
Source: Fehr & Peers, 2021

Under Cumulative No Project Conditions, traffic associated with land use growth in the City of Manteca and City of Lathrop contributes to the increase in traffic volumes along Lathrop Road. As displayed, the following three intersections would operate deficiently:

- Union Road/Lathrop Road would operate deficiently at LOS F during the AM peak hour and LOS E during the PM peak hour.
- Lathrop Road/Harlan Road would operate deficiently at LOS E during the PM peak hour.
- Lathrop Road/Madison Grove Drive would operate deficiently at LOS F during the AM and PM peak hour.

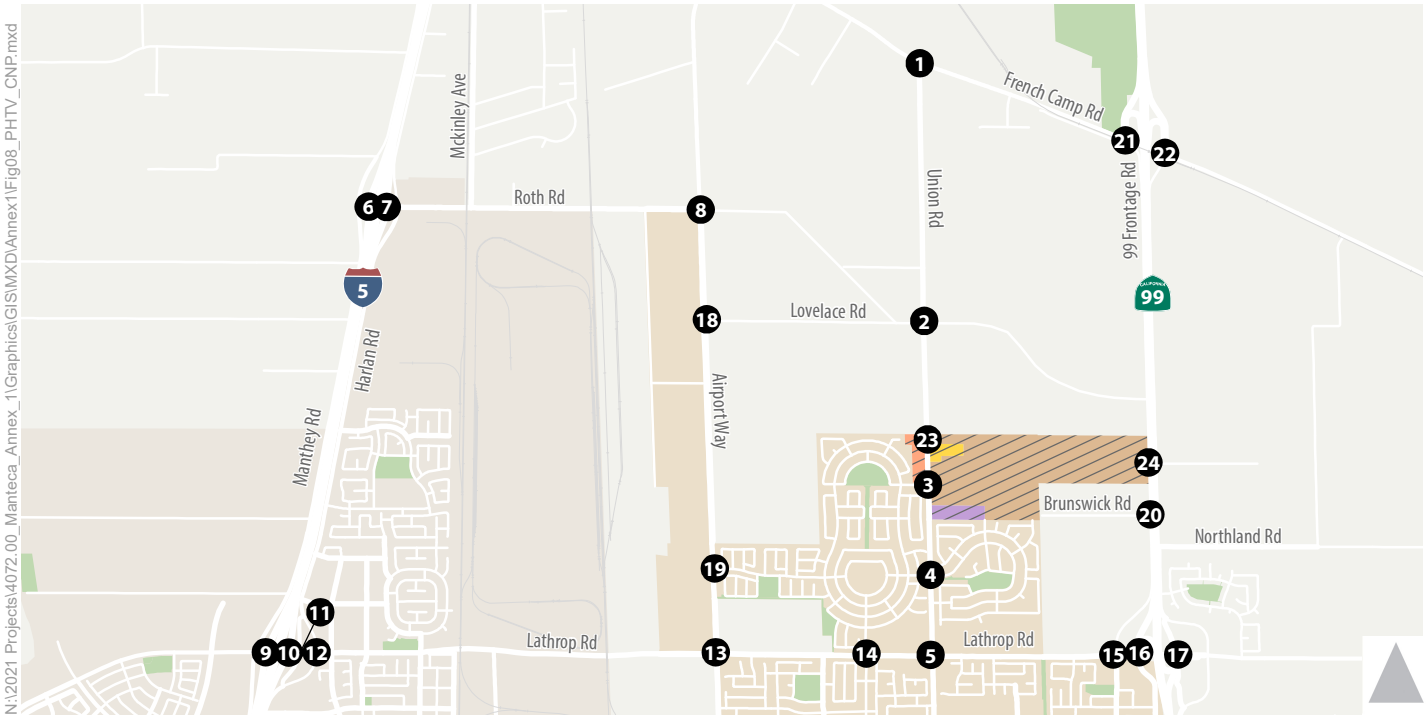


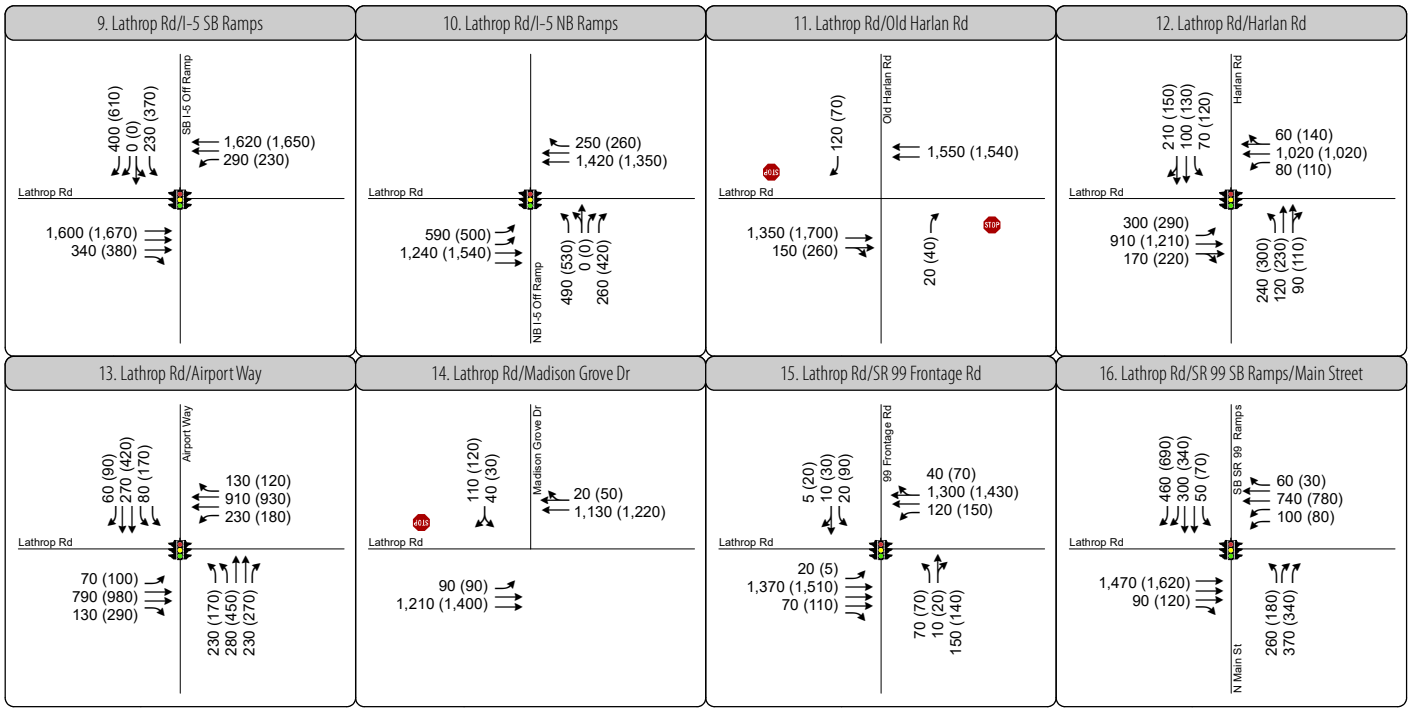


Turn Lane
AM (PM) Peak Hour Traffic Volume
Traffic Signal
Stop Sign
1 Study Intersection
Annexation 1 Area
Lathrop City Limits
Manteca City Limits
Development Area
Non-Development Area 1
Non-Development Area 2
Non-Development Area 3

Figure 8a

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

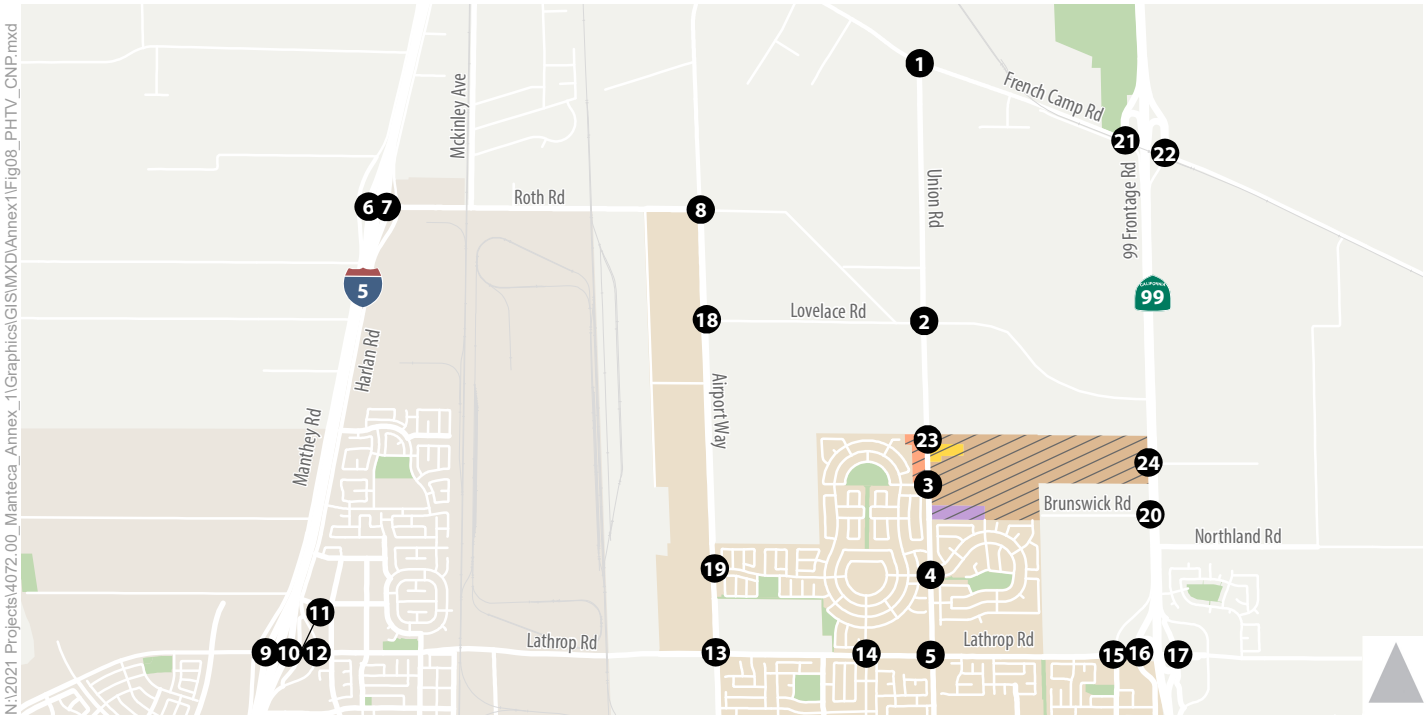


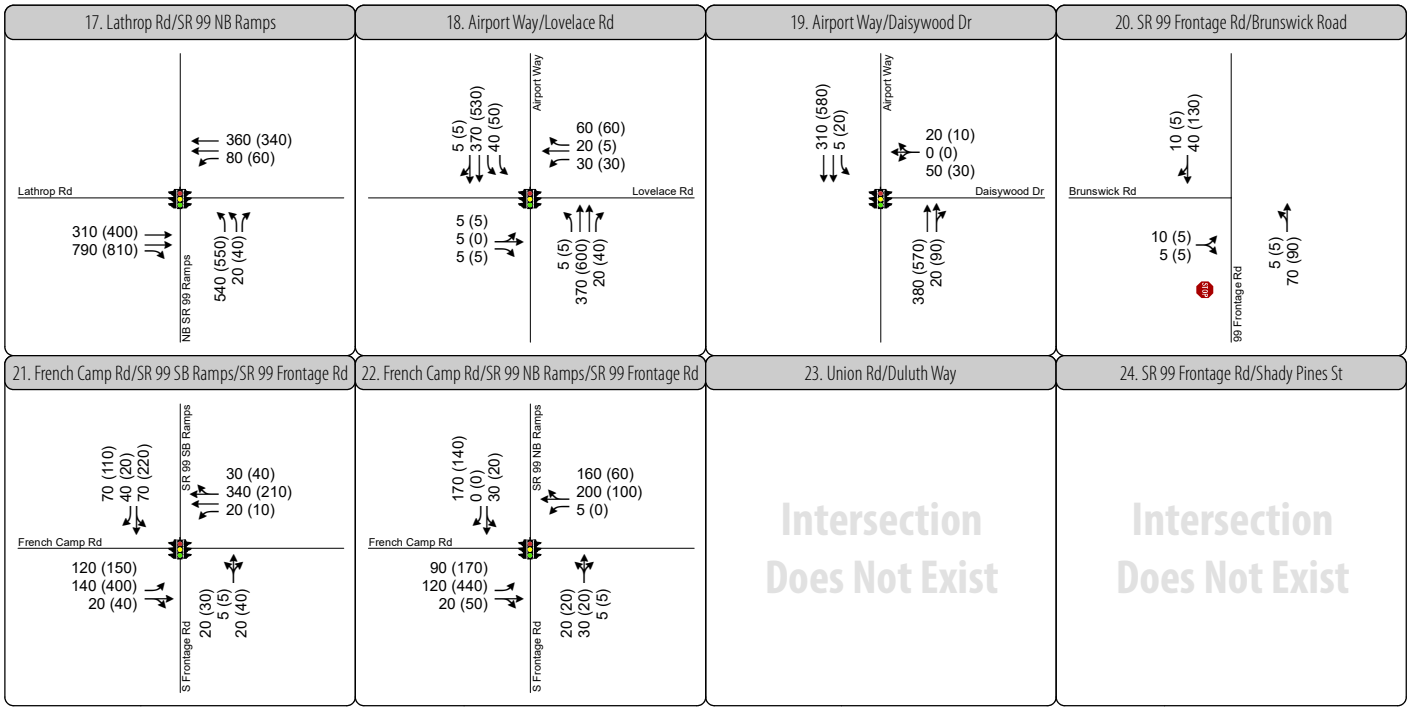


Turn Lane
AM (PM) Peak Hour Traffic Volume
Traffic Signal
Stop Sign
Study Intersection
Annexation 1 Area
Lathrop City Limits
Manteca City Limits
Development Area
Non-Development Area 1
Non-Development Area 2
Non-Development Area 3

Figure 8b

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





Turn Lane
AM (PM) Peak Hour Traffic Volume
Traffic Signal
Stop Sign
Study Intersection
Annexation 1 Area
Lathrop City Limits
Manteca City Limits
Development Area
Non-Development Area 1
Non-Development Area 2
Non-Development Area 3

Figure 8c

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

6.2 Cumulative Plus Project Intersection Operations

Under Cumulative conditions, changes in availability and locations of complimentary land use and transportation network would result in modifications to the development project's trip distribution. The Interim General Plan Year 2040 TFM was used to develop Cumulative Plus Project trip distribution and forecasts. **Figure 9** displays Cumulative Plus Project trip distribution. **Figures 10A through 10 C** display the intersection turning movements under Cumulative Plus Project Conditions.

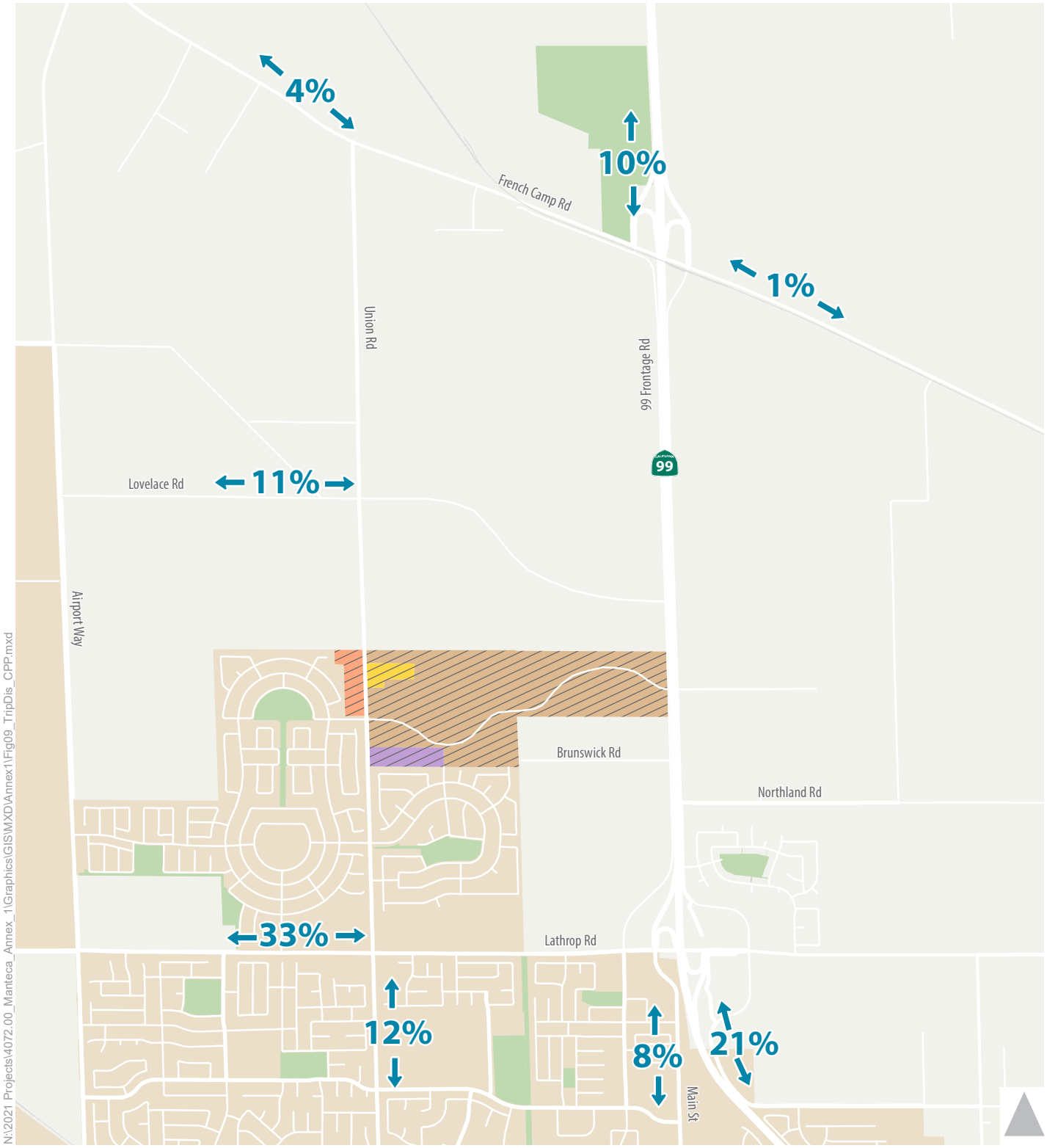
Table 10 presents the results of the Cumulative Plus Project intersection operations analysis.

Table 10: Intersection Operations –Cumulative Plus Project Conditions

Intersection	Control Type	Cumulative Conditions				Cumulative Plus Project Conditions			
		AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour	
		Delay[1]	LOS	Delay[1]	LOS	Delay[1]	LOS	Delay[1]	LOS
1. Union Road/French Camp Road	Signal	13.4	B	15.7	B	14.6	B	18.8	B
2. Union Road/Lovelace Road[2]	Signal	14.9	B	15.5	B	50.9	D	20.4	C
3. Union Road/Shady Pines Street[2]	SSSC/ Signal[4]	1.8 (17.8)	A (C)	1.8 (20.3)	A (C)	16.6	B	17.2	B
4. Union Road/Del Webb Boulevard/Clearwater Creek Boulevard	Signal	16.2	B	16.6	B	17.5	B	16.7	B
5. Union Road/Lathrop Road	Signal	**89.8**	**F**	**79.7**	**E**	**127.8**	**F**	**109.1**	**F**
6. Roth Road/I-5 SB Ramps[2]	Signal	13.9	B	18.0	B	18.0	B	18.9	B
7. Roth Road/I-5 NB Ramps[2]	Signal	13.2	B	14.4	B	15.4	B	13.2	B
8. Roth Road/Airport Way[2]	Signal	22.5	C	23.1	C	25.4	C	25.5	C
9. Lathrop Road/I-5 SB Ramps[2 3]	Signal	17.8	B	21.3	C	18.8	B	25.2	C
10. Lathrop Road/I-5 NB[2 3] Ramps	Signal	34.8	C	25.4	C	38.3	D	25.9	C
11. Lathrop Road/Old Harlan Road	SSSC	1.2 (29.2)	A (D)	<1 (27.1)	A (D)	1.3 (31.2)	A (D)	<1 (27.9)	A (D)
12. Lathrop Road/Harlan Road	Signal	54.4	D	**71.8**	**E**	**57.6**	**E**	**76.2**	**E**
13. Lathrop Road/Airport Way[2]	Signal	33.2	C	32.6	C	35.3	D	37.9	D
14. Lathrop Road/Madison Grove Drive	SSSC	**36.8 (>300)**	**E (F)**	**16.7 (>300)**	**C (F)**	**44.8 (>300)**	**E (F)**	**17.3 (>300)**	**C (F)**

Table 10: Intersection Operations –Cumulative Plus Project Conditions									
Intersection	Control Type	Cumulative Conditions				Cumulative Plus Project Conditions			
		AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour	
		Delay[1]	LOS	Delay[1]	LOS	Delay[1]	LOS	Delay[1]	LOS
15. Lathrop Road/SR 99 Frontage Road	Signal	17.1	B	19.5	B	20.2	C	25.5	C
16. Lathrop Road/SR 99 SB Ramps/Main Street	Signal	47.4	D	45.3	D	53.0	D	49.7	D
17. Lathrop Road/SR 99 NB Ramps	Signal	11.2	B	10.8	B	11.3	B	11.0	B
18. Airport Way/Lovelace Road[2]	Signal	9.1	A	9.2	A	9.6	A	9.7	A
19. Airport Way/Daisywood Drive[2]	Signal	6.9	A	7.2	A	7.1	A	7.5	A
20. SR 99 Frontage Road/Brunswick Road	SSSC	1.3 (9.2)	A (A)	<1 (9.6)	A (A)	<1 (9.8)	A (A)	<1 (10.7)	A (B)
21. French Camp Road/SR 99 SB Ramps/SR 99 Frontage Road	Signal	23.9	C	30.4	C	26.3	C	33.9	C
22. French Camp Road/SR 99 NB Ramps/SR 99 Frontage Road	Signal	26.3	C	18.9	B	27.9	C	24.8	B
23. Union Road/Duluth Way	SSSC	Intersection does not exist under this scenario				0.2 (10.9)	A (B)	0.1 (9.8)	A (A)
24. SR 99 Frontage Road/Shady Pines St	SSSC					3.4 (10.1)	A (B)	1.8 (12.2)	A (B)

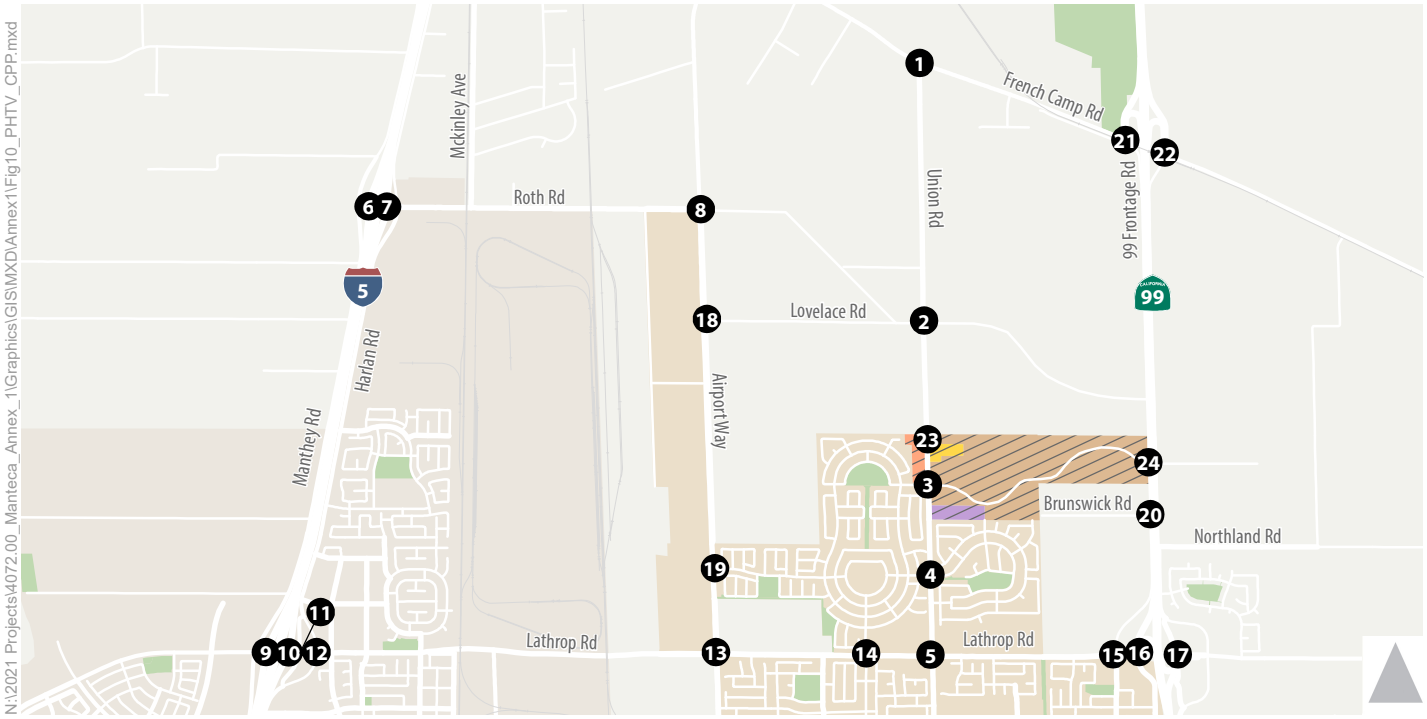
Notes:
Bold indicates deficient operations; SSSC = Side-Street Stop Control; LOS = Level of Service
[1] For signalized intersections and roundabouts, average intersection delay is reported in seconds per vehicle for all approaches. For side street stop-controlled intersections, intersection delay is reported in seconds per vehicle for the overall intersection and (worst-case) movement. Intersection delay is calculated based on the procedures and methodology contained in the Highway Capacity Manual 6th Edition (Transportation Research Board, 2016).
[2] Intersection lane configuration and/or traffic control are different from Existing Conditions due to planned intersection and roadway improvements.
[3] The future interchange design has not been formalized. Delay and LOS are estimated using an improved tight-diamond interchange configuration and are subject to change.
[4] Per Traffic COA #1, the developer shall install a traffic signal at Union Road/Shady Pines Street under Existing Plus Project conditions. Therefore, the intersection is analyzed as a side-street stop controlled intersection under Cumulative No Project conditions, and as a signalized intersection under Cumulative Plus Project conditions.
Source: Fehr & Peers, 2021



XX% Trip Distribution Percentage

Figure 9

Cumulative Plus Project Trip Distribution



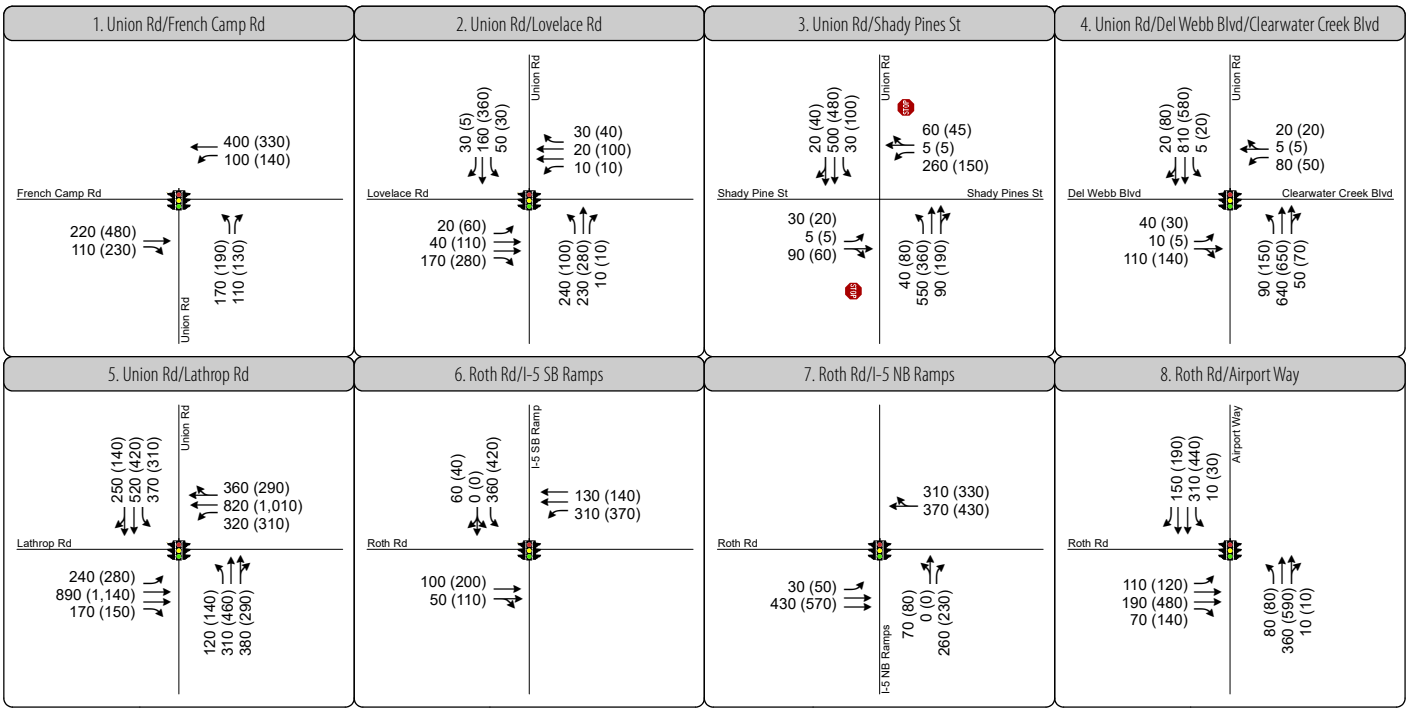


Figure 10a

Peak Hour Traffic Volumes and Lane Configurations - Cumulative Plus Project Conditions

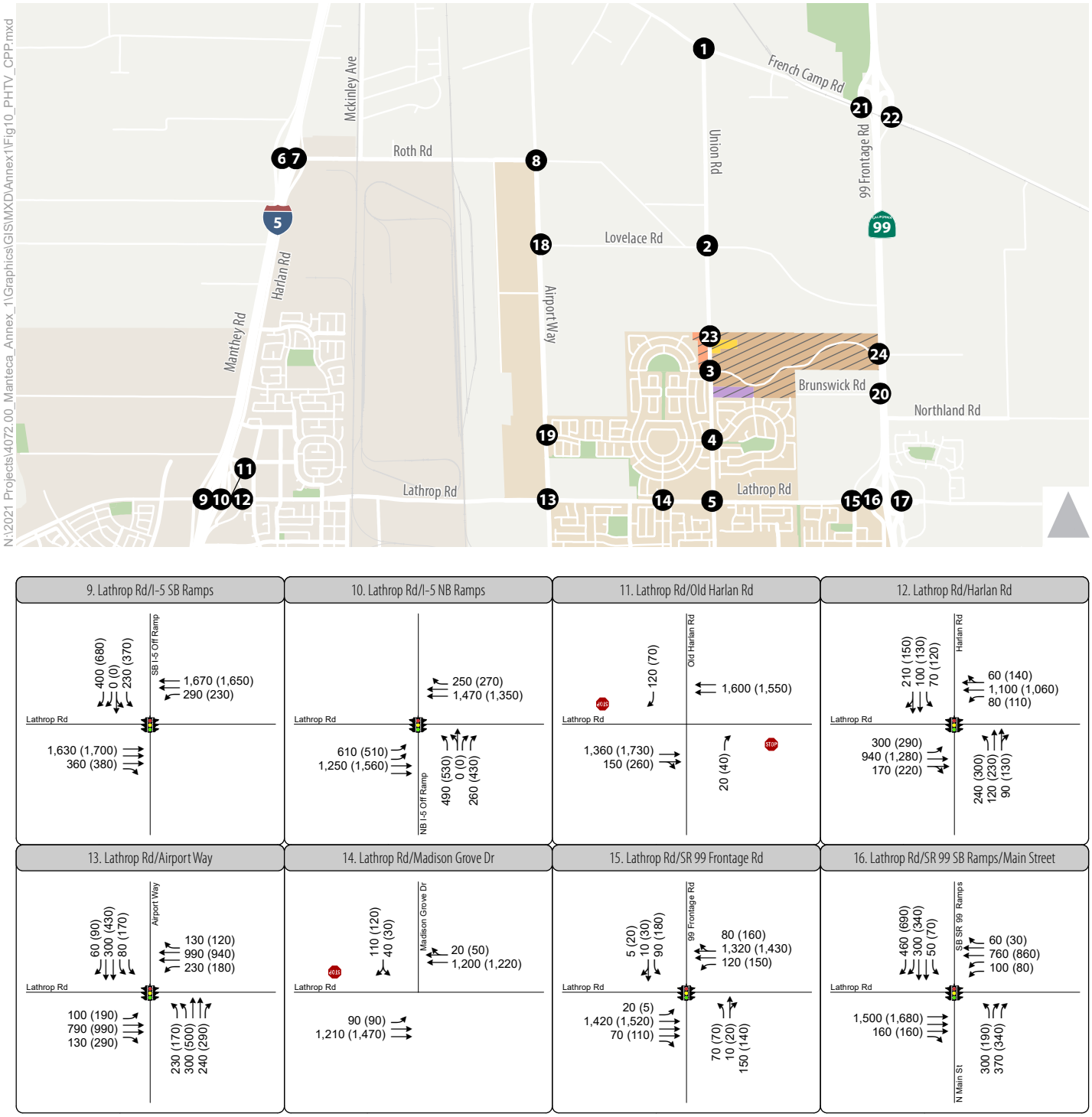
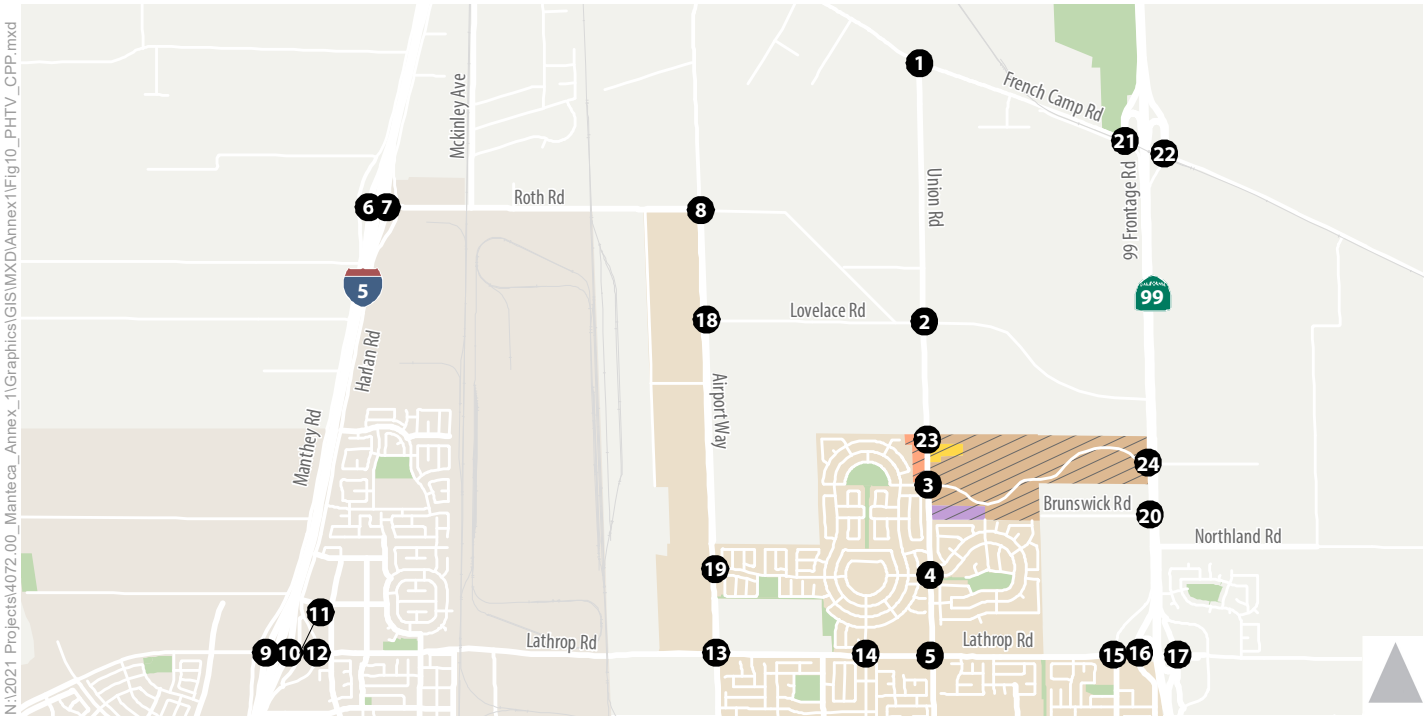
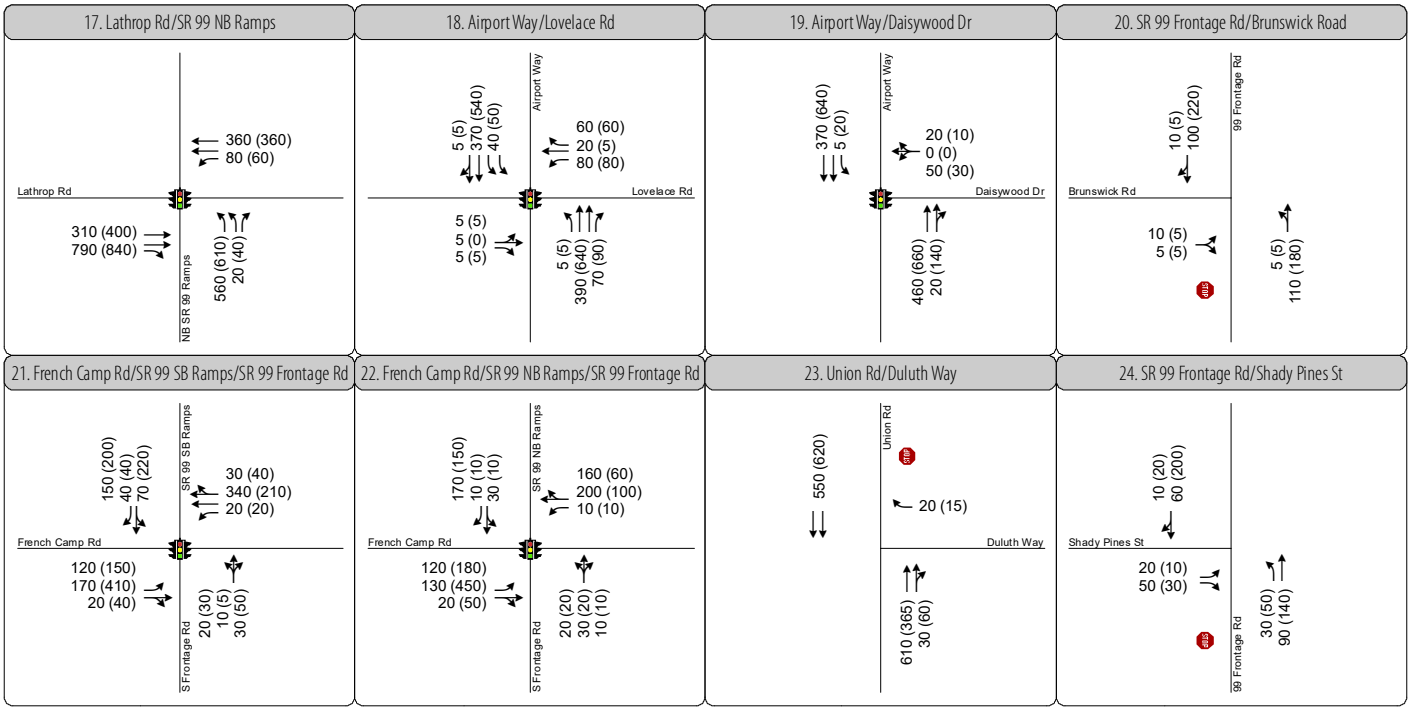


Figure 10b

Peak Hour Traffic Volumes and Lane Configurations - Cumulative Plus Project Conditions





Turn Lane
AM (PM) Peak Hour Traffic Volume
Traffic Signal
Stop Sign
Study Intersection
Annexation 1 Area
Lathrop City Limits
Manteca City Limits
Development Area
Non-Development Area 1
Non-Development Area 2
Non-Development Area 3

Figure 10c

Peak Hour Traffic Volumes and Lane Configurations - Cumulative Plus Project Conditions

Traffic COA #1 requires the developer to install a traffic signal and implement intersection lane configuration improvements at the Union Road / Shady Pines Street intersection. Therefore, this improvement is assumed to be in place under Cumulative Plus Project conditions. As shown in **Table 10**, with improvements identified in Traffic COA #1, this intersection would operate acceptably at LOS B during the AM and PM peak hour.

As displayed in **Table 10**, under Cumulative Plus Project Conditions:

- Union Road/Lathrop Road would continue to deficiently with additional delay during the AM and PM peak hour.
- Lathrop Road/Madison Grove Drive would continue to deficiently with additional delay during the AM and PM peak hour.
- Lathrop Road/Harlan Road would continue to operate deficiently with additional delay during the PM peak hour, and operate deficiently during the AM peak hour.

The City of Manteca is in the process of updating the PFIP. The improvements required for Union Road/Lathrop Road and Lathrop Road/Madison Grove Drive will be analyzed separately as part of the PFIP update. Because the Project would contribute to the cumulative growth in traffic volumes at these intersections, it is recommended that the following be incorporated into the Conditions of Approval for the proposed project:

- **Traffic COA #3 –** The developer shall pay the current PFIP fee as determined by the City of Manteca prior to issuance of building permits to mitigate the Project's impact at Union Road/Lathrop Road and Lathrop Road/Madison Grove Drive. The developer shall install a new traffic signal controller at the Union Road/Lathrop Road intersection and fund a traffic signal timing optimization study.

The Lathrop Road/Harlan Road intersection is located in the City of Lathrop. This intersection will be further evaluated as part of the I-5/Lathrop Road interchange improvement project identified in the SJCOG RTP/SCS. Potential improvements may include lane configuration improvements and signal coordination with the reconstructed I-5/Lathrop Road interchange that may reduce motor vehicle delay.

7. Safety Assessment Analysis

This section describes the potential safety impacts associated with transportation and circulation that could result from implementation of the proposed project. It describes the safety-related reviews, investigations, and analysis that was completed for Existing Plus Project and Cumulative Plus Project scenarios.

7.1 Planned Traffic Safety Improvements in the Project Area

The following documents and projects in the City of Manteca, City of Lathrop, San Joaquin County, San Joaquin Council of Governments, and Caltrans jurisdictions are reviewed for traffic safety improvements:

- **City of Manteca Active Transportation Plan (ATP) (2020)**
- **City of Manteca PFIP**
- **SJCOG RTP/SCS**
- **I-5/Roth Road Interchange Project** – This interchange would be improved to provide additional travel lanes for motor vehicles, signalized intersections, and sidewalks with ADA compliant ramps and crosswalks for pedestrians.
- **I-5/Louise Avenue Interchange Project** – This interchange would be improved to provide additional travel lanes for motor vehicles, and sidewalks with ADA compliant ramps and crosswalks for pedestrians.

The proposed project proposes multi-modal safety improvements including sidewalk along Union Road and internal roadways, as well as a continuation of the Class I (off-street) Tidewater Bikeway. The project will also support the implementation of City of Manteca and SHS safety projects by paying fees to assist in funding safety improvement projects.

The proposed project does not consist of any improvements or physical changes to freeway mainline, freeway interchange, or other State Highway System (SHS) facilities. Besides the A detailed review of the facility design of the safety improvement projects listed above confirmed that the proposed project would not physically disrupt any existing multi-modal facility.

A review of the City of Manteca ATP indicate that future Class II bike lane have been identified on Union Road north of Lathrop Road and SR 99 Frontage Road north of Lathrop Road. Based on the Tentative Subdivision Map Plans (labeled Attachment A) in the Notice of Preparation dated October 22, 2021, the proposed project will include the widening of Union Road, but does not currently include the construction of Class II bike lanes along Union Road or SR 99 Frontage Road. Therefore, it is recommended that the following be included in the COA for the proposed project.

- **Traffic COA #4** – The developer shall construct Class II bike lanes along its frontage on Union Road and SR 99 Frontage Road, as identified in the City of Manteca ATP. The design of the bike

lane shall be reviewed and approved by the Director of Engineering. The cost of bike lane construction shall be included in the total cost associated with the Union Road widening along the project frontage.

The proposed project consists of a mix of single family and multi-family uses. Implementation of the proposed project would result in changes in traffic volumes on local roadways, freeway mainline segments, and interchange ramp intersections around the project area. Based on analysis on the similar land use types, the mix of pedestrian, bicycle, and motor vehicle travel would not change, and the traffic mix would remain compatible with existing and planned facility design.

7.2 Freeway Off-Ramp Queueing Analysis

As described in Chapter 5 and 6, intersection operations analyses were completed for the following freeway ramp intersections:

6. Roth Road/I-5 SB Ramps
7. Roth Road/I-5 NB Ramps
9. Lathrop Road/I-5 SB Ramps
10. Lathrop Road/I-5 NB Ramps
15. Lathrop Road/SR 99 SB Ramps/Main Street
16. Lathrop Road/SR 99 NB Ramps
20. French Camp Road/SR 99 SB Ramps/W 99 Frontage Road
21. French Camp Road/SR 99 NB Ramps/S 99 Frontage Road

Results of the intersection operations analysis show that all 8 ramp intersections operate at LOS D or better during the AM and PM peak hour under Existing Plus Project, Cumulative No Project, and Cumulative Plus Project Conditions.

In addition, a freeway off-ramp queueing analysis was completed for the 8 ramp intersections during the AM and PM peak hour. The off-ramp queueing analysis was completed using the Synchro 11 software package as described in Chapter 2, and the 95th percentile queue is reported for all freeway off-ramp movements.

Table 11 presents the results of the freeway off-ramp queueing analysis for the AM and PM peak hour under Existing Plus Project Conditions. As shown, with the addition of the project traffic, all freeway off-ramp queues can be accommodated within the off-ramp storage. Technical Calculations are included in **Appendix A**.

Table 11: Freeway Off-Ramp Queueing Analysis – Existing Plus Project Conditions						
Intersection	Move-ment	Storage (ft)	AM Peak Hour		PM Peak Hour	
			Volume	95th Percentile Queue (ft)	Volume	95th Percentile Queue (ft)
6. Roth Road/I-5 SB Ramps	SBL	1,400	260	75	330	125
	SBL/T/R	520	40	50	30	50
7. Roth Road/I-5 NB Ramps	NBL/T	1,375	20	25	20	25
	NBR	630	190	50	180	50
9. Lathrop Road/I-5 SB Ramps	SBL/T/R	1,525	335	276	510	513
10. Lathrop Road/I-5 NB Ramps	NBL/T/R	1,625	365	264	565	562
16. Lathrop Road/SR 99 SB Ramps/Main Street	SBL	560	50	84	70	106
	SBT	1,450	300	173	370	197
	SBR	1,450	220	36	300	40
17. Lathrop Road/SR 99 NB Ramps	NBL	1,350	400	94	480	119
	NBR	670	30	16	40	19
21. French Camp Road/SR 99 SB Ramps/W 99 Frontage Road	SBL/T	1,800	110	129	240	240
	SBR	500	80	28	90	27
22. French Camp Road/SR 99 NB Ramps/S 99 Frontage Road	SBL/T	1,800	30	51	20	29
	SBR	400	170	68	140	44
Source: Fehr & Peers, 2021						

Table 12 presents the results of the freeway off-ramp queueing analysis for the AM and PM peak hour under Cumulative Plus Project Conditions. As shown, with the addition of the project traffic, all freeway off-ramp queues can be accommodated within the off-ramp storage. Technical Calculations are included in **Appendix A**.

Table 12: Freeway Off-Ramp Queueing Analysis – Cumulative Plus Project Conditions						
Intersection	Move-ment	Storage (ft)	AM Peak Hour		PM Peak Hour	
			Volume	95th Percentile Queue	Volume	95th Percentile Queue
6. Roth Road/I-5 SB Ramps[1]	SBL	1,400	360	196	420	189
	SBL/T/R	520	60	118	40	113
7. Roth Road/I-5 NB Ramps[1]	NBL/T	1,375	70	95	80	80
	NBR	630	260	74	230	69
9. Lathrop Road/I-5 SB Ramps[1 2]	SBL	1,525	230	98	370	158
	SBR	1,525	400	163	680	325
10. Lathrop Road/I-5 NB Ramps[1 2]	NBL	1,625	490	373	530	309
	NBR	1,625	260	94	430	193
16. Lathrop Road/SR 99 SB Ramps/Main Street	SBL	560	50	96	70	127
	SBT	1,450	300	173	340	183
	SBR	1,450	460	242	690	380
17. Lathrop Road/SR 99 NB Ramps	NBL	1,350	560	138	610	124
	NBR	670	20	13	40	16
21. French Camp Road/SR 99 SB Ramps/W 99 Frontage Road	SBL/T	1,800	110	129	260	257
	SBR	500	150	57	200	57
22. French Camp Road/SR 99 NB Ramps/S 99 Frontage Road	SBL/T	1,800	40	62	20	30
	SBR	400	170	66	150	54

Notes:
[1] Intersection lane configuration and/or traffic control are different from Existing Conditions due to planned intersection and roadway improvements.
[2] The future interchange design has not been formalized. Off-Ramp storage is assumed to be equal to the existing off-ramp storage.
Source: Fehr & Peers, 2021

Based on the freeway off-ramp queueing analysis, the proposed project would not result in freeway off-ramp queuing spilling back from interchanges and would not affect traffic operations on the freeway mainline. Traffic generated by the proposed project would remain compatible with the planned traffic safety improvements in the vicinity of the project.

8. Additional Analysis

This chapter describes the additional analysis completed for the proposed development project, including a policy consistency review and a site access evaluation.

8.1 Policy Consistency

The City of Manteca ATP (2020) and City of Manteca General Plan (2003) were reviewed to determine if the proposed development project results in any inconsistencies with adopted transportation related policies.

Active Transportation Plan (ATP)

The ATP identifies planned future Class II bike lane on Union Road north of Lathrop Road and SR 99 Frontage Road north of Lathrop Road. Based on the Tentative Subdivision Map Plans (labeled Attachment A) in the Notice of Preparation dated October 22, 2021, the proposed project will include the widening of Union Road, which will provide a second northbound vehicle travel lane and landscaped sidewalk area. The proposed project will also construct landscaped sidewalk area long SR 99 Frontage Road. However, the project plans do not currently include the construction of Class II bike lanes as identified in the ATP. Therefore, the following COA is recommended to ensure the project is consistent with the ATP:

- **Traffic COA #4** – The developer shall construct Class II bike lanes along its frontage on Union Road and SR 99 Frontage Road, as identified in the City of Manteca ATP. The design of the bike lane shall be reviewed and approved by the Director of Engineering. The cost of bike lane construction shall be included in the total cost associated with the Union Road widening along the project frontage.

The proposed project will construct the continuation of the Class I Tidewater Bikeway. The proposed project will also construct sidewalks on internal streets, providing adequate connections to and throughout the site for pedestrians.

Manteca General Plan

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. The proposed General Plan Update shows the Development Area portion of the Project site with a Low Density Residential, High Density Residential, and Park land use designation. It is noted that the proposed Project includes a General Plan Amendment that proposes land uses consistent with the proposed General Plan Update.

The proposed General Plan Update shows the Annexation SubArea 1 and 2 as Low Density Residential, and Annexation SubArea 3 as Low Density Residential, Medium Density Residential, and Commercial. It is noted that the proposed Project includes a General Plan Amendment that proposes land uses in the Annexation SubAreas consistent with the proposed General Plan Update.

Additionally, the proposed project is consistent with goals and policies identified in the Circulation Element of the City of Manteca General Plan 2023, as described below:

Goals

- Goal C-2. Provide complete streets designed to serve a broad spectrum of travel modes, including automobiles, public transit, walking, and bicycling.
- Goal C-9. Provide a safe, secure, and convenient bicycle route system that connects to retail, employment centers, public facilities, and parks
- Goal C-10. Provide for safe and convenient pedestrian circulation.

The proposed project includes bicycle and pedestrian improvements that will help create complete streets and are consistent with the goals described above.

Policies

- C-P-2: To the extent feasible, the City shall strive for a vehicular LOS of D or better at all streets and intersections, except in the Downtown area where right-of-way is limited, pedestrian, bicycle, and transit mobility are most important and vehicular LOS is not a consideration.
- C-P-9: Residential and collector street intersections with collector and arterial streets shall be aligned with other residential and collector streets, where feasible, to maintain a high degree of connectivity between neighborhoods, minimize circuitous travel, and to allow bicyclists and pedestrians to travel conveniently and safely from one neighborhood to another without using major streets.

Although LOS cannot be used as a CEQA metric to identify significant transportation impacts, intersection operations were analyzed for the proposed project and are discussed in Chapters 4, 5, and 6. With recommended improvements described in those chapters, all intersections would operate at LOS D or better with the addition of project trips. Additionally, the project has been designed so residential streets align with the existing intersection at Union Road/Shady Pines Street and connect to the residential development to the west.

8.2 Site Access Evaluation

As described in Chapter 4 and displayed in **Figure 7**, access for the proposed development project would be at Union Road/Shady Pines Street, SR 99 Frontage Road/Shady Pines Street, and Union Road/Duluth Way. The preliminary site plan indicates adequate emergency access would be provided and there do not appear to be any geometric hazards. However, all intersections and street sections should be reviewed by the City of Manteca and designed to comply with typical City standards. With consideration to pedestrian safety, it is recommended that Union Road/Shady Pines Street be constructed as a signalized intersection under Existing Plus Project and Cumulative Plus Project Conditions. SR 99 Frontage Road/Shady Pines Street and Union Road/Duluth Way intersections may be constructed as side-street stop control intersections. All project access intersections, internal intersections, and internal roadways should be carefully designed to ensure they can accommodate emergency vehicles.

9. Conclusion

This chapter presents the conclusions of the transportation impact analysis for the proposed North Manteca Annexation #1 project in the City of Manteca.

9.1 Transportation Impact Analysis

Consistent with SB 743, VMT is used as the primary metric for identifying significant transportation impacts. Under both Existing and Cumulative Conditions, the proposed development would generate home-based VMT per single family household and multi-family household that exceed 85 percent of the City-wide average. In addition, under both Existing and Cumulative Conditions, the proposed development would result in a net increase of total VMT in the model area. Therefore, there is a **significant** transportation impact.

The VMT generation of a project is largely dictated by the combination of land use proximity and transportation infrastructure. Mitigation Measure **MM-TRA-1** summarizes transportation measures with VMT-reducing benefits that may be applicable at project or community level in the City of Manteca. However, as the suburban land use context of the City largely dictates the distance and modes of travel between destinations, combined with the City's limited ability to influence other measures that would have the largest effect on VMT (such as implementation of a VMT tax or an increase in the fuel tax), the effectiveness of these TDM measures cannot be guaranteed to reduce impacts and the impact is considered **significant and unavoidable.**

MM-TRA-1: Implement VMT mitigation options

Potential measures for individual development include, but are not limited to:

- Increase residential density
- Limit residential parking supply
- Unbundle residential parking cost from property cost
- Provide access to transit (Transit Oriented Development)
- Improve street connectivity
- Provide ride-share program
- Implement subsidized or discounted transit program
- Provide end-of-trip bicycle facilities
- Provide community-based travel planning
- Provide electric vehicle charging infrastructure
- Implement market price public on-street parking
- Provide pedestrian network improvement

- Construct or improve bike facility
- Construct or improve bike boulevard
- Expand bikeway network
- Implement conventional or electric carshare program
- Implement pedal or electric bikeshare program
- Implement scootershare program
- Extend transit network coverage or hours
- Increase transit service frequency
- Implement transit-supportive roadway treatments
- Reduce transit fares

With the implementation of Traffic COA #4, the proposed development project would not conflict with any program, plan, ordinance, or policy addressing the circulation system, substantially increase hazards due to a geometric feature, or result in inadequate emergency access. These impacts would be **less than significant**.

9.2 Intersection Operations Analysis

Results of the intersection operations analysis indicate that all intersections operate acceptably under Existing Conditions. With the addition of project trips, level of service at Union Road/Shady Pines Street and Union Road/Lovelace Road would degrade from acceptable operations to deficient operations during both peak hours. Under Existing Plus Project Conditions, both intersections would operate acceptably as a signalized intersection.

Under Cumulative No Project and Cumulative Plus Project conditions, Union Road/Lathrop Road and Lathrop Road/Madison Grove Drive would operate deficiently during the AM and PM peak hour. Because the Project would contribute to the cumulative growth in traffic volumes at these intersections, the developer shall contribute to improve traffic operations at these two locations.

Under Cumulative No Project and Cumulative Plus Project conditions, the Lathrop Road/Harlan Road intersection would operate deficiently during the AM and PM peak hour. This intersection is located in the City of Lathrop and will be further evaluated as part of the I-5/Lathrop Road interchange improvement project identified in the SJCOG RTP/SCS.

Recommended Conditions of Approval

The following conditions should be incorporated into the Conditions of Approval for the proposed project:

- **Traffic COA #1** – The developer shall install a traffic signal and implement intersection lane configuration improvements (i.e., add a southbound left turn pocket) at the Union Road/Shady Pines Street intersection. The design of the traffic signal and intersection improvements shall be

reviewed and approved by the Director of Engineering. The developer shall pay for the total cost for the design and installation of the improvements as this intersection would provide direct access to the project site.

- **Traffic COA #2 –** The developer shall pay the current PFIP fee as determined by the City of Manteca prior to issuance of building permits to mitigate the proposed project's impact at Union Road/Lovelace Road. The project contributes to approximately 15 percent of volumes at this intersection under Existing Plus Project conditions. Therefore, the project's fair share would be 15 percent of the cost of signalizing the Union Road/Lovelace intersection. The traffic signal shall be constructed when the Lovelace Road extension is constructed.
- **Traffic COA #3 –** The developer shall pay the current PFIP fee as determined by the City of Manteca prior to issuance of building permits to mitigate the Project's impact at Union Road/Lathrop Road and Lathrop Road/Madison Grove Drive. The developer shall install a new traffic signal controller at the Union Road/Lathrop Road intersection and fund a traffic signal timing optimization study.
- **Traffic COA #4** – The developer shall construct Class II bike lanes along its frontage on Union Road and SR 99 Frontage Road, as identified in the City of Manteca ATP. The design of the bike lane shall be reviewed and approved by the Director of Engineering. The cost of bike lane construction shall be included in the total cost associated with the Union Road widening along the project frontage.

Appendix A – Technical Calculations

Appendix B – Signal Warrant Calculations

Appendix A – Technical Calculations



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	213	87	46	360	164	45
Future Volume (veh/h)	213	87	46	360	164	45
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1737	1737	1737	1737	1737	1737
Adj Flow Rate, veh/h	227	93	49	383	174	48
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	11	11	11	11	11	11
Cap, veh/h	462	391	87	815	380	338
Arrive On Green	0.27	0.27	0.05	0.47	0.23	0.23
Sat Flow, veh/h	1737	1472	1654	1737	1654	1472
Grp Volume(v), veh/h	227	93	49	383	174	48
Grp Sat Flow(s),veh/h/ln	1737	1472	1654	1737	1654	1472
Q Serve(g_s), s	4.4	2.0	1.2	6.0	3.6	1.0
Cycle Q Clear(g_c), s	4.4	2.0	1.2	6.0	3.6	1.0
Prop In Lane		1.00	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	462	391	87	815	380	338
V/C Ratio(X)	0.49	0.24	0.56	0.47	0.46	0.14
Avail Cap(c_a), veh/h	1745	1479	831	1745	831	739
HCM Platoon Ratio	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
Uniform Delay (d), s/veh	12.3	11.5	18.4	7.2	13.2	12.2
Incr Delay (d2), s/veh	2.9	1.1	5.6	1.5	3.1	0.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.4	0.5	0.5	1.3	1.2	0.3
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	15.3	12.6	24.0	8.7	16.3	12.9
LnGrp LOS	B	B	C	A	B	B
Approach Vol, veh/h	320			432	222	
Approach Delay, s/veh	14.5			10.5	15.6	
Approach LOS	B			B	B	

Timer - Assigned Phs	1	2		4		6
Phs Duration (G+Y+Rc), s	8.1	16.6		15.1		24.7
Change Period (Y+Rc), s	6.0	6.0		6.0		6.0
Max Green Setting (Gmax), s	20.0	40.0		20.0		40.0
Max Q Clear Time (g_c+I1), s	3.2	6.4		5.6		8.0
Green Ext Time (p_c), s	0.1	4.2		1.6		5.7

Intersection Summary			
HCM 6th Ctrl Delay		13.0	
HCM 6th LOS		B	

Intersection	
Int Delay, s/veh	2.4

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	12	53	58	181	144	29
Future Vol, veh/h	12	53	58	181	144	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	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	8	8	8	8	8	8
Mvmt Flow	13	60	65	203	162	33

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	512	179	195	0	-	0
Stage 1	179	-	-	-	-	-
Stage 2	333	-	-	-	-	-
Critical Hdwy	6.48	6.28	4.18	-	-	-
Critical Hdwy Stg 1	5.48	-	-	-	-	-
Critical Hdwy Stg 2	5.48	-	-	-	-	-
Follow-up Hdwy	3.572	3.372	2.272	-	-	-
Pot Cap-1 Maneuver	511	849	1343	-	-	-
Stage 1	838	-	-	-	-	-
Stage 2	713	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	483	849	1343	-	-	-
Mov Cap-2 Maneuver	483	-	-	-	-	-
Stage 1	792	-	-	-	-	-
Stage 2	713	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	10.4	1.9	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1343	-	745	-	-
HCM Lane V/C Ratio	0.049	-	0.098	-	-
HCM Control Delay (s)	7.8	0	10.4	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0.2	-	0.3	-	-

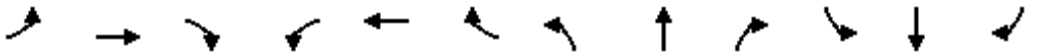
Intersection	
Int Delay, s/veh	1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	8	27	15	235	183	6
Future Vol, veh/h	8	27	15	235	183	6
Conflicting Peds, #/hr	0	0	1	0	0	1
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	100	140	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	87	87	87	87	87	87
Heavy Vehicles, %	7	7	7	7	7	7
Mvmt Flow	9	31	17	270	210	7

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	519	215	218	0	-	0
Stage 1	215	-	-	-	-	-
Stage 2	304	-	-	-	-	-
Critical Hdwy	6.47	6.27	4.17	-	-	-
Critical Hdwy Stg 1	5.47	-	-	-	-	-
Critical Hdwy Stg 2	5.47	-	-	-	-	-
Follow-up Hdwy	3.563	3.363	2.263	-	-	-
Pot Cap-1 Maneuver	508	813	1322	-	-	-
Stage 1	809	-	-	-	-	-
Stage 2	737	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	500	812	1321	-	-	-
Mov Cap-2 Maneuver	500	-	-	-	-	-
Stage 1	798	-	-	-	-	-
Stage 2	736	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	10.2	0.5	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	1321	-	500	812	-	-
HCM Lane V/C Ratio	0.013	-	0.018	0.038	-	-
HCM Control Delay (s)	7.8	-	12.3	9.6	-	-
HCM Lane LOS	A	-	B	A	-	-
HCM 95th %tile Q(veh)	0	-	0.1	0.1	-	-



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	2	0	47	76	1	14	24	236	45	6	201	1
Future Volume (veh/h)	2	0	47	76	1	14	24	236	45	6	201	1
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		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1811	1811	1811	1811	1811	1811	1811	1811	1811	1811	1811	1811
Adj Flow Rate, veh/h	2	0	57	93	1	17	29	288	55	7	245	1
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Percent Heavy Veh, %	6	6	6	6	6	6	6	6	6	6	6	6
Cap, veh/h	6	0	145	173	17	282	72	882	166	19	965	4
Arrive On Green	0.00	0.00	0.10	0.10	0.19	0.19	0.04	0.31	0.31	0.01	0.27	0.27
Sat Flow, veh/h	1725	0	1510	1725	86	1460	1725	2889	544	1725	3514	14
Grp Volume(v), veh/h	2	0	57	93	0	18	29	170	173	7	120	126
Grp Sat Flow(s),veh/h/ln	1725	0	1510	1725	0	1546	1725	1721	1713	1725	1721	1808
Q Serve(g_s), s	0.0	0.0	1.3	1.9	0.0	0.3	0.6	2.8	2.9	0.1	2.0	2.0
Cycle Q Clear(g_c), s	0.0	0.0	1.3	1.9	0.0	0.3	0.6	2.8	2.9	0.1	2.0	2.0
Prop In Lane	1.00		1.00	1.00		0.94	1.00		0.32	1.00		0.01
Lane Grp Cap(c), veh/h	6	0	145	173	0	298	72	525	523	19	473	497
V/C Ratio(X)	0.35	0.00	0.39	0.54	0.00	0.06	0.40	0.32	0.33	0.36	0.25	0.25
Avail Cap(c_a), veh/h	986	0	946	986	0	968	1221	1874	1866	1221	1874	1969
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	1.00	1.00
Uniform Delay (d), s/veh	18.3	0.0	15.6	15.7	0.0	12.1	17.1	9.8	9.9	18.0	10.4	10.4
Incr Delay (d2), s/veh	33.2	0.0	1.7	2.6	0.0	0.1	3.6	0.5	0.5	10.9	0.4	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	0.0	0.5	0.7	0.0	0.1	0.3	0.7	0.8	0.1	0.5	0.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	51.5	0.0	17.3	18.3	0.0	12.2	20.7	10.3	10.4	28.9	10.8	10.8
LnGrp LOS	D	A	B	B	A	B	C	B	B	C	B	B
Approach Vol, veh/h		59			111			372			253	
Approach Delay, s/veh		18.5			17.3			11.2			11.3	
Approach LOS		B			B			B			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	4.4	16.5	7.7	8.1	5.5	15.4	4.1	11.7
Change Period (Y+Rc), s	4.0	5.3	4.0	4.6	4.0	5.3	4.0	4.6
Max Green Setting (Gmax), s	26.0	40.0	21.0	23.0	26.0	40.0	21.0	23.0
Max Q Clear Time (g_c+I1), s	2.1	4.9	3.9	3.3	2.6	4.0	2.0	2.3
Green Ext Time (p_c), s	0.0	2.8	0.2	0.2	0.0	1.9	0.0	0.0

Intersection Summary	
HCM 6th Ctrl Delay	12.6
HCM 6th LOS	B

Notes

User approved pedestrian interval to be less than phase max green.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	71	378	133	303	357	141	116	169	253	129	240	48
Future Volume (veh/h)	71	378	133	303	357	141	116	169	253	129	240	48
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		0.99	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1811	1811	1811	1811	1811	1811	1811	1811	1811	1811	1811	1811
Adj Flow Rate, veh/h	81	430	151	344	406	160	132	192	288	147	273	55
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Percent Heavy Veh, %	6	6	6	6	6	6	6	6	6	6	6	6
Cap, veh/h	105	671	299	387	867	338	168	433	381	185	746	148
Arrive On Green	0.06	0.19	0.19	0.22	0.36	0.36	0.10	0.25	0.25	0.11	0.26	0.26
Sat Flow, veh/h	1725	3441	1535	1725	2420	942	1725	1721	1514	1725	2854	566
Grp Volume(v), veh/h	81	430	151	344	287	279	132	192	288	147	163	165
Grp Sat Flow(s),veh/h/ln	1725	1721	1535	1725	1721	1641	1725	1721	1514	1725	1721	1699
Q Serve(g_s), s	3.8	9.3	7.1	15.7	10.4	10.7	6.1	7.6	14.3	6.8	6.3	6.5
Cycle Q Clear(g_c), s	3.8	9.3	7.1	15.7	10.4	10.7	6.1	7.6	14.3	6.8	6.3	6.5
Prop In Lane	1.00		1.00	1.00		0.57	1.00		1.00	1.00		0.33
Lane Grp Cap(c), veh/h	105	671	299	387	617	588	168	433	381	185	450	444
V/C Ratio(X)	0.77	0.64	0.50	0.89	0.47	0.47	0.78	0.44	0.76	0.79	0.36	0.37
Avail Cap(c_a), veh/h	510	1482	661	510	741	707	510	847	745	510	847	836
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	37.6	30.1	29.2	30.5	20.1	20.1	35.8	25.6	28.1	35.4	24.5	24.6
Incr Delay (d2), s/veh	11.1	1.5	1.9	14.1	0.8	0.8	7.8	1.0	4.4	7.5	0.7	0.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.8	3.7	2.6	7.5	3.9	3.8	2.8	3.1	5.3	3.0	2.4	2.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	48.7	31.6	31.1	44.6	20.8	21.0	43.6	26.6	32.5	42.8	25.2	25.3
LnGrp LOS	D	C	C	D	C	C	D	C	C	D	C	C
Approach Vol, veh/h		662			910			612			475	
Approach Delay, s/veh		33.5			29.9			33.0			30.7	
Approach LOS		C			C			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	12.2	20.8	11.9	26.2	9.0	34.1	12.7	25.4
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	24.0	35.0	24.0	40.0	24.0	35.0	24.0	40.0
Max Q Clear Time (g_c+I1), s	17.7	11.3	8.1	8.5	5.8	12.7	8.8	16.3
Green Ext Time (p_c), s	0.6	4.5	0.3	2.6	0.1	4.5	0.3	4.1

Intersection Summary	
HCM 6th Ctrl Delay	31.7
HCM 6th LOS	C

Intersection	
Int Delay, s/veh	10.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	56	21	143	37	0	0	0	0	216	3	33
Future Vol, veh/h	0	56	21	143	37	0	0	0	0	216	3	33
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	0	-	-	-	-	-	0	-	520
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	87	87	87	87	87	87	87	87	87	87	87	87
Heavy Vehicles, %	37	37	37	37	37	37	37	37	37	37	37	37
Mvmt Flow	0	64	24	164	43	0	0	0	0	248	3	38

Major/Minor	Major1			Major2			Minor2		
Conflicting Flow All	-	0	0	88	0	0	403	459	22
Stage 1	-	-	-	-	-	-	371	371	-
Stage 2	-	-	-	-	-	-	32	88	-
Critical Hdwy	-	-	-	4.84	-	-	7.54	7.24	7.64
Critical Hdwy Stg 1	-	-	-	-	-	-	6.54	6.24	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	6.24	-
Follow-up Hdwy	-	-	-	2.57	-	-	3.87	4.37	3.67
Pot Cap-1 Maneuver	0	-	-	1284	-	0	493	427	947
Stage 1	0	-	-	-	-	0	575	538	-
Stage 2	0	-	-	-	-	0	893	746	-
Platoon blocked, %		-	-		-				
Mov Cap-1 Maneuver	-	-	-	1284	-	-	430	0	947
Mov Cap-2 Maneuver	-	-	-	-	-	-	430	0	-
Stage 1	-	-	-	-	-	-	575	0	-
Stage 2	-	-	-	-	-	-	779	0	-

Approach	EB	WB	SB
HCM Control Delay, s	0	6.5	16.6
HCM LOS			C

Minor Lane/Major Mvmt	EBT	EBR	WBL	WBT	SBLn1	SBLn2
Capacity (veh/h)	-	-	1284	-	430	519
HCM Lane V/C Ratio	-	-	0.128	-	0.385	0.239
HCM Control Delay (s)	-	-	8.2	-	18.5	14.1
HCM Lane LOS	-	-	A	-	C	B
HCM 95th %tile Q(veh)	-	-	0.4	-	1.8	0.9

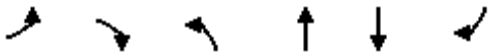
Intersection	
Int Delay, s/veh	3.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	17	255	0	0	168	231	12	3	158	0	0	0
Future Vol, veh/h	17	255	0	0	168	231	12	3	158	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	Free	-	-	Stop	-	-	None
Storage Length	0	-	-	-	-	-	630	-	0	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	87	87	87	87	87	87	87	87	87	87	87	87
Heavy Vehicles, %	37	37	37	37	37	37	37	37	37	37	37	37
Mvmt Flow	20	293	0	0	193	266	14	3	182	0	0	0

Major/Minor	Major1			Major2			Minor1		
Conflicting Flow All	193	0	-	-	-	0	430	526	147
Stage 1	-	-	-	-	-	-	333	333	-
Stage 2	-	-	-	-	-	-	97	193	-
Critical Hdwy	4.84	-	-	-	-	-	7.54	7.24	7.64
Critical Hdwy Stg 1	-	-	-	-	-	-	6.54	6.24	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	6.24	-
Follow-up Hdwy	2.57	-	-	-	-	-	3.87	4.37	3.67
Pot Cap-1 Maneuver	1157	-	0	0	-	0	472	387	773
Stage 1	-	-	0	0	-	0	604	562	-
Stage 2	-	-	0	0	-	0	821	661	-
Platoon blocked, %		-			-				
Mov Cap-1 Maneuver	1157	-	-	-	-	-	464	0	773
Mov Cap-2 Maneuver	-	-	-	-	-	-	464	0	-
Stage 1	-	-	-	-	-	-	594	0	-
Stage 2	-	-	-	-	-	-	821	0	-

Approach	EB	WB	NB
HCM Control Delay, s	0.5	0	11.3
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	WBT
Capacity (veh/h)	464	773	1157	-	-
HCM Lane V/C Ratio	0.037	0.235	0.017	-	-
HCM Control Delay (s)	13.1	11.1	8.2	-	-
HCM Lane LOS	B	B	A	-	-
HCM 95th %tile Q(veh)	0.1	0.9	0.1	-	-



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	57	63	80	221	154	63
Future Volume (veh/h)	57	63	80	221	154	63
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1604	1604	1604	1604	1604	1604
Adj Flow Rate, veh/h	61	67	85	235	164	67
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	20	20	20	20	20	20
Cap, veh/h	138	122	106	771	536	210
Arrive On Green	0.09	0.09	0.07	0.48	0.25	0.25
Sat Flow, veh/h	1527	1359	1527	1604	2217	839
Grp Volume(v), veh/h	61	67	85	235	115	116
Grp Sat Flow(s),veh/h/ln	1527	1359	1527	1604	1523	1453
Q Serve(g_s), s	1.1	1.3	1.5	2.5	1.7	1.8
Cycle Q Clear(g_c), s	1.1	1.3	1.5	2.5	1.7	1.8
Prop In Lane	1.00	1.00	1.00			0.58
Lane Grp Cap(c), veh/h	138	122	106	771	382	364
V/C Ratio(X)	0.44	0.55	0.81	0.30	0.30	0.32
Avail Cap(c_a), veh/h	1311	1166	1311	2237	2125	2026
HCM Platoon Ratio	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
Uniform Delay (d), s/veh	12.1	12.2	12.8	4.4	8.5	8.5
Incr Delay (d2), s/veh	2.2	3.8	18.0	0.8	1.6	1.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	0.4	0.8	0.2	0.4	0.4
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	14.3	15.9	30.8	5.2	10.1	10.3
LnGrp LOS	B	B	C	A	B	B
Approach Vol, veh/h	128			320	231	
Approach Delay, s/veh	15.2			12.0	10.2	
Approach LOS	B			B	B	

Timer - Assigned Phs	1	2		4		6
Phs Duration (G+Y+Rc), s	6.4	13.0		8.5		19.4
Change Period (Y+Rc), s	4.5	6.0		6.0		6.0
Max Green Setting (Gmax), s	24.0	39.0		24.0		39.0
Max Q Clear Time (g_c+I1), s	3.5	3.8		3.3		4.5
Green Ext Time (p_c), s	0.3	3.2		0.3		3.3

Intersection Summary			
HCM 6th Ctrl Delay			12.0
HCM 6th LOS			B

Notes

User approved pedestrian interval to be less than phase max green.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	486	66	282	625	0	0	0	0	227	5	85
Future Volume (veh/h)	0	486	66	282	625	0	0	0	0	227	5	85
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		1.00				1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Work Zone On Approach		No			No						No	
Adj Sat Flow, veh/h/ln	0	1811	1811	1811	1811	0				1811	1811	1811
Adj Flow Rate, veh/h	0	552	75	320	710	0				258	6	97
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88				0.88	0.88	0.88
Percent Heavy Veh, %	0	6	6	6	6	0				6	6	6
Cap, veh/h	0	1033	138	379	981	0				310	7	116
Arrive On Green	0.00	0.24	0.24	0.22	0.54	0.00				0.26	0.26	0.26
Sat Flow, veh/h	0	4559	587	1725	1811	0				1194	28	449
Grp Volume(v), veh/h	0	412	215	320	710	0				361	0	0
Grp Sat Flow(s),veh/h/ln	0	1648	1687	1725	1811	0				1671	0	0
Q Serve(g_s), s	0.0	5.0	5.2	8.2	13.7	0.0				9.4	0.0	0.0
Cycle Q Clear(g_c), s	0.0	5.0	5.2	8.2	13.7	0.0				9.4	0.0	0.0
Prop In Lane	0.00		0.35	1.00		0.00				0.71		0.27
Lane Grp Cap(c), veh/h	0	775	397	379	981	0				433	0	0
V/C Ratio(X)	0.00	0.53	0.54	0.84	0.72	0.00				0.83	0.00	0.00
Avail Cap(c_a), veh/h	0	3212	1644	934	1765	0				1447	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	1.00	1.00	1.00	0.00				1.00	0.00	0.00
Uniform Delay (d), s/veh	0.0	15.4	15.5	17.3	8.0	0.0				16.2	0.0	0.0
Incr Delay (d2), s/veh	0.0	0.5	1.1	2.0	0.9	0.0				1.6	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	1.5	1.7	2.8	3.0	0.0				2.9	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	16.0	16.5	19.3	8.9	0.0				17.8	0.0	0.0
LnGrp LOS	A	B	B	B	A	A				B	A	A
Approach Vol, veh/h		627			1030						361	
Approach Delay, s/veh		16.2			12.1						17.8	
Approach LOS		B			B						B	

Timer - Assigned Phs	1	2		4		6
Phs Duration (G+Y+Rc), s	14.1	15.5		16.6		29.6
Change Period (Y+Rc), s	4.0	4.6		4.6		4.6
Max Green Setting (Gmax), s	25.0	45.0		40.0		45.0
Max Q Clear Time (g_c+I1), s	10.2	7.2		11.4		15.7
Green Ext Time (p_c), s	0.1	3.7		0.7		4.5

Intersection Summary	
HCM 6th Ctrl Delay	14.4
HCM 6th LOS	B



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	72	641	0	0	827	245	80	2	189	0	0	0
Future Volume (veh/h)	72	641	0	0	827	245	80	2	189	0	0	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.93	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	1811	1811	0	0	1811	1811	1811	1811	1811			
Adj Flow Rate, veh/h	82	728	0	0	940	278	91	2	215			
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88			
Percent Heavy Veh, %	6	6	0	0	6	6	6	6	6			
Cap, veh/h	110	2101	0	0	1229	362	108	2	254			
Arrive On Green	0.06	0.61	0.00	0.00	0.48	0.48	0.23	0.23	0.23			
Sat Flow, veh/h	1725	3532	0	0	2665	758	469	10	1109			
Grp Volume(v), veh/h	82	728	0	0	627	591	308	0	0			
Grp Sat Flow(s),veh/h/ln	1725	1721	0	0	1721	1612	1588	0	0			
Q Serve(g_s), s	2.7	6.0	0.0	0.0	17.2	17.4	10.6	0.0	0.0			
Cycle Q Clear(g_c), s	2.7	6.0	0.0	0.0	17.2	17.4	10.6	0.0	0.0			
Prop In Lane	1.00		0.00	0.00		0.47	0.30		0.70			
Lane Grp Cap(c), veh/h	110	2101	0	0	821	769	364	0	0			
V/C Ratio(X)	0.75	0.35	0.00	0.00	0.76	0.77	0.85	0.00	0.00			
Avail Cap(c_a), veh/h	751	2698	0	0	1349	1264	1107	0	0			
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	1.00	1.00	0.00	0.00	1.00	1.00	1.00	0.00	0.00			
Uniform Delay (d), s/veh	26.4	5.5	0.0	0.0	12.3	12.4	21.2	0.0	0.0			
Incr Delay (d2), s/veh	3.8	0.1	0.0	0.0	1.4	1.5	2.1	0.0	0.0			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	1.1	1.2	0.0	0.0	5.0	4.8	3.5	0.0	0.0			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	30.2	5.6	0.0	0.0	13.7	13.9	23.3	0.0	0.0			
LnGrp LOS	C	A	A	A	B	B	C	A	A			
Approach Vol, veh/h		810			1218			308				
Approach Delay, s/veh		8.1			13.8			23.3				
Approach LOS		A			B			C				
Timer - Assigned Phs		2			5	6		8				
Phs Duration (G+Y+Rc), s		39.6			7.6	32.0		17.8				
Change Period (Y+Rc), s		4.6			4.0	4.6		4.6				
Max Green Setting (Gmax), s		45.0			25.0	45.0		40.0				
Max Q Clear Time (g_c+I1), s		8.0			4.7	19.4		12.6				
Green Ext Time (p_c), s		4.7			0.0	8.0		0.6				
Intersection Summary												
HCM 6th Ctrl Delay			13.1									
HCM 6th LOS			B									

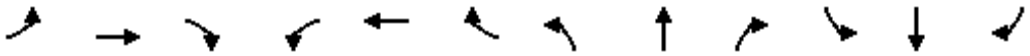
Intersection	
Int Delay, s/veh	1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	680	150	0	955	0	0	0	14	0	0	117
Future Vol, veh/h	0	680	150	0	955	0	0	0	14	0	0	117
Conflicting Peds, #/hr	0	0	2	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	0	-	-	0
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	88	88	88	88	88	88	88	88	88	88	88	88
Heavy Vehicles, %	6	6	6	6	6	6	6	6	6	6	6	6
Mvmt Flow	0	773	170	0	1085	0	0	0	16	0	0	133

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	-	0	0	-	-	0	-	-	474	-	-	543
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	-	-	-	7.02	-	-	7.02
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	-	-	-	3.36	-	-	3.36
Pot Cap-1 Maneuver	0	-	-	0	-	0	0	0	526	0	0	474
Stage 1	0	-	-	0	-	0	0	0	-	0	0	-
Stage 2	0	-	-	0	-	0	0	0	-	0	0	-
Platoon blocked, %		-	-		-							
Mov Cap-1 Maneuver	-	-	-	-	-	-	-	-	525	-	-	474
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0	12.1	15.5
HCM LOS			B	C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBT	SBLn1
Capacity (veh/h)	525	-	-	-	474
HCM Lane V/C Ratio	0.03	-	-	-	0.28
HCM Control Delay (s)	12.1	-	-	-	15.5
HCM Lane LOS	B	-	-	-	C
HCM 95th %tile Q(veh)	0.1	-	-	-	1.1



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	189	387	140	77	536	53	208	111	71	54	96	145
Future Volume (veh/h)	189	387	140	77	536	53	208	111	71	54	96	145
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		0.97	1.00		0.99	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1811	1811	1811	1811	1811	1811	1811	1811	1811	1811	1811	1811
Adj Flow Rate, veh/h	215	440	159	88	609	60	236	126	81	61	109	165
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Percent Heavy Veh, %	6	6	6	6	6	6	6	6	6	6	6	6
Cap, veh/h	247	930	333	114	940	92	268	556	334	103	298	263
Arrive On Green	0.14	0.38	0.38	0.07	0.30	0.30	0.16	0.27	0.27	0.06	0.17	0.17
Sat Flow, veh/h	1725	2480	888	1725	3156	310	1725	2062	1238	1725	1721	1516
Grp Volume(v), veh/h	215	304	295	88	332	337	236	104	103	61	109	165
Grp Sat Flow(s),veh/h/ln	1725	1721	1648	1725	1721	1745	1725	1721	1580	1725	1721	1516
Q Serve(g_s), s	11.4	12.5	12.8	4.7	15.7	15.7	12.5	4.4	4.8	3.2	5.2	9.4
Cycle Q Clear(g_c), s	11.4	12.5	12.8	4.7	15.7	15.7	12.5	4.4	4.8	3.2	5.2	9.4
Prop In Lane	1.00		0.54	1.00		0.18	1.00		0.78	1.00		1.00
Lane Grp Cap(c), veh/h	247	645	618	114	513	520	268	464	426	103	298	263
V/C Ratio(X)	0.87	0.47	0.48	0.77	0.65	0.65	0.88	0.22	0.24	0.59	0.37	0.63
Avail Cap(c_a), veh/h	369	736	705	369	736	746	406	699	642	332	717	632
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	39.2	22.2	22.3	43.0	28.6	28.6	38.6	26.6	26.7	42.9	34.1	35.9
Incr Delay (d2), s/veh	9.8	1.1	1.2	12.5	2.9	2.9	9.6	0.5	0.6	2.0	1.6	5.2
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	5.3	4.9	4.8	2.3	6.4	6.6	5.8	1.8	1.8	1.4	2.2	3.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	49.0	23.3	23.5	55.5	31.5	31.5	48.2	27.1	27.3	44.9	35.7	41.0
LnGrp LOS	D	C	C	E	C	C	D	C	C	D	D	D
Approach Vol, veh/h		814			757			443			335	
Approach Delay, s/veh		30.2			34.3			38.4			40.0	
Approach LOS		C			C			D			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	11.2	40.6	19.6	22.2	18.4	33.4	10.6	31.2
Change Period (Y+Rc), s	5.0	5.5	5.0	6.0	5.0	5.5	5.0	6.0
Max Green Setting (Gmax), s	20.0	40.0	22.0	39.0	20.0	40.0	18.0	38.0
Max Q Clear Time (g_c+I1), s	6.7	14.8	14.5	11.4	13.4	17.7	5.2	6.8
Green Ext Time (p_c), s	0.2	6.8	0.0	3.0	0.0	7.2	0.0	2.3

Intersection Summary	
HCM 6th Ctrl Delay	34.4
HCM 6th LOS	C

Notes

User approved pedestrian interval to be less than phase max green.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	64	320	95	61	404	64	137	153	52	44	123	56
Future Volume (veh/h)	64	320	95	61	404	64	137	153	52	44	123	56
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.98	1.00		0.98	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1781	1781	1781	1781	1781	1781	1781	1781	1781	1781	1781	1781
Adj Flow Rate, veh/h	74	368	109	70	464	74	157	176	60	51	141	64
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Percent Heavy Veh, %	8	8	8	8	8	8	8	8	8	8	8	8
Cap, veh/h	95	695	589	90	578	92	199	306	104	76	303	251
Arrive On Green	0.06	0.39	0.39	0.05	0.39	0.39	0.12	0.24	0.24	0.04	0.17	0.17
Sat Flow, veh/h	1697	1781	1510	1697	1494	238	1697	1262	430	1697	1781	1476
Grp Volume(v), veh/h	74	368	109	70	0	538	157	0	236	51	141	64
Grp Sat Flow(s),veh/h/ln	1697	1781	1510	1697	0	1732	1697	0	1692	1697	1781	1476
Q Serve(g_s), s	3.1	11.4	3.4	2.9	0.0	19.8	6.4	0.0	8.8	2.1	5.1	2.7
Cycle Q Clear(g_c), s	3.1	11.4	3.4	2.9	0.0	19.8	6.4	0.0	8.8	2.1	5.1	2.7
Prop In Lane	1.00		1.00	1.00		0.14	1.00		0.25	1.00		1.00
Lane Grp Cap(c), veh/h	95	695	589	90	0	670	199	0	411	76	303	251
V/C Ratio(X)	0.78	0.53	0.18	0.78	0.00	0.80	0.79	0.00	0.57	0.68	0.47	0.26
Avail Cap(c_a), veh/h	592	921	780	592	0	1016	592	0	945	592	1294	1072
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	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	33.3	16.8	14.3	33.5	0.0	19.5	30.7	0.0	23.9	33.7	26.8	25.8
Incr Delay (d2), s/veh	12.6	1.3	0.3	13.4	0.0	5.1	6.8	0.0	2.0	10.0	1.8	0.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.5	4.2	1.1	1.5	0.0	7.7	2.8	0.0	3.4	1.0	2.1	0.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	45.9	18.1	14.7	46.9	0.0	24.6	37.5	0.0	25.9	43.7	28.6	26.6
LnGrp LOS	D	B	B	D	A	C	D	A	C	D	C	C
Approach Vol, veh/h		551			608			393			256	
Approach Delay, s/veh		21.2			27.2			30.5			31.1	
Approach LOS		C			C			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	7.8	33.9	7.2	22.7	8.0	33.7	12.4	17.5
Change Period (Y+Rc), s	4.0	6.0	4.0	5.3	4.0	6.0	4.0	5.3
Max Green Setting (Gmax), s	25.0	37.0	25.0	40.0	25.0	42.0	25.0	52.0
Max Q Clear Time (g_c+I1), s	4.9	13.4	4.1	10.8	5.1	21.8	8.4	7.1
Green Ext Time (p_c), s	0.1	4.8	0.1	2.1	0.1	5.9	0.3	1.6

Intersection Summary	
HCM 6th Ctrl Delay	26.6
HCM 6th LOS	C

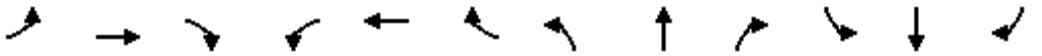
Intersection	
Int Delay, s/veh	0.9

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	13	566	500	16	33	11
Future Vol, veh/h	13	566	500	16	33	11
Conflicting Peds, #/hr	1	0	0	1	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	110	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	86	86	86	86	86	86
Heavy Vehicles, %	7	7	7	7	7	7
Mvmt Flow	15	658	581	19	38	13

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	601	0	-	0	951	301
Stage 1	-	-	-	-	592	-
Stage 2	-	-	-	-	359	-
Critical Hdwy	4.24	-	-	-	6.94	7.04
Critical Hdwy Stg 1	-	-	-	-	5.94	-
Critical Hdwy Stg 2	-	-	-	-	5.94	-
Follow-up Hdwy	2.27	-	-	-	3.57	3.37
Pot Cap-1 Maneuver	939	-	-	-	249	680
Stage 1	-	-	-	-	502	-
Stage 2	-	-	-	-	663	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	938	-	-	-	245	679
Mov Cap-2 Maneuver	-	-	-	-	245	-
Stage 1	-	-	-	-	493	-
Stage 2	-	-	-	-	662	-

Approach	EB	WB	SB
HCM Control Delay, s	0.2	0	19.9
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	938	-	-	-	292
HCM Lane V/C Ratio	0.016	-	-	-	0.175
HCM Control Delay (s)	8.9	-	-	-	19.9
HCM Lane LOS	A	-	-	-	C
HCM 95th %tile Q(veh)	0	-	-	-	0.6



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	18	666	69	113	663	32	68	7	144	19	10	6
Future Volume (veh/h)	18	666	69	113	663	32	68	7	144	19	10	6
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		0.98	1.00		1.00	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1811	1811	1811	1811	1811	1811	1811	1811	1811	1811	1811	1811
Adj Flow Rate, veh/h	20	748	78	127	745	36	76	8	162	21	11	7
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Percent Heavy Veh, %	6	6	6	6	6	6	6	6	6	6	6	6
Cap, veh/h	43	1318	401	163	1123	54	123	11	217	45	105	67
Arrive On Green	0.02	0.27	0.27	0.09	0.34	0.34	0.07	0.15	0.15	0.03	0.10	0.10
Sat Flow, veh/h	1725	4944	1502	1725	3337	161	1725	73	1473	1725	1028	654
Grp Volume(v), veh/h	20	748	78	127	384	397	76	0	170	21	0	18
Grp Sat Flow(s),veh/h/ln	1725	1648	1502	1725	1721	1778	1725	0	1546	1725	0	1683
Q Serve(g_s), s	0.5	5.2	1.6	2.9	7.6	7.6	1.7	0.0	4.2	0.5	0.0	0.4
Cycle Q Clear(g_c), s	0.5	5.2	1.6	2.9	7.6	7.6	1.7	0.0	4.2	0.5	0.0	0.4
Prop In Lane	1.00		1.00	1.00		0.09	1.00		0.95	1.00		0.39
Lane Grp Cap(c), veh/h	43	1318	401	163	579	598	123	0	228	45	0	172
V/C Ratio(X)	0.47	0.57	0.19	0.78	0.66	0.66	0.62	0.00	0.75	0.47	0.00	0.10
Avail Cap(c_a), veh/h	867	4971	1510	867	1730	1787	863	0	1554	867	0	1691
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	19.1	12.6	11.3	17.6	11.3	11.3	17.9	0.0	16.2	19.1	0.0	16.2
Incr Delay (d2), s/veh	2.9	0.1	0.1	3.0	0.5	0.5	1.9	0.0	1.8	2.8	0.0	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	1.4	0.4	1.0	1.9	2.0	0.7	0.0	1.4	0.2	0.0	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	22.0	12.7	11.4	20.6	11.8	11.7	19.8	0.0	18.1	21.9	0.0	16.3
LnGrp LOS	C	B	B	C	B	B	B	A	B	C	A	B
Approach Vol, veh/h		846			908			246			39	
Approach Delay, s/veh		12.8			13.0			18.6			19.3	
Approach LOS		B			B			B			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	5.1	19.1	5.1	10.5	7.9	16.3	6.9	8.7
Change Period (Y+Rc), s	4.1	5.7	4.1	4.6	4.1	5.7	4.1	4.6
Max Green Setting (Gmax), s	20.0	40.0	20.0	40.0	20.0	40.0	19.9	40.0
Max Q Clear Time (g_c+I1), s	2.5	9.6	2.5	6.2	4.9	7.2	3.7	2.4
Green Ext Time (p_c), s	0.0	0.6	0.0	0.7	0.1	3.4	0.1	0.0

Intersection Summary	
HCM 6th Ctrl Delay	13.7
HCM 6th LOS	B



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	747	82	91	499	56	93	0	369	42	272	216
Future Volume (veh/h)	0	747	82	91	499	56	93	0	369	42	272	216
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		0.98	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	0	1811	1811	1811	1811	1811	1811	0	1811	1811	1811	1811
Adj Flow Rate, veh/h	0	839	92	102	561	63	104	0	415	47	306	243
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Percent Heavy Veh, %	0	6	6	6	6	6	6	0	6	6	6	6
Cap, veh/h	0	1624	552	201	1694	739	138	0	0	73	657	516
Arrive On Green	0.00	0.36	0.36	0.06	0.49	0.49	0.08	0.00	0.00	0.04	0.19	0.19
Sat Flow, veh/h	0	4781	1515	3346	3441	1502	1725	104		1725	3441	2701
Grp Volume(v), veh/h	0	839	92	102	561	63	104	45.1		47	306	243
Grp Sat Flow(s),veh/h/ln	0	1485	1515	1673	1721	1502	1725	D		1725	1721	1351
Q Serve(g_s), s	0.0	10.7	3.0	2.1	7.2	1.6	4.3			1.9	5.7	5.8
Cycle Q Clear(g_c), s	0.0	10.7	3.0	2.1	7.2	1.6	4.3			1.9	5.7	5.8
Prop In Lane	0.00		1.00	1.00		1.00	1.00			1.00		1.00
Lane Grp Cap(c), veh/h	0	1624	552	201	1694	739	138			73	657	516
V/C Ratio(X)	0.00	0.52	0.17	0.51	0.33	0.09	0.75			0.65	0.47	0.47
Avail Cap(c_a), veh/h	0	3745	1274	922	2893	1262	475			475	1755	1377
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00			1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	1.00	1.00	1.00	1.00	1.00			1.00	1.00	1.00
Uniform Delay (d), s/veh	0.0	18.0	15.6	33.1	11.2	9.8	32.7			34.2	26.1	26.1
Incr Delay (d2), s/veh	0.0	0.5	0.3	3.1	0.2	0.1	12.4			14.2	1.2	1.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0			0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	3.3	0.9	0.9	2.3	0.5	2.1			1.0	2.2	1.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	18.6	15.9	36.2	11.4	9.9	45.1			48.4	27.2	27.6
LnGrp LOS	A	B	B	D	B	A	D			D	C	C
Approach Vol, veh/h		931			726						596	
Approach Delay, s/veh		18.3			14.8						29.1	
Approach LOS		B			B						C	

Timer - Assigned Phs	1	2	3	4		6	7
Phs Duration (G+Y+Rc), s	9.3	32.5	10.5	20.4		41.7	7.8
Change Period (Y+Rc), s	4.9	* 6	* 4.7	6.5		6.0	* 4.7
Max Green Setting (Gmax), s	20.0	* 61	* 20	37.0		61.0	* 20
Max Q Clear Time (g_c+I1), s	4.1	12.7	6.3	7.8		9.2	3.9
Green Ext Time (p_c), s	0.4	13.8	0.3	6.0		8.4	0.1

Intersection Summary	
HCM 6th Ctrl Delay	21.1
HCM 6th LOS	C

Notes

User approved pedestrian interval to be less than phase max green.

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



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	299	453	75	318	328	20
Future Volume (veh/h)	299	453	75	318	328	20
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1811	1811	1811	1811	1811	1811
Adj Flow Rate, veh/h	336	0	84	357	369	22
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Percent Heavy Veh, %	6	6	6	6	6	6
Cap, veh/h	962		136	1619	733	336
Arrive On Green	0.28	0.00	0.08	0.47	0.22	0.22
Sat Flow, veh/h	3532	1535	1725	3532	3346	1535
Grp Volume(v), veh/h	336	0	84	357	369	22
Grp Sat Flow(s),veh/h/ln	1721	1535	1725	1721	1673	1535
Q Serve(g_s), s	2.8	0.0	1.7	2.2	3.5	0.4
Cycle Q Clear(g_c), s	2.8	0.0	1.7	2.2	3.5	0.4
Prop In Lane		1.00	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	962		136	1619	733	336
V/C Ratio(X)	0.35		0.62	0.22	0.50	0.07
Avail Cap(c_a), veh/h	3367		965	3367	2152	987
HCM Platoon Ratio	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	1.00
Uniform Delay (d), s/veh	10.3	0.0	15.9	5.6	12.3	11.1
Incr Delay (d2), s/veh	0.1	0.0	1.7	0.0	0.2	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.7	0.0	0.6	0.3	0.9	0.1
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	10.4	0.0	17.6	5.6	12.5	11.1
LnGrp LOS	B		B	A	B	B
Approach Vol, veh/h	336	A		441	391	
Approach Delay, s/veh	10.4			7.9	12.4	
Approach LOS	B			A	B	

Timer - Assigned Phs	1	2			6	8
Phs Duration (G+Y+Rc), s	6.8	16.2			23.0	12.7
Change Period (Y+Rc), s	4.0	* 6.2			6.2	4.9
Max Green Setting (Gmax), s	20.0	* 35			35.0	23.0
Max Q Clear Time (g_c+I1), s	3.7	4.8			4.2	5.5
Green Ext Time (p_c), s	0.0	0.3			0.4	0.2

Intersection Summary	
HCM 6th Ctrl Delay	10.1
HCM 6th LOS	B

Notes

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

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



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	1	3	1	22	13	53	6	245	17	39	170	6
Future Volume (veh/h)	1	3	1	22	13	53	6	245	17	39	170	6
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1693	1693	1693	1693	1693	1693	1693	1693	1693	1693	1693	1693
Adj Flow Rate, veh/h	1	3	1	25	15	60	7	278	19	44	193	7
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Percent Heavy Veh, %	14	14	14	14	14	14	14	14	14	14	14	14
Cap, veh/h	191	128	139	195	20	81	18	495	420	83	1053	38
Arrive On Green	0.10	0.10	0.10	0.10	0.10	0.10	0.01	0.29	0.29	0.05	0.33	0.33
Sat Flow, veh/h	312	1328	1434	348	209	835	1612	1693	1434	1612	3163	114
Grp Volume(v), veh/h	4	0	1	100	0	0	7	278	19	44	98	102
Grp Sat Flow(s),veh/h/ln	1639	0	1434	1392	0	0	1612	1693	1434	1612	1608	1669
Q Serve(g_s), s	0.0	0.0	0.0	1.9	0.0	0.0	0.1	3.9	0.3	0.7	1.2	1.2
Cycle Q Clear(g_c), s	0.1	0.0	0.0	2.0	0.0	0.0	0.1	3.9	0.3	0.7	1.2	1.2
Prop In Lane	0.25		1.00	0.25		0.60	1.00		1.00	1.00		0.07
Lane Grp Cap(c), veh/h	320	0	139	296	0	0	18	495	420	83	535	556
V/C Ratio(X)	0.01	0.00	0.01	0.34	0.00	0.00	0.38	0.56	0.05	0.53	0.18	0.18
Avail Cap(c_a), veh/h	1546	0	1285	1944	0	0	1502	2608	2210	1444	2478	2572
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	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	11.4	0.0	11.4	12.3	0.0	0.0	13.7	8.4	7.1	12.9	6.6	6.6
Incr Delay (d2), s/veh	0.0	0.0	0.0	0.2	0.0	0.0	4.8	1.4	0.1	1.9	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	0.0	0.0	0.0	0.4	0.0	0.0	0.0	0.7	0.0	0.2	0.2	0.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	11.4	0.0	11.4	12.6	0.0	0.0	18.5	9.8	7.1	14.8	6.8	6.8
LnGrp LOS	B	A	B	B	A	A	B	A	A	B	A	A
Approach Vol, veh/h		5			100			304			244	
Approach Delay, s/veh		11.4			12.6			9.8			8.3	
Approach LOS		B			B			A			A	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	6.1	14.4		7.4	5.0	15.5		7.4
Change Period (Y+Rc), s	* 4.7	6.2		* 4.7	* 4.7	6.2		* 4.7
Max Green Setting (Gmax), s	* 25	43.0		* 25	* 26	43.0		* 35
Max Q Clear Time (g_c+I1), s	2.7	5.9		2.1	2.1	3.2		4.0
Green Ext Time (p_c), s	0.0	2.3		0.0	0.0	1.5		0.3

Intersection Summary	
HCM 6th Ctrl Delay	9.7
HCM 6th LOS	A

Notes

User approved pedestrian interval to be less than phase max green.

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



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	44	0	13	0	254	11	4	183	0
Future Volume (veh/h)	0	0	0	44	0	13	0	254	11	4	183	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		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
Work Zone On Approach					No			No			No	
Adj Sat Flow, veh/h/ln				1722	1811	1722	0	1722	1722	1722	1722	0
Adj Flow Rate, veh/h				54	0	16	0	310	13	5	223	0
Peak Hour Factor				0.82	0.92	0.82	0.92	0.82	0.82	0.82	0.82	0.92
Percent Heavy Veh, %				12	6	12	0	12	12	12	12	0
Cap, veh/h				117	0	35	0	1142	48	13	911	0
Arrive On Green				0.09	0.00	0.09	0.00	0.36	0.36	0.01	0.53	0.00
Sat Flow, veh/h				1294	0	383	0	3283	134	1640	1722	0
Grp Volume(v), veh/h				70	0	0	0	158	165	5	223	0
Grp Sat Flow(s),veh/h/ln				1677	0	0	0	1636	1695	1640	1722	0
Q Serve(g_s), s				1.1	0.0	0.0	0.0	1.9	1.9	0.1	1.9	0.0
Cycle Q Clear(g_c), s				1.1	0.0	0.0	0.0	1.9	1.9	0.1	1.9	0.0
Prop In Lane				0.77		0.23	0.00		0.08	1.00		0.00
Lane Grp Cap(c), veh/h				151	0	0	0	585	605	13	911	0
V/C Ratio(X)				0.46	0.00	0.00	0.00	0.27	0.27	0.37	0.24	0.00
Avail Cap(c_a), veh/h				1887	0	0	0	2968	3074	1547	3124	0
HCM Platoon Ratio				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)				1.00	0.00	0.00	0.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh				11.9	0.0	0.0	0.0	6.3	6.3	13.6	3.5	0.0
Incr Delay (d2), s/veh				2.2	0.0	0.0	0.0	0.5	0.5	16.3	0.3	0.0
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				0.4	0.0	0.0	0.0	0.3	0.3	0.1	0.1	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh				14.1	0.0	0.0	0.0	6.8	6.8	29.9	3.8	0.0
LnGrp LOS				B	A	A	A	A	A	C	A	A
Approach Vol, veh/h					70			323			228	
Approach Delay, s/veh					14.1			6.8			4.4	
Approach LOS					B			A			A	

Timer - Assigned Phs	1	2		4		6
Phs Duration (G+Y+Rc), s	4.7	15.8		7.0		20.6
Change Period (Y+Rc), s	4.5	6.0		4.5		6.0
Max Green Setting (Gmax), s	26.0	50.0		31.0		50.0
Max Q Clear Time (g_c+I1), s	2.1	3.9		3.1		3.9
Green Ext Time (p_c), s	0.0	3.8		0.3		2.5

Intersection Summary	
HCM 6th Ctrl Delay	6.7
HCM 6th LOS	A

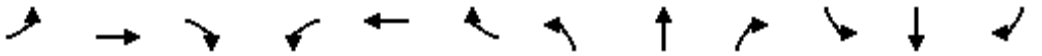
Intersection	
Int Delay, s/veh	0.2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	1	1	64	34	0
Future Vol, veh/h	0	1	1	64	34	0
Conflicting Peds, #/hr	0	0	1	0	0	1
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	89	89	89	89	89	89
Heavy Vehicles, %	9	9	9	9	9	9
Mvmt Flow	0	1	1	72	38	0

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	113	39	39	0	-	0
Stage 1	39	-	-	-	-	-
Stage 2	74	-	-	-	-	-
Critical Hdwy	6.49	6.29	4.19	-	-	-
Critical Hdwy Stg 1	5.49	-	-	-	-	-
Critical Hdwy Stg 2	5.49	-	-	-	-	-
Follow-up Hdwy	3.581	3.381	2.281	-	-	-
Pot Cap-1 Maneuver	867	1013	1527	-	-	-
Stage 1	966	-	-	-	-	-
Stage 2	931	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	864	1012	1526	-	-	-
Mov Cap-2 Maneuver	864	-	-	-	-	-
Stage 1	964	-	-	-	-	-
Stage 2	930	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	8.6	0.1	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1526	-	1012	-	-
HCM Lane V/C Ratio	0.001	-	0.001	-	-
HCM Control Delay (s)	7.4	0	8.6	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	0	-	-



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	117	137	17	16	334	12	13	4	18	62	32	51
Future Volume (veh/h)	117	137	17	16	334	12	13	4	18	62	32	51
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1663	1663	1663	1663	1663	1663	1663	1663	1663	1663	1663	1663
Adj Flow Rate, veh/h	130	152	19	18	371	13	14	4	20	69	36	57
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	16	16	16	16	16	16	16	16	16	16	16	16
Cap, veh/h	166	369	46	63	707	25	27	8	38	109	57	145
Arrive On Green	0.10	0.25	0.25	0.04	0.23	0.23	0.05	0.05	0.05	0.10	0.10	0.10
Sat Flow, veh/h	1584	1449	181	1584	3114	109	550	157	786	1058	552	1409
Grp Volume(v), veh/h	130	0	171	18	188	196	38	0	0	105	0	57
Grp Sat Flow(s),veh/h/ln	1584	0	1630	1584	1580	1643	1494	0	0	1610	0	1409
Q Serve(g_s), s	4.2	0.0	4.6	0.6	5.5	5.5	1.3	0.0	0.0	3.3	0.0	2.0
Cycle Q Clear(g_c), s	4.2	0.0	4.6	0.6	5.5	5.5	1.3	0.0	0.0	3.3	0.0	2.0
Prop In Lane	1.00		0.11	1.00		0.07	0.37		0.53	0.66		1.00
Lane Grp Cap(c), veh/h	166	0	415	63	359	373	73	0	0	166	0	145
V/C Ratio(X)	0.78	0.00	0.41	0.29	0.52	0.53	0.52	0.00	0.00	0.63	0.00	0.39
Avail Cap(c_a), veh/h	779	0	928	899	1255	1306	452	0	0	853	0	746
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	1.00	1.00	1.00	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	23.1	0.0	16.4	24.7	17.9	17.9	24.6	0.0	0.0	22.7	0.0	22.2
Incr Delay (d2), s/veh	7.8	0.0	1.0	2.5	1.8	1.8	5.8	0.0	0.0	4.0	0.0	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	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.7	0.0	1.4	0.2	1.7	1.8	0.5	0.0	0.0	1.3	0.0	0.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	30.8	0.0	17.4	27.1	19.7	19.7	30.3	0.0	0.0	26.7	0.0	23.9
LnGrp LOS	C	A	B	C	B	B	C	A	A	C	A	C
Approach Vol, veh/h		301			402			38			162	
Approach Delay, s/veh		23.2			20.0			30.3			25.7	
Approach LOS		C			C			C			C	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	9.6	20.5		15.3	11.0	19.0		7.5				
Change Period (Y+Rc), s	7.5	* 7		* 9.9	5.5	7.0		4.9				
Max Green Setting (Gmax), s	30.0	* 30		* 28	26.0	42.0		16.0				
Max Q Clear Time (g_c+I1), s	2.6	6.6		5.3	6.2	7.5		3.3				
Green Ext Time (p_c), s	0.0	1.2		0.6	0.3	3.2		0.1				

Intersection Summary			
HCM 6th Ctrl Delay		22.5	
HCM 6th LOS		C	

Notes

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



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	83	119	15	3	182	155	16	24	1	8	0	164
Future Volume (veh/h)	83	119	15	3	182	155	16	24	1	8	0	164
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1663	1663	1663	1663	1663	1663	1663	1663	1663	1663	1663	1663
Adj Flow Rate, veh/h	92	132	17	3	202	172	18	27	1	9	0	182
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	16	16	16	16	16	16	16	16	16	16	16	16
Cap, veh/h	121	504	65	9	231	197	39	59	2	243	0	216
Arrive On Green	0.08	0.35	0.35	0.01	0.28	0.28	0.06	0.06	0.06	0.15	0.00	0.15
Sat Flow, veh/h	1584	1444	186	1584	829	706	636	954	35	1584	0	1409
Grp Volume(v), veh/h	92	0	149	3	0	374	46	0	0	9	0	182
Grp Sat Flow(s),veh/h/ln	1584	0	1629	1584	0	1536	1625	0	0	1584	0	1409
Q Serve(g_s), s	3.6	0.0	4.1	0.1	0.0	14.6	1.7	0.0	0.0	0.3	0.0	7.9
Cycle Q Clear(g_c), s	3.6	0.0	4.1	0.1	0.0	14.6	1.7	0.0	0.0	0.3	0.0	7.9
Prop In Lane	1.00		0.11	1.00		0.46	0.39		0.02	1.00		1.00
Lane Grp Cap(c), veh/h	121	0	569	9	0	427	100	0	0	243	0	216
V/C Ratio(X)	0.76	0.00	0.26	0.33	0.00	0.87	0.46	0.00	0.00	0.04	0.00	0.84
Avail Cap(c_a), veh/h	656	0	831	682	0	906	699	0	0	656	0	584
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	28.4	0.0	14.6	31.1	0.0	21.6	28.4	0.0	0.0	22.6	0.0	25.8
Incr Delay (d2), s/veh	3.7	0.0	0.1	7.8	0.0	2.3	1.2	0.0	0.0	0.0	0.0	3.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.3	0.0	1.2	0.1	0.0	5.1	0.6	0.0	0.0	0.1	0.0	0.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	32.1	0.0	14.7	38.9	0.0	23.9	29.7	0.0	0.0	22.6	0.0	29.2
LnGrp LOS	C	A	B	D	A	C	C	A	A	C	A	C
Approach Vol, veh/h		241			377			46			191	
Approach Delay, s/veh		21.3			24.0			29.7			28.9	
Approach LOS		C			C			C			C	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	6.7	28.9		17.5	11.1	24.5		9.7
Change Period (Y+Rc), s	* 6.3	* 7		7.9	* 6.3	7.0		5.8
Max Green Setting (Gmax), s	* 27	* 32		26.0	* 26	37.0		27.0
Max Q Clear Time (g_c+I1), s	2.1	6.1		9.9	5.6	16.6		3.7
Green Ext Time (p_c), s	0.0	0.1		0.1	0.0	0.9		0.1

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

Notes

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



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	474	192	65	260	157	63
Future Volume (veh/h)	474	192	65	260	157	63
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1811	1811	1811	1811	1811	1811
Adj Flow Rate, veh/h	504	204	69	277	167	67
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	6	6	6	6	6	6
Cap, veh/h	784	664	103	1090	307	273
Arrive On Green	0.43	0.43	0.06	0.60	0.18	0.18
Sat Flow, veh/h	1811	1535	1725	1811	1725	1535
Grp Volume(v), veh/h	504	204	69	277	167	67
Grp Sat Flow(s),veh/h/ln	1811	1535	1725	1811	1725	1535
Q Serve(g_s), s	11.9	4.7	2.1	3.9	4.8	2.0
Cycle Q Clear(g_c), s	11.9	4.7	2.1	3.9	4.8	2.0
Prop In Lane		1.00	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	784	664	103	1090	307	273
V/C Ratio(X)	0.64	0.31	0.67	0.25	0.54	0.25
Avail Cap(c_a), veh/h	1328	1125	632	1328	632	563
HCM Platoon Ratio	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
Uniform Delay (d), s/veh	12.2	10.1	25.1	5.1	20.4	19.3
Incr Delay (d2), s/veh	3.2	0.9	7.4	0.4	5.4	1.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.9	1.3	0.9	0.8	2.0	0.7
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	15.4	11.1	32.6	5.5	25.8	21.0
LnGrp LOS	B	B	C	A	C	C
Approach Vol, veh/h	708			346	234	
Approach Delay, s/veh	14.1			10.9	24.4	
Approach LOS	B			B	C	

Timer - Assigned Phs	1	2		4		6
Phs Duration (G+Y+Rc), s	9.2	29.6		15.7		38.9
Change Period (Y+Rc), s	6.0	6.0		6.0		6.0
Max Green Setting (Gmax), s	20.0	40.0		20.0		40.0
Max Q Clear Time (g_c+I1), s	4.1	13.9		6.8		5.9
Green Ext Time (p_c), s	0.1	9.7		1.6		3.9

Intersection Summary	
HCM 6th Ctrl Delay	15.1
HCM 6th LOS	B

Intersection	
Int Delay, s/veh	2.1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	20	56	44	210	252	6
Future Vol, veh/h	20	56	44	210	252	6
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	86	86	86	86	86	86
Heavy Vehicles, %	4	4	4	4	4	4
Mvmt Flow	23	65	51	244	293	7

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	643	297	300	0	-	0
Stage 1	297	-	-	-	-	-
Stage 2	346	-	-	-	-	-
Critical Hdwy	6.44	6.24	4.14	-	-	-
Critical Hdwy Stg 1	5.44	-	-	-	-	-
Critical Hdwy Stg 2	5.44	-	-	-	-	-
Follow-up Hdwy	3.536	3.336	2.236	-	-	-
Pot Cap-1 Maneuver	435	738	1250	-	-	-
Stage 1	749	-	-	-	-	-
Stage 2	712	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	415	738	1250	-	-	-
Mov Cap-2 Maneuver	415	-	-	-	-	-
Stage 1	714	-	-	-	-	-
Stage 2	712	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	11.9	1.4	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1250	-	613	-	-
HCM Lane V/C Ratio	0.041	-	0.144	-	-
HCM Control Delay (s)	8	0	11.9	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0.1	-	0.5	-	-

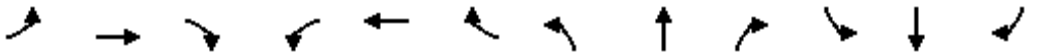
Intersection	
Int Delay, s/veh	0.8

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	5	20	28	252	297	19
Future Vol, veh/h	5	20	28	252	297	19
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	100	140	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	3	3	3	3	3	3
Mvmt Flow	6	22	31	283	334	21

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	690	345	355	0	-	0
Stage 1	345	-	-	-	-	-
Stage 2	345	-	-	-	-	-
Critical Hdwy	6.43	6.23	4.13	-	-	-
Critical Hdwy Stg 1	5.43	-	-	-	-	-
Critical Hdwy Stg 2	5.43	-	-	-	-	-
Follow-up Hdwy	3.527	3.327	2.227	-	-	-
Pot Cap-1 Maneuver	409	696	1198	-	-	-
Stage 1	715	-	-	-	-	-
Stage 2	715	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	398	696	1198	-	-	-
Mov Cap-2 Maneuver	398	-	-	-	-	-
Stage 1	696	-	-	-	-	-
Stage 2	715	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	11.1	0.8	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	1198	-	398	696	-	-
HCM Lane V/C Ratio	0.026	-	0.014	0.032	-	-
HCM Control Delay (s)	8.1	-	14.2	10.3	-	-
HCM Lane LOS	A	-	B	B	-	-
HCM 95th %tile Q(veh)	0.1	-	0	0.1	-	-



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	3	2	50	48	1	12	59	267	59	16	294	6
Future Volume (veh/h)	3	2	50	48	1	12	59	267	59	16	294	6
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		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	3	2	54	52	1	13	63	287	63	17	316	6
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	9	6	150	120	18	238	138	935	202	46	969	18
Arrive On Green	0.00	0.10	0.10	0.07	0.16	0.16	0.08	0.32	0.32	0.03	0.27	0.27
Sat Flow, veh/h	1781	57	1535	1781	114	1488	1781	2894	624	1781	3566	68
Grp Volume(v), veh/h	3	0	56	52	0	14	63	174	176	17	157	165
Grp Sat Flow(s),veh/h/ln	1781	0	1592	1781	0	1603	1781	1777	1742	1781	1777	1856
Q Serve(g_s), s	0.1	0.0	1.2	1.0	0.0	0.3	1.2	2.7	2.8	0.3	2.6	2.6
Cycle Q Clear(g_c), s	0.1	0.0	1.2	1.0	0.0	0.3	1.2	2.7	2.8	0.3	2.6	2.6
Prop In Lane	1.00		0.96	1.00		0.93	1.00		0.36	1.00		0.04
Lane Grp Cap(c), veh/h	9	0	155	120	0	256	138	574	563	46	483	504
V/C Ratio(X)	0.34	0.00	0.36	0.43	0.00	0.05	0.46	0.30	0.31	0.37	0.33	0.33
Avail Cap(c_a), veh/h	1016	0	994	1016	0	1001	1258	1931	1893	1258	1926	2012
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	1.00	1.00
Uniform Delay (d), s/veh	18.3	0.0	15.5	16.5	0.0	13.1	16.2	9.4	9.4	17.6	10.7	10.7
Incr Delay (d2), s/veh	21.5	0.0	1.4	2.5	0.0	0.1	2.4	0.4	0.4	4.8	0.6	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	0.0	0.4	0.4	0.0	0.1	0.5	0.7	0.7	0.2	0.7	0.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	39.7	0.0	16.9	19.0	0.0	13.2	18.6	9.8	9.8	22.4	11.3	11.2
LnGrp LOS	D	A	B	B	A	B	B	A	A	C	B	B
Approach Vol, veh/h		59			66			413			339	
Approach Delay, s/veh		18.1			17.7			11.1			11.8	
Approach LOS		B			B			B			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	5.0	17.2	6.5	8.2	6.8	15.3	4.2	10.5
Change Period (Y+Rc), s	4.0	5.3	4.0	4.6	4.0	5.3	4.0	4.6
Max Green Setting (Gmax), s	26.0	40.0	21.0	23.0	26.0	39.9	21.0	23.0
Max Q Clear Time (g_c+I1), s	2.3	4.8	3.0	3.2	3.2	4.6	2.1	2.3
Green Ext Time (p_c), s	0.0	2.9	0.1	0.2	0.1	2.6	0.0	0.0

Intersection Summary	
HCM 6th Ctrl Delay	12.4
HCM 6th LOS	B

Notes

User approved pedestrian interval to be less than phase max green.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	120	543	130	247	411	147	105	257	257	168	240	54
Future Volume (veh/h)	120	543	130	247	411	147	105	257	257	168	240	54
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		0.99	1.00		0.99	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856
Adj Flow Rate, veh/h	126	572	137	260	433	155	111	271	271	177	253	57
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	162	845	372	306	816	289	144	428	377	219	817	181
Arrive On Green	0.09	0.24	0.24	0.17	0.32	0.32	0.08	0.24	0.24	0.12	0.29	0.29
Sat Flow, veh/h	1767	3526	1552	1767	2542	901	1767	1763	1551	1767	2862	632
Grp Volume(v), veh/h	126	572	137	260	299	289	111	271	271	177	154	156
Grp Sat Flow(s),veh/h/ln	1767	1763	1552	1767	1763	1680	1767	1763	1551	1767	1763	1731
Q Serve(g_s), s	5.7	12.0	6.0	11.7	11.3	11.5	5.0	11.2	13.1	8.0	5.6	5.8
Cycle Q Clear(g_c), s	5.7	12.0	6.0	11.7	11.3	11.5	5.0	11.2	13.1	8.0	5.6	5.8
Prop In Lane	1.00		1.00	1.00		0.54	1.00		1.00	1.00		0.37
Lane Grp Cap(c), veh/h	162	845	372	306	566	539	144	428	377	219	503	494
V/C Ratio(X)	0.78	0.68	0.37	0.85	0.53	0.54	0.77	0.63	0.72	0.81	0.31	0.32
Avail Cap(c_a), veh/h	519	1509	665	519	755	719	519	863	759	519	863	847
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	36.3	28.2	25.9	32.8	22.7	22.8	36.8	27.7	28.4	34.8	22.9	22.9
Incr Delay (d2), s/veh	7.8	1.4	0.9	6.6	1.1	1.2	8.3	2.2	3.7	6.9	0.5	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	2.7	4.8	2.2	5.2	4.4	4.3	2.4	4.7	4.9	3.6	2.2	2.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	44.1	29.6	26.8	39.4	23.8	23.9	45.1	29.9	32.1	41.7	23.4	23.5
LnGrp LOS	D	C	C	D	C	C	D	C	C	D	C	C
Approach Vol, veh/h		835			848			653			487	
Approach Delay, s/veh		31.3			28.6			33.4			30.1	
Approach LOS		C			C			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	18.1	24.6	10.7	28.3	11.5	31.2	14.2	24.9
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	24.0	35.0	24.0	40.0	24.0	35.0	24.0	40.0
Max Q Clear Time (g_c+I1), s	13.7	14.0	7.0	7.8	7.7	13.5	10.0	15.1
Green Ext Time (p_c), s	0.5	5.6	0.2	2.5	0.3	4.7	0.4	4.7

Intersection Summary	
HCM 6th Ctrl Delay	30.8
HCM 6th LOS	C

Intersection	
Int Delay, s/veh	10.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	121	36	164	49	0	0	0	0	281	3	26
Future Vol, veh/h	0	121	36	164	49	0	0	0	0	281	3	26
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	0	-	-	-	-	-	0	-	520
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	25	25	25	25	25	25	25	25	25	25	25	25
Mvmt Flow	0	129	38	174	52	0	0	0	0	299	3	28

Major/Minor	Major1			Major2					Minor2		
Conflicting Flow All	-	0	0	167	0	0			465	567	26
Stage 1	-	-	-	-	-	-			400	400	-
Stage 2	-	-	-	-	-	-			65	167	-
Critical Hdwy	-	-	-	4.6	-	-			7.3	7	7.4
Critical Hdwy Stg 1	-	-	-	-	-	-			6.3	6	-
Critical Hdwy Stg 2	-	-	-	-	-	-			6.3	6	-
Follow-up Hdwy	-	-	-	2.45	-	-			3.75	4.25	3.55
Pot Cap-1 Maneuver	0	-	-	1256	-	0			472	386	974
Stage 1	0	-	-	-	-	0			583	546	-
Stage 2	0	-	-	-	-	0			886	707	-
Platoon blocked, %		-	-		-						
Mov Cap-1 Maneuver	-	-	-	1256	-	-			406	0	974
Mov Cap-2 Maneuver	-	-	-	-	-	-			406	0	-
Stage 1	-	-	-	-	-	-			583	0	-
Stage 2	-	-	-	-	-	-			763	0	-

Approach	EB	WB	SB
HCM Control Delay, s	0	6.4	19.6
HCM LOS			C

Minor Lane/Major Mvmt	EBT	EBR	WBL	WBT	SBLn1	SBLn2
Capacity (veh/h)	-	-	1256	-	406	465
HCM Lane V/C Ratio	-	-	0.139	-	0.491	0.281
HCM Control Delay (s)	-	-	8.3	-	22.1	15.7
HCM Lane LOS	-	-	A	-	C	C
HCM 95th %tile Q(veh)	-	-	0.5	-	2.6	1.1

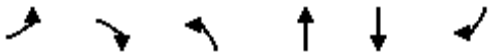
Intersection	
Int Delay, s/veh	3.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	29	373	0	0	193	257	20	1	168	0	0	0
Future Vol, veh/h	29	373	0	0	193	257	20	1	168	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	Free	-	-	Stop	-	-	None
Storage Length	0	-	-	-	-	-	630	-	0	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	25	25	25	25	25	25	25	25	25	25	25	25
Mvmt Flow	31	397	0	0	205	273	21	1	179	0	0	0

Major/Minor	Major1			Major2			Minor1		
Conflicting Flow All	205	0	-	-	-	0	664	664	199
Stage 1	-	-	-	-	-	-	459	459	-
Stage 2	-	-	-	-	-	-	205	205	-
Critical Hdwy	4.475	-	-	-	-	-	6.975	6.875	7.275
Critical Hdwy Stg 1	-	-	-	-	-	-	6.175	5.875	-
Critical Hdwy Stg 2	-	-	-	-	-	-	5.775	5.875	-
Follow-up Hdwy	2.4375	-	-	-	-	-	3.7375	4.2375	3.5375
Pot Cap-1 Maneuver	1226	-	0	0	-	0	368	345	749
Stage 1	-	-	0	0	-	0	551	520	-
Stage 2	-	-	0	0	-	0	770	684	-
Platoon blocked, %		-			-				
Mov Cap-1 Maneuver	1226	-	-	-	-	-	359	0	749
Mov Cap-2 Maneuver	-	-	-	-	-	-	359	0	-
Stage 1	-	-	-	-	-	-	537	0	-
Stage 2	-	-	-	-	-	-	770	0	-

Approach	EB	WB	NB
HCM Control Delay, s	0.6	0	11.8
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	WBT
Capacity (veh/h)	359	749	1226	-	-
HCM Lane V/C Ratio	0.062	0.239	0.025	-	-
HCM Control Delay (s)	15.7	11.3	8	-	-
HCM Lane LOS	C	B	A	-	-
HCM 95th %tile Q(veh)	0.2	0.9	0.1	-	-



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	115	134	72	296	247	67
Future Volume (veh/h)	115	134	72	296	247	67
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1678	1678	1678	1678	1678	1678
Adj Flow Rate, veh/h	134	156	84	344	287	78
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86
Percent Heavy Veh, %	15	15	15	15	15	15
Cap, veh/h	275	244	104	821	740	198
Arrive On Green	0.17	0.17	0.07	0.49	0.30	0.30
Sat Flow, veh/h	1598	1422	1598	1678	2572	664
Grp Volume(v), veh/h	134	156	84	344	182	183
Grp Sat Flow(s),veh/h/ln	1598	1422	1598	1678	1594	1558
Q Serve(g_s), s	2.7	3.6	1.8	4.7	3.2	3.3
Cycle Q Clear(g_c), s	2.7	3.6	1.8	4.7	3.2	3.3
Prop In Lane	1.00	1.00	1.00			0.43
Lane Grp Cap(c), veh/h	275	244	104	821	474	464
V/C Ratio(X)	0.49	0.64	0.81	0.42	0.38	0.39
Avail Cap(c_a), veh/h	1082	962	1082	1845	1753	1714
HCM Platoon Ratio	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
Uniform Delay (d), s/veh	13.3	13.7	16.4	5.8	9.9	9.9
Incr Delay (d2), s/veh	1.3	2.8	18.3	1.2	1.8	2.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.9	1.1	1.0	0.7	0.8	0.9
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	14.6	16.4	34.7	7.0	11.7	11.9
LnGrp LOS	B	B	C	A	B	B
Approach Vol, veh/h	290			428	365	
Approach Delay, s/veh	15.6			12.5	11.8	
Approach LOS	B			B	B	

Timer - Assigned Phs	1	2		4		6
Phs Duration (G+Y+Rc), s	6.8	16.5		12.1		23.4
Change Period (Y+Rc), s	4.5	6.0		6.0		6.0
Max Green Setting (Gmax), s	24.0	39.0		24.0		39.0
Max Q Clear Time (g_c+I1), s	3.8	5.3		5.6		6.7
Green Ext Time (p_c), s	0.3	5.2		0.8		5.0

Intersection Summary			
HCM 6th Ctrl Delay		13.1	
HCM 6th LOS		B	

Notes

User approved pedestrian interval to be less than phase max green.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	615	66	226	390	0	0	0	0	356	18	96
Future Volume (veh/h)	0	615	66	226	390	0	0	0	0	356	18	96
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.96	1.00		1.00				1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Work Zone On Approach		No			No						No	
Adj Sat Flow, veh/h/ln	0	1841	1841	1841	1841	0				1841	1841	1841
Adj Flow Rate, veh/h	0	683	73	251	433	0				396	20	107
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90				0.90	0.90	0.90
Percent Heavy Veh, %	0	4	4	4	4	0				4	4	4
Cap, veh/h	0	1136	120	302	905	0				444	22	120
Arrive On Green	0.00	0.25	0.25	0.17	0.49	0.00				0.34	0.34	0.34
Sat Flow, veh/h	0	4757	486	1753	1841	0				1297	65	350
Grp Volume(v), veh/h	0	496	260	251	433	0				523	0	0
Grp Sat Flow(s),veh/h/ln	0	1675	1727	1753	1841	0				1713	0	0
Q Serve(g_s), s	0.0	7.3	7.4	7.7	8.7	0.0				16.0	0.0	0.0
Cycle Q Clear(g_c), s	0.0	7.3	7.4	7.7	8.7	0.0				16.0	0.0	0.0
Prop In Lane	0.00		0.28	1.00		0.00				0.76		0.20
Lane Grp Cap(c), veh/h	0	829	427	302	905	0				586	0	0
V/C Ratio(X)	0.00	0.60	0.61	0.83	0.48	0.00				0.89	0.00	0.00
Avail Cap(c_a), veh/h	0	2115	1090	632	1162	0				1081	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	1.00	1.00	1.00	0.00				1.00	0.00	0.00
Uniform Delay (d), s/veh	0.0	18.4	18.5	22.2	9.4	0.0				17.3	0.0	0.0
Incr Delay (d2), s/veh	0.0	0.6	1.3	2.3	0.4	0.0				1.9	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	2.4	2.6	2.9	2.5	0.0				5.3	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	19.1	19.7	24.5	9.7	0.0				19.2	0.0	0.0
LnGrp LOS	A	B	B	C	A	A				B	A	A
Approach Vol, veh/h		756			684						523	
Approach Delay, s/veh		19.3			15.1						19.2	
Approach LOS		B			B						B	

Timer - Assigned Phs	1	2		4		6
Phs Duration (G+Y+Rc), s	13.5	18.3		23.6		31.9
Change Period (Y+Rc), s	4.0	4.6		4.6		4.6
Max Green Setting (Gmax), s	20.0	35.0		35.0		35.0
Max Q Clear Time (g_c+I1), s	9.7	9.4		18.0		10.7
Green Ext Time (p_c), s	0.1	4.3		1.0		2.2

Intersection Summary	
HCM 6th Ctrl Delay	17.8
HCM 6th LOS	B



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	73	898	0	0	575	248	41	2	419	0	0	0
Future Volume (veh/h)	73	898	0	0	575	248	41	2	419	0	0	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.94	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Work Zone On Approach		No			No			No				
Adj Sat Flow, veh/h/ln	1841	1841	0	0	1841	1841	1841	1841	1841			
Adj Flow Rate, veh/h	81	998	0	0	639	276	46	2	466			
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90			
Percent Heavy Veh, %	4	4	0	0	4	4	4	4	4			
Cap, veh/h	107	1712	0	0	843	364	51	2	514			
Arrive On Green	0.06	0.49	0.00	0.00	0.36	0.36	0.36	0.36	0.36			
Sat Flow, veh/h	1753	3589	0	0	2416	1003	141	6	1429			
Grp Volume(v), veh/h	81	998	0	0	481	434	514	0	0			
Grp Sat Flow(s),veh/h/ln	1753	1749	0	0	1749	1578	1576	0	0			
Q Serve(g_s), s	2.8	12.4	0.0	0.0	14.7	14.7	18.9	0.0	0.0			
Cycle Q Clear(g_c), s	2.8	12.4	0.0	0.0	14.7	14.7	18.9	0.0	0.0			
Prop In Lane	1.00		0.00	0.00		0.64	0.09		0.91			
Lane Grp Cap(c), veh/h	107	1712	0	0	635	573	567	0	0			
V/C Ratio(X)	0.76	0.58	0.00	0.00	0.76	0.76	0.91	0.00	0.00			
Avail Cap(c_a), veh/h	575	2007	0	0	1003	906	905	0	0			
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	1.00	1.00	0.00	0.00	1.00	1.00	1.00	0.00	0.00			
Uniform Delay (d), s/veh	28.2	11.1	0.0	0.0	17.1	17.1	18.6	0.0	0.0			
Incr Delay (d2), s/veh	4.0	0.3	0.0	0.0	1.7	1.9	5.6	0.0	0.0			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	1.2	3.6	0.0	0.0	5.1	4.6	6.5	0.0	0.0			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	32.2	11.4	0.0	0.0	18.8	19.0	24.2	0.0	0.0			
LnGrp LOS	C	B	A	A	B	B	C	A	A			
Approach Vol, veh/h		1079			915			514				
Approach Delay, s/veh		13.0			18.9			24.2				
Approach LOS		B			B			C				
Timer - Assigned Phs		2			5	6		8				
Phs Duration (G+Y+Rc), s		34.5			7.7	26.7		26.5				
Change Period (Y+Rc), s		4.6			4.0	4.6		4.6				
Max Green Setting (Gmax), s		35.0			20.0	35.0		35.0				
Max Q Clear Time (g_c+I1), s		14.4			4.8	16.7		20.9				
Green Ext Time (p_c), s		6.1			0.0	5.0		1.0				
Intersection Summary												
HCM 6th Ctrl Delay			17.4									
HCM 6th LOS			B									

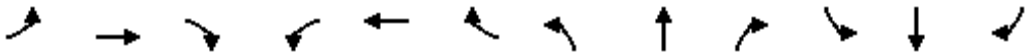
Intersection	
Int Delay, s/veh	0.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	1058	259	0	761	0	0	0	35	0	0	62
Future Vol, veh/h	0	1058	259	0	761	0	0	0	35	0	0	62
Conflicting Peds, #/hr	0	0	2	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	0	-	-	0
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	4	4	4	4	4	4	4	4	4	4	4	4
Mvmt Flow	0	1176	288	0	846	0	0	0	39	0	0	69

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	-	0	0	-	-	0	-	-	734	-	-	423
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	-	-	-	6.98	-	-	6.98
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	-	-	-	3.34	-	-	3.34
Pot Cap-1 Maneuver	0	-	-	0	-	0	0	0	358	0	0	574
Stage 1	0	-	-	0	-	0	0	0	-	0	0	-
Stage 2	0	-	-	0	-	0	0	0	-	0	0	-
Platoon blocked, %		-	-		-							
Mov Cap-1 Maneuver	-	-	-	-	-	-	-	-	357	-	-	574
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0	16.3	12.1
HCM LOS			C	B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBT	SBLn1
Capacity (veh/h)	357	-	-	-	574
HCM Lane V/C Ratio	0.109	-	-	-	0.12
HCM Control Delay (s)	16.3	-	-	-	12.1
HCM Lane LOS	C	-	-	-	B
HCM 95th %tile Q(veh)	0.4	-	-	-	0.4



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	206	720	172	102	374	103	229	210	105	113	130	111
Future Volume (veh/h)	206	720	172	102	374	103	229	210	105	113	130	111
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		0.97	1.00		0.99	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	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1841	1841	1841	1841	1841	1841	1841	1841	1841	1841	1841	1841
Adj Flow Rate, veh/h	229	800	191	113	416	114	254	233	117	126	144	123
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	4	4	4	4	4	4	4	4	4	4	4	4
Cap, veh/h	261	1012	242	144	801	217	286	547	265	155	304	237
Arrive On Green	0.15	0.36	0.36	0.08	0.30	0.30	0.16	0.24	0.24	0.09	0.17	0.17
Sat Flow, veh/h	1753	2787	665	1753	2700	731	1753	2276	1102	1753	1837	1433
Grp Volume(v), veh/h	229	502	489	113	268	262	254	177	173	126	136	131
Grp Sat Flow(s),veh/h/ln	1753	1749	1704	1753	1749	1682	1753	1749	1629	1753	1749	1522
Q Serve(g_s), s	12.2	24.4	24.4	6.0	12.1	12.4	13.5	8.1	8.6	6.7	6.7	7.5
Cycle Q Clear(g_c), s	12.2	24.4	24.4	6.0	12.1	12.4	13.5	8.1	8.6	6.7	6.7	7.5
Prop In Lane	1.00		0.39	1.00		0.43	1.00		0.68	1.00		0.94
Lane Grp Cap(c), veh/h	261	635	619	144	519	499	286	420	391	155	289	252
V/C Ratio(X)	0.88	0.79	0.79	0.78	0.52	0.53	0.89	0.42	0.44	0.81	0.47	0.52
Avail Cap(c_a), veh/h	368	735	716	368	735	707	405	698	650	331	716	624
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	39.7	27.1	27.1	42.8	27.8	27.9	39.0	30.6	30.7	42.6	36.0	36.3
Incr Delay (d2), s/veh	12.3	6.6	6.8	10.6	1.7	1.8	12.5	1.4	1.7	3.8	2.5	3.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.9	10.5	10.3	2.9	5.0	4.9	6.6	3.5	3.4	3.0	2.9	2.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	51.9	33.7	33.8	53.4	29.5	29.7	51.5	32.0	32.4	46.4	38.5	39.8
LnGrp LOS	D	C	C	D	C	C	D	C	C	D	D	D
Approach Vol, veh/h		1220			643			604			393	
Approach Delay, s/veh		37.2			33.8			40.3			41.5	
Approach LOS		D			C			D			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	12.8	40.1	20.5	21.7	19.2	33.7	13.4	28.9
Change Period (Y+Rc), s	5.0	5.5	5.0	6.0	5.0	5.5	5.0	6.0
Max Green Setting (Gmax), s	20.0	40.0	22.0	39.0	20.0	40.0	18.0	38.0
Max Q Clear Time (g_c+I1), s	8.0	26.4	15.5	9.5	14.2	14.4	8.7	10.6
Green Ext Time (p_c), s	0.2	8.1	0.0	2.9	0.0	5.9	0.0	3.9

Intersection Summary	
HCM 6th Ctrl Delay	37.7
HCM 6th LOS	D

Notes

User approved pedestrian interval to be less than phase max green.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	63	492	156	59	342	70	110	227	98	96	198	81
Future Volume (veh/h)	63	492	156	59	342	70	110	227	98	96	198	81
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	1811	1811	1811	1811	1811	1811	1811	1811	1811	1811	1811	1811
Adj Flow Rate, veh/h	64	497	158	60	345	71	111	229	99	97	200	82
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Percent Heavy Veh, %	6	6	6	6	6	6	6	6	6	6	6	6
Cap, veh/h	87	647	548	84	518	107	145	296	128	127	432	366
Arrive On Green	0.05	0.36	0.36	0.05	0.36	0.36	0.08	0.25	0.25	0.07	0.24	0.24
Sat Flow, veh/h	1725	1811	1535	1725	1457	300	1725	1190	515	1725	1811	1535
Grp Volume(v), veh/h	64	497	158	60	0	416	111	0	328	97	200	82
Grp Sat Flow(s),veh/h/ln	1725	1811	1535	1725	0	1757	1725	0	1705	1725	1811	1535
Q Serve(g_s), s	2.6	17.3	5.2	2.4	0.0	14.2	4.5	0.0	12.7	3.9	6.7	3.1
Cycle Q Clear(g_c), s	2.6	17.3	5.2	2.4	0.0	14.2	4.5	0.0	12.7	3.9	6.7	3.1
Prop In Lane	1.00		1.00	1.00		0.17	1.00		0.30	1.00		1.00
Lane Grp Cap(c), veh/h	87	647	548	84	0	625	145	0	424	127	432	366
V/C Ratio(X)	0.73	0.77	0.29	0.71	0.00	0.67	0.77	0.00	0.77	0.77	0.46	0.22
Avail Cap(c_a), veh/h	607	944	800	607	0	1040	607	0	961	607	1327	1124
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	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	33.2	20.2	16.4	33.3	0.0	19.3	31.8	0.0	24.8	32.3	23.2	21.8
Incr Delay (d2), s/veh	11.3	4.4	0.6	10.5	0.0	2.6	8.2	0.0	4.7	9.2	1.2	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.3	7.0	1.7	1.2	0.0	5.4	2.1	0.0	5.1	1.8	2.7	1.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	44.5	24.6	17.0	43.8	0.0	21.9	40.1	0.0	29.6	41.5	24.4	22.2
LnGrp LOS	D	C	B	D	A	C	D	A	C	D	C	C
Approach Vol, veh/h		719			476			439			379	
Approach Delay, s/veh		24.7			24.7			32.2			28.3	
Approach LOS		C			C			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	7.5	31.4	9.2	23.0	7.6	31.2	10.0	22.2
Change Period (Y+Rc), s	4.0	6.0	4.0	5.3	4.0	6.0	4.0	5.3
Max Green Setting (Gmax), s	25.0	37.0	25.0	40.0	25.0	42.0	25.0	52.0
Max Q Clear Time (g_c+I1), s	4.4	19.3	5.9	14.7	4.6	16.2	6.5	8.7
Green Ext Time (p_c), s	0.1	6.1	0.2	3.0	0.1	4.8	0.2	2.3

Intersection Summary	
HCM 6th Ctrl Delay	27.0
HCM 6th LOS	C

Intersection	
Int Delay, s/veh	0.6

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	16	733	571	42	24	12
Future Vol, veh/h	16	733	571	42	24	12
Conflicting Peds, #/hr	1	0	0	1	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	110	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	3	3	3	3	3	3
Mvmt Flow	17	772	601	44	25	13

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	646	0	-	0	1044	324
Stage 1	-	-	-	-	624	-
Stage 2	-	-	-	-	420	-
Critical Hdwy	4.16	-	-	-	6.86	6.96
Critical Hdwy Stg 1	-	-	-	-	5.86	-
Critical Hdwy Stg 2	-	-	-	-	5.86	-
Follow-up Hdwy	2.23	-	-	-	3.53	3.33
Pot Cap-1 Maneuver	929	-	-	-	223	669
Stage 1	-	-	-	-	494	-
Stage 2	-	-	-	-	628	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	928	-	-	-	219	668
Mov Cap-2 Maneuver	-	-	-	-	219	-
Stage 1	-	-	-	-	485	-
Stage 2	-	-	-	-	627	-

Approach	EB	WB	SB
HCM Control Delay, s	0.2	0	19.7
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	928	-	-	-	282
HCM Lane V/C Ratio	0.018	-	-	-	0.134
HCM Control Delay (s)	9	-	-	-	19.7
HCM Lane LOS	A	-	-	-	C
HCM 95th %tile Q(veh)	0.1	-	-	-	0.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	6	810	101	148	695	27	64	14	134	35	29	14
Future Volume (veh/h)	6	810	101	148	695	27	64	14	134	35	29	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856
Adj Flow Rate, veh/h	6	853	106	156	732	28	67	15	141	37	31	15
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	14	1436	446	203	1351	52	113	20	190	73	129	62
Arrive On Green	0.01	0.28	0.28	0.11	0.39	0.39	0.06	0.13	0.13	0.04	0.11	0.11
Sat Flow, veh/h	1767	5066	1572	1767	3462	132	1767	153	1442	1767	1181	572
Grp Volume(v), veh/h	6	853	106	156	373	387	67	0	156	37	0	46
Grp Sat Flow(s),veh/h/ln	1767	1689	1572	1767	1763	1832	1767	0	1596	1767	0	1753
Q Serve(g_s), s	0.1	6.3	2.2	3.7	7.1	7.1	1.6	0.0	4.1	0.9	0.0	1.0
Cycle Q Clear(g_c), s	0.1	6.3	2.2	3.7	7.1	7.1	1.6	0.0	4.1	0.9	0.0	1.0
Prop In Lane	1.00		1.00	1.00		0.07	1.00		0.90	1.00		0.33
Lane Grp Cap(c), veh/h	14	1436	446	203	688	715	113	0	210	73	0	192
V/C Ratio(X)	0.42	0.59	0.24	0.77	0.54	0.54	0.59	0.00	0.74	0.50	0.00	0.24
Avail Cap(c_a), veh/h	819	4694	1457	819	1634	1697	819	0	1479	819	0	1624
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	21.3	13.3	11.9	18.6	10.2	10.2	19.7	0.0	18.0	20.3	0.0	17.6
Incr Delay (d2), s/veh	7.2	0.1	0.1	2.3	0.2	0.2	4.9	0.0	1.9	5.3	0.0	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	1.7	0.6	1.3	1.8	1.9	0.7	0.0	1.4	0.4	0.0	0.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	28.5	13.5	12.0	20.9	10.4	10.4	24.5	0.0	20.0	25.5	0.0	17.8
LnGrp LOS	C	B	B	C	B	B	C	A	B	C	A	B
Approach Vol, veh/h		965			916			223			83	
Approach Delay, s/veh		13.4			12.2			21.3			21.3	
Approach LOS		B			B			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	4.4	22.5	5.9	10.3	9.1	17.9	6.9	9.3
Change Period (Y+Rc), s	4.1	5.7	4.1	4.6	4.1	5.7	4.1	4.6
Max Green Setting (Gmax), s	20.0	40.0	20.0	40.0	20.0	40.0	20.0	40.0
Max Q Clear Time (g_c+I1), s	2.1	9.1	2.9	6.1	5.7	8.3	3.6	3.0
Green Ext Time (p_c), s	0.0	0.5	0.0	0.7	0.2	4.0	0.1	0.1

Intersection Summary	
HCM 6th Ctrl Delay	14.0
HCM 6th LOS	B



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	869	110	77	482	24	120	0	336	68	331	268
Future Volume (veh/h)	0	869	110	77	482	24	120	0	336	68	331	268
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		0.99	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	0	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856
Adj Flow Rate, veh/h	0	915	116	81	507	25	126	0	354	72	348	282
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	0	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	0	1712	590	179	1723	769	165	0	750	96	713	560
Arrive On Green	0.00	0.38	0.38	0.05	0.49	0.49	0.09	0.00	0.24	0.05	0.20	0.20
Sat Flow, veh/h	0	4899	1572	3428	3526	1572	1767	0	3104	1767	3526	2768
Grp Volume(v), veh/h	0	915	116	81	507	25	126	0	354	72	348	282
Grp Sat Flow(s),veh/h/ln	0	1522	1572	1714	1763	1572	1767	0	1552	1767	1763	1384
Q Serve(g_s), s	0.0	12.5	4.0	1.8	6.9	0.7	5.6	0.0	7.8	3.2	7.0	7.2
Cycle Q Clear(g_c), s	0.0	12.5	4.0	1.8	6.9	0.7	5.6	0.0	7.8	3.2	7.0	7.2
Prop In Lane	0.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	0	1712	590	179	1723	769	165	0	750	96	713	560
V/C Ratio(X)	0.00	0.53	0.20	0.45	0.29	0.03	0.76	0.00	0.47	0.75	0.49	0.50
Avail Cap(c_a), veh/h	0	3488	1202	859	2694	1202	443	0	1439	443	1634	1283
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)	0.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	0.0	19.5	16.8	36.7	12.2	10.6	35.3	0.0	25.9	37.2	28.2	28.3
Incr Delay (d2), s/veh	0.0	0.5	0.3	2.8	0.2	0.0	10.9	0.0	0.9	17.1	1.2	1.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	4.0	1.3	0.8	2.3	0.2	2.7	0.0	2.7	1.8	2.8	2.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	20.0	17.2	39.5	12.4	10.6	46.2	0.0	26.8	54.3	29.3	29.9
LnGrp LOS	A	C	B	D	B	B	D	A	C	D	C	C
Approach Vol, veh/h		1031			613			480			702	
Approach Delay, s/veh		19.7			15.9			31.9			32.1	
Approach LOS		B			B			C			C	

Timer - Assigned Phs	1	2	3	4		6	7	8
Phs Duration (G+Y+Rc), s	9.1	35.9	12.2	22.6		45.0	9.0	25.8
Change Period (Y+Rc), s	4.9	* 6	* 4.7	6.5		6.0	* 4.7	* 6.5
Max Green Setting (Gmax), s	20.0	* 61	* 20	37.0		61.0	* 20	* 37
Max Q Clear Time (g_c+I1), s	13.8	14.5	7.6	9.2		8.9	5.2	9.8
Green Ext Time (p_c), s	0.3	15.4	0.4	6.9		7.0	0.2	2.8

Intersection Summary	
HCM 6th Ctrl Delay	24.0
HCM 6th LOS	C

Notes

User approved pedestrian interval to be less than phase max green.

User approved volume balancing among the lanes for turning movement.

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

User approved changes to right turn type.



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	376	479	53	263	320	37
Future Volume (veh/h)	376	479	53	263	320	37
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1856	1856	1856	1856	1856	1856
Adj Flow Rate, veh/h	396	0	56	277	337	39
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	3	3	3	3	3	3
Cap, veh/h	1008		106	1622	764	350
Arrive On Green	0.29	0.00	0.06	0.46	0.22	0.22
Sat Flow, veh/h	3618	1572	1767	3618	3428	1572
Grp Volume(v), veh/h	396	0	56	277	337	39
Grp Sat Flow(s),veh/h/ln	1763	1572	1767	1763	1714	1572
Q Serve(g_s), s	3.2	0.0	1.1	1.6	3.0	0.7
Cycle Q Clear(g_c), s	3.2	0.0	1.1	1.6	3.0	0.7
Prop In Lane		1.00	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	1008		106	1622	764	350
V/C Ratio(X)	0.39		0.53	0.17	0.44	0.11
Avail Cap(c_a), veh/h	3526		1010	3526	2253	1034
HCM Platoon Ratio	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	1.00
Uniform Delay (d), s/veh	10.1	0.0	16.0	5.5	11.7	10.8
Incr Delay (d2), s/veh	0.1	0.0	1.5	0.0	0.1	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.8	0.0	0.4	0.3	0.8	0.2
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	10.1	0.0	17.5	5.6	11.9	10.9
LnGrp LOS	B		B	A	B	B
Approach Vol, veh/h	396	A		333	376	
Approach Delay, s/veh	10.1			7.6	11.8	
Approach LOS	B			A	B	

Timer - Assigned Phs	1	2			6	8
Phs Duration (G+Y+Rc), s	6.1	16.2			22.3	12.7
Change Period (Y+Rc), s	4.0	* 6.2			6.2	4.9
Max Green Setting (Gmax), s	20.0	* 35			35.0	23.0
Max Q Clear Time (g_c+I1), s	3.1	5.2			3.6	5.0
Green Ext Time (p_c), s	0.0	0.4			0.3	0.2

Intersection Summary		
HCM 6th Ctrl Delay	9.9	
HCM 6th LOS	A	

Notes

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

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



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	1	0	6	12	1	51	4	319	15	50	331	2
Future Volume (veh/h)	1	0	6	12	1	51	4	319	15	50	331	2
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1767	1767	1767	1767	1767	1767	1767	1767	1767	1767	1767	1767
Adj Flow Rate, veh/h	1	0	7	14	1	58	5	362	17	57	376	2
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Percent Heavy Veh, %	9	9	9	9	9	9	9	9	9	9	9	9
Cap, veh/h	358	0	114	165	2	88	14	599	508	106	1348	7
Arrive On Green	0.08	0.00	0.08	0.08	0.08	0.08	0.01	0.34	0.34	0.06	0.39	0.39
Sat Flow, veh/h	1536	0	1497	279	20	1156	1682	1767	1497	1682	3423	18
Grp Volume(v), veh/h	1	0	7	73	0	0	5	362	17	57	184	194
Grp Sat Flow(s),veh/h/ln	1536	0	1497	1454	0	0	1682	1767	1497	1682	1678	1763
Q Serve(g_s), s	0.0	0.0	0.1	1.4	0.0	0.0	0.1	5.1	0.2	1.0	2.2	2.2
Cycle Q Clear(g_c), s	0.0	0.0	0.1	1.5	0.0	0.0	0.1	5.1	0.2	1.0	2.2	2.2
Prop In Lane	1.00		1.00	0.19		0.79	1.00		1.00	1.00		0.01
Lane Grp Cap(c), veh/h	358	0	114	254	0	0	14	599	508	106	661	695
V/C Ratio(X)	0.00	0.00	0.06	0.29	0.00	0.00	0.36	0.60	0.03	0.54	0.28	0.28
Avail Cap(c_a), veh/h	1323	0	1252	1858	0	0	1464	2541	2154	1407	2414	2537
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	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	12.8	0.0	12.8	13.4	0.0	0.0	14.7	8.2	6.6	13.6	6.2	6.2
Incr Delay (d2), s/veh	0.0	0.0	0.1	0.2	0.0	0.0	5.9	1.4	0.0	1.6	0.3	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.9	0.0	0.3	0.3	0.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	12.8	0.0	12.9	13.7	0.0	0.0	20.6	9.6	6.6	15.1	6.5	6.5
LnGrp LOS	B	A	B	B	A	A	C	A	A	B	A	A
Approach Vol, veh/h		8			73			384			435	
Approach Delay, s/veh		12.9			13.7			9.6			7.6	
Approach LOS		B			B			A			A	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	6.6	16.3		7.0	4.9	18.0		7.0
Change Period (Y+Rc), s	* 4.7	6.2		* 4.7	* 4.7	6.2		* 4.7
Max Green Setting (Gmax), s	* 25	43.0		* 25	* 26	43.0		* 35
Max Q Clear Time (g_c+I1), s	3.0	7.1		2.1	2.1	4.2		3.5
Green Ext Time (p_c), s	0.0	3.0		0.0	0.0	2.9		0.2

Intersection Summary	
HCM 6th Ctrl Delay	9.0
HCM 6th LOS	A

Notes

User approved pedestrian interval to be less than phase max green.

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



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	23	0	6	0	332	27	11	359	0
Future Volume (veh/h)	0	0	0	23	0	6	0	332	27	11	359	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				1767	1811	1767	0	1767	1767	1767	1767	0
Adj Flow Rate, veh/h				25	0	7	0	361	29	12	390	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, %				9	6	9	0	9	9	9	9	0
Cap, veh/h				62	0	17	0	1175	94	32	990	0
Arrive On Green				0.05	0.00	0.05	0.00	0.37	0.37	0.02	0.56	0.00
Sat Flow, veh/h				1312	0	367	0	3236	252	1682	1767	0
Grp Volume(v), veh/h				32	0	0	0	192	198	12	390	0
Grp Sat Flow(s),veh/h/ln				1679	0	0	0	1678	1721	1682	1767	0
Q Serve(g_s), s				0.5	0.0	0.0	0.0	2.2	2.2	0.2	3.3	0.0
Cycle Q Clear(g_c), s				0.5	0.0	0.0	0.0	2.2	2.2	0.2	3.3	0.0
Prop In Lane				0.78		0.22	0.00		0.15	1.00		0.00
Lane Grp Cap(c), veh/h				80	0	0	0	627	643	32	990	0
V/C Ratio(X)				0.40	0.00	0.00	0.00	0.31	0.31	0.37	0.39	0.00
Avail Cap(c_a), veh/h				1943	0	0	0	3133	3212	1633	3297	0
HCM Platoon Ratio				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)				1.00	0.00	0.00	0.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh				12.4	0.0	0.0	0.0	5.9	5.9	13.0	3.3	0.0
Incr Delay (d2), s/veh				3.2	0.0	0.0	0.0	0.6	0.6	7.0	0.5	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				0.2	0.0	0.0	0.0	0.3	0.4	0.1	0.1	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh				15.6	0.0	0.0	0.0	6.5	6.5	20.0	3.9	0.0
LnGrp LOS				B	A	A	A	A	A	B	A	A
Approach Vol, veh/h					32			390			402	
Approach Delay, s/veh					15.6			6.5			4.3	
Approach LOS					B			A			A	

Timer - Assigned Phs	1	2		4		6
Phs Duration (G+Y+Rc), s	5.0	16.0		5.8		21.0
Change Period (Y+Rc), s	4.5	6.0		4.5		6.0
Max Green Setting (Gmax), s	26.0	50.0		31.0		50.0
Max Q Clear Time (g_c+I1), s	2.2	4.2		2.5		5.3
Green Ext Time (p_c), s	0.0	4.7		0.1		4.7

Intersection Summary	
HCM 6th Ctrl Delay	5.8
HCM 6th LOS	A

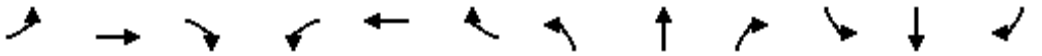
Intersection	
Int Delay, s/veh	0.5

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	1	5	3	55	81	1
Future Vol, veh/h	1	5	3	55	81	1
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	87	87	87	87	87	87
Heavy Vehicles, %	1	1	1	1	1	1
Mvmt Flow	1	6	3	63	93	1

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	163	94	94	0	-	0
Stage 1	94	-	-	-	-	-
Stage 2	69	-	-	-	-	-
Critical Hdwy	6.41	6.21	4.11	-	-	-
Critical Hdwy Stg 1	5.41	-	-	-	-	-
Critical Hdwy Stg 2	5.41	-	-	-	-	-
Follow-up Hdwy	3.509	3.309	2.209	-	-	-
Pot Cap-1 Maneuver	830	966	1506	-	-	-
Stage 1	932	-	-	-	-	-
Stage 2	956	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	828	966	1506	-	-	-
Mov Cap-2 Maneuver	828	-	-	-	-	-
Stage 1	930	-	-	-	-	-
Stage 2	956	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	8.9	0.4	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1506	-	940	-	-
HCM Lane V/C Ratio	0.002	-	0.007	-	-
HCM Control Delay (s)	7.4	0	8.9	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	0	-	-



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	150	372	33	9	210	18	29	5	38	196	19	88
Future Volume (veh/h)	150	372	33	9	210	18	29	5	38	196	19	88
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1767	1767	1767	1767	1767	1767	1767	1767	1767	1767	1767	1767
Adj Flow Rate, veh/h	155	384	34	9	216	19	30	5	39	202	20	91
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	9	9	9	9	9	9	9	9	9	9	9	9
Cap, veh/h	198	470	42	35	711	62	43	7	56	268	27	261
Arrive On Green	0.12	0.29	0.29	0.02	0.23	0.23	0.07	0.07	0.07	0.17	0.17	0.17
Sat Flow, veh/h	1682	1600	142	1682	3123	272	642	107	835	1538	152	1497
Grp Volume(v), veh/h	155	0	418	9	115	120	74	0	0	222	0	91
Grp Sat Flow(s),veh/h/ln	1682	0	1741	1682	1678	1718	1584	0	0	1690	0	1497
Q Serve(g_s), s	5.9	0.0	14.7	0.3	3.8	3.8	3.0	0.0	0.0	8.3	0.0	3.5
Cycle Q Clear(g_c), s	5.9	0.0	14.7	0.3	3.8	3.8	3.0	0.0	0.0	8.3	0.0	3.5
Prop In Lane	1.00		0.08	1.00		0.16	0.41		0.53	0.91		1.00
Lane Grp Cap(c), veh/h	198	0	512	35	382	391	107	0	0	295	0	261
V/C Ratio(X)	0.78	0.00	0.82	0.26	0.30	0.31	0.69	0.00	0.00	0.75	0.00	0.35
Avail Cap(c_a), veh/h	662	0	793	764	1066	1091	383	0	0	716	0	634
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	1.00	1.00	1.00	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	28.3	0.0	21.7	31.9	21.2	21.2	30.2	0.0	0.0	25.9	0.0	24.0
Incr Delay (d2), s/veh	6.6	0.0	5.4	3.8	0.7	0.7	7.8	0.0	0.0	3.9	0.0	0.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.4	0.0	5.7	0.2	1.3	1.4	1.3	0.0	0.0	3.3	0.0	1.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	35.0	0.0	27.0	35.7	21.9	21.9	37.9	0.0	0.0	29.8	0.0	24.8
LnGrp LOS	C	A	C	D	C	C	D	A	A	C	A	C
Approach Vol, veh/h		573			244			74			313	
Approach Delay, s/veh		29.2			22.4			37.9			28.4	
Approach LOS		C			C			D			C	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	8.9	26.4		21.4	13.3	22.0		9.4				
Change Period (Y+Rc), s	7.5	* 7		* 9.9	5.5	7.0		4.9				
Max Green Setting (Gmax), s	30.0	* 30		* 28	26.0	42.0		16.0				
Max Q Clear Time (g_c+I1), s	2.3	16.7		10.3	7.9	5.8		5.0				
Green Ext Time (p_c), s	0.0	2.7		1.3	0.3	1.9		0.2				

Intersection Summary			
HCM 6th Ctrl Delay		28.1	
HCM 6th LOS		C	

Notes

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



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	120	438	48	0	81	51	16	14	2	5	0	140
Future Volume (veh/h)	120	438	48	0	81	51	16	14	2	5	0	140
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1767	1767	1767	1767	1767	1767	1767	1767	1767	1767	1767	1767
Adj Flow Rate, veh/h	124	452	49	0	84	53	16	14	2	5	0	144
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	9	9	9	9	9	9	9	9	9	9	9	9
Cap, veh/h	160	691	75	3	230	145	42	37	5	199	0	177
Arrive On Green	0.10	0.44	0.44	0.00	0.23	0.23	0.05	0.05	0.05	0.12	0.00	0.12
Sat Flow, veh/h	1682	1566	170	1682	1013	639	852	746	107	1682	0	1497
Grp Volume(v), veh/h	124	0	501	0	0	137	32	0	0	5	0	144
Grp Sat Flow(s),veh/h/ln	1682	0	1736	1682	0	1652	1705	0	0	1682	0	1497
Q Serve(g_s), s	3.8	0.0	12.0	0.0	0.0	3.7	1.0	0.0	0.0	0.1	0.0	5.0
Cycle Q Clear(g_c), s	3.8	0.0	12.0	0.0	0.0	3.7	1.0	0.0	0.0	0.1	0.0	5.0
Prop In Lane	1.00		0.10	1.00		0.39	0.50		0.06	1.00		1.00
Lane Grp Cap(c), veh/h	160	0	766	3	0	375	85	0	0	199	0	177
V/C Ratio(X)	0.78	0.00	0.65	0.00	0.00	0.37	0.38	0.00	0.00	0.03	0.00	0.81
Avail Cap(c_a), veh/h	827	0	1050	859	0	1155	870	0	0	827	0	736
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	0.00	0.00	1.00	1.00	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	23.4	0.0	11.6	0.0	0.0	17.2	24.4	0.0	0.0	20.6	0.0	22.8
Incr Delay (d2), s/veh	3.0	0.0	0.4	0.0	0.0	0.2	1.0	0.0	0.0	0.0	0.0	3.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.4	0.0	3.0	0.0	0.0	1.3	0.4	0.0	0.0	0.0	0.0	1.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	26.4	0.0	12.0	0.0	0.0	17.5	25.4	0.0	0.0	20.7	0.0	26.2
LnGrp LOS	C	A	B	A	A	B	C	A	A	C	A	C
Approach Vol, veh/h		625			137			32			149	
Approach Delay, s/veh		14.8			17.5			25.4			26.0	
Approach LOS		B			B			C			C	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	10.0	30.3		14.2	11.3	19.0		8.4
Change Period (Y+Rc), s	* 6.3	* 7		7.9	* 6.3	7.0		5.8
Max Green Setting (Gmax), s	* 23	* 32		26.0	* 26	37.0		27.0
Max Q Clear Time (g_c+I1), s	10.0	14.0		7.0	5.8	5.7		3.0
Green Ext Time (p_c), s	0.0	0.3		0.1	0.0	0.3		0.0

Intersection Summary	
HCM 6th Ctrl Delay	17.3
HCM 6th LOS	B

Notes

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



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	220	120	90	360	190	100
Future Volume (veh/h)	220	120	90	360	190	100
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1737	1737	1737	1737	1737	1737
Adj Flow Rate, veh/h	234	128	96	383	202	106
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	11	11	11	11	11	11
Cap, veh/h	470	398	132	853	377	336
Arrive On Green	0.27	0.27	0.08	0.49	0.23	0.23
Sat Flow, veh/h	1737	1472	1654	1737	1654	1472
Grp Volume(v), veh/h	234	128	96	383	202	106
Grp Sat Flow(s),veh/h/ln	1737	1472	1654	1737	1654	1472
Q Serve(g_s), s	4.8	3.0	2.4	6.1	4.6	2.6
Cycle Q Clear(g_c), s	4.8	3.0	2.4	6.1	4.6	2.6
Prop In Lane		1.00	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	470	398	132	853	377	336
V/C Ratio(X)	0.50	0.32	0.73	0.45	0.54	0.32
Avail Cap(c_a), veh/h	1627	1379	775	1627	775	690
HCM Platoon Ratio	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
Uniform Delay (d), s/veh	13.1	12.4	19.2	7.1	14.5	13.7
Incr Delay (d2), s/veh	2.9	1.7	7.5	1.3	4.2	1.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.6	0.8	1.0	1.3	1.6	0.8
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	16.1	14.1	26.7	8.4	18.7	15.6
LnGrp LOS	B	B	C	A	B	B
Approach Vol, veh/h	362			479	308	
Approach Delay, s/veh	15.4			12.1	17.7	
Approach LOS	B			B	B	

Timer - Assigned Phs	1	2		4		6
Phs Duration (G+Y+Rc), s	9.4	17.6		15.7		27.0
Change Period (Y+Rc), s	6.0	6.0		6.0		6.0
Max Green Setting (Gmax), s	20.0	40.0		20.0		40.0
Max Q Clear Time (g_c+I1), s	4.4	6.8		6.6		8.1
Green Ext Time (p_c), s	0.2	4.7		2.2		5.7

Intersection Summary						
HCM 6th Ctrl Delay			14.6			
HCM 6th LOS			B			

Intersection	
Int Delay, s/veh	13.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕		↰	↱			↕			↕	
Traffic Vol, veh/h	20	90	60	10	30	30	190	220	20	40	160	40
Future Vol, veh/h	20	90	60	10	30	30	190	220	20	40	160	40
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	-	-	-	0	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	89	92	89	92	92	92	89	89	92	92	89	89
Heavy Vehicles, %	8	6	8	6	6	6	8	8	6	6	8	8
Mvmt Flow	22	98	67	11	33	33	213	247	22	43	180	45

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1006	984	203	1055	995	258	225	0	0	269	0	0
Stage 1	289	289	-	684	684	-	-	-	-	-	-	-
Stage 2	717	695	-	371	311	-	-	-	-	-	-	-
Critical Hdwy	7.18	6.56	6.28	7.16	6.56	6.26	4.18	-	-	4.16	-	-
Critical Hdwy Stg 1	6.18	5.56	-	6.16	5.56	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.18	5.56	-	6.16	5.56	-	-	-	-	-	-	-
Follow-up Hdwy	3.572	4.054	3.372	3.554	4.054	3.354	2.272	-	-	2.254	-	-
Pot Cap-1 Maneuver	214	245	823	200	241	771	1309	-	-	1272	-	-
Stage 1	706	666	-	432	443	-	-	-	-	-	-	-
Stage 2	411	438	-	641	651	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	148	190	823	92	187	771	1309	-	-	1272	-	-
Mov Cap-2 Maneuver	148	190	-	92	187	-	-	-	-	-	-	-
Stage 1	570	640	-	349	358	-	-	-	-	-	-	-
Stage 2	289	354	-	479	626	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	52.3	24.4	3.7	1.3
HCM LOS	F	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1309	-	-	251	92	301	1272	-	-
HCM Lane V/C Ratio	0.163	-	-	0.748	0.118	0.217	0.034	-	-
HCM Control Delay (s)	8.3	0	-	52.3	49.3	20.2	7.9	0	-
HCM Lane LOS	A	A	-	F	E	C	A	A	-
HCM 95th %tile Q(veh)	0.6	-	-	5.3	0.4	0.8	0.1	-	-

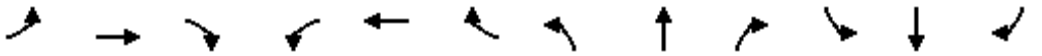
Intersection	
Int Delay, s/veh	23.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	10	0	30	250	0	60	20	290	90	30	220	10
Future Vol, veh/h	10	0	30	250	0	60	20	290	90	30	220	10
Conflicting Peds, #/hr	0	0	0	0	0	0	1	0	0	0	0	1
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	0	-	100	100	-	-	140	-	-	140	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	87	92	87	92	92	92	87	87	92	92	87	87
Heavy Vehicles, %	7	6	7	6	6	6	7	7	6	6	7	7
Mvmt Flow	11	0	34	272	0	65	23	333	98	33	253	11

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	539	803	260	770	759	216	265	0	0	431	0	0
Stage 1	326	326	-	428	428	-	-	-	-	-	-	-
Stage 2	213	477	-	342	331	-	-	-	-	-	-	-
Critical Hdwy	7.405	6.59	6.305	7.39	6.59	6.99	4.205	-	-	4.19	-	-
Critical Hdwy Stg 1	6.205	5.59	-	6.59	5.59	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.605	5.59	-	6.19	5.59	-	-	-	-	-	-	-
Follow-up Hdwy	3.5665	4.057	3.3665	3.557	4.057	3.357	2.2665	-	-	2.257	-	-
Pot Cap-1 Maneuver	430	310	764	298	329	778	1265	-	-	1102	-	-
Stage 1	673	639	-	567	575	-	-	-	-	-	-	-
Stage 2	757	547	-	662	636	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	379	295	763	274	313	778	1264	-	-	1102	-	-
Mov Cap-2 Maneuver	379	295	-	274	313	-	-	-	-	-	-	-
Stage 1	660	619	-	557	565	-	-	-	-	-	-	-
Stage 2	681	537	-	613	616	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	11.1	76.9	0.4	0.9
HCM LOS	B	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1264	-	-	379	763	274	778	1102	-	-
HCM Lane V/C Ratio	0.018	-	-	0.03	0.045	0.992	0.084	0.03	-	-
HCM Control Delay (s)	7.9	-	-	14.8	9.9	92.9	10.1	8.4	-	-
HCM Lane LOS	A	-	-	B	A	F	B	A	-	-
HCM 95th %tile Q(veh)	0.1	-	-	0.1	0.1	10	0.3	0.1	-	-



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	10	10	50	80	10	20	30	450	50	10	550	10
Future Volume (veh/h)	10	10	50	80	10	20	30	450	50	10	550	10
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		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1811	1811	1811	1811	1811	1811	1811	1811	1811	1811	1811	1811
Adj Flow Rate, veh/h	12	12	61	98	12	24	37	549	61	12	671	12
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Percent Heavy Veh, %	6	6	6	6	6	6	6	6	6	6	6	6
Cap, veh/h	32	27	139	164	99	198	86	1167	129	32	1185	21
Arrive On Green	0.02	0.11	0.11	0.10	0.18	0.18	0.05	0.37	0.37	0.02	0.34	0.34
Sat Flow, veh/h	1725	255	1296	1725	538	1077	1725	3123	346	1725	3457	62
Grp Volume(v), veh/h	12	0	73	98	0	36	37	302	308	12	334	349
Grp Sat Flow(s),veh/h/ln	1725	0	1551	1725	0	1615	1725	1721	1749	1725	1721	1798
Q Serve(g_s), s	0.3	0.0	1.9	2.4	0.0	0.8	0.9	5.9	5.9	0.3	7.0	7.0
Cycle Q Clear(g_c), s	0.3	0.0	1.9	2.4	0.0	0.8	0.9	5.9	5.9	0.3	7.0	7.0
Prop In Lane	1.00		0.84	1.00		0.67	1.00		0.20	1.00		0.03
Lane Grp Cap(c), veh/h	32	0	166	164	0	297	86	643	653	32	590	616
V/C Ratio(X)	0.37	0.00	0.44	0.60	0.00	0.12	0.43	0.47	0.47	0.37	0.57	0.57
Avail Cap(c_a), veh/h	821	0	808	821	0	842	1016	1559	1585	1016	1559	1629
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	1.00	1.00
Uniform Delay (d), s/veh	21.4	0.0	18.5	19.2	0.0	15.0	20.4	10.5	10.5	21.4	11.8	11.8
Incr Delay (d2), s/veh	7.1	0.0	1.8	3.5	0.0	0.2	3.4	0.8	0.8	7.1	1.2	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	0.2	0.0	0.7	1.0	0.0	0.3	0.4	1.6	1.7	0.2	2.1	2.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	28.5	0.0	20.3	22.6	0.0	15.2	23.8	11.3	11.3	28.5	13.1	13.0
LnGrp LOS	C	A	C	C	A	B	C	B	B	C	B	B
Approach Vol, veh/h		85			134			647			695	
Approach Delay, s/veh		21.4			20.6			12.0			13.3	
Approach LOS		C			C			B			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	4.8	21.8	8.2	9.3	6.2	20.4	4.8	12.7
Change Period (Y+Rc), s	4.0	5.3	4.0	4.6	4.0	5.3	4.0	4.6
Max Green Setting (Gmax), s	26.0	40.0	21.0	23.0	26.0	40.0	21.0	23.0
Max Q Clear Time (g_c+I1), s	2.3	7.9	4.4	3.9	2.9	9.0	2.3	2.8
Green Ext Time (p_c), s	0.0	5.4	0.2	0.3	0.1	6.1	0.0	0.1

Intersection Summary	
HCM 6th Ctrl Delay	13.8
HCM 6th LOS	B

Notes

User approved pedestrian interval to be less than phase max green.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	140	380	140	310	360	240	120	300	270	210	420	150
Future Volume (veh/h)	140	380	140	310	360	240	120	300	270	210	420	150
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		0.99	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1811	1811	1811	1811	1811	1811	1811	1811	1811	1811	1811	1811
Adj Flow Rate, veh/h	159	432	159	352	409	273	136	341	307	239	477	170
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Percent Heavy Veh, %	6	6	6	6	6	6	6	6	6	6	6	6
Cap, veh/h	193	623	278	382	577	381	168	448	394	274	798	282
Arrive On Green	0.11	0.18	0.18	0.22	0.29	0.29	0.10	0.26	0.26	0.16	0.32	0.32
Sat Flow, veh/h	1725	3441	1535	1725	1984	1311	1725	1721	1514	1725	2481	877
Grp Volume(v), veh/h	159	432	159	352	354	328	136	341	307	239	330	317
Grp Sat Flow(s),veh/h/ln	1725	1721	1535	1725	1721	1575	1725	1721	1514	1725	1721	1638
Q Serve(g_s), s	9.1	11.9	9.6	20.2	18.6	18.8	7.8	18.5	19.0	13.7	16.2	16.5
Cycle Q Clear(g_c), s	9.1	11.9	9.6	20.2	18.6	18.8	7.8	18.5	19.0	13.7	16.2	16.5
Prop In Lane	1.00		1.00	1.00		0.83	1.00		1.00	1.00		0.54
Lane Grp Cap(c), veh/h	193	623	278	382	500	458	168	448	394	274	553	527
V/C Ratio(X)	0.82	0.69	0.57	0.92	0.71	0.72	0.81	0.76	0.78	0.87	0.60	0.60
Avail Cap(c_a), veh/h	410	1193	532	410	596	546	410	682	600	410	682	649
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	43.9	38.7	37.8	38.4	32.0	32.1	44.6	34.5	34.7	41.5	28.7	28.8
Incr Delay (d2), s/veh	8.6	2.0	2.6	25.1	3.7	4.3	8.9	3.8	5.0	12.6	1.5	1.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.2	5.0	3.7	10.7	7.8	7.3	3.7	7.9	7.2	6.5	6.5	6.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	52.5	40.7	40.4	63.5	35.7	36.4	53.5	38.3	39.6	54.1	30.2	30.4
LnGrp LOS	D	D	D	E	D	D	D	D	D	D	C	C
Approach Vol, veh/h		750			1034			784			886	
Approach Delay, s/veh		43.1			45.4			41.5			36.7	
Approach LOS		D			D			D			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	16.4	23.3	13.8	37.5	15.3	34.4	20.1	31.3
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	24.0	35.0	24.0	40.0	24.0	35.0	24.0	40.0
Max Q Clear Time (g_c+I1), s	22.2	13.9	9.8	18.5	11.1	20.8	15.7	21.0
Green Ext Time (p_c), s	0.2	4.4	0.3	5.2	0.3	4.6	0.4	5.3

Intersection Summary	
HCM 6th Ctrl Delay	41.8
HCM 6th LOS	D

Intersection	
Int Delay, s/veh	13

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	70	30	170	40	0	0	0	0	260	5	40
Future Vol, veh/h	0	70	30	170	40	0	0	0	0	260	5	40
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	0	-	-	-	-	-	0	-	520
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	87	87	87	87	87	87	87	87	87	87	87	87
Heavy Vehicles, %	37	37	37	37	37	37	37	37	37	37	37	37
Mvmt Flow	0	80	34	195	46	0	0	0	0	299	6	46

Major/Minor	Major1			Major2					Minor2		
Conflicting Flow All	-	0	0	114	0	0			476	550	23
Stage 1	-	-	-	-	-	-			436	436	-
Stage 2	-	-	-	-	-	-			40	114	-
Critical Hdwy	-	-	-	4.84	-	-			7.54	7.24	7.64
Critical Hdwy Stg 1	-	-	-	-	-	-			6.54	6.24	-
Critical Hdwy Stg 2	-	-	-	-	-	-			6.54	6.24	-
Follow-up Hdwy	-	-	-	2.57	-	-			3.87	4.37	3.67
Pot Cap-1 Maneuver	0	-	-	1251	-	0			439	374	945
Stage 1	0	-	-	-	-	0			528	498	-
Stage 2	0	-	-	-	-	0			884	724	-
Platoon blocked, %		-	-		-						
Mov Cap-1 Maneuver	-	-	-	1251	-	-			371	0	945
Mov Cap-2 Maneuver	-	-	-	-	-	-			371	0	-
Stage 1	-	-	-	-	-	-			528	0	-
Stage 2	-	-	-	-	-	-			746	0	-

Approach	EB	WB	SB
HCM Control Delay, s	0	6.8	21.6
HCM LOS			C

Minor Lane/Major Mvmt	EBT	EBR	WBL	WBT	SBLn1	SBLn2
Capacity (veh/h)	-	-	1251	-	371	459
HCM Lane V/C Ratio	-	-	0.156	-	0.537	0.33
HCM Control Delay (s)	-	-	8.4	-	25.4	16.7
HCM Lane LOS	-	-	A	-	D	C
HCM 95th %tile Q(veh)	-	-	0.6	-	3	1.4

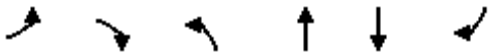
Intersection	
Int Delay, s/veh	3.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	20	310	0	0	190	350	20	5	190	0	0	0
Future Vol, veh/h	20	310	0	0	190	350	20	5	190	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	Free	-	-	Stop	-	-	None
Storage Length	0	-	-	-	-	-	630	-	0	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	87	87	87	87	87	87	87	87	87	87	87	87
Heavy Vehicles, %	37	37	37	37	37	37	37	37	37	37	37	37
Mvmt Flow	23	356	0	0	218	402	23	6	218	0	0	0

Major/Minor	Major1			Major2			Minor1		
Conflicting Flow All	218	0	-	-	-	0	511	620	178
Stage 1	-	-	-	-	-	-	402	402	-
Stage 2	-	-	-	-	-	-	109	218	-
Critical Hdwy	4.84	-	-	-	-	-	7.54	7.24	7.64
Critical Hdwy Stg 1	-	-	-	-	-	-	6.54	6.24	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	6.24	-
Follow-up Hdwy	2.57	-	-	-	-	-	3.87	4.37	3.67
Pot Cap-1 Maneuver	1128	-	0	0	-	0	415	337	735
Stage 1	-	-	0	0	-	0	552	519	-
Stage 2	-	-	0	0	-	0	809	643	-
Platoon blocked, %		-			-				
Mov Cap-1 Maneuver	1128	-	-	-	-	-	407	0	735
Mov Cap-2 Maneuver	-	-	-	-	-	-	407	0	-
Stage 1	-	-	-	-	-	-	541	0	-
Stage 2	-	-	-	-	-	-	809	0	-

Approach	EB	WB	NB
HCM Control Delay, s	0.5	0	12.3
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	WBT
Capacity (veh/h)	407	735	1128	-	-
HCM Lane V/C Ratio	0.071	0.297	0.02	-	-
HCM Control Delay (s)	14.5	12	8.3	-	-
HCM Lane LOS	B	B	A	-	-
HCM 95th %tile Q(veh)	0.2	1.2	0.1	-	-



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	70	120	240	230	170	70
Future Volume (veh/h)	70	120	240	230	170	70
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1604	1604	1604	1604	1604	1604
Adj Flow Rate, veh/h	74	128	255	245	181	74
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	20	20	20	20	20	20
Cap, veh/h	211	188	335	887	465	183
Arrive On Green	0.14	0.14	0.22	0.55	0.22	0.22
Sat Flow, veh/h	1527	1359	1527	1604	2215	841
Grp Volume(v), veh/h	74	128	255	245	127	128
Grp Sat Flow(s),veh/h/ln	1527	1359	1527	1604	1523	1452
Q Serve(g_s), s	1.7	3.5	6.1	3.1	2.8	2.9
Cycle Q Clear(g_c), s	1.7	3.5	6.1	3.1	2.8	2.9
Prop In Lane	1.00	1.00	1.00			0.58
Lane Grp Cap(c), veh/h	211	188	335	887	332	317
V/C Ratio(X)	0.35	0.68	0.76	0.28	0.38	0.40
Avail Cap(c_a), veh/h	944	840	944	1610	1530	1458
HCM Platoon Ratio	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
Uniform Delay (d), s/veh	15.2	15.9	14.2	4.6	13.0	13.0
Incr Delay (d2), s/veh	1.0	4.3	5.1	0.6	2.6	3.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.6	1.1	1.8	0.4	0.9	0.9
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	16.2	20.2	19.3	5.2	15.6	16.0
LnGrp LOS	B	C	B	A	B	B
Approach Vol, veh/h	202			500	255	
Approach Delay, s/veh	18.7			12.4	15.8	
Approach LOS	B			B	B	

Timer - Assigned Phs	1	2		4		6
Phs Duration (G+Y+Rc), s	13.0	14.5		11.4		27.5
Change Period (Y+Rc), s	4.5	6.0		6.0		6.0
Max Green Setting (Gmax), s	24.0	39.0		24.0		39.0
Max Q Clear Time (g_c+I1), s	8.1	4.9		5.5		5.1
Green Ext Time (p_c), s	1.0	3.5		0.6		3.4

Intersection Summary	
HCM 6th Ctrl Delay	14.6
HCM 6th LOS	B

Notes

User approved pedestrian interval to be less than phase max green.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	500	90	330	670	0	0	0	0	230	5	100
Future Volume (veh/h)	0	500	90	330	670	0	0	0	0	230	5	100
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		1.00				1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Work Zone On Approach		No			No						No	
Adj Sat Flow, veh/h/ln	0	1811	1811	1811	1811	0				1811	1811	1811
Adj Flow Rate, veh/h	0	568	102	375	761	0				261	6	114
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88				0.88	0.88	0.88
Percent Heavy Veh, %	0	6	6	6	6	0				6	6	6
Cap, veh/h	0	990	174	428	1012	0				305	7	133
Arrive On Green	0.00	0.24	0.24	0.25	0.56	0.00				0.27	0.27	0.27
Sat Flow, veh/h	0	4373	741	1725	1811	0				1140	26	498
Grp Volume(v), veh/h	0	442	228	375	761	0				381	0	0
Grp Sat Flow(s),veh/h/ln	0	1648	1655	1725	1811	0				1664	0	0
Q Serve(g_s), s	0.0	6.3	6.5	11.1	16.9	0.0				11.5	0.0	0.0
Cycle Q Clear(g_c), s	0.0	6.3	6.5	11.1	16.9	0.0				11.5	0.0	0.0
Prop In Lane	0.00		0.45	1.00		0.00				0.69		0.30
Lane Grp Cap(c), veh/h	0	775	389	428	1012	0				445	0	0
V/C Ratio(X)	0.00	0.57	0.59	0.88	0.75	0.00				0.86	0.00	0.00
Avail Cap(c_a), veh/h	0	2799	1405	814	1538	0				1256	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	1.00	1.00	1.00	0.00				1.00	0.00	0.00
Uniform Delay (d), s/veh	0.0	17.9	18.0	19.1	8.9	0.0				18.4	0.0	0.0
Incr Delay (d2), s/veh	0.0	0.6	1.3	2.3	1.0	0.0				1.9	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	2.0	2.2	3.9	4.1	0.0				3.8	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	18.5	19.2	21.4	9.9	0.0				20.3	0.0	0.0
LnGrp LOS	A	B	B	C	A	A				C	A	A
Approach Vol, veh/h		670			1136						381	
Approach Delay, s/veh		18.7			13.7						20.3	
Approach LOS		B			B						C	

Timer - Assigned Phs	1	2		4		6
Phs Duration (G+Y+Rc), s	17.1	17.1		18.8		34.2
Change Period (Y+Rc), s	4.0	4.6		4.6		4.6
Max Green Setting (Gmax), s	25.0	45.0		40.0		45.0
Max Q Clear Time (g_c+I1), s	13.1	8.5		13.5		18.9
Green Ext Time (p_c), s	0.1	4.0		0.7		4.8

Intersection Summary	
HCM 6th Ctrl Delay	16.4
HCM 6th LOS	B



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	80	650	0	0	920	250	80	5	280	0	0	0
Future Volume (veh/h)	80	650	0	0	920	250	80	5	280	0	0	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.93	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	1811	1811	0	0	1811	1811	1811	1811	1811			
Adj Flow Rate, veh/h	91	739	0	0	1045	284	91	6	318			
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88			
Percent Heavy Veh, %	6	6	0	0	6	6	6	6	6			
Cap, veh/h	116	2033	0	0	1244	335	100	7	350			
Arrive On Green	0.07	0.59	0.00	0.00	0.47	0.47	0.29	0.29	0.29			
Sat Flow, veh/h	1725	3532	0	0	2726	710	346	23	1208			
Grp Volume(v), veh/h	91	739	0	0	679	650	415	0	0			
Grp Sat Flow(s),veh/h/ln	1725	1721	0	0	1721	1624	1576	0	0			
Q Serve(g_s), s	4.0	8.6	0.0	0.0	26.6	27.2	19.6	0.0	0.0			
Cycle Q Clear(g_c), s	4.0	8.6	0.0	0.0	26.6	27.2	19.6	0.0	0.0			
Prop In Lane	1.00		0.00	0.00		0.44	0.22		0.77			
Lane Grp Cap(c), veh/h	116	2033	0	0	812	767	457	0	0			
V/C Ratio(X)	0.79	0.36	0.00	0.00	0.84	0.85	0.91	0.00	0.00			
Avail Cap(c_a), veh/h	558	2033	0	0	1002	946	816	0	0			
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	1.00	1.00	0.00	0.00	1.00	1.00	1.00	0.00	0.00			
Uniform Delay (d), s/veh	35.5	8.2	0.0	0.0	17.8	18.0	26.4	0.0	0.0			
Incr Delay (d2), s/veh	4.4	0.1	0.0	0.0	5.1	6.0	3.4	0.0	0.0			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	1.7	2.5	0.0	0.0	9.9	9.7	7.0	0.0	0.0			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	39.9	8.3	0.0	0.0	22.9	24.0	29.9	0.0	0.0			
LnGrp LOS	D	A	A	A	C	C	C	A	A			
Approach Vol, veh/h		830			1329			415				
Approach Delay, s/veh		11.8			23.4			29.9				
Approach LOS		B			C			C				
Timer - Assigned Phs		2			5	6		8				
Phs Duration (G+Y+Rc), s		50.3			9.2	41.1		27.0				
Change Period (Y+Rc), s		4.6			4.0	4.6		4.6				
Max Green Setting (Gmax), s		45.0			25.0	45.0		40.0				
Max Q Clear Time (g_c+I1), s		10.6			6.0	29.2		21.6				
Green Ext Time (p_c), s		4.8			0.0	7.2		0.8				
Intersection Summary												
HCM 6th Ctrl Delay			20.7									
HCM 6th LOS			C									

Intersection	
Int Delay, s/veh	1.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	780	150	0	1050	0	0	0	20	0	0	120
Future Vol, veh/h	0	780	150	0	1050	0	0	0	20	0	0	120
Conflicting Peds, #/hr	0	0	2	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	0	-	-	0
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	88	88	88	88	88	88	88	88	88	88	88	88
Heavy Vehicles, %	6	6	6	6	6	6	6	6	6	6	6	6
Mvmt Flow	0	886	170	0	1193	0	0	0	23	0	0	136

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	-	0	0	-	-	0	-	-	530	-	-	597
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	-	-	-	7.02	-	-	7.02
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	-	-	-	3.36	-	-	3.36
Pot Cap-1 Maneuver	0	-	-	0	-	0	0	0	483	0	0	436
Stage 1	0	-	-	0	-	0	0	0	-	0	0	-
Stage 2	0	-	-	0	-	0	0	0	-	0	0	-
Platoon blocked, %		-	-		-							
Mov Cap-1 Maneuver	-	-	-	-	-	-	-	-	482	-	-	436
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0	12.8	17
HCM LOS			B	C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBT	SBLn1
Capacity (veh/h)	482	-	-	-	436
HCM Lane V/C Ratio	0.047	-	-	-	0.313
HCM Control Delay (s)	12.8	-	-	-	17
HCM Lane LOS	B	-	-	-	C
HCM 95th %tile Q(veh)	0.1	-	-	-	1.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	260	410	160	80	660	60	210	120	80	60	110	160
Future Volume (veh/h)	260	410	160	80	660	60	210	120	80	60	110	160
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		0.97	1.00		0.99	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1811	1811	1811	1811	1811	1811	1811	1811	1811	1811	1811	1811
Adj Flow Rate, veh/h	295	466	182	91	750	68	239	136	91	68	125	182
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Percent Heavy Veh, %	6	6	6	6	6	6	6	6	6	6	6	6
Cap, veh/h	308	996	386	116	956	87	266	556	348	95	302	266
Arrive On Green	0.18	0.41	0.41	0.07	0.30	0.30	0.15	0.27	0.27	0.05	0.18	0.18
Sat Flow, veh/h	1725	2421	938	1725	3182	288	1725	2027	1268	1725	1721	1516
Grp Volume(v), veh/h	295	330	318	91	405	413	239	114	113	68	125	182
Grp Sat Flow(s),veh/h/ln	1725	1721	1639	1725	1721	1750	1725	1721	1575	1725	1721	1516
Q Serve(g_s), s	19.0	15.7	15.9	5.8	24.2	24.2	15.3	5.8	6.3	4.3	7.2	12.6
Cycle Q Clear(g_c), s	19.0	15.7	15.9	5.8	24.2	24.2	15.3	5.8	6.3	4.3	7.2	12.6
Prop In Lane	1.00		0.57	1.00		0.16	1.00		0.81	1.00		1.00
Lane Grp Cap(c), veh/h	308	708	675	116	517	526	266	472	432	95	302	266
V/C Ratio(X)	0.96	0.47	0.47	0.79	0.78	0.79	0.90	0.24	0.26	0.72	0.41	0.68
Avail Cap(c_a), veh/h	308	708	675	308	614	624	339	583	534	277	599	528
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	45.6	24.0	24.1	51.5	35.9	35.9	46.5	31.6	31.8	52.1	41.1	43.3
Incr Delay (d2), s/veh	39.9	1.0	1.1	13.1	7.5	7.4	19.4	0.6	0.7	3.8	1.9	6.5
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	11.2	6.2	6.0	2.9	10.7	10.9	7.8	2.4	2.4	1.9	3.1	5.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	85.5	25.0	25.2	64.5	43.4	43.3	65.9	32.2	32.5	55.9	43.1	49.8
LnGrp LOS	F	C	C	E	D	D	E	C	C	E	D	D
Approach Vol, veh/h		943			909			466			375	
Approach Delay, s/veh		44.0			45.4			49.5			48.7	
Approach LOS		D			D			D			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	12.5	51.6	22.3	25.6	25.0	39.2	11.2	36.8
Change Period (Y+Rc), s	5.0	5.5	5.0	6.0	5.0	5.5	5.0	6.0
Max Green Setting (Gmax), s	20.0	40.0	22.0	39.0	20.0	40.0	18.0	38.0
Max Q Clear Time (g_c+I1), s	7.8	17.9	17.3	14.6	21.0	26.2	6.3	8.3
Green Ext Time (p_c), s	0.2	7.0	0.0	3.2	0.0	6.8	0.0	2.5

Intersection Summary	
HCM 6th Ctrl Delay	46.1
HCM 6th LOS	D

Notes

User approved pedestrian interval to be less than phase max green.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	100	320	100	90	440	100	140	170	100	50	140	80
Future Volume (veh/h)	100	320	100	90	440	100	140	170	100	50	140	80
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		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1781	1781	1781	1781	1781	1781	1781	1781	1781	1781	1781	1781
Adj Flow Rate, veh/h	115	368	115	103	506	115	161	195	115	57	161	92
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Percent Heavy Veh, %	8	8	8	8	8	8	8	8	8	8	8	8
Cap, veh/h	147	752	638	132	578	131	199	242	142	73	282	234
Arrive On Green	0.09	0.42	0.42	0.08	0.41	0.41	0.12	0.23	0.23	0.04	0.16	0.16
Sat Flow, veh/h	1697	1781	1510	1697	1398	318	1697	1040	613	1697	1781	1476
Grp Volume(v), veh/h	115	368	115	103	0	621	161	0	310	57	161	92
Grp Sat Flow(s),veh/h/ln	1697	1781	1510	1697	0	1716	1697	0	1653	1697	1781	1476
Q Serve(g_s), s	5.7	12.9	4.1	5.1	0.0	28.6	8.0	0.0	15.2	2.9	7.2	4.8
Cycle Q Clear(g_c), s	5.7	12.9	4.1	5.1	0.0	28.6	8.0	0.0	15.2	2.9	7.2	4.8
Prop In Lane	1.00		1.00	1.00		0.19	1.00		0.37	1.00		1.00
Lane Grp Cap(c), veh/h	147	752	638	132	0	710	199	0	384	73	282	234
V/C Ratio(X)	0.78	0.49	0.18	0.78	0.00	0.87	0.81	0.00	0.81	0.78	0.57	0.39
Avail Cap(c_a), veh/h	493	766	649	493	0	837	493	0	769	493	1076	892
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	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	38.5	18.1	15.5	38.9	0.0	23.2	37.0	0.0	31.2	40.8	33.5	32.5
Incr Delay (d2), s/veh	8.8	1.1	0.3	9.5	0.0	10.7	7.6	0.0	6.3	16.0	2.9	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	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.6	5.0	1.3	2.4	0.0	12.3	3.5	0.0	6.3	1.5	3.2	1.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	47.3	19.2	15.8	48.4	0.0	33.9	44.7	0.0	37.5	56.7	36.4	34.2
LnGrp LOS	D	B	B	D	A	C	D	A	D	E	D	C
Approach Vol, veh/h		598			724			471			310	
Approach Delay, s/veh		23.9			36.0			40.0			39.5	
Approach LOS		C			D			D			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	10.7	42.3	7.7	25.3	11.4	41.6	14.1	18.9
Change Period (Y+Rc), s	4.0	6.0	4.0	5.3	4.0	6.0	4.0	5.3
Max Green Setting (Gmax), s	25.0	37.0	25.0	40.0	25.0	42.0	25.0	52.0
Max Q Clear Time (g_c+I1), s	7.7	14.9	4.9	17.2	7.7	30.6	10.0	9.2
Green Ext Time (p_c), s	0.2	4.7	0.1	2.7	0.2	5.0	0.3	2.0

Intersection Summary	
HCM 6th Ctrl Delay	34.0
HCM 6th LOS	C

Intersection	
Int Delay, s/veh	1.3

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	20	600	560	30	40	20
Future Vol, veh/h	20	600	560	30	40	20
Conflicting Peds, #/hr	1	0	0	1	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	110	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	86	86	86	86	86	86
Heavy Vehicles, %	7	7	7	7	7	7
Mvmt Flow	23	698	651	35	47	23

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	687	0	-	0	1065	344
Stage 1	-	-	-	-	670	-
Stage 2	-	-	-	-	395	-
Critical Hdwy	4.24	-	-	-	6.94	7.04
Critical Hdwy Stg 1	-	-	-	-	5.94	-
Critical Hdwy Stg 2	-	-	-	-	5.94	-
Follow-up Hdwy	2.27	-	-	-	3.57	3.37
Pot Cap-1 Maneuver	870	-	-	-	210	638
Stage 1	-	-	-	-	457	-
Stage 2	-	-	-	-	635	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	869	-	-	-	204	637
Mov Cap-2 Maneuver	-	-	-	-	204	-
Stage 1	-	-	-	-	445	-
Stage 2	-	-	-	-	634	-

Approach	EB	WB	SB
HCM Control Delay, s	0.3	0	23.5
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	869	-	-	-	264
HCM Lane V/C Ratio	0.027	-	-	-	0.264
HCM Control Delay (s)	9.3	-	-	-	23.5
HCM Lane LOS	A	-	-	-	C
HCM 95th %tile Q(veh)	0.1	-	-	-	1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	20	710	70	120	690	110	70	10	150	160	10	10
Future Volume (veh/h)	20	710	70	120	690	110	70	10	150	160	10	10
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		0.98	1.00		1.00	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1811	1811	1811	1811	1811	1811	1811	1811	1811	1811	1811	1811
Adj Flow Rate, veh/h	22	798	79	135	775	124	79	11	169	180	11	11
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Percent Heavy Veh, %	6	6	6	6	6	6	6	6	6	6	6	6
Cap, veh/h	45	1254	381	174	971	155	114	14	222	229	181	181
Arrive On Green	0.03	0.25	0.25	0.10	0.33	0.33	0.07	0.15	0.15	0.13	0.22	0.22
Sat Flow, veh/h	1725	4944	1502	1725	2960	474	1725	95	1455	1725	825	825
Grp Volume(v), veh/h	22	798	79	135	450	449	79	0	180	180	0	22
Grp Sat Flow(s),veh/h/ln	1725	1648	1502	1725	1721	1713	1725	0	1549	1725	0	1650
Q Serve(g_s), s	0.6	7.4	2.1	3.9	12.2	12.2	2.3	0.0	5.7	5.2	0.0	0.5
Cycle Q Clear(g_c), s	0.6	7.4	2.1	3.9	12.2	12.2	2.3	0.0	5.7	5.2	0.0	0.5
Prop In Lane	1.00		1.00	1.00		0.28	1.00		0.94	1.00		0.50
Lane Grp Cap(c), veh/h	45	1254	381	174	565	562	114	0	237	229	0	362
V/C Ratio(X)	0.49	0.64	0.21	0.78	0.80	0.80	0.70	0.00	0.76	0.79	0.00	0.06
Avail Cap(c_a), veh/h	672	3851	1170	672	1340	1334	668	0	1207	672	0	1285
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	24.7	17.1	15.1	22.5	15.7	15.7	23.5	0.0	20.9	21.6	0.0	15.8
Incr Delay (d2), s/veh	3.0	0.2	0.1	2.8	1.0	1.0	2.9	0.0	1.9	2.3	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	0.3	2.3	0.6	1.5	3.8	3.8	1.0	0.0	2.0	2.0	0.0	0.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	27.6	17.3	15.2	25.4	16.7	16.7	26.3	0.0	22.8	23.9	0.0	15.9
LnGrp LOS	C	B	B	C	B	B	C	A	C	C	A	B
Approach Vol, veh/h		899			1034			259			202	
Approach Delay, s/veh		17.3			17.8			23.8			23.0	
Approach LOS		B			B			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	5.4	22.5	10.9	12.4	9.3	18.7	7.5	15.9
Change Period (Y+Rc), s	4.1	5.7	4.1	4.6	4.1	5.7	4.1	4.6
Max Green Setting (Gmax), s	20.0	40.0	20.0	40.0	20.0	40.0	19.9	40.0
Max Q Clear Time (g_c+I1), s	2.6	14.2	7.2	7.7	5.9	9.4	4.3	2.5
Green Ext Time (p_c), s	0.0	0.7	0.2	0.8	0.1	3.7	0.1	0.0

Intersection Summary	
HCM 6th Ctrl Delay	18.7
HCM 6th LOS	B



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	810	210	100	530	100	170	0	370	50	300	220
Future Volume (veh/h)	0	810	210	100	530	100	170	0	370	50	300	220
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		0.98	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	0	1811	1811	1811	1811	1811	1811	0	1811	1811	1811	1811
Adj Flow Rate, veh/h	0	910	236	112	596	112	191	0	416	56	337	247
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Percent Heavy Veh, %	0	6	6	6	6	6	6	0	6	6	6	6
Cap, veh/h	0	1668	568	189	1674	730	233	0	0	73	631	496
Arrive On Green	0.00	0.37	0.37	0.06	0.49	0.49	0.14	0.00	0.00	0.04	0.18	0.18
Sat Flow, veh/h	0	4781	1515	3346	3441	1502	1725	191		1725	3441	2701
Grp Volume(v), veh/h	0	910	236	112	596	112	191	47.7		56	337	247
Grp Sat Flow(s),veh/h/ln	0	1485	1515	1673	1721	1502	1725	D		1725	1721	1351
Q Serve(g_s), s	0.0	14.2	10.2	2.9	9.5	3.7	9.5			2.8	7.8	7.3
Cycle Q Clear(g_c), s	0.0	14.2	10.2	2.9	9.5	3.7	9.5			2.8	7.8	7.3
Prop In Lane	0.00		1.00	1.00		1.00	1.00			1.00		1.00
Lane Grp Cap(c), veh/h	0	1668	568	189	1674	730	233			73	631	496
V/C Ratio(X)	0.00	0.55	0.42	0.59	0.36	0.15	0.82			0.77	0.53	0.50
Avail Cap(c_a), veh/h	0	3079	1047	758	2378	1038	391			391	1442	1132
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00			1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	1.00	1.00	1.00	1.00	1.00			1.00	1.00	1.00
Uniform Delay (d), s/veh	0.0	21.7	20.5	40.7	14.1	12.6	37.1			41.8	32.6	32.4
Incr Delay (d2), s/veh	0.0	0.6	1.0	4.7	0.3	0.2	10.6			22.9	1.6	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	0.0
%ile BackOfQ(50%),veh/ln	0.0	4.6	3.5	1.3	3.3	1.1	4.5			1.6	3.2	2.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	22.3	21.4	45.3	14.3	12.8	47.7			64.8	34.2	34.1
LnGrp LOS	A	C	C	D	B	B	D			E	C	C
Approach Vol, veh/h		1146			820						640	
Approach Delay, s/veh		22.1			18.4						36.8	
Approach LOS		C			B						D	

Timer - Assigned Phs	1	2	3	4		6	7
Phs Duration (G+Y+Rc), s	9.9	39.1	16.6	22.7		48.9	8.4
Change Period (Y+Rc), s	4.9	* 6	* 4.7	6.5		6.0	* 4.7
Max Green Setting (Gmax), s	20.0	* 61	* 20	37.0		61.0	* 20
Max Q Clear Time (g_c+I1), s	11.9	16.2	11.5	9.8		11.5	4.8
Green Ext Time (p_c), s	0.4	16.9	0.6	6.4		9.5	0.1

Intersection Summary	
HCM 6th Ctrl Delay	26.1
HCM 6th LOS	C

Notes

User approved pedestrian interval to be less than phase max green.

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



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	310	470	80	330	400	30
Future Volume (veh/h)	310	470	80	330	400	30
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1811	1811	1811	1811	1811	1811
Adj Flow Rate, veh/h	348	0	90	371	449	34
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Percent Heavy Veh, %	6	6	6	6	6	6
Cap, veh/h	956		142	1622	738	338
Arrive On Green	0.28	0.00	0.08	0.47	0.22	0.22
Sat Flow, veh/h	3532	1535	1725	3532	3346	1535
Grp Volume(v), veh/h	348	0	90	371	449	34
Grp Sat Flow(s),veh/h/ln	1721	1535	1725	1721	1673	1535
Q Serve(g_s), s	2.9	0.0	1.8	2.3	4.3	0.6
Cycle Q Clear(g_c), s	2.9	0.0	1.8	2.3	4.3	0.6
Prop In Lane		1.00	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	956		142	1622	738	338
V/C Ratio(X)	0.36		0.63	0.23	0.61	0.10
Avail Cap(c_a), veh/h	3345		958	3345	2138	980
HCM Platoon Ratio	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	1.00
Uniform Delay (d), s/veh	10.4	0.0	16.0	5.6	12.6	11.2
Incr Delay (d2), s/veh	0.1	0.0	1.7	0.0	0.3	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.7	0.0	0.6	0.4	1.1	0.2
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	10.5	0.0	17.7	5.7	12.9	11.2
LnGrp LOS	B		B	A	B	B
Approach Vol, veh/h	348	A		461	483	
Approach Delay, s/veh	10.5			8.0	12.8	
Approach LOS	B			A	B	

Timer - Assigned Phs	1	2			6	8
Phs Duration (G+Y+Rc), s	7.0	16.2			23.2	12.8
Change Period (Y+Rc), s	4.0	* 6.2			6.2	4.9
Max Green Setting (Gmax), s	20.0	* 35			35.0	23.0
Max Q Clear Time (g_c+I1), s	3.8	4.9			4.3	6.3
Green Ext Time (p_c), s	0.0	0.4			0.4	0.3

Intersection Summary	
HCM 6th Ctrl Delay	10.5
HCM 6th LOS	B

Notes

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

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



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	10	10	10	50	20	150	10	270	50	80	200	10
Future Volume (veh/h)	10	10	10	50	20	150	10	270	50	80	200	10
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1693	1693	1693	1693	1693	1693	1693	1693	1693	1693	1693	1693
Adj Flow Rate, veh/h	11	11	11	57	23	170	11	307	57	91	227	11
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Percent Heavy Veh, %	14	14	14	14	14	14	14	14	14	14	14	14
Cap, veh/h	270	212	318	167	52	217	28	481	407	131	1086	52
Arrive On Green	0.22	0.22	0.22	0.22	0.22	0.22	0.02	0.28	0.28	0.08	0.35	0.35
Sat Flow, veh/h	575	956	1434	226	235	978	1612	1693	1434	1612	3119	150
Grp Volume(v), veh/h	22	0	11	250	0	0	11	307	57	91	116	122
Grp Sat Flow(s),veh/h/ln	1531	0	1434	1438	0	0	1612	1693	1434	1612	1608	1662
Q Serve(g_s), s	0.0	0.0	0.2	3.6	0.0	0.0	0.3	6.0	1.1	2.1	1.9	1.9
Cycle Q Clear(g_c), s	0.4	0.0	0.2	6.1	0.0	0.0	0.3	6.0	1.1	2.1	1.9	1.9
Prop In Lane	0.50		1.00	0.23		0.68	1.00		1.00	1.00		0.09
Lane Grp Cap(c), veh/h	482	0	318	436	0	0	28	481	407	131	560	579
V/C Ratio(X)	0.05	0.00	0.03	0.57	0.00	0.00	0.39	0.64	0.14	0.69	0.21	0.21
Avail Cap(c_a), veh/h	1061	0	949	1428	0	0	1109	1926	1632	1066	1829	1891
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	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	11.6	0.0	11.5	13.8	0.0	0.0	18.4	11.8	10.1	16.9	8.7	8.7
Incr Delay (d2), s/veh	0.0	0.0	0.0	0.4	0.0	0.0	3.3	2.0	0.2	2.4	0.3	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	0.0	0.1	1.4	0.0	0.0	0.1	1.6	0.2	0.6	0.4	0.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	11.6	0.0	11.5	14.2	0.0	0.0	21.7	13.8	10.3	19.3	8.9	8.9
LnGrp LOS	B	A	B	B	A	A	C	B	B	B	A	A
Approach Vol, veh/h		33			250			375			329	
Approach Delay, s/veh		11.6			14.2			13.5			11.8	
Approach LOS		B			B			B			B	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	7.8	16.9		13.1	5.4	19.4		13.1
Change Period (Y+Rc), s	* 4.7	6.2		* 4.7	* 4.7	6.2		* 4.7
Max Green Setting (Gmax), s	* 25	43.0		* 25	* 26	43.0		* 35
Max Q Clear Time (g_c+I1), s	4.1	8.0		2.4	2.3	3.9		8.1
Green Ext Time (p_c), s	0.1	2.7		0.1	0.0	1.8		0.9

Intersection Summary	
HCM 6th Ctrl Delay	13.1
HCM 6th LOS	B

Notes

User approved pedestrian interval to be less than phase max green.

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



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	60	0	40	0	290	20	20	220	0
Future Volume (veh/h)	0	0	0	60	0	40	0	290	20	20	220	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		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
Work Zone On Approach					No			No			No	
Adj Sat Flow, veh/h/ln				1722	1811	1722	0	1722	1722	1722	1722	0
Adj Flow Rate, veh/h				73	0	49	0	354	24	24	268	0
Peak Hour Factor				0.82	0.92	0.82	0.92	0.82	0.82	0.82	0.82	0.92
Percent Heavy Veh, %				12	6	12	0	12	12	12	12	0
Cap, veh/h				126	0	84	0	1035	70	59	896	0
Arrive On Green				0.13	0.00	0.13	0.00	0.33	0.33	0.04	0.52	0.00
Sat Flow, veh/h				983	0	660	0	3192	210	1640	1722	0
Grp Volume(v), veh/h				122	0	0	0	186	192	24	268	0
Grp Sat Flow(s),veh/h/ln				1643	0	0	0	1636	1679	1640	1722	0
Q Serve(g_s), s				2.1	0.0	0.0	0.0	2.5	2.6	0.4	2.6	0.0
Cycle Q Clear(g_c), s				2.1	0.0	0.0	0.0	2.5	2.6	0.4	2.6	0.0
Prop In Lane				0.60		0.40	0.00		0.12	1.00		0.00
Lane Grp Cap(c), veh/h				210	0	0	0	545	560	59	896	0
V/C Ratio(X)				0.58	0.00	0.00	0.00	0.34	0.34	0.40	0.30	0.00
Avail Cap(c_a), veh/h				1706	0	0	0	2740	2812	1428	2884	0
HCM Platoon Ratio				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)				1.00	0.00	0.00	0.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh				12.3	0.0	0.0	0.0	7.5	7.5	14.1	4.1	0.0
Incr Delay (d2), s/veh				2.5	0.0	0.0	0.0	0.8	0.8	4.4	0.4	0.0
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				0.7	0.0	0.0	0.0	0.5	0.5	0.2	0.1	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh				14.8	0.0	0.0	0.0	8.3	8.3	18.4	4.5	0.0
LnGrp LOS				B	A	A	A	A	A	B	A	A
Approach Vol, veh/h					122			378			292	
Approach Delay, s/veh					14.8			8.3			5.6	
Approach LOS					B			A			A	

Timer - Assigned Phs	1	2		4		6
Phs Duration (G+Y+Rc), s	5.6	16.0		8.3		21.5
Change Period (Y+Rc), s	4.5	6.0		4.5		6.0
Max Green Setting (Gmax), s	26.0	50.0		31.0		50.0
Max Q Clear Time (g_c+I1), s	2.4	4.6		4.1		4.6
Green Ext Time (p_c), s	0.0	4.5		0.7		3.0

Intersection Summary	
HCM 6th Ctrl Delay	8.3
HCM 6th LOS	A

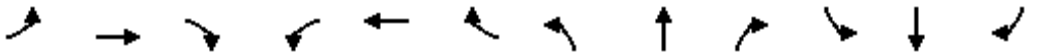
Intersection	
Int Delay, s/veh	0.8

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	10	10	10	140	170	10
Future Vol, veh/h	10	10	10	140	170	10
Conflicting Peds, #/hr	0	0	1	0	0	1
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	89	89	89	89	89	89
Heavy Vehicles, %	9	9	9	9	9	9
Mvmt Flow	11	11	11	157	191	11

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	377	198	203	0	-	0
Stage 1	198	-	-	-	-	-
Stage 2	179	-	-	-	-	-
Critical Hdwy	6.49	6.29	4.19	-	-	-
Critical Hdwy Stg 1	5.49	-	-	-	-	-
Critical Hdwy Stg 2	5.49	-	-	-	-	-
Follow-up Hdwy	3.581	3.381	2.281	-	-	-
Pot Cap-1 Maneuver	611	826	1328	-	-	-
Stage 1	819	-	-	-	-	-
Stage 2	835	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	604	825	1327	-	-	-
Mov Cap-2 Maneuver	604	-	-	-	-	-
Stage 1	811	-	-	-	-	-
Stage 2	834	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	10.3	0.5	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1327	-	697	-	-
HCM Lane V/C Ratio	0.008	-	0.032	-	-
HCM Control Delay (s)	7.7	0	10.3	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0.1	-	-



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	120	180	20	20	340	20	20	10	40	70	40	80
Future Volume (veh/h)	120	180	20	20	340	20	20	10	40	70	40	80
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1663	1663	1663	1663	1663	1663	1663	1663	1663	1663	1663	1663
Adj Flow Rate, veh/h	133	200	22	22	378	22	22	11	44	78	44	89
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	16	16	16	16	16	16	16	16	16	16	16	16
Cap, veh/h	170	351	39	74	649	38	32	16	64	122	69	166
Arrive On Green	0.11	0.24	0.24	0.05	0.21	0.21	0.07	0.07	0.07	0.12	0.12	0.12
Sat Flow, veh/h	1584	1472	162	1584	3035	176	425	213	851	1030	581	1409
Grp Volume(v), veh/h	133	0	222	22	196	204	77	0	0	122	0	89
Grp Sat Flow(s),veh/h/ln	1584	0	1634	1584	1580	1631	1489	0	0	1611	0	1409
Q Serve(g_s), s	4.6	0.0	6.7	0.8	6.3	6.3	2.8	0.0	0.0	4.1	0.0	3.3
Cycle Q Clear(g_c), s	4.6	0.0	6.7	0.8	6.3	6.3	2.8	0.0	0.0	4.1	0.0	3.3
Prop In Lane	1.00		0.10	1.00		0.11	0.29		0.57	0.64		1.00
Lane Grp Cap(c), veh/h	170	0	390	74	338	349	111	0	0	190	0	166
V/C Ratio(X)	0.78	0.00	0.57	0.30	0.58	0.58	0.69	0.00	0.00	0.64	0.00	0.53
Avail Cap(c_a), veh/h	733	0	876	846	1182	1220	424	0	0	804	0	703
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	24.4	0.0	18.8	25.9	19.8	19.8	25.3	0.0	0.0	23.6	0.0	23.3
Incr Delay (d2), s/veh	7.7	0.0	2.0	2.2	2.4	2.4	7.5	0.0	0.0	3.6	0.0	2.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.8	0.0	2.2	0.3	2.1	2.1	1.1	0.0	0.0	1.5	0.0	1.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	32.1	0.0	20.8	28.1	22.2	22.2	32.8	0.0	0.0	27.2	0.0	26.0
LnGrp LOS	C	A	C	C	C	C	C	A	A	C	A	C
Approach Vol, veh/h		355			422			77			211	
Approach Delay, s/veh		25.0			22.5			32.8			26.7	
Approach LOS		C			C			C			C	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	10.1	20.4		16.5	11.5	19.0		9.1				
Change Period (Y+Rc), s	7.5	* 7		* 9.9	5.5	7.0		4.9				
Max Green Setting (Gmax), s	30.0	* 30		* 28	26.0	42.0		16.0				
Max Q Clear Time (g_c+I1), s	2.8	8.7		6.1	6.6	8.3		4.8				
Green Ext Time (p_c), s	0.0	1.6		0.8	0.3	3.3		0.2				

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

Notes

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



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	140	130	20	10	190	160	20	30	10	20	10	170
Future Volume (veh/h)	140	130	20	10	190	160	20	30	10	20	10	170
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1663	1663	1663	1663	1663	1663	1663	1663	1663	1663	1663	1663
Adj Flow Rate, veh/h	156	144	22	11	211	178	22	33	11	22	11	189
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	16	16	16	16	16	16	16	16	16	16	16	16
Cap, veh/h	188	539	82	30	236	199	37	56	19	169	85	222
Arrive On Green	0.12	0.38	0.38	0.02	0.28	0.28	0.07	0.07	0.07	0.16	0.16	0.16
Sat Flow, veh/h	1584	1409	215	1584	833	703	530	794	265	1073	536	1409
Grp Volume(v), veh/h	156	0	166	11	0	389	66	0	0	33	0	189
Grp Sat Flow(s),veh/h/ln	1584	0	1624	1584	0	1536	1589	0	0	1609	0	1409
Q Serve(g_s), s	7.0	0.0	5.1	0.5	0.0	17.8	2.9	0.0	0.0	1.3	0.0	9.5
Cycle Q Clear(g_c), s	7.0	0.0	5.1	0.5	0.0	17.8	2.9	0.0	0.0	1.3	0.0	9.5
Prop In Lane	1.00		0.13	1.00		0.46	0.33		0.17	0.67		1.00
Lane Grp Cap(c), veh/h	188	0	621	30	0	435	112	0	0	254	0	222
V/C Ratio(X)	0.83	0.00	0.27	0.36	0.00	0.90	0.59	0.00	0.00	0.13	0.00	0.85
Avail Cap(c_a), veh/h	564	0	712	586	0	778	587	0	0	573	0	502
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	31.4	0.0	15.5	35.4	0.0	25.1	32.9	0.0	0.0	26.4	0.0	29.9
Incr Delay (d2), s/veh	3.5	0.0	0.1	2.7	0.0	2.7	1.8	0.0	0.0	0.1	0.0	3.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.6	0.0	1.6	0.2	0.0	6.4	1.1	0.0	0.0	0.5	0.0	3.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	35.0	0.0	15.6	38.0	0.0	27.8	34.7	0.0	0.0	26.5	0.0	33.4
LnGrp LOS	C	A	B	D	A	C	C	A	A	C	A	C
Approach Vol, veh/h		322			400			66			222	
Approach Delay, s/veh		25.0			28.1			34.7			32.4	
Approach LOS		C			C			C			C	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	7.7	34.9		19.4	15.0	27.7		11.0
Change Period (Y+Rc), s	* 6.3	* 7		7.9	* 6.3	7.0		5.8
Max Green Setting (Gmax), s	* 27	* 32		26.0	* 26	37.0		27.0
Max Q Clear Time (g_c+I1), s	2.5	7.1		11.5	9.0	19.8		4.9
Green Ext Time (p_c), s	0.0	0.1		0.1	0.0	0.9		0.1

Intersection Summary		
HCM 6th Ctrl Delay		28.5
HCM 6th LOS		C

Notes

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

Intersection	
Int Delay, s/veh	0.3

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	20	330	30	0	260
Future Vol, veh/h	0	20	330	30	0	260
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, %	6	6	6	6	6	6
Mvmt Flow	0	22	359	33	0	283

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	-	196	0	0	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.99	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.357	-	-	-	-
Pot Cap-1 Maneuver	0	802	-	-	0	-
Stage 1	0	-	-	-	0	-
Stage 2	0	-	-	-	0	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	-	802	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	9.6	0	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBT
Capacity (veh/h)	-	-	802	-
HCM Lane V/C Ratio	-	-	0.027	-
HCM Control Delay (s)	-	-	9.6	-
HCM Lane LOS	-	-	A	-
HCM 95th %tile Q(veh)	-	-	0.1	-

Intersection	
Int Delay, s/veh	2.8

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	70	60	350	40	20	250
Future Vol, veh/h	70	60	350	40	20	250
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, %	6	6	6	6	6	6
Mvmt Flow	76	65	380	43	22	272

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	718	402	0	0	423	0
Stage 1	402	-	-	-	-	-
Stage 2	316	-	-	-	-	-
Critical Hdwy	6.46	6.26	-	-	4.16	-
Critical Hdwy Stg 1	5.46	-	-	-	-	-
Critical Hdwy Stg 2	5.46	-	-	-	-	-
Follow-up Hdwy	3.554	3.354	-	-	2.254	-
Pot Cap-1 Maneuver	390	640	-	-	1115	-
Stage 1	667	-	-	-	-	-
Stage 2	730	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	381	640	-	-	1115	-
Mov Cap-2 Maneuver	381	-	-	-	-	-
Stage 1	667	-	-	-	-	-
Stage 2	713	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	16	0	0.6
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	469	1115	-
HCM Lane V/C Ratio	-	-	0.301	0.019	-
HCM Control Delay (s)	-	-	16	8.3	0
HCM Lane LOS	-	-	C	A	A
HCM 95th %tile Q(veh)	-	-	1.3	0.1	-

Intersection	
Int Delay, s/veh	2.6

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	60	60	370	40	20	210
Future Vol, veh/h	60	60	370	40	20	210
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, %	6	6	6	6	6	6
Mvmt Flow	65	65	402	43	22	228

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	696	424	0	0	445	0
Stage 1	424	-	-	-	-	-
Stage 2	272	-	-	-	-	-
Critical Hdwy	6.46	6.26	-	-	4.16	-
Critical Hdwy Stg 1	5.46	-	-	-	-	-
Critical Hdwy Stg 2	5.46	-	-	-	-	-
Follow-up Hdwy	3.554	3.354	-	-	2.254	-
Pot Cap-1 Maneuver	402	622	-	-	1094	-
Stage 1	652	-	-	-	-	-
Stage 2	765	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	393	622	-	-	1094	-
Mov Cap-2 Maneuver	393	-	-	-	-	-
Stage 1	652	-	-	-	-	-
Stage 2	747	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	15.2	0	0.7
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	482	1094	-
HCM Lane V/C Ratio	-	-	0.271	0.02	-
HCM Control Delay (s)	-	-	15.2	8.4	0
HCM Lane LOS	-	-	C	A	A
HCM 95th %tile Q(veh)	-	-	1.1	0.1	-

Intersection	
Int Delay, s/veh	3.1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	20	60	40	110	110	10
Future Vol, veh/h	20	60	40	110	110	10
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	120	0	200	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	6	6	6	6	6	6
Mvmt Flow	22	65	43	120	120	11

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	332	126	131	0	-	0
Stage 1	126	-	-	-	-	-
Stage 2	206	-	-	-	-	-
Critical Hdwy	6.46	6.26	4.16	-	-	-
Critical Hdwy Stg 1	5.46	-	-	-	-	-
Critical Hdwy Stg 2	5.46	-	-	-	-	-
Follow-up Hdwy	3.554	3.354	2.254	-	-	-
Pot Cap-1 Maneuver	655	914	1430	-	-	-
Stage 1	890	-	-	-	-	-
Stage 2	819	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	635	914	1430	-	-	-
Mov Cap-2 Maneuver	635	-	-	-	-	-
Stage 1	863	-	-	-	-	-
Stage 2	819	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	9.6	2	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	1430	-	635	914	-	-
HCM Lane V/C Ratio	0.03	-	0.034	0.071	-	-
HCM Control Delay (s)	7.6	-	10.9	9.2	-	-
HCM Lane LOS	A	-	B	A	-	-
HCM 95th %tile Q(veh)	0.1	-	0.1	0.2	-	-



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	480	230	70	270	200	70
Future Volume (veh/h)	480	230	70	270	200	70
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1811	1811	1811	1811	1811	1811
Adj Flow Rate, veh/h	511	245	74	287	213	74
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	6	6	6	6	6	6
Cap, veh/h	793	672	105	1096	313	279
Arrive On Green	0.44	0.44	0.06	0.61	0.18	0.18
Sat Flow, veh/h	1811	1535	1725	1811	1725	1535
Grp Volume(v), veh/h	511	245	74	287	213	74
Grp Sat Flow(s),veh/h/ln	1811	1535	1725	1811	1725	1535
Q Serve(g_s), s	12.4	6.0	2.4	4.2	6.5	2.3
Cycle Q Clear(g_c), s	12.4	6.0	2.4	4.2	6.5	2.3
Prop In Lane		1.00	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	793	672	105	1096	313	279
V/C Ratio(X)	0.64	0.36	0.70	0.26	0.68	0.27
Avail Cap(c_a), veh/h	1287	1091	613	1287	613	545
HCM Platoon Ratio	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
Uniform Delay (d), s/veh	12.4	10.6	25.9	5.2	21.5	19.8
Incr Delay (d2), s/veh	3.2	1.2	8.3	0.5	9.0	1.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.1	1.6	1.1	0.9	2.9	0.8
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	15.6	11.8	34.2	5.7	30.5	21.6
LnGrp LOS	B	B	C	A	C	C
Approach Vol, veh/h	756			361	287	
Approach Delay, s/veh	14.3			11.5	28.2	
Approach LOS	B			B	C	

Timer - Assigned Phs	1	2		4		6
Phs Duration (G+Y+Rc), s	9.4	30.6		16.2		40.1
Change Period (Y+Rc), s	6.0	6.0		6.0		6.0
Max Green Setting (Gmax), s	20.0	40.0		20.0		40.0
Max Q Clear Time (g_c+I1), s	4.4	14.4		8.5		6.2
Green Ext Time (p_c), s	0.1	10.2		1.9		4.1

Intersection Summary			
HCM 6th Ctrl Delay		16.5	
HCM 6th LOS		B	

Intersection	
Int Delay, s/veh	39.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕		↰	↑			↕			↕	
Traffic Vol, veh/h	20	140	60	70	110	40	60	260	40	40	350	10
Future Vol, veh/h	20	140	60	70	110	40	60	260	40	40	350	10
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	-	-	-	0	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	86	92	86	92	92	92	86	86	92	92	86	86
Heavy Vehicles, %	4	6	4	6	6	6	4	4	6	6	4	4
Mvmt Flow	23	152	70	76	120	43	70	302	43	43	407	12

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1044	984	413	1074	969	324	419	0	0	345	0	0
Stage 1	499	499	-	464	464	-	-	-	-	-	-	-
Stage 2	545	485	-	610	505	-	-	-	-	-	-	-
Critical Hdwy	7.14	6.56	6.24	7.16	6.56	6.26	4.14	-	-	4.16	-	-
Critical Hdwy Stg 1	6.14	5.56	-	6.16	5.56	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.14	5.56	-	6.16	5.56	-	-	-	-	-	-	-
Follow-up Hdwy	3.536	4.054	3.336	3.554	4.054	3.354	2.236	-	-	2.254	-	-
Pot Cap-1 Maneuver	205	245	635	194	250	708	1129	-	-	1192	-	-
Stage 1	550	537	-	571	557	-	-	-	-	-	-	-
Stage 2	519	545	-	475	534	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	101	216	635	~ 68	220	708	1129	-	-	1192	-	-
Mov Cap-2 Maneuver	101	216	-	~ 68	220	-	-	-	-	-	-	-
Stage 1	508	512	-	527	514	-	-	-	-	-	-	-
Stage 2	345	503	-	283	509	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	115.5	104.7	1.4	0.8
HCM LOS	F	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1129	-	-	235	68	270	1192	-	-
HCM Lane V/C Ratio	0.062	-	-	1.043	1.119	0.604	0.036	-	-
HCM Control Delay (s)	8.4	0	-	115.5	250.1	36.8	8.1	0	-
HCM Lane LOS	A	A	-	F	F	E	A	A	-
HCM 95th %tile Q(veh)	0.2	-	-	10.2	5.9	3.6	0.1	-	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

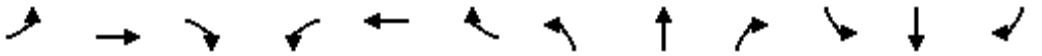
Intersection	
Int Delay, s/veh	15.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	10	0	20	150	0	50	30	260	140	110	260	20
Future Vol, veh/h	10	0	20	150	0	50	30	260	140	110	260	20
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	0	-	100	100	-	-	140	-	-	140	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	89	92	89	92	92	92	89	89	92	92	89	89
Heavy Vehicles, %	3	6	3	6	6	6	3	3	6	6	3	3
Mvmt Flow	11	0	22	163	0	54	34	292	152	120	292	22

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	757	1055	303	990	990	222	314	0	0	444	0	0
Stage 1	543	543	-	436	436	-	-	-	-	-	-	-
Stage 2	214	512	-	554	554	-	-	-	-	-	-	-
Critical Hdwy	7.345	6.59	6.245	7.39	6.59	6.99	4.145	-	-	4.19	-	-
Critical Hdwy Stg 1	6.145	5.59	-	6.59	5.59	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.545	5.59	-	6.19	5.59	-	-	-	-	-	-	-
Follow-up Hdwy	3.5285	4.057	3.3285	3.557	4.057	3.357	2.2285	-	-	2.257	-	-
Pot Cap-1 Maneuver	308	220	733	208	240	771	1238	-	-	1090	-	-
Stage 1	521	511	-	561	571	-	-	-	-	-	-	-
Stage 2	766	527	-	507	505	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	257	191	733	181	208	771	1238	-	-	1090	-	-
Mov Cap-2 Maneuver	257	191	-	181	208	-	-	-	-	-	-	-
Stage 1	507	455	-	546	556	-	-	-	-	-	-	-
Stage 2	692	513	-	437	449	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	13.3	73.8	0.6	2.4
HCM LOS	B	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1238	-	-	257	733	181	771	1090	-	-
HCM Lane V/C Ratio	0.027	-	-	0.044	0.031	0.901	0.07	0.11	-	-
HCM Control Delay (s)	8	-	-	19.6	10.1	95.1	10	8.7	-	-
HCM Lane LOS	A	-	-	C	B	F	B	A	-	-
HCM 95th %tile Q(veh)	0.1	-	-	0.1	0.1	6.8	0.2	0.4	-	-



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	10	10	70	50	10	20	60	470	60	20	320	10
Future Volume (veh/h)	10	10	70	50	10	20	60	470	60	20	320	10
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		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	11	11	75	54	11	22	65	505	65	22	344	11
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, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	31	26	178	122	99	198	139	967	124	58	915	29
Arrive On Green	0.02	0.13	0.13	0.07	0.18	0.18	0.08	0.31	0.31	0.03	0.26	0.26
Sat Flow, veh/h	1781	207	1408	1781	557	1113	1781	3159	405	1781	3512	112
Grp Volume(v), veh/h	11	0	86	54	0	33	65	283	287	22	174	181
Grp Sat Flow(s),veh/h/ln	1781	0	1615	1781	0	1670	1781	1777	1787	1781	1777	1847
Q Serve(g_s), s	0.2	0.0	1.9	1.1	0.0	0.6	1.3	5.0	5.1	0.5	3.1	3.1
Cycle Q Clear(g_c), s	0.2	0.0	1.9	1.1	0.0	0.6	1.3	5.0	5.1	0.5	3.1	3.1
Prop In Lane	1.00		0.87	1.00		0.67	1.00		0.23	1.00		0.06
Lane Grp Cap(c), veh/h	31	0	204	122	0	297	139	544	547	58	463	481
V/C Ratio(X)	0.36	0.00	0.42	0.44	0.00	0.11	0.47	0.52	0.52	0.38	0.38	0.38
Avail Cap(c_a), veh/h	696	0	631	696	0	653	928	1389	1397	928	1342	1396
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	1.00	1.00
Uniform Delay (d), s/veh	18.6	0.0	15.5	17.2	0.0	13.2	16.9	11.0	11.0	18.2	11.6	11.6
Incr Delay (d2), s/veh	6.8	0.0	1.4	2.5	0.0	0.2	2.4	1.1	1.1	4.0	0.7	0.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	0.0	0.7	0.5	0.0	0.2	0.5	1.5	1.5	0.2	0.9	1.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	25.5	0.0	16.8	19.7	0.0	13.4	19.3	12.1	12.1	22.2	12.3	12.3
LnGrp LOS	C	A	B	B	A	B	B	B	B	C	B	B
Approach Vol, veh/h		97			87			635			377	
Approach Delay, s/veh		17.8			17.3			12.9			12.9	
Approach LOS		B			B			B			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	5.3	17.0	6.6	9.5	7.0	15.3	4.7	11.4
Change Period (Y+Rc), s	4.0	5.3	4.0	4.6	4.0	5.3	4.0	4.6
Max Green Setting (Gmax), s	20.0	30.0	15.0	15.0	20.0	29.0	15.0	15.0
Max Q Clear Time (g_c+I1), s	2.5	7.1	3.1	3.9	3.3	5.1	2.2	2.6
Green Ext Time (p_c), s	0.0	4.5	0.1	0.3	0.1	2.6	0.0	0.1

Intersection Summary	
HCM 6th Ctrl Delay	13.6
HCM 6th LOS	B

Notes

User approved pedestrian interval to be less than phase max green.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	200	550	130	260	420	150	110	390	290	170	260	110
Future Volume (veh/h)	200	550	130	260	420	150	110	390	290	170	260	110
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		0.99	1.00		0.99	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856
Adj Flow Rate, veh/h	211	579	137	274	442	158	116	411	305	179	274	116
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	250	808	356	313	674	238	148	541	398	217	776	319
Arrive On Green	0.14	0.23	0.23	0.18	0.26	0.26	0.08	0.28	0.28	0.12	0.32	0.32
Sat Flow, veh/h	1767	3526	1552	1767	2542	900	1767	1925	1415	1767	2424	998
Grp Volume(v), veh/h	211	579	137	274	305	295	116	376	340	179	197	193
Grp Sat Flow(s),veh/h/ln	1767	1763	1552	1767	1763	1680	1767	1763	1578	1767	1763	1660
Q Serve(g_s), s	11.0	14.3	7.1	14.3	14.6	14.8	6.1	18.5	18.7	9.4	8.1	8.5
Cycle Q Clear(g_c), s	11.0	14.3	7.1	14.3	14.6	14.8	6.1	18.5	18.7	9.4	8.1	8.5
Prop In Lane	1.00		1.00	1.00		0.54	1.00		0.90	1.00		0.60
Lane Grp Cap(c), veh/h	250	808	356	313	467	445	148	495	443	217	564	531
V/C Ratio(X)	0.84	0.72	0.39	0.88	0.65	0.66	0.78	0.76	0.77	0.83	0.35	0.36
Avail Cap(c_a), veh/h	448	1303	574	448	652	621	448	745	667	448	745	701
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	39.6	33.6	30.8	37.9	30.9	31.0	42.5	31.1	31.2	40.5	24.7	24.8
Incr Delay (d2), s/veh	7.7	1.7	1.0	12.9	2.2	2.4	8.7	3.5	4.1	7.8	0.5	0.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.1	6.0	2.6	7.0	6.1	5.9	2.9	7.9	7.3	4.4	3.3	3.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	47.3	35.4	31.8	50.9	33.1	33.4	51.3	34.6	35.3	48.3	25.2	25.4
LnGrp LOS	D	D	C	D	C	C	D	C	D	D	C	C
Approach Vol, veh/h		927			874			832			569	
Approach Delay, s/veh		37.5			38.8			37.2			32.5	
Approach LOS		D			D			D			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	30.8	26.7	11.9	35.3	17.4	30.1	15.6	31.6
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	24.0	35.0	24.0	40.0	24.0	35.0	24.0	40.0
Max Q Clear Time (g_c+I1), s	16.3	16.3	8.1	10.5	13.0	16.8	11.4	20.7
Green Ext Time (p_c), s	0.5	5.4	0.2	3.2	0.4	4.5	0.4	5.9

Intersection Summary	
HCM 6th Ctrl Delay	36.9
HCM 6th LOS	D

Intersection	
Int Delay, s/veh	14.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	130	40	190	50	0	0	0	0	330	5	30
Future Vol, veh/h	0	130	40	190	50	0	0	0	0	330	5	30
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	0	-	-	-	-	-	0	-	520
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	25	25	25	25	25	25	25	25	25	25	25	25
Mvmt Flow	0	138	43	202	53	0	0	0	0	351	5	32

Major/Minor	Major1			Major2			Minor2		
Conflicting Flow All	-	0	0	181	0	0	526	638	27
Stage 1	-	-	-	-	-	-	457	457	-
Stage 2	-	-	-	-	-	-	69	181	-
Critical Hdwy	-	-	-	4.6	-	-	7.3	7	7.4
Critical Hdwy Stg 1	-	-	-	-	-	-	6.3	6	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.3	6	-
Follow-up Hdwy	-	-	-	2.45	-	-	3.75	4.25	3.55
Pot Cap-1 Maneuver	0	-	-	1239	-	0	429	349	972
Stage 1	0	-	-	-	-	0	542	512	-
Stage 2	0	-	-	-	-	0	882	696	-
Platoon blocked, %		-	-		-				
Mov Cap-1 Maneuver	-	-	-	1239	-	-	359	0	972
Mov Cap-2 Maneuver	-	-	-	-	-	-	359	0	-
Stage 1	-	-	-	-	-	-	542	0	-
Stage 2	-	-	-	-	-	-	738	0	-

Approach	EB	WB	SB
HCM Control Delay, s	0	6.7	26.7
HCM LOS			D

Minor Lane/Major Mvmt	EBT	EBR	WBL	WBT	SBLn1	SBLn2
Capacity (veh/h)	-	-	1239	-	359	415
HCM Lane V/C Ratio	-	-	0.163	-	0.652	0.372
HCM Control Delay (s)	-	-	8.5	-	32	18.7
HCM Lane LOS	-	-	A	-	D	C
HCM 95th %tile Q(veh)	-	-	0.6	-	4.4	1.7

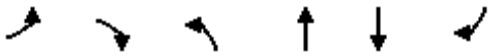
Intersection	
Int Delay, s/veh	3.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	30	430	0	0	220	320	20	5	180	0	0	0
Future Vol, veh/h	30	430	0	0	220	320	20	5	180	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	Free	-	-	Stop	-	-	None
Storage Length	0	-	-	-	-	-	630	-	0	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	25	25	25	25	25	25	25	25	25	25	25	25
Mvmt Flow	32	457	0	0	234	340	21	5	191	0	0	0

Major/Minor	Major1			Major2			Minor1		
Conflicting Flow All	234	0	-	-	-	0	638	755	229
Stage 1	-	-	-	-	-	-	521	521	-
Stage 2	-	-	-	-	-	-	117	234	-
Critical Hdwy	4.6	-	-	-	-	-	7.3	7	7.4
Critical Hdwy Stg 1	-	-	-	-	-	-	6.3	6	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.3	6	-
Follow-up Hdwy	2.45	-	-	-	-	-	3.75	4.25	3.55
Pot Cap-1 Maneuver	1179	-	0	0	-	0	360	295	708
Stage 1	-	-	0	0	-	0	500	476	-
Stage 2	-	-	0	0	-	0	831	656	-
Platoon blocked, %		-			-				
Mov Cap-1 Maneuver	1179	-	-	-	-	-	350	0	708
Mov Cap-2 Maneuver	-	-	-	-	-	-	350	0	-
Stage 1	-	-	-	-	-	-	487	0	-
Stage 2	-	-	-	-	-	-	831	0	-

Approach	EB	WB	NB
HCM Control Delay, s	0.5	0	12.5
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	WBT
Capacity (veh/h)	350	708	1179	-	-
HCM Lane V/C Ratio	0.076	0.27	0.027	-	-
HCM Control Delay (s)	16.1	12	8.1	-	-
HCM Lane LOS	C	B	A	-	-
HCM 95th %tile Q(veh)	0.2	1.1	0.1	-	-



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	130	180	150	300	260	70
Future Volume (veh/h)	130	180	150	300	260	70
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1678	1678	1678	1678	1678	1678
Adj Flow Rate, veh/h	151	209	174	349	302	81
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86
Percent Heavy Veh, %	15	15	15	15	15	15
Cap, veh/h	324	289	230	870	675	178
Arrive On Green	0.20	0.20	0.14	0.52	0.27	0.27
Sat Flow, veh/h	1598	1422	1598	1678	2579	658
Grp Volume(v), veh/h	151	209	174	349	191	192
Grp Sat Flow(s),veh/h/ln	1598	1422	1598	1678	1594	1559
Q Serve(g_s), s	3.6	5.9	4.5	5.5	4.3	4.4
Cycle Q Clear(g_c), s	3.6	5.9	4.5	5.5	4.3	4.4
Prop In Lane	1.00	1.00	1.00			0.42
Lane Grp Cap(c), veh/h	324	289	230	870	431	422
V/C Ratio(X)	0.47	0.72	0.76	0.40	0.44	0.46
Avail Cap(c_a), veh/h	741	660	741	1362	1294	1266
HCM Platoon Ratio	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
Uniform Delay (d), s/veh	15.1	16.1	17.7	6.3	13.0	13.1
Incr Delay (d2), s/veh	1.0	3.4	7.1	1.1	2.6	2.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.2	1.9	1.7	1.0	1.3	1.4
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	16.2	19.5	24.8	7.4	15.6	15.9
LnGrp LOS	B	B	C	A	B	B
Approach Vol, veh/h	360			523	383	
Approach Delay, s/veh	18.1			13.2	15.7	
Approach LOS	B			B	B	

Timer - Assigned Phs	1	2		4		6
Phs Duration (G+Y+Rc), s	10.7	17.7		14.8		28.4
Change Period (Y+Rc), s	4.5	6.0		6.0		6.0
Max Green Setting (Gmax), s	20.0	35.0		20.0		35.0
Max Q Clear Time (g_c+I1), s	6.5	6.4		7.9		7.5
Green Ext Time (p_c), s	0.6	5.2		0.9		4.9

Intersection Summary	
HCM 6th Ctrl Delay	15.4
HCM 6th LOS	B

Notes

User approved pedestrian interval to be less than phase max green.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	620	70	300	410	0	0	0	0	360	20	130
Future Volume (veh/h)	0	620	70	300	410	0	0	0	0	360	20	130
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.96	1.00		1.00				1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Work Zone On Approach		No			No						No	
Adj Sat Flow, veh/h/ln	0	1841	1841	1841	1841	0				1841	1841	1841
Adj Flow Rate, veh/h	0	689	78	333	456	0				400	22	144
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90				0.90	0.90	0.90
Percent Heavy Veh, %	0	4	4	4	4	0				4	4	4
Cap, veh/h	0	1173	131	373	955	0				443	24	159
Arrive On Green	0.00	0.26	0.26	0.21	0.52	0.00				0.37	0.37	0.37
Sat Flow, veh/h	0	4726	511	1753	1841	0				1203	66	433
Grp Volume(v), veh/h	0	504	263	333	456	0				566	0	0
Grp Sat Flow(s),veh/h/ln	0	1675	1721	1753	1841	0				1703	0	0
Q Serve(g_s), s	0.0	10.7	10.9	15.1	12.9	0.0				25.7	0.0	0.0
Cycle Q Clear(g_c), s	0.0	10.7	10.9	15.1	12.9	0.0				25.7	0.0	0.0
Prop In Lane	0.00		0.30	1.00		0.00				0.71		0.25
Lane Grp Cap(c), veh/h	0	862	443	373	955	0				627	0	0
V/C Ratio(X)	0.00	0.58	0.59	0.89	0.48	0.00				0.90	0.00	0.00
Avail Cap(c_a), veh/h	0	1437	738	430	955	0				730	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	1.00	1.00	1.00	0.00				1.00	0.00	0.00
Uniform Delay (d), s/veh	0.0	26.5	26.6	31.2	12.5	0.0				24.4	0.0	0.0
Incr Delay (d2), s/veh	0.0	1.2	2.5	18.8	0.7	0.0				13.6	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	4.1	4.4	7.8	4.6	0.0				11.5	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	27.7	29.0	50.0	13.3	0.0				38.0	0.0	0.0
LnGrp LOS	A	C	C	D	B	A				D	A	A
Approach Vol, veh/h		767			789						566	
Approach Delay, s/veh		28.2			28.8						38.0	
Approach LOS		C			C						D	

Timer - Assigned Phs	1	2		4		6
Phs Duration (G+Y+Rc), s	21.4	25.6		34.6		46.9
Change Period (Y+Rc), s	4.0	4.6		4.6		4.6
Max Green Setting (Gmax), s	20.0	35.0		35.0		35.0
Max Q Clear Time (g_c+I1), s	17.1	12.9		27.7		14.9
Green Ext Time (p_c), s	0.3	8.1		2.4		4.5

Intersection Summary	
HCM 6th Ctrl Delay	31.0
HCM 6th LOS	C



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	80	900	0	0	660	250	50	5	510	0	0	0
Future Volume (veh/h)	80	900	0	0	660	250	50	5	510	0	0	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.94	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Work Zone On Approach		No			No			No				
Adj Sat Flow, veh/h/ln	1841	1841	0	0	1841	1841	1841	1841	1841			
Adj Flow Rate, veh/h	89	1000	0	0	733	278	56	6	567			
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90			
Percent Heavy Veh, %	4	4	0	0	4	4	4	4	4			
Cap, veh/h	116	1686	0	0	897	340	58	6	583			
Arrive On Green	0.07	0.48	0.00	0.00	0.37	0.37	0.41	0.41	0.41			
Sat Flow, veh/h	1753	3589	0	0	2521	921	140	15	1422			
Grp Volume(v), veh/h	89	1000	0	0	528	483	629	0	0			
Grp Sat Flow(s),veh/h/ln	1753	1749	0	0	1749	1601	1578	0	0			
Q Serve(g_s), s	4.3	17.7	0.0	0.0	23.3	23.3	33.4	0.0	0.0			
Cycle Q Clear(g_c), s	4.3	17.7	0.0	0.0	23.3	23.3	33.4	0.0	0.0			
Prop In Lane	1.00		0.00	0.00		0.58	0.09		0.90			
Lane Grp Cap(c), veh/h	116	1686	0	0	646	591	647	0	0			
V/C Ratio(X)	0.77	0.59	0.00	0.00	0.82	0.82	0.97	0.00	0.00			
Avail Cap(c_a), veh/h	411	1686	0	0	717	657	647	0	0			
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	1.00	1.00	0.00	0.00	1.00	1.00	1.00	0.00	0.00			
Uniform Delay (d), s/veh	39.2	16.0	0.0	0.0	24.3	24.3	24.7	0.0	0.0			
Incr Delay (d2), s/veh	10.2	0.8	0.0	0.0	7.9	8.6	28.5	0.0	0.0			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	2.1	6.3	0.0	0.0	10.0	9.3	16.0	0.0	0.0			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	49.4	16.8	0.0	0.0	32.2	32.9	53.2	0.0	0.0			
LnGrp LOS	D	B	A	A	C	C	D	A	A			
Approach Vol, veh/h		1089			1011			629				
Approach Delay, s/veh		19.5			32.5			53.2				
Approach LOS		B			C			D				
Timer - Assigned Phs		2			5	6		8				
Phs Duration (G+Y+Rc), s		45.7			9.6	36.1		39.6				
Change Period (Y+Rc), s		4.6			4.0	4.6		4.6				
Max Green Setting (Gmax), s		35.0			20.0	35.0		35.0				
Max Q Clear Time (g_c+I1), s		19.7			6.3	25.3		35.4				
Green Ext Time (p_c), s		8.9			0.1	6.2		0.0				
Intersection Summary												
HCM 6th Ctrl Delay			32.1									
HCM 6th LOS			C									

Intersection	
Int Delay, s/veh	0.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	1150	260	0	840	0	0	0	40	0	0	70
Future Vol, veh/h	0	1150	260	0	840	0	0	0	40	0	0	70
Conflicting Peds, #/hr	0	0	2	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	0	-	-	0
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	4	4	4	4	4	4	4	4	4	4	4	4
Mvmt Flow	0	1278	289	0	933	0	0	0	44	0	0	78

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	-	0	0	-	-	0	-	-	786	-	-	467
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	-	-	-	6.98	-	-	6.98
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	-	-	-	3.34	-	-	3.34
Pot Cap-1 Maneuver	0	-	-	0	-	0	0	0	331	0	0	537
Stage 1	0	-	-	0	-	0	0	0	-	0	0	-
Stage 2	0	-	-	0	-	0	0	0	-	0	0	-
Platoon blocked, %		-	-		-							
Mov Cap-1 Maneuver	-	-	-	-	-	-	-	-	330	-	-	537
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0	17.6	12.8
HCM LOS			C	B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBT	SBLn1
Capacity (veh/h)	330	-	-	-	537
HCM Lane V/C Ratio	0.135	-	-	-	0.145
HCM Control Delay (s)	17.6	-	-	-	12.8
HCM Lane LOS	C	-	-	-	B
HCM 95th %tile Q(veh)	0.5	-	-	-	0.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	220	780	180	110	440	110	230	210	120	120	140	120
Future Volume (veh/h)	220	780	180	110	440	110	230	210	120	120	140	120
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		0.97	1.00		0.99	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	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1841	1841	1841	1841	1841	1841	1841	1841	1841	1841	1841	1841
Adj Flow Rate, veh/h	244	867	200	122	489	122	256	233	133	133	156	133
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	4	4	4	4	4	4	4	4	4	4	4	4
Cap, veh/h	277	953	220	154	742	184	284	538	295	163	328	257
Arrive On Green	0.16	0.34	0.34	0.09	0.27	0.27	0.16	0.25	0.25	0.09	0.18	0.18
Sat Flow, veh/h	1753	2808	647	1753	2756	683	1753	2170	1191	1753	1835	1438
Grp Volume(v), veh/h	244	540	527	122	309	302	256	186	180	133	148	141
Grp Sat Flow(s),veh/h/ln	1753	1749	1707	1753	1749	1690	1753	1749	1613	1753	1749	1524
Q Serve(g_s), s	12.6	27.3	27.3	6.3	14.5	14.7	13.3	8.3	8.8	6.9	7.0	7.8
Cycle Q Clear(g_c), s	12.6	27.3	27.3	6.3	14.5	14.7	13.3	8.3	8.8	6.9	7.0	7.8
Prop In Lane	1.00		0.38	1.00		0.40	1.00		0.74	1.00		0.94
Lane Grp Cap(c), veh/h	277	594	579	154	471	455	284	433	399	163	313	272
V/C Ratio(X)	0.88	0.91	0.91	0.79	0.66	0.66	0.90	0.43	0.45	0.82	0.47	0.52
Avail Cap(c_a), veh/h	284	594	579	284	566	547	284	566	522	208	566	494
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	38.2	29.2	29.2	41.4	30.0	30.1	38.1	29.3	29.5	41.2	34.1	34.4
Incr Delay (d2), s/veh	24.6	18.8	19.2	10.5	3.6	3.9	28.8	1.4	1.7	14.0	2.4	3.2
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	7.0	13.6	13.3	3.1	6.2	6.1	7.7	3.5	3.4	3.5	3.0	3.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	62.8	48.0	48.5	51.9	33.7	34.0	66.9	30.8	31.2	55.3	36.5	37.6
LnGrp LOS	E	D	D	D	C	C	E	C	C	E	D	D
Approach Vol, veh/h		1311			733			622			422	
Approach Delay, s/veh		51.0			36.9			45.8			42.8	
Approach LOS		D			D			D			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	13.1	36.9	20.0	22.6	19.6	30.5	13.6	28.9
Change Period (Y+Rc), s	5.0	5.5	5.0	6.0	5.0	5.5	5.0	6.0
Max Green Setting (Gmax), s	15.0	30.0	15.0	30.0	15.0	30.0	11.0	30.0
Max Q Clear Time (g_c+I1), s	8.3	29.3	15.3	9.8	14.6	16.7	8.9	10.8
Green Ext Time (p_c), s	0.2	0.5	0.0	2.8	0.0	5.0	0.0	3.6

Intersection Summary	
HCM 6th Ctrl Delay	45.5
HCM 6th LOS	D

Notes

User approved pedestrian interval to be less than phase max green.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	70	540	160	60	390	70	110	240	110	100	220	90
Future Volume (veh/h)	70	540	160	60	390	70	110	240	110	100	220	90
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	1811	1811	1811	1811	1811	1811	1811	1811	1811	1811	1811	1811
Adj Flow Rate, veh/h	71	545	162	61	394	71	111	242	111	101	222	91
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Percent Heavy Veh, %	6	6	6	6	6	6	6	6	6	6	6	6
Cap, veh/h	92	641	543	83	521	94	143	306	140	131	462	392
Arrive On Green	0.05	0.35	0.35	0.05	0.35	0.35	0.08	0.26	0.26	0.08	0.26	0.26
Sat Flow, veh/h	1725	1811	1535	1725	1494	269	1725	1166	535	1725	1811	1535
Grp Volume(v), veh/h	71	545	162	61	0	465	111	0	353	101	222	91
Grp Sat Flow(s),veh/h/ln	1725	1811	1535	1725	0	1763	1725	0	1701	1725	1811	1535
Q Serve(g_s), s	3.0	20.7	5.7	2.6	0.0	17.4	4.7	0.0	14.4	4.3	7.7	3.5
Cycle Q Clear(g_c), s	3.0	20.7	5.7	2.6	0.0	17.4	4.7	0.0	14.4	4.3	7.7	3.5
Prop In Lane	1.00		1.00	1.00		0.15	1.00		0.31	1.00		1.00
Lane Grp Cap(c), veh/h	92	641	543	83	0	615	143	0	447	131	462	392
V/C Ratio(X)	0.78	0.85	0.30	0.73	0.00	0.76	0.77	0.00	0.79	0.77	0.48	0.23
Avail Cap(c_a), veh/h	464	730	619	464	0	711	464	0	914	464	974	825
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	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	34.8	22.2	17.4	34.9	0.0	21.4	33.4	0.0	25.5	33.7	23.5	21.9
Incr Delay (d2), s/veh	13.0	10.1	0.6	11.8	0.0	5.4	8.5	0.0	5.0	9.2	1.2	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.5	9.4	1.9	1.3	0.0	7.2	2.2	0.0	5.8	2.0	3.1	1.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	47.8	32.3	18.0	46.7	0.0	26.8	42.0	0.0	30.5	42.9	24.7	22.4
LnGrp LOS	D	C	B	D	A	C	D	A	C	D	C	C
Approach Vol, veh/h		778			526			464			414	
Approach Delay, s/veh		30.7			29.1			33.2			28.7	
Approach LOS		C			C			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	7.6	32.3	9.6	24.8	8.0	32.0	10.2	24.3
Change Period (Y+Rc), s	4.0	6.0	4.0	5.3	4.0	6.0	4.0	5.3
Max Green Setting (Gmax), s	20.0	30.0	20.0	40.0	20.0	30.0	20.0	40.0
Max Q Clear Time (g_c+I1), s	4.6	22.7	6.3	16.4	5.0	19.4	6.7	9.7
Green Ext Time (p_c), s	0.1	3.7	0.2	3.2	0.1	3.4	0.2	2.5

Intersection Summary	
HCM 6th Ctrl Delay	30.5
HCM 6th LOS	C

Intersection	
Int Delay, s/veh	0.8

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	20	750	600	50	30	20
Future Vol, veh/h	20	750	600	50	30	20
Conflicting Peds, #/hr	1	0	0	1	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	110	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	3	3	3	3	3	3
Mvmt Flow	21	789	632	53	32	21

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	686	0	-	0	1097	344
Stage 1	-	-	-	-	660	-
Stage 2	-	-	-	-	437	-
Critical Hdwy	4.16	-	-	-	6.86	6.96
Critical Hdwy Stg 1	-	-	-	-	5.86	-
Critical Hdwy Stg 2	-	-	-	-	5.86	-
Follow-up Hdwy	2.23	-	-	-	3.53	3.33
Pot Cap-1 Maneuver	897	-	-	-	206	649
Stage 1	-	-	-	-	473	-
Stage 2	-	-	-	-	616	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	896	-	-	-	201	648
Mov Cap-2 Maneuver	-	-	-	-	201	-
Stage 1	-	-	-	-	462	-
Stage 2	-	-	-	-	615	-

Approach	EB	WB	SB
HCM Control Delay, s	0.2	0	20.9
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	896	-	-	-	278
HCM Lane V/C Ratio	0.023	-	-	-	0.189
HCM Control Delay (s)	9.1	-	-	-	20.9
HCM Lane LOS	A	-	-	-	C
HCM 95th %tile Q(veh)	0.1	-	-	-	0.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	10	810	110	150	700	280	70	20	140	240	30	20
Future Volume (veh/h)	10	810	110	150	700	280	70	20	140	240	30	20
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856
Adj Flow Rate, veh/h	11	853	116	158	737	295	74	21	147	253	32	21
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	25	1275	396	202	864	346	105	29	203	316	276	181
Arrive On Green	0.01	0.25	0.25	0.11	0.35	0.35	0.06	0.14	0.14	0.18	0.26	0.26
Sat Flow, veh/h	1767	5066	1572	1767	2458	984	1767	200	1403	1767	1046	686
Grp Volume(v), veh/h	11	853	116	158	529	503	74	0	168	253	0	53
Grp Sat Flow(s),veh/h/ln	1767	1689	1572	1767	1763	1679	1767	0	1603	1767	0	1732
Q Serve(g_s), s	0.4	9.0	3.5	5.2	16.5	16.5	2.4	0.0	6.0	8.2	0.0	1.4
Cycle Q Clear(g_c), s	0.4	9.0	3.5	5.2	16.5	16.5	2.4	0.0	6.0	8.2	0.0	1.4
Prop In Lane	1.00		1.00	1.00		0.59	1.00		0.88	1.00		0.40
Lane Grp Cap(c), veh/h	25	1275	396	202	620	590	105	0	232	316	0	457
V/C Ratio(X)	0.45	0.67	0.29	0.78	0.85	0.85	0.71	0.00	0.73	0.80	0.00	0.12
Avail Cap(c_a), veh/h	594	3405	1057	594	1185	1128	594	0	1078	594	0	1164
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	29.1	20.0	18.0	25.6	17.9	17.9	27.5	0.0	24.3	23.4	0.0	16.6
Incr Delay (d2), s/veh	4.6	0.2	0.2	2.5	1.3	1.4	8.4	0.0	1.6	4.7	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	3.0	1.1	2.1	5.6	5.4	1.2	0.0	2.2	3.4	0.0	0.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	33.7	20.3	18.1	28.2	19.2	19.2	35.9	0.0	25.9	28.1	0.0	16.7
LnGrp LOS	C	C	B	C	B	B	D	A	C	C	A	B
Approach Vol, veh/h		980			1190			242			306	
Approach Delay, s/veh		20.2			20.4			29.0			26.1	
Approach LOS		C			C			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	4.9	26.6	14.7	13.2	10.9	20.7	7.6	20.3
Change Period (Y+Rc), s	4.1	5.7	4.1	4.6	4.1	5.7	4.1	4.6
Max Green Setting (Gmax), s	20.0	40.0	20.0	40.0	20.0	40.0	20.0	40.0
Max Q Clear Time (g_c+I1), s	2.4	18.5	10.2	8.0	7.2	11.0	4.4	3.4
Green Ext Time (p_c), s	0.0	0.8	0.5	0.7	0.1	4.0	0.1	0.1

Intersection Summary	
HCM 6th Ctrl Delay	21.7
HCM 6th LOS	C



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	1040	150	80	670	70	160	0	340	70	370	300
Future Volume (veh/h)	0	1040	150	80	670	70	160	0	340	70	370	300
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		0.99	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	0	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856
Adj Flow Rate, veh/h	0	1095	158	84	705	74	168	0	358	74	389	316
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	0	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	0	1795	618	166	1748	780	206	0	806	97	698	548
Arrive On Green	0.00	0.39	0.39	0.05	0.50	0.50	0.12	0.00	0.26	0.05	0.20	0.20
Sat Flow, veh/h	0	4899	1572	3428	3526	1572	1767	0	3105	1767	3526	2768
Grp Volume(v), veh/h	0	1095	158	84	705	74	168	0	358	74	389	316
Grp Sat Flow(s),veh/h/ln	0	1522	1572	1714	1763	1572	1767	0	1552	1767	1763	1384
Q Serve(g_s), s	0.0	17.4	6.1	2.2	11.4	2.3	8.4	0.0	8.7	3.7	9.0	9.4
Cycle Q Clear(g_c), s	0.0	17.4	6.1	2.2	11.4	2.3	8.4	0.0	8.7	3.7	9.0	9.4
Prop In Lane	0.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	0	1795	618	166	1748	780	206	0	806	97	698	548
V/C Ratio(X)	0.00	0.61	0.26	0.51	0.40	0.09	0.82	0.00	0.44	0.76	0.56	0.58
Avail Cap(c_a), veh/h	0	2518	867	567	1945	867	292	0	806	292	1167	916
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)	0.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	0.0	21.9	18.5	42.1	14.4	12.1	39.1	0.0	28.1	42.2	32.8	32.9
Incr Delay (d2), s/veh	0.0	0.7	0.4	3.7	0.3	0.1	14.6	0.0	0.7	17.5	1.6	2.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	5.7	2.1	1.0	4.1	0.7	4.3	0.0	3.1	2.0	3.8	3.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	22.6	19.0	45.8	14.7	12.2	53.8	0.0	28.8	59.8	34.3	35.0
LnGrp LOS	A	C	B	D	B	B	D	A	C	E	C	D
Approach Vol, veh/h		1253			863			526			779	
Approach Delay, s/veh		22.2			17.5			36.8			37.0	
Approach LOS		C			B			D			D	

Timer - Assigned Phs	1	2	3	4		6	7	8
Phs Duration (G+Y+Rc), s	9.3	41.7	15.2	24.5		50.9	9.7	30.0
Change Period (Y+Rc), s	4.9	* 6	* 4.7	6.5		6.0	* 4.7	* 6.5
Max Green Setting (Gmax), s	15.0	* 50	* 15	30.0		50.0	* 15	* 14
Max Q Clear Time (g_c+I1), s	4.2	19.4	10.4	11.4		13.4	5.7	10.7
Green Ext Time (p_c), s	0.2	16.3	0.3	6.6		10.3	0.2	0.8

Intersection Summary	
HCM 6th Ctrl Delay	26.6
HCM 6th LOS	C

Notes

User approved pedestrian interval to be less than phase max green.

User approved volume balancing among the lanes for turning movement.

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

User approved changes to right turn type.



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	380	540	60	340	480	40
Future Volume (veh/h)	380	540	60	340	480	40
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		0.98	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1856	1856	1856	1856	1856	1856
Adj Flow Rate, veh/h	400	568	63	358	505	42
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	3	3	3	3	3	3
Cap, veh/h	1520	664	104	2015	691	317
Arrive On Green	0.43	0.43	0.06	0.57	0.20	0.20
Sat Flow, veh/h	3618	1540	1767	3618	3428	1572
Grp Volume(v), veh/h	400	568	63	358	505	42
Grp Sat Flow(s),veh/h/ln	1763	1540	1767	1763	1714	1572
Q Serve(g_s), s	3.6	16.3	1.7	2.4	6.7	1.1
Cycle Q Clear(g_c), s	3.6	16.3	1.7	2.4	6.7	1.1
Prop In Lane		1.00	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	1520	664	104	2015	691	317
V/C Ratio(X)	0.26	0.86	0.61	0.18	0.73	0.13
Avail Cap(c_a), veh/h	1802	787	542	2015	1051	482
HCM Platoon Ratio	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
Uniform Delay (d), s/veh	8.9	12.5	22.5	5.0	18.3	16.0
Incr Delay (d2), s/veh	0.1	8.2	5.6	0.0	1.5	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.0	5.3	0.8	0.5	2.3	0.3
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	9.0	20.7	28.1	5.0	19.8	16.2
LnGrp LOS	A	C	C	A	B	B
Approach Vol, veh/h	968			421	547	
Approach Delay, s/veh	15.9			8.5	19.5	
Approach LOS	B			A	B	

Timer - Assigned Phs	1	2			6	8
Phs Duration (G+Y+Rc), s	6.9	27.3			34.2	14.8
Change Period (Y+Rc), s	4.0	* 6.2			6.2	4.9
Max Green Setting (Gmax), s	15.0	* 25			25.0	15.0
Max Q Clear Time (g_c+I1), s	3.7	18.3			4.4	8.7
Green Ext Time (p_c), s	0.1	2.8			2.1	1.1

Intersection Summary		
HCM 6th Ctrl Delay	15.3	
HCM 6th LOS	B	

Notes

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



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	10	0	10	20	10	130	10	350	30	80	370	10
Future Volume (veh/h)	10	0	10	20	10	130	10	350	30	80	370	10
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1767	1767	1767	1767	1767	1767	1767	1767	1767	1767	1767	1767
Adj Flow Rate, veh/h	11	0	11	23	11	148	11	398	34	91	420	11
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Percent Heavy Veh, %	9	9	9	9	9	9	9	9	9	9	9	9
Cap, veh/h	418	0	232	129	25	190	29	595	505	139	1344	35
Arrive On Green	0.15	0.00	0.15	0.15	0.15	0.15	0.02	0.34	0.34	0.08	0.40	0.40
Sat Flow, veh/h	1428	0	1497	121	160	1225	1682	1767	1497	1682	3342	87
Grp Volume(v), veh/h	11	0	11	182	0	0	11	398	34	91	211	220
Grp Sat Flow(s),veh/h/ln	1428	0	1497	1506	0	0	1682	1767	1497	1682	1678	1751
Q Serve(g_s), s	0.0	0.0	0.2	2.2	0.0	0.0	0.2	7.1	0.6	1.9	3.1	3.2
Cycle Q Clear(g_c), s	0.2	0.0	0.2	4.2	0.0	0.0	0.2	7.1	0.6	1.9	3.1	3.2
Prop In Lane	1.00		1.00	0.13		0.81	1.00		1.00	1.00		0.05
Lane Grp Cap(c), veh/h	418	0	232	344	0	0	29	595	505	139	675	704
V/C Ratio(X)	0.03	0.00	0.05	0.53	0.00	0.00	0.38	0.67	0.07	0.66	0.31	0.31
Avail Cap(c_a), veh/h	871	0	817	925	0	0	918	1688	1430	918	1603	1673
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	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	13.2	0.0	13.2	14.9	0.0	0.0	17.8	10.4	8.2	16.3	7.5	7.5
Incr Delay (d2), s/veh	0.0	0.0	0.0	0.5	0.0	0.0	3.0	1.9	0.1	2.0	0.4	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	0.0	0.1	1.1	0.0	0.0	0.1	1.7	0.1	0.6	0.6	0.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	13.2	0.0	13.2	15.3	0.0	0.0	20.8	12.2	8.3	18.3	7.9	7.9
LnGrp LOS	B	A	B	B	A	A	C	B	A	B	A	A
Approach Vol, veh/h		22			182			443			522	
Approach Delay, s/veh		13.2			15.3			12.2			9.7	
Approach LOS		B			B			B			A	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	7.7	18.5		10.4	5.3	20.9		10.4
Change Period (Y+Rc), s	* 4.7	6.2		* 4.7	* 4.7	6.2		* 4.7
Max Green Setting (Gmax), s	* 20	35.0		* 20	* 20	35.0		* 20
Max Q Clear Time (g_c+I1), s	3.2	9.1		2.2	2.2	5.2		6.2
Green Ext Time (p_c), s	0.1	3.3		0.0	0.0	3.3		0.5

Intersection Summary	
HCM 6th Ctrl Delay	11.6
HCM 6th LOS	B

Notes

User approved pedestrian interval to be less than phase max green.

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



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	30	0	30	0	370	30	20	370	0
Future Volume (veh/h)	0	0	0	30	0	30	0	370	30	20	370	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				1767	1811	1767	0	1767	1767	1767	1767	0
Adj Flow Rate, veh/h				33	0	33	0	402	33	22	402	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, %				9	6	9	0	9	9	9	9	0
Cap, veh/h				70	0	70	0	1108	91	57	962	0
Arrive On Green				0.09	0.00	0.09	0.00	0.35	0.35	0.03	0.54	0.00
Sat Flow, veh/h				812	0	812	0	3230	257	1682	1767	0
Grp Volume(v), veh/h				66	0	0	0	214	221	22	402	0
Grp Sat Flow(s),veh/h/ln				1624	0	0	0	1678	1720	1682	1767	0
Q Serve(g_s), s				1.1	0.0	0.0	0.0	2.7	2.7	0.4	3.8	0.0
Cycle Q Clear(g_c), s				1.1	0.0	0.0	0.0	2.7	2.7	0.4	3.8	0.0
Prop In Lane				0.50		0.50	0.00		0.15	1.00		0.00
Lane Grp Cap(c), veh/h				139	0	0	0	592	607	57	962	0
V/C Ratio(X)				0.47	0.00	0.00	0.00	0.36	0.36	0.39	0.42	0.00
Avail Cap(c_a), veh/h				1429	0	0	0	2363	2421	1184	2487	0
HCM Platoon Ratio				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)				1.00	0.00	0.00	0.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh				12.4	0.0	0.0	0.0	6.8	6.8	13.4	3.8	0.0
Incr Delay (d2), s/veh				2.5	0.0	0.0	0.0	0.8	0.8	4.3	0.6	0.0
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				0.4	0.0	0.0	0.0	0.5	0.5	0.1	0.2	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh				14.9	0.0	0.0	0.0	7.6	7.6	17.7	4.4	0.0
LnGrp LOS				B	A	A	A	A	A	B	A	A
Approach Vol, veh/h					66			435			424	
Approach Delay, s/veh					14.9			7.6			5.1	
Approach LOS					B			A			A	

Timer - Assigned Phs	1	2		4		6
Phs Duration (G+Y+Rc), s	5.5	16.0		6.9		21.5
Change Period (Y+Rc), s	4.5	6.0		4.5		6.0
Max Green Setting (Gmax), s	20.0	40.0		25.0		40.0
Max Q Clear Time (g_c+I1), s	2.4	4.7		3.1		5.8
Green Ext Time (p_c), s	0.0	5.1		0.3		4.7

Intersection Summary	
HCM 6th Ctrl Delay	7.0
HCM 6th LOS	A

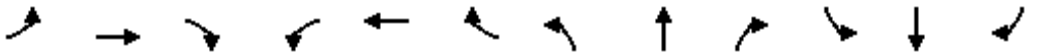
Intersection	
Int Delay, s/veh	0.5

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	10	10	10	300	290	10
Future Vol, veh/h	10	10	10	300	290	10
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	87	87	87	87	87	87
Heavy Vehicles, %	1	1	1	1	1	1
Mvmt Flow	11	11	11	345	333	11

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	706	339	344	0	-	0
Stage 1	339	-	-	-	-	-
Stage 2	367	-	-	-	-	-
Critical Hdwy	6.41	6.21	4.11	-	-	-
Critical Hdwy Stg 1	5.41	-	-	-	-	-
Critical Hdwy Stg 2	5.41	-	-	-	-	-
Follow-up Hdwy	3.509	3.309	2.209	-	-	-
Pot Cap-1 Maneuver	404	706	1221	-	-	-
Stage 1	724	-	-	-	-	-
Stage 2	703	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	400	706	1221	-	-	-
Mov Cap-2 Maneuver	400	-	-	-	-	-
Stage 1	716	-	-	-	-	-
Stage 2	703	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	12.4	0.3	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1221	-	511	-	-
HCM Lane V/C Ratio	0.009	-	0.045	-	-
HCM Control Delay (s)	8	0	12.4	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0.1	-	-



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	160	380	40	20	210	20	30	10	50	200	40	90
Future Volume (veh/h)	160	380	40	20	210	20	30	10	50	200	40	90
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1767	1767	1767	1767	1767	1767	1767	1767	1767	1767	1767	1767
Adj Flow Rate, veh/h	165	392	41	21	216	21	31	10	52	206	41	93
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	9	9	9	9	9	9	9	9	9	9	9	9
Cap, veh/h	207	464	48	72	747	72	40	13	66	261	52	277
Arrive On Green	0.12	0.29	0.29	0.04	0.24	0.24	0.07	0.07	0.07	0.18	0.18	0.18
Sat Flow, veh/h	1682	1573	164	1682	3093	298	527	170	884	1414	282	1497
Grp Volume(v), veh/h	165	0	433	21	116	121	93	0	0	247	0	93
Grp Sat Flow(s),veh/h/ln	1682	0	1737	1682	1678	1713	1581	0	0	1696	0	1497
Q Serve(g_s), s	7.1	0.0	17.3	0.9	4.2	4.3	4.3	0.0	0.0	10.3	0.0	4.0
Cycle Q Clear(g_c), s	7.1	0.0	17.3	0.9	4.2	4.3	4.3	0.0	0.0	10.3	0.0	4.0
Prop In Lane	1.00		0.09	1.00		0.17	0.33		0.56	0.83		1.00
Lane Grp Cap(c), veh/h	207	0	512	72	405	414	119	0	0	313	0	277
V/C Ratio(X)	0.80	0.00	0.85	0.29	0.29	0.29	0.78	0.00	0.00	0.79	0.00	0.34
Avail Cap(c_a), veh/h	591	0	707	682	953	972	331	0	0	642	0	567
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	1.00	1.00	1.00	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	31.5	0.0	24.5	34.3	22.9	22.9	33.6	0.0	0.0	28.8	0.0	26.2
Incr Delay (d2), s/veh	6.9	0.0	8.3	2.2	0.6	0.6	10.8	0.0	0.0	4.4	0.0	0.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.0	0.0	7.2	0.4	1.5	1.6	1.9	0.0	0.0	4.2	0.0	1.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	38.4	0.0	32.8	36.6	23.4	23.5	44.4	0.0	0.0	33.2	0.0	26.9
LnGrp LOS	D	A	C	D	C	C	D	A	A	C	A	C
Approach Vol, veh/h		598			258			93			340	
Approach Delay, s/veh		34.3			24.5			44.4			31.5	
Approach LOS		C			C			D			C	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	10.7	28.8		23.6	14.6	24.9		10.9				
Change Period (Y+Rc), s	7.5	* 7		* 9.9	5.5	7.0		5.4				
Max Green Setting (Gmax), s	30.0	* 30		* 28	26.0	42.0		15.5				
Max Q Clear Time (g_c+I1), s	2.9	19.3		12.3	9.1	6.3		6.3				
Green Ext Time (p_c), s	0.0	2.5		1.4	0.4	1.9		0.2				

Intersection Summary			
HCM 6th Ctrl Delay		32.3	
HCM 6th LOS		C	

Notes

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



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	120	450	60	10	90	60	20	20	10	10	10	140
Future Volume (veh/h)	120	450	60	10	90	60	20	20	10	10	10	140
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1767	1767	1767	1767	1767	1767	1767	1767	1767	1767	1767	1767
Adj Flow Rate, veh/h	124	464	62	10	93	62	21	21	10	10	10	144
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	9	9	9	9	9	9	9	9	9	9	9	9
Cap, veh/h	160	533	71	30	269	179	45	45	22	107	107	186
Arrive On Green	0.10	0.35	0.35	0.02	0.27	0.27	0.07	0.07	0.07	0.12	0.12	0.12
Sat Flow, veh/h	1682	1526	204	1682	989	659	676	676	322	862	862	1497
Grp Volume(v), veh/h	124	0	526	10	0	155	52	0	0	20	0	144
Grp Sat Flow(s),veh/h/ln	1682	0	1730	1682	0	1648	1675	0	0	1724	0	1497
Q Serve(g_s), s	4.4	0.0	17.4	0.4	0.0	4.6	1.8	0.0	0.0	0.6	0.0	5.7
Cycle Q Clear(g_c), s	4.4	0.0	17.4	0.4	0.0	4.6	1.8	0.0	0.0	0.6	0.0	5.7
Prop In Lane	1.00		0.12	1.00		0.40	0.40		0.19	0.50		1.00
Lane Grp Cap(c), veh/h	160	0	604	30	0	448	112	0	0	214	0	186
V/C Ratio(X)	0.77	0.00	0.87	0.33	0.00	0.35	0.46	0.00	0.00	0.09	0.00	0.78
Avail Cap(c_a), veh/h	550	0	707	550	0	674	548	0	0	564	0	490
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	27.0	0.0	18.6	29.7	0.0	17.9	27.5	0.0	0.0	23.7	0.0	26.0
Incr Delay (d2), s/veh	7.8	0.0	11.0	6.3	0.0	0.7	2.9	0.0	0.0	0.2	0.0	6.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.9	0.0	7.2	0.2	0.0	1.7	0.8	0.0	0.0	0.2	0.0	2.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	34.8	0.0	29.6	36.0	0.0	18.6	30.4	0.0	0.0	23.9	0.0	32.8
LnGrp LOS	C	A	C	D	A	B	C	A	A	C	A	C
Approach Vol, veh/h		650			165			52			164	
Approach Delay, s/veh		30.6			19.6			30.4			31.7	
Approach LOS		C			B			C			C	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	7.4	28.4		15.5	12.1	23.6		9.9
Change Period (Y+Rc), s	* 6.3	* 7		7.9	* 6.3	7.0		5.8
Max Green Setting (Gmax), s	* 2.8	* 25		20.0	* 20	25.0		20.0
Max Q Clear Time (g_c+I1), s	2.4	19.4		7.7	6.4	6.6		3.8
Green Ext Time (p_c), s	0.0	2.0		0.4	0.2	1.1		0.1

Intersection Summary	
HCM 6th Ctrl Delay	29.0
HCM 6th LOS	C

Notes

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

Intersection	
Int Delay, s/veh	1.5

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	40	20	270	50	30	360
Future Vol, veh/h	40	20	270	50	30	360
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	6	6	6	6	6	6
Mvmt Flow	43	22	293	54	33	391

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	777	320	0	0	347	0
Stage 1	320	-	-	-	-	-
Stage 2	457	-	-	-	-	-
Critical Hdwy	6.46	6.26	-	-	4.16	-
Critical Hdwy Stg 1	5.46	-	-	-	-	-
Critical Hdwy Stg 2	5.46	-	-	-	-	-
Follow-up Hdwy	3.554	3.354	-	-	2.254	-
Pot Cap-1 Maneuver	360	712	-	-	1190	-
Stage 1	727	-	-	-	-	-
Stage 2	629	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	347	712	-	-	1190	-
Mov Cap-2 Maneuver	347	-	-	-	-	-
Stage 1	727	-	-	-	-	-
Stage 2	607	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	15.2	0	0.6
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	419	1190	-
HCM Lane V/C Ratio	-	-	0.156	0.027	-
HCM Control Delay (s)	-	-	15.2	8.1	0
HCM Lane LOS	-	-	C	A	A
HCM 95th %tile Q(veh)	-	-	0.5	0.1	-

Intersection	
Int Delay, s/veh	0.3

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	20	270	50	0	390
Future Vol, veh/h	0	20	270	50	0	390
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, %	6	6	6	6	6	6
Mvmt Flow	0	22	293	54	0	424

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	-	320	0	0	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.26	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.354	-	-	-	-
Pot Cap-1 Maneuver	0	712	-	-	0	-
Stage 1	0	-	-	-	0	-
Stage 2	0	-	-	-	0	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	-	712	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	10.2	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBT
Capacity (veh/h)	-	-	712	-
HCM Lane V/C Ratio	-	-	0.031	-
HCM Control Delay (s)	-	-	10.2	-
HCM Lane LOS	-	-	B	-
HCM 95th %tile Q(veh)	-	-	0.1	-

Intersection	
Int Delay, s/veh	2.1

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	20	60	300	80	90	390
Future Vol, veh/h	20	60	300	80	90	390
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, %	6	6	6	6	6	6
Mvmt Flow	22	65	326	87	98	424

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	990	370	0	0	413	0
Stage 1	370	-	-	-	-	-
Stage 2	620	-	-	-	-	-
Critical Hdwy	6.46	6.26	-	-	4.16	-
Critical Hdwy Stg 1	5.46	-	-	-	-	-
Critical Hdwy Stg 2	5.46	-	-	-	-	-
Follow-up Hdwy	3.554	3.354	-	-	2.254	-
Pot Cap-1 Maneuver	269	667	-	-	1125	-
Stage 1	690	-	-	-	-	-
Stage 2	529	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	238	667	-	-	1125	-
Mov Cap-2 Maneuver	238	-	-	-	-	-
Stage 1	690	-	-	-	-	-
Stage 2	469	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	14.6	0	1.6
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	460	1125	-
HCM Lane V/C Ratio	-	-	0.189	0.087	-
HCM Control Delay (s)	-	-	14.6	8.5	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	0.7	0.3	-

Intersection	
Int Delay, s/veh	2.4

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	20	40	100	200	250	20
Future Vol, veh/h	20	40	100	200	250	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	120	0	200	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	6	6	6	6	6	6
Mvmt Flow	22	43	109	217	272	22

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	718	283	294	0	-	0
Stage 1	283	-	-	-	-	-
Stage 2	435	-	-	-	-	-
Critical Hdwy	6.46	6.26	4.16	-	-	-
Critical Hdwy Stg 1	5.46	-	-	-	-	-
Critical Hdwy Stg 2	5.46	-	-	-	-	-
Follow-up Hdwy	3.554	3.354	2.254	-	-	-
Pot Cap-1 Maneuver	390	746	1245	-	-	-
Stage 1	756	-	-	-	-	-
Stage 2	644	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	356	746	1245	-	-	-
Mov Cap-2 Maneuver	356	-	-	-	-	-
Stage 1	689	-	-	-	-	-
Stage 2	644	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	12	2.7	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	1245	-	356	746	-	-
HCM Lane V/C Ratio	0.087	-	0.061	0.058	-	-
HCM Control Delay (s)	8.2	-	15.8	10.1	-	-
HCM Lane LOS	A	-	C	B	-	-
HCM 95th %tile Q(veh)	0.3	-	0.2	0.2	-	-



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	220	90	60	360	170	60
Future Volume (veh/h)	220	90	60	360	170	60
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1737	1737	1737	1737	1737	1737
Adj Flow Rate, veh/h	234	96	64	383	181	64
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	11	11	11	11	11	11
Cap, veh/h	466	395	104	830	379	337
Arrive On Green	0.27	0.27	0.06	0.48	0.23	0.23
Sat Flow, veh/h	1737	1472	1654	1737	1654	1472
Grp Volume(v), veh/h	234	96	64	383	181	64
Grp Sat Flow(s),veh/h/ln	1737	1472	1654	1737	1654	1472
Q Serve(g_s), s	4.7	2.1	1.5	6.0	3.9	1.4
Cycle Q Clear(g_c), s	4.7	2.1	1.5	6.0	3.9	1.4
Prop In Lane		1.00	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	466	395	104	830	379	337
V/C Ratio(X)	0.50	0.24	0.61	0.46	0.48	0.19
Avail Cap(c_a), veh/h	1696	1437	808	1696	808	719
HCM Platoon Ratio	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
Uniform Delay (d), s/veh	12.7	11.7	18.7	7.2	13.7	12.7
Incr Delay (d2), s/veh	3.0	1.1	5.7	1.5	3.4	1.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.6	0.6	0.6	1.3	1.3	0.4
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	15.7	12.9	24.4	8.6	17.0	13.7
LnGrp LOS	B	B	C	A	B	B
Approach Vol, veh/h	330			447	245	
Approach Delay, s/veh	14.9			10.9	16.2	
Approach LOS	B			B	B	

Timer - Assigned Phs	1	2		4		6
Phs Duration (G+Y+Rc), s	8.6	17.0		15.4		25.6
Change Period (Y+Rc), s	6.0	6.0		6.0		6.0
Max Green Setting (Gmax), s	20.0	40.0		20.0		40.0
Max Q Clear Time (g_c+I1), s	3.5	6.7		5.9		8.0
Green Ext Time (p_c), s	0.1	4.3		1.7		5.7

Intersection Summary			
HCM 6th Ctrl Delay		13.4	
HCM 6th LOS		B	



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	20	10	60	10	5	10	90	190	10	10	150	30
Future Volume (veh/h)	20	10	60	10	5	10	90	190	10	10	150	30
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1781	1811	1781	1811	1811	1811	1781	1781	1811	1811	1781	1781
Adj Flow Rate, veh/h	22	11	67	11	5	11	101	213	11	11	169	34
Peak Hour Factor	0.89	0.92	0.89	0.92	0.92	0.92	0.89	0.89	0.92	0.92	0.89	0.89
Percent Heavy Veh, %	8	6	8	6	6	6	8	8	6	6	8	8
Cap, veh/h	159	762	334	25	488	218	151	426	367	25	293	248
Arrive On Green	0.09	0.22	0.22	0.01	0.14	0.14	0.09	0.24	0.24	0.01	0.16	0.16
Sat Flow, veh/h	1697	3441	1510	1725	3441	1535	1697	1781	1535	1725	1781	1510
Grp Volume(v), veh/h	22	11	67	11	5	11	101	213	11	11	169	34
Grp Sat Flow(s),veh/h/ln	1697	1721	1510	1725	1721	1535	1697	1781	1535	1725	1781	1510
Q Serve(g_s), s	0.4	0.1	1.3	0.2	0.0	0.2	2.0	3.6	0.2	0.2	3.1	0.7
Cycle Q Clear(g_c), s	0.4	0.1	1.3	0.2	0.0	0.2	2.0	3.6	0.2	0.2	3.1	0.7
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	159	762	334	25	488	218	151	426	367	25	293	248
V/C Ratio(X)	0.14	0.01	0.20	0.44	0.01	0.05	0.67	0.50	0.03	0.44	0.58	0.14
Avail Cap(c_a), veh/h	866	2001	878	245	2001	893	241	1036	893	245	1036	878
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	14.7	10.7	11.2	17.2	13.0	13.1	15.6	11.6	10.3	17.2	13.6	12.6
Incr Delay (d2), s/veh	0.4	0.0	0.3	11.7	0.0	0.1	5.0	0.9	0.0	11.7	1.8	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	0.1	0.0	0.3	0.2	0.0	0.1	0.7	0.9	0.0	0.1	0.9	0.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	15.0	10.7	11.5	28.9	13.0	13.2	20.6	12.5	10.3	28.9	15.4	12.8
LnGrp LOS	B	B	B	C	B	B	C	B	B	C	B	B
Approach Vol, veh/h		100			27			325			214	
Approach Delay, s/veh		12.2			19.6			14.9			15.7	
Approach LOS		B			B			B			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	5.0	12.3	7.6	10.3	7.8	9.5	5.0	12.9
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	5.0	20.5	5.0	20.5	18.0	20.5	5.0	20.5
Max Q Clear Time (g_c+I1), s	2.2	3.3	4.0	5.1	2.4	2.2	2.2	5.6
Green Ext Time (p_c), s	0.0	0.2	0.0	0.7	0.0	0.0	0.0	0.8

Intersection Summary	
HCM 6th Ctrl Delay	14.9
HCM 6th LOS	B

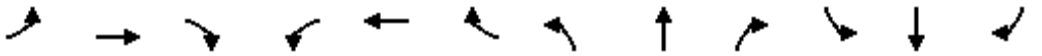
Intersection	
Int Delay, s/veh	1.8

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	30	90	40	470	340	20
Future Vol, veh/h	30	90	40	470	340	20
Conflicting Peds, #/hr	0	0	1	0	0	1
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	100	140	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	87	87	87	87	87	87
Heavy Vehicles, %	7	7	7	7	7	7
Mvmt Flow	34	103	46	540	391	23

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	766	208	415	0	-	0
Stage 1	404	-	-	-	-	-
Stage 2	362	-	-	-	-	-
Critical Hdwy	6.94	7.04	4.24	-	-	-
Critical Hdwy Stg 1	5.94	-	-	-	-	-
Critical Hdwy Stg 2	5.94	-	-	-	-	-
Follow-up Hdwy	3.57	3.37	2.27	-	-	-
Pot Cap-1 Maneuver	329	783	1106	-	-	-
Stage 1	628	-	-	-	-	-
Stage 2	660	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	315	782	1105	-	-	-
Mov Cap-2 Maneuver	315	-	-	-	-	-
Stage 1	601	-	-	-	-	-
Stage 2	659	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	12.2	0.7	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	1105	-	315	782	-	-
HCM Lane V/C Ratio	0.042	-	0.109	0.132	-	-
HCM Control Delay (s)	8.4	-	17.8	10.3	-	-
HCM Lane LOS	A	-	C	B	-	-
HCM 95th %tile Q(veh)	0.1	-	0.4	0.5	-	-



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	40	10	110	80	5	20	80	470	50	5	400	20
Future Volume (veh/h)	40	10	110	80	5	20	80	470	50	5	400	20
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		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1811	1811	1811	1811	1811	1811	1811	1811	1811	1811	1811	1811
Adj Flow Rate, veh/h	49	12	134	98	6	24	98	573	61	6	488	24
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Percent Heavy Veh, %	6	6	6	6	6	6	6	6	6	6	6	6
Cap, veh/h	105	19	209	162	57	230	162	1106	117	17	893	44
Arrive On Green	0.06	0.15	0.15	0.09	0.18	0.18	0.09	0.35	0.35	0.01	0.27	0.27
Sat Flow, veh/h	1725	126	1404	1725	316	1265	1725	3138	333	1725	3334	164
Grp Volume(v), veh/h	49	0	146	98	0	30	98	314	320	6	251	261
Grp Sat Flow(s),veh/h/ln	1725	0	1530	1725	0	1581	1725	1721	1751	1725	1721	1777
Q Serve(g_s), s	1.2	0.0	4.1	2.5	0.0	0.7	2.5	6.5	6.6	0.2	5.7	5.7
Cycle Q Clear(g_c), s	1.2	0.0	4.1	2.5	0.0	0.7	2.5	6.5	6.6	0.2	5.7	5.7
Prop In Lane	1.00		0.92	1.00		0.80	1.00		0.19	1.00		0.09
Lane Grp Cap(c), veh/h	105	0	227	162	0	287	162	606	617	17	461	476
V/C Ratio(X)	0.47	0.00	0.64	0.61	0.00	0.10	0.61	0.52	0.52	0.36	0.55	0.55
Avail Cap(c_a), veh/h	801	0	778	801	0	804	991	1521	1548	991	1521	1571
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	1.00	1.00
Uniform Delay (d), s/veh	20.5	0.0	18.1	19.7	0.0	15.4	19.7	11.6	11.6	22.3	14.2	14.2
Incr Delay (d2), s/veh	3.2	0.0	3.0	3.6	0.0	0.2	3.6	1.0	1.0	12.7	1.4	1.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.6	0.0	1.5	1.0	0.0	0.2	1.0	1.9	2.0	0.1	1.8	1.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	23.7	0.0	21.1	23.3	0.0	15.6	23.3	12.6	12.6	34.9	15.6	15.6
LnGrp LOS	C	A	C	C	A	B	C	B	B	C	B	B
Approach Vol, veh/h		195			128			732			518	
Approach Delay, s/veh		21.8			21.5			14.0			15.8	
Approach LOS		C			C			B			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	4.4	21.2	8.2	11.3	8.2	17.4	6.8	12.8
Change Period (Y+Rc), s	4.0	5.3	4.0	4.6	4.0	5.3	4.0	4.6
Max Green Setting (Gmax), s	26.0	40.0	21.0	23.0	26.0	40.0	21.0	23.0
Max Q Clear Time (g_c+I1), s	2.2	8.6	4.5	6.1	4.5	7.7	3.2	2.7
Green Ext Time (p_c), s	0.0	5.6	0.2	0.8	0.2	4.3	0.1	0.1

Intersection Summary	
HCM 6th Ctrl Delay	16.2
HCM 6th LOS	B

Notes

User approved pedestrian interval to be less than phase max green.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	180	890	170	310	820	300	120	250	380	230	360	150
Future Volume (veh/h)	180	890	170	310	820	300	120	250	380	230	360	150
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		0.99	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1811	1811	1811	1811	1811	1811	1811	1811	1811	1811	1811	1811
Adj Flow Rate, veh/h	205	1011	193	352	932	341	136	284	432	261	409	170
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Percent Heavy Veh, %	6	6	6	6	6	6	6	6	6	6	6	6
Cap, veh/h	201	975	435	345	906	330	162	373	328	259	646	265
Arrive On Green	0.12	0.28	0.28	0.20	0.37	0.37	0.09	0.22	0.22	0.15	0.27	0.27
Sat Flow, veh/h	1725	3441	1535	1725	2471	899	1725	1721	1513	1725	2367	972
Grp Volume(v), veh/h	205	1011	193	352	647	626	136	284	432	261	296	283
Grp Sat Flow(s),veh/h/ln	1725	1721	1535	1725	1721	1649	1725	1721	1513	1725	1721	1618
Q Serve(g_s), s	14.0	34.0	12.4	24.0	44.0	44.0	9.3	18.6	26.0	18.0	18.1	18.5
Cycle Q Clear(g_c), s	14.0	34.0	12.4	24.0	44.0	44.0	9.3	18.6	26.0	18.0	18.1	18.5
Prop In Lane	1.00		1.00	1.00		0.54	1.00		1.00	1.00		0.60
Lane Grp Cap(c), veh/h	201	975	435	345	631	605	162	373	328	259	470	442
V/C Ratio(X)	1.02	1.04	0.44	1.02	1.03	1.03	0.84	0.76	1.32	1.01	0.63	0.64
Avail Cap(c_a), veh/h	201	975	435	345	631	605	187	373	328	259	470	442
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	53.0	43.0	35.2	48.0	38.0	38.0	53.5	44.1	47.0	51.0	38.3	38.4
Incr Delay (d2), s/veh	68.4	38.8	1.0	53.7	42.6	45.9	25.1	9.5	162.9	58.2	3.1	3.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	9.7	19.1	4.7	15.1	24.9	24.4	5.1	8.7	24.4	11.7	7.8	7.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	121.4	81.8	36.3	101.7	80.6	83.9	78.6	53.6	209.9	109.2	41.4	42.0
LnGrp LOS	F	F	D	F	F	F	E	D	F	F	D	D
Approach Vol, veh/h		1409			1625			852			840	
Approach Delay, s/veh		81.3			86.4			136.9			62.7	
Approach LOS		F			F			F			E	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	28.0	39.0	15.2	37.8	18.0	49.0	22.0	31.0
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	24.0	34.0	13.0	31.0	14.0	44.0	18.0	26.0
Max Q Clear Time (g_c+I1), s	26.0	36.0	11.3	20.5	16.0	46.0	20.0	28.0
Green Ext Time (p_c), s	0.0	0.0	0.1	3.2	0.0	0.0	0.0	0.0

Intersection Summary	
HCM 6th Ctrl Delay	89.8
HCM 6th LOS	F



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	100	50	220	130	0	0	0	0	260	0	60
Future Volume (veh/h)	0	100	50	220	130	0	0	0	0	260	0	60
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00				1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Work Zone On Approach		No			No						No	
Adj Sat Flow, veh/h/ln	0	1352	1352	1352	1352	0				1352	1352	1352
Adj Flow Rate, veh/h	0	115	57	253	149	0				363	0	0
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87				0.87	0.87	0.87
Percent Heavy Veh, %	0	37	37	37	37	0				37	37	37
Cap, veh/h	0	429	201	292	1493	0				479	251	0
Arrive On Green	0.00	0.25	0.25	0.23	0.58	0.00				0.19	0.00	0.00
Sat Flow, veh/h	0	1765	795	1287	2636	0				2575	1352	0
Grp Volume(v), veh/h	0	85	87	253	149	0				363	0	0
Grp Sat Flow(s),veh/h/ln	0	1284	1208	1287	1284	0				1287	1352	0
Q Serve(g_s), s	0.0	2.1	2.3	7.5	1.0	0.0				5.3	0.0	0.0
Cycle Q Clear(g_c), s	0.0	2.1	2.3	7.5	1.0	0.0				5.3	0.0	0.0
Prop In Lane	0.00		0.66	1.00		0.00				1.00		0.00
Lane Grp Cap(c), veh/h	0	325	306	292	1493	0				479	251	0
V/C Ratio(X)	0.00	0.26	0.28	0.87	0.10	0.00				0.76	0.00	0.00
Avail Cap(c_a), veh/h	0	370	349	652	2301	0				1003	527	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	1.00	1.00	1.00	0.00				1.00	0.00	0.00
Uniform Delay (d), s/veh	0.0	11.8	11.9	14.7	3.7	0.0				15.2	0.0	0.0
Incr Delay (d2), s/veh	0.0	0.4	0.5	3.0	0.0	0.0				0.9	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.5	0.5	1.9	0.1	0.0				1.2	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	12.2	12.4	17.7	3.7	0.0				16.2	0.0	0.0
LnGrp LOS	A	B	B	B	A	A				B	A	A
Approach Vol, veh/h		172			402						363	
Approach Delay, s/veh		12.3			12.5						16.2	
Approach LOS		B			B						B	

Timer - Assigned Phs	1	2		4		6
Phs Duration (G+Y+Rc), s	13.0	14.6		11.9		27.6
Change Period (Y+Rc), s	4.0	4.6		4.6		4.6
Max Green Setting (Gmax), s	20.0	11.4		15.4		35.4
Max Q Clear Time (g_c+I1), s	9.5	4.3		7.3		3.0
Green Ext Time (p_c), s	0.1	0.4		0.2		0.9

Intersection Summary	
HCM 6th Ctrl Delay	13.9
HCM 6th LOS	B

Notes

User approved volume balancing among the lanes for turning movement.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	30	330	0	0	280	250	70	0	260	0	0	0
Future Volume (veh/h)	30	330	0	0	280	250	70	0	260	0	0	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Work Zone On Approach		No			No			No				
Adj Sat Flow, veh/h/ln	1352	1352	0	0	1352	1352	1352	1352	1352			
Adj Flow Rate, veh/h	34	379	0	0	322	0	80	0	299			
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87			
Percent Heavy Veh, %	37	37	0	0	37	37	37	37	37			
Cap, veh/h	51	1185	0	0	430		386	0	343			
Arrive On Green	0.04	0.46	0.00	0.00	0.32	0.00	0.30	0.00	0.30			
Sat Flow, veh/h	1287	2636	0	0	1352	0	1287	0	1145			
Grp Volume(v), veh/h	34	379	0	0	322	0	80	0	299			
Grp Sat Flow(s),veh/h/ln	1287	1284	0	0	1352	0	1287	0	1145			
Q Serve(g_s), s	1.0	3.6	0.0	0.0	8.2	0.0	1.8	0.0	9.5			
Cycle Q Clear(g_c), s	1.0	3.6	0.0	0.0	8.2	0.0	1.8	0.0	9.5			
Prop In Lane	1.00		0.00	0.00		0.00	1.00		1.00			
Lane Grp Cap(c), veh/h	51	1185	0	0	430		386	0	343			
V/C Ratio(X)	0.67	0.32	0.00	0.00	0.75		0.21	0.00	0.87			
Avail Cap(c_a), veh/h	167	4231	0	0	1911		582	0	518			
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	1.00	1.00	0.00	0.00	1.00	0.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	18.2	6.5	0.0	0.0	11.8	0.0	10.1	0.0	12.8			
Incr Delay (d2), s/veh	5.5	0.2	0.0	0.0	2.6	0.0	0.1	0.0	7.1			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	0.3	0.6	0.0	0.0	2.0	0.0	0.3	0.0	2.3			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	23.7	6.7	0.0	0.0	14.4	0.0	10.2	0.0	19.8			
LnGrp LOS	C	A	A	A	B		B	A	B			
Approach Vol, veh/h		413			322	A		379				
Approach Delay, s/veh		8.1			14.4			17.8				
Approach LOS		A			B			B				
Timer - Assigned Phs		2			5	6		8				
Phs Duration (G+Y+Rc), s		22.4			5.5	16.8		16.1				
Change Period (Y+Rc), s		4.6			4.0	4.6		4.6				
Max Green Setting (Gmax), s		63.4			5.0	54.4		17.4				
Max Q Clear Time (g_c+I1), s		5.6			3.0	10.2		11.5				
Green Ext Time (p_c), s		2.7			0.0	2.0		0.2				

Intersection Summary	
HCM 6th Ctrl Delay	13.2
HCM 6th LOS	B

Notes

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



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	100	90	70	10	190	20	80	330	10	10	310	90
Future Volume (veh/h)	100	90	70	10	190	20	80	330	10	10	310	90
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1604	1811	1604	1811	1811	1811	1604	1604	1811	1811	1604	1604
Adj Flow Rate, veh/h	106	98	74	11	207	22	85	351	11	11	330	96
Peak Hour Factor	0.94	0.92	0.94	0.92	0.92	0.92	0.94	0.94	0.92	0.92	0.94	0.94
Percent Heavy Veh, %	20	6	20	6	6	6	20	20	6	6	20	20
Cap, veh/h	134	955	377	24	282	30	101	884	28	24	734	327
Arrive On Green	0.09	0.28	0.28	0.01	0.18	0.18	0.07	0.29	0.29	0.01	0.24	0.24
Sat Flow, veh/h	1527	3441	1359	1725	1609	171	1527	3016	94	1725	3047	1359
Grp Volume(v), veh/h	106	98	74	11	0	229	85	177	185	11	330	96
Grp Sat Flow(s),veh/h/ln	1527	1721	1359	1725	0	1780	1527	1523	1587	1725	1523	1359
Q Serve(g_s), s	3.6	1.1	2.2	0.3	0.0	6.4	2.9	4.9	4.9	0.3	4.8	3.0
Cycle Q Clear(g_c), s	3.6	1.1	2.2	0.3	0.0	6.4	2.9	4.9	4.9	0.3	4.8	3.0
Prop In Lane	1.00		1.00	1.00		0.10	1.00		0.06	1.00		1.00
Lane Grp Cap(c), veh/h	134	955	377	24	0	312	101	446	465	24	734	327
V/C Ratio(X)	0.79	0.10	0.20	0.45	0.00	0.73	0.84	0.40	0.40	0.45	0.45	0.29
Avail Cap(c_a), veh/h	933	2958	1168	165	0	612	117	989	1030	165	2037	908
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	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	23.4	14.1	14.4	25.6	0.0	20.4	24.2	14.8	14.8	25.6	16.9	16.2
Incr Delay (d2), s/veh	10.0	0.0	0.3	12.5	0.0	3.3	38.4	2.1	2.0	12.5	1.6	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	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.6	0.4	0.6	0.2	0.0	2.7	1.9	1.5	1.6	0.2	1.5	1.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	33.4	14.1	14.7	38.1	0.0	23.7	62.5	16.9	16.8	38.1	18.5	18.0
LnGrp LOS	C	B	B	D	A	C	E	B	B	D	B	B
Approach Vol, veh/h		278			240			447			437	
Approach Delay, s/veh		21.6			24.4			25.5			18.9	
Approach LOS		C			C			C			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.0	18.6	5.2	20.5	5.2	21.3	10.6	15.2
Change Period (Y+Rc), s	4.5	6.0	4.5	6.0	4.5	6.0	6.0	* 6
Max Green Setting (Gmax), s	4.0	35.0	5.0	45.0	5.0	34.0	32.0	* 18
Max Q Clear Time (g_c+I1), s	4.9	6.8	2.3	4.2	2.3	6.9	5.6	8.4
Green Ext Time (p_c), s	0.0	5.8	0.0	0.9	0.0	4.8	0.3	0.8

Intersection Summary	
HCM 6th Ctrl Delay	22.5
HCM 6th LOS	C

Notes

User approved pedestrian interval to be less than phase max green.

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



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	1600	340	290	1620	0	0	0	0	230	0	400
Future Volume (veh/h)	0	1600	340	290	1620	0	0	0	0	230	0	400
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		1.00				1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Work Zone On Approach		No			No						No	
Adj Sat Flow, veh/h/ln	0	1811	1811	1811	1811	0				1811	1811	1811
Adj Flow Rate, veh/h	0	1818	205	330	1841	0				261	0	365
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88				0.88	0.88	0.88
Percent Heavy Veh, %	0	6	6	6	6	0				6	6	6
Cap, veh/h	0	2099	636	374	2425	0				513	0	456
Arrive On Green	0.00	0.42	0.42	0.22	0.70	0.00				0.15	0.00	0.15
Sat Flow, veh/h	0	5107	1499	1725	3532	0				3450	0	3070
Grp Volume(v), veh/h	0	1818	205	330	1841	0				261	0	365
Grp Sat Flow(s),veh/h/ln	0	1648	1499	1725	1721	0				1725	0	1535
Q Serve(g_s), s	0.0	21.0	5.7	11.6	21.3	0.0				4.4	0.0	7.2
Cycle Q Clear(g_c), s	0.0	21.0	5.7	11.6	21.3	0.0				4.4	0.0	7.2
Prop In Lane	0.00		1.00	1.00		0.00				1.00		1.00
Lane Grp Cap(c), veh/h	0	2099	636	374	2425	0				513	0	456
V/C Ratio(X)	0.00	0.87	0.32	0.88	0.76	0.00				0.51	0.00	0.80
Avail Cap(c_a), veh/h	0	2158	654	385	2488	0				571	0	508
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	1.00	1.00	1.00	0.00				1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	16.4	12.0	23.8	5.9	0.0				24.6	0.0	25.8
Incr Delay (d2), s/veh	0.0	3.9	0.3	19.6	1.3	0.0				0.3	0.0	7.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	7.0	1.6	6.2	3.6	0.0				1.6	0.0	2.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	20.3	12.3	43.4	7.2	0.0				24.9	0.0	32.9
LnGrp LOS	A	C	B	D	A	A				C	A	C
Approach Vol, veh/h		2023			2171						626	
Approach Delay, s/veh		19.5			12.7						29.6	
Approach LOS		B			B						C	

Timer - Assigned Phs	1	2		4		6
Phs Duration (G+Y+Rc), s	17.6	31.3		13.9		48.9
Change Period (Y+Rc), s	4.0	4.6		4.6		4.6
Max Green Setting (Gmax), s	14.0	27.4		10.4		45.4
Max Q Clear Time (g_c+I1), s	13.6	23.0		9.2		23.3
Green Ext Time (p_c), s	0.0	3.6		0.1		13.6

Intersection Summary	
HCM 6th Ctrl Delay	17.8
HCM 6th LOS	B

Notes

User approved volume balancing among the lanes for turning movement.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	590	1240	0	0	1420	250	490	0	260	0	0	0
Future Volume (veh/h)	590	1240	0	0	1420	250	490	0	260	0	0	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		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			
Work Zone On Approach		No			No			No				
Adj Sat Flow, veh/h/ln	1811	1811	0	0	1811	1811	1811	1811	1811			
Adj Flow Rate, veh/h	670	1409	0	0	1614	233	557	0	160			
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88			
Percent Heavy Veh, %	6	6	0	0	6	6	6	6	6			
Cap, veh/h	669	2489	0	0	1648	706	602	0	535			
Arrive On Green	0.20	0.72	0.00	0.00	0.48	0.48	0.17	0.00	0.17			
Sat Flow, veh/h	3346	3532	0	0	3532	1475	3450	0	3070			
Grp Volume(v), veh/h	670	1409	0	0	1614	233	557	0	160			
Grp Sat Flow(s),veh/h/ln	1673	1721	0	0	1721	1475	1725	0	1535			
Q Serve(g_s), s	18.0	17.3	0.0	0.0	41.4	8.8	14.3	0.0	4.1			
Cycle Q Clear(g_c), s	18.0	17.3	0.0	0.0	41.4	8.8	14.3	0.0	4.1			
Prop In Lane	1.00		0.00	0.00		1.00	1.00		1.00			
Lane Grp Cap(c), veh/h	669	2489	0	0	1648	706	602	0	535			
V/C Ratio(X)	1.00	0.57	0.00	0.00	0.98	0.33	0.93	0.00	0.30			
Avail Cap(c_a), veh/h	669	2489	0	0	1648	706	602	0	535			
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	1.00	1.00	0.00	0.00	1.00	1.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	36.0	5.8	0.0	0.0	23.0	14.5	36.6	0.0	32.4			
Incr Delay (d2), s/veh	35.1	0.3	0.0	0.0	17.4	0.2	20.1	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			
%ile BackOfQ(50%),veh/ln	10.1	4.1	0.0	0.0	18.4	2.7	7.3	0.0	1.4			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	71.1	6.1	0.0	0.0	40.5	14.8	56.7	0.0	32.5			
LnGrp LOS	F	A	A	A	D	B	E	A	C			
Approach Vol, veh/h		2079			1847			717				
Approach Delay, s/veh		27.0			37.2			51.3				
Approach LOS		C			D			D				
Timer - Assigned Phs		2			5	6		8				
Phs Duration (G+Y+Rc), s		69.7			22.0	47.7		20.3				
Change Period (Y+Rc), s		4.6			4.0	4.6		4.6				
Max Green Setting (Gmax), s		65.1			18.0	43.1		15.7				
Max Q Clear Time (g_c+I1), s		19.3			20.0	43.4		16.3				
Green Ext Time (p_c), s		12.5			0.0	0.0		0.0				

Intersection Summary	
HCM 6th Ctrl Delay	34.8
HCM 6th LOS	C

Notes

User approved volume balancing among the lanes for turning movement.

Intersection	
Int Delay, s/veh	1.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	1350	150	0	1550	0	0	0	20	0	0	120
Future Vol, veh/h	0	1350	150	0	1550	0	0	0	20	0	0	120
Conflicting Peds, #/hr	0	0	2	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	0	-	-	0
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	88	88	88	88	88	88	88	88	88	88	88	88
Heavy Vehicles, %	6	6	6	6	6	6	6	6	6	6	6	6
Mvmt Flow	0	1534	170	0	1761	0	0	0	23	0	0	136

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	-	0	0	-	-	0	-	-	854	-	-	881
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	-	-	-	7.02	-	-	7.02
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	-	-	-	3.36	-	-	3.36
Pot Cap-1 Maneuver	0	-	-	0	-	0	0	0	294	0	0	282
Stage 1	0	-	-	0	-	0	0	0	-	0	0	-
Stage 2	0	-	-	0	-	0	0	0	-	0	0	-
Platoon blocked, %		-	-		-							
Mov Cap-1 Maneuver	-	-	-	-	-	-	-	-	293	-	-	282
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0	18.3	29.2
HCM LOS			C	D

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBT	SBLn1
Capacity (veh/h)	293	-	-	-	282
HCM Lane V/C Ratio	0.078	-	-	-	0.484
HCM Control Delay (s)	18.3	-	-	-	29.2
HCM Lane LOS	C	-	-	-	D
HCM 95th %tile Q(veh)	0.2	-	-	-	2.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	300	910	170	80	1020	60	240	120	90	70	100	210
Future Volume (veh/h)	300	910	170	80	1020	60	240	120	90	70	100	210
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.98	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	1811	1811	1811	1811	1811	1811	1811	1811	1811	1811	1811	1811
Adj Flow Rate, veh/h	341	1034	183	91	1159	66	273	136	10	80	114	0
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Percent Heavy Veh, %	6	6	6	6	6	6	6	6	6	6	6	6
Cap, veh/h	329	1490	263	113	1271	72	274	636	46	100	326	0
Arrive On Green	0.19	0.51	0.51	0.07	0.38	0.38	0.16	0.20	0.20	0.06	0.09	0.00
Sat Flow, veh/h	1725	2921	516	1725	3305	188	1725	3250	237	1725	3532	0
Grp Volume(v), veh/h	341	608	609	91	603	622	273	71	75	80	114	0
Grp Sat Flow(s),veh/h/ln	1725	1721	1717	1725	1721	1773	1725	1721	1766	1725	1721	0
Q Serve(g_s), s	24.0	33.7	33.9	6.5	41.8	41.8	19.9	4.4	4.5	5.8	3.9	0.0
Cycle Q Clear(g_c), s	24.0	33.7	33.9	6.5	41.8	41.8	19.9	4.4	4.5	5.8	3.9	0.0
Prop In Lane	1.00		0.30	1.00		0.11	1.00		0.13	1.00		0.00
Lane Grp Cap(c), veh/h	329	878	876	113	662	682	274	337	346	100	326	0
V/C Ratio(X)	1.04	0.69	0.70	0.81	0.91	0.91	1.00	0.21	0.22	0.80	0.35	0.00
Avail Cap(c_a), veh/h	329	878	876	137	677	698	274	575	590	178	958	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	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	50.9	23.3	23.4	58.0	36.7	36.7	52.8	42.4	42.5	58.5	53.3	0.0
Incr Delay (d2), s/veh	59.2	3.0	3.1	25.9	17.2	17.0	52.9	0.7	0.7	5.4	1.4	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	15.5	13.5	13.5	3.6	19.8	20.4	12.5	1.9	2.0	2.6	1.7	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	110.1	26.4	26.5	83.9	53.9	53.7	105.8	43.1	43.1	63.9	54.7	0.0
LnGrp LOS	F	C	C	F	D	D	F	D	D	E	D	A
Approach Vol, veh/h		1558			1316			419			194	
Approach Delay, s/veh		44.7			55.9			83.9			58.5	
Approach LOS		D			E			F			E	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	13.2	69.6	25.0	17.9	29.0	53.9	12.3	30.6
Change Period (Y+Rc), s	5.0	5.5	5.0	6.0	5.0	5.5	5.0	6.0
Max Green Setting (Gmax), s	10.0	63.5	20.0	35.0	24.0	49.5	13.0	42.0
Max Q Clear Time (g_c+I1), s	8.5	35.9	21.9	5.9	26.0	43.8	7.8	6.5
Green Ext Time (p_c), s	0.0	16.1	0.0	1.1	0.0	4.5	0.0	1.5

Intersection Summary	
HCM 6th Ctrl Delay	54.4
HCM 6th LOS	D

Notes

User approved pedestrian interval to be less than phase max green.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	70	790	130	230	910	130	230	280	230	80	270	60
Future Volume (veh/h)	70	790	130	230	910	130	230	280	230	80	270	60
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		0.99	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1781	1781	1781	1781	1781	1781	1781	1781	1781	1781	1781	1781
Adj Flow Rate, veh/h	80	908	149	264	1046	149	264	322	264	92	310	69
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Percent Heavy Veh, %	8	8	8	8	8	8	8	8	8	8	8	8
Cap, veh/h	101	1155	515	296	1543	679	331	771	339	161	596	262
Arrive On Green	0.06	0.34	0.34	0.17	0.46	0.46	0.10	0.23	0.23	0.05	0.18	0.18
Sat Flow, veh/h	1697	3385	1510	1697	3385	1490	3291	3385	1488	3291	3385	1490
Grp Volume(v), veh/h	80	908	149	264	1046	149	264	322	264	92	310	69
Grp Sat Flow(s),veh/h/ln	1697	1692	1510	1697	1692	1490	1646	1692	1488	1646	1692	1490
Q Serve(g_s), s	4.3	22.4	6.7	14.1	22.6	5.6	7.3	7.5	15.5	2.5	7.7	3.7
Cycle Q Clear(g_c), s	4.3	22.4	6.7	14.1	22.6	5.6	7.3	7.5	15.5	2.5	7.7	3.7
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	101	1155	515	296	1543	679	331	771	339	161	596	262
V/C Ratio(X)	0.79	0.79	0.29	0.89	0.68	0.22	0.80	0.42	0.78	0.57	0.52	0.26
Avail Cap(c_a), veh/h	146	1300	580	310	1628	717	354	1129	496	248	1020	449
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	43.1	27.5	22.4	37.5	19.9	15.3	40.9	30.6	33.7	43.3	34.7	33.1
Incr Delay (d2), s/veh	16.6	3.7	0.7	25.4	1.5	0.3	11.4	0.6	6.7	3.2	1.1	0.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.2	8.9	2.3	7.6	8.3	1.8	3.3	3.0	5.9	1.1	3.1	1.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	59.8	31.3	23.0	63.0	21.4	15.6	52.3	31.2	40.4	46.4	35.8	33.9
LnGrp LOS	E	C	C	E	C	B	D	C	D	D	D	C
Approach Vol, veh/h		1137			1459			850			471	
Approach Delay, s/veh		32.2			28.3			40.6			37.6	
Approach LOS		C			C			D			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	30.2	37.7	8.5	26.5	9.5	48.4	13.3	21.7
Change Period (Y+Rc), s	4.0	6.0	4.0	5.3	4.0	6.0	4.0	5.3
Max Green Setting (Gmax), s	17.0	35.7	7.0	31.0	8.0	44.7	10.0	28.0
Max Q Clear Time (g_c+I1), s	16.1	24.4	4.5	17.5	6.3	24.6	9.3	9.7
Green Ext Time (p_c), s	0.1	7.3	0.0	3.7	0.0	12.5	0.1	2.9

Intersection Summary	
HCM 6th Ctrl Delay	33.2
HCM 6th LOS	C

Intersection	
Int Delay, s/veh	36.8

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	90	1210	1130	20	40	110
Future Vol, veh/h	90	1210	1130	20	40	110
Conflicting Peds, #/hr	1	0	0	1	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	110	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	86	86	86	86	86	86
Heavy Vehicles, %	7	7	7	7	7	7
Mvmt Flow	105	1407	1314	23	47	128

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	1338	0	-	0	2241	670
Stage 1	-	-	-	-	1327	-
Stage 2	-	-	-	-	914	-
Critical Hdwy	4.24	-	-	-	6.94	7.04
Critical Hdwy Stg 1	-	-	-	-	5.94	-
Critical Hdwy Stg 2	-	-	-	-	5.94	-
Follow-up Hdwy	2.27	-	-	-	3.57	3.37
Pot Cap-1 Maneuver	486	-	-	-	~ 33	388
Stage 1	-	-	-	-	203	-
Stage 2	-	-	-	-	339	-
Platoon blocked, %			-	-		
Mov Cap-1 Maneuver	486	-	-	-	~ 26	388
Mov Cap-2 Maneuver	-	-	-	-	~ 26	-
Stage 1	-	-	-	-	159	-
Stage 2	-	-	-	-	339	-

Approach	EB	WB	SB
HCM Control Delay, s	1	0	$ 628.6
HCM LOS			F

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	486	-	-	-	82
HCM Lane V/C Ratio	0.215	-	-	-	2.127
HCM Control Delay (s)	14.4	-	-	-	$ 628.6
HCM Lane LOS	B	-	-	-	F
HCM 95th %tile Q(veh)	0.8	-	-	-	15.7

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	20	1370	70	120	1300	40	70	10	150	20	10	5
Future Volume (veh/h)	20	1370	70	120	1300	40	70	10	150	20	10	5
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		0.98	1.00		1.00	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1811	1811	1811	1811	1811	1811	1811	1811	1811	1811	1811	1811
Adj Flow Rate, veh/h	22	1539	79	135	1461	45	79	11	169	22	11	6
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Percent Heavy Veh, %	6	6	6	6	6	6	6	6	6	6	6	6
Cap, veh/h	44	2083	633	171	1686	52	105	14	216	44	125	68
Arrive On Green	0.03	0.42	0.42	0.10	0.50	0.50	0.06	0.15	0.15	0.03	0.11	0.11
Sat Flow, veh/h	1725	4944	1503	1725	3405	105	1725	95	1455	1725	1096	598
Grp Volume(v), veh/h	22	1539	79	135	737	769	79	0	180	22	0	17
Grp Sat Flow(s),veh/h/ln	1725	1648	1503	1725	1721	1790	1725	0	1549	1725	0	1694
Q Serve(g_s), s	0.8	15.9	1.9	4.6	22.9	23.1	2.7	0.0	6.8	0.8	0.0	0.5
Cycle Q Clear(g_c), s	0.8	15.9	1.9	4.6	22.9	23.1	2.7	0.0	6.8	0.8	0.0	0.5
Prop In Lane	1.00		1.00	1.00		0.06	1.00		0.94	1.00		0.35
Lane Grp Cap(c), veh/h	44	2083	633	171	852	886	105	0	231	44	0	193
V/C Ratio(X)	0.50	0.74	0.12	0.79	0.87	0.87	0.76	0.00	0.78	0.50	0.00	0.09
Avail Cap(c_a), veh/h	145	3229	981	338	1317	1369	302	0	766	142	0	681
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	29.2	14.7	10.7	26.7	13.5	13.6	28.0	0.0	24.9	29.2	0.0	24.1
Incr Delay (d2), s/veh	3.2	0.2	0.0	3.1	2.5	2.5	4.1	0.0	2.2	3.2	0.0	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.3	4.6	0.5	1.8	7.0	7.3	1.2	0.0	2.5	0.3	0.0	0.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	32.4	14.9	10.7	29.7	16.0	16.0	32.1	0.0	27.0	32.4	0.0	24.1
LnGrp LOS	C	B	B	C	B	B	C	A	C	C	A	C
Approach Vol, veh/h		1640			1641			259			39	
Approach Delay, s/veh		15.0			17.1			28.6			28.8	
Approach LOS		B			B			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	5.6	35.7	5.6	13.6	10.1	31.3	7.8	11.5
Change Period (Y+Rc), s	4.1	5.7	4.1	4.6	4.1	5.7	4.1	4.6
Max Green Setting (Gmax), s	5.1	46.4	5.0	30.0	11.9	39.6	10.6	24.4
Max Q Clear Time (g_c+I1), s	2.8	25.1	2.8	8.8	6.6	17.9	4.7	2.5
Green Ext Time (p_c), s	0.0	1.2	0.0	0.7	0.1	7.7	0.0	0.0

Intersection Summary	
HCM 6th Ctrl Delay	17.1
HCM 6th LOS	B



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑	↱	↰↰	↑↑	↱	↰		↱↱	↰	↑↑	↱↱
Traffic Volume (veh/h)	0	1470	90	100	740	60	260	0	370	50	300	460
Future Volume (veh/h)	0	1470	90	100	740	60	260	0	370	50	300	460
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		0.98	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	0	1811	1811	1811	1811	1811	1811	0	1811	1811	1811	1811
Adj Flow Rate, veh/h	0	1652	32	112	831	28	292	0	416	56	337	402
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Percent Heavy Veh, %	0	6	6	6	6	6	6	0	6	6	6	6
Cap, veh/h	0	1777	605	133	1640	716	299	0	0	72	745	585
Arrive On Green	0.00	0.40	0.40	0.04	0.48	0.48	0.17	0.00	0.00	0.04	0.22	0.22
Sat Flow, veh/h	0	4781	1516	3346	3441	1502	1725	292		1725	3441	2701
Grp Volume(v), veh/h	0	1652	32	112	831	28	292	98.8		56	337	402
Grp Sat Flow(s),veh/h/ln	0	1485	1516	1673	1721	1502	1725	F		1725	1721	1351
Q Serve(g_s), s	0.0	45.6	1.7	4.3	21.5	1.3	21.7			4.1	11.0	17.6
Cycle Q Clear(g_c), s	0.0	45.6	1.7	4.3	21.5	1.3	21.7			4.1	11.0	17.6
Prop In Lane	0.00		1.00	1.00		1.00	1.00			1.00		1.00
Lane Grp Cap(c), veh/h	0	1777	605	133	1640	716	299			72	745	585
V/C Ratio(X)	0.00	0.93	0.05	0.84	0.51	0.04	0.98			0.78	0.45	0.69
Avail Cap(c_a), veh/h	0	1789	609	133	1644	717	299			143	1310	1028
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00			1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	1.00	1.00	1.00	1.00	1.00			1.00	1.00	1.00
Uniform Delay (d), s/veh	0.0	37.0	23.8	61.4	23.2	18.0	53.0			61.1	43.8	46.4
Incr Delay (d2), s/veh	0.0	9.4	0.1	38.1	0.5	0.0	45.9			24.5	1.0	3.2
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
%ile BackOfQ(50%),veh/ln	0.0	17.2	0.6	2.5	8.4	0.4	12.9			2.3	4.7	6.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	46.4	23.8	99.5	23.7	18.0	98.8			85.6	44.8	49.6
LnGrp LOS	A	D	C	F	C	B	F			F	D	D
Approach Vol, veh/h		1684			971						795	
Approach Delay, s/veh		45.9			32.3						50.1	
Approach LOS		D			C						D	

Timer - Assigned Phs	1	2	3	4		6	7
Phs Duration (G+Y+Rc), s	10.0	57.4	27.0	34.4		67.4	10.1
Change Period (Y+Rc), s	4.9	* 6	* 4.7	6.5		6.0	* 4.7
Max Green Setting (Gmax), s	5.1	* 52	* 22	49.0		61.5	* 11
Max Q Clear Time (g_c+I1), s	6.3	47.6	23.7	19.6		23.5	6.1
Green Ext Time (p_c), s	0.0	3.8	0.0	8.2		12.3	0.1

Intersection Summary	
HCM 6th Ctrl Delay	47.4
HCM 6th LOS	D

Notes

User approved pedestrian interval to be less than phase max green.

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



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	310	790	80	360	540	20
Future Volume (veh/h)	310	790	80	360	540	20
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1811	1811	1811	1811	1811	1811
Adj Flow Rate, veh/h	348	0	90	404	607	22
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Percent Heavy Veh, %	6	6	6	6	6	6
Cap, veh/h	938		141	1594	784	360
Arrive On Green	0.27	0.00	0.08	0.46	0.23	0.23
Sat Flow, veh/h	3532	1535	1725	3532	3346	1535
Grp Volume(v), veh/h	348	0	90	404	607	22
Grp Sat Flow(s),veh/h/ln	1721	1535	1725	1721	1673	1535
Q Serve(g_s), s	3.0	0.0	1.9	2.6	6.2	0.4
Cycle Q Clear(g_c), s	3.0	0.0	1.9	2.6	6.2	0.4
Prop In Lane		1.00	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	938		141	1594	784	360
V/C Ratio(X)	0.37		0.64	0.25	0.77	0.06
Avail Cap(c_a), veh/h	1435		235	2241	1824	836
HCM Platoon Ratio	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	1.00
Uniform Delay (d), s/veh	10.8	0.0	16.3	6.0	13.1	10.9
Incr Delay (d2), s/veh	0.1	0.0	1.8	0.0	0.6	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.8	0.0	0.6	0.4	1.7	0.1
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	10.9	0.0	18.1	6.0	13.8	10.9
LnGrp LOS	B		B	A	B	B
Approach Vol, veh/h	348	A		494	629	
Approach Delay, s/veh	10.9			8.2	13.7	
Approach LOS	B			A	B	

Timer - Assigned Phs	1	2			6	8
Phs Duration (G+Y+Rc), s	7.0	16.2			23.2	13.5
Change Period (Y+Rc), s	4.0	* 6.2			6.2	4.9
Max Green Setting (Gmax), s	5.0	* 15			23.9	20.0
Max Q Clear Time (g_c+I1), s	3.9	5.0			4.6	8.2
Green Ext Time (p_c), s	0.0	0.3			0.4	0.4

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

Notes

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

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



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	5	5	30	20	60	5	370	20	40	370	5
Future Volume (veh/h)	5	5	5	30	20	60	5	370	20	40	370	5
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1693	1693	1693	1693	1693	1693	1693	1693	1693	1693	1693	1693
Adj Flow Rate, veh/h	6	6	6	34	23	68	6	420	23	45	420	6
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Percent Heavy Veh, %	14	14	14	14	14	14	14	14	14	14	14	14
Cap, veh/h	248	106	159	388	187	159	16	912	407	165	1059	15
Arrive On Green	0.11	0.11	0.11	0.11	0.11	0.11	0.01	0.28	0.28	0.05	0.33	0.33
Sat Flow, veh/h	511	961	1434	1269	1693	1434	1612	3216	1434	3127	3245	46
Grp Volume(v), veh/h	12	0	6	34	23	68	6	420	23	45	208	218
Grp Sat Flow(s),veh/h/ln	1471	0	1434	1269	1693	1434	1612	1608	1434	1564	1608	1683
Q Serve(g_s), s	0.0	0.0	0.1	0.7	0.3	1.2	0.1	3.0	0.3	0.4	2.8	2.8
Cycle Q Clear(g_c), s	0.2	0.0	0.1	0.9	0.3	1.2	0.1	3.0	0.3	0.4	2.8	2.8
Prop In Lane	0.50		1.00	1.00		1.00	1.00		1.00	1.00		0.03
Lane Grp Cap(c), veh/h	354	0	159	388	187	159	16	912	407	165	525	550
V/C Ratio(X)	0.03	0.00	0.04	0.09	0.12	0.43	0.38	0.46	0.06	0.27	0.40	0.40
Avail Cap(c_a), veh/h	1680	0	1525	1597	1800	1525	343	1072	478	554	525	550
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	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	11.2	0.0	11.2	11.6	11.3	11.7	13.9	8.3	7.4	12.8	7.3	7.3
Incr Delay (d2), s/veh	0.0	0.0	0.0	0.0	0.1	0.7	5.5	0.5	0.1	0.3	0.7	0.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	0.0	0.0	0.1	0.1	0.3	0.0	0.5	0.0	0.1	0.4	0.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	11.2	0.0	11.2	11.7	11.4	12.4	19.4	8.8	7.4	13.2	8.0	8.0
LnGrp LOS	B	A	B	B	B	B	B	A	A	B	A	A
Approach Vol, veh/h		18			125			449			471	
Approach Delay, s/veh		11.2			12.0			8.9			8.5	
Approach LOS		B			B			A			A	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	6.2	14.2		7.8	5.0	15.4		7.8
Change Period (Y+Rc), s	* 4.7	6.2		* 4.7	* 4.7	6.2		* 4.7
Max Green Setting (Gmax), s	* 5	9.4		* 30	* 6	8.4		* 30
Max Q Clear Time (g_c+I1), s	2.4	5.0		2.2	2.1	4.8		3.2
Green Ext Time (p_c), s	0.0	1.3		0.0	0.0	1.0		0.2

Intersection Summary	
HCM 6th Ctrl Delay	9.1
HCM 6th LOS	A

Notes

User approved pedestrian interval to be less than phase max green.

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



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	50	0	20	0	380	20	5	310	0
Future Volume (veh/h)	0	0	0	50	0	20	0	380	20	5	310	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		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
Work Zone On Approach					No			No			No	
Adj Sat Flow, veh/h/ln				1722	1811	1722	0	1722	1722	1722	1722	0
Adj Flow Rate, veh/h				61	0	24	0	463	24	6	378	0
Peak Hour Factor				0.82	0.92	0.82	0.92	0.82	0.82	0.82	0.82	0.92
Percent Heavy Veh, %				12	6	12	0	12	12	12	12	0
Cap, veh/h				124	0	49	0	1121	58	16	1714	0
Arrive On Green				0.10	0.00	0.10	0.00	0.35	0.35	0.01	0.52	0.00
Sat Flow, veh/h				1196	0	471	0	3247	163	1640	3358	0
Grp Volume(v), veh/h				85	0	0	0	239	248	6	378	0
Grp Sat Flow(s),veh/h/ln				1667	0	0	0	1636	1689	1640	1636	0
Q Serve(g_s), s				1.4	0.0	0.0	0.0	3.1	3.1	0.1	1.8	0.0
Cycle Q Clear(g_c), s				1.4	0.0	0.0	0.0	3.1	3.1	0.1	1.8	0.0
Prop In Lane				0.72		0.28	0.00		0.10	1.00		0.00
Lane Grp Cap(c), veh/h				172	0	0	0	580	599	16	1714	0
V/C Ratio(X)				0.49	0.00	0.00	0.00	0.41	0.41	0.37	0.22	0.00
Avail Cap(c_a), veh/h				1479	0	0	0	1103	1139	349	3425	0
HCM Platoon Ratio				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)				1.00	0.00	0.00	0.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh				11.9	0.0	0.0	0.0	6.9	6.9	13.9	3.6	0.0
Incr Delay (d2), s/veh				2.2	0.0	0.0	0.0	1.0	1.0	13.8	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				0.5	0.0	0.0	0.0	0.6	0.6	0.1	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh				14.1	0.0	0.0	0.0	7.9	7.9	27.7	3.7	0.0
LnGrp LOS				B	A	A	A	A	A	C	A	A
Approach Vol, veh/h					85			487			384	
Approach Delay, s/veh					14.1			7.9			4.1	
Approach LOS					B			A			A	

Timer - Assigned Phs	1	2		4		6
Phs Duration (G+Y+Rc), s	4.8	16.0		7.4		20.8
Change Period (Y+Rc), s	4.5	6.0		4.5		6.0
Max Green Setting (Gmax), s	6.3	19.0		25.0		29.5
Max Q Clear Time (g_c+I1), s	2.1	5.1		3.4		3.8
Green Ext Time (p_c), s	0.0	4.0		0.4		4.1

Intersection Summary	
HCM 6th Ctrl Delay	6.9
HCM 6th LOS	A

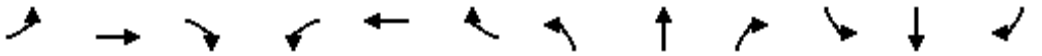
Intersection	
Int Delay, s/veh	1.3

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	10	5	5	70	40	10
Future Vol, veh/h	10	5	5	70	40	10
Conflicting Peds, #/hr	0	0	1	0	0	1
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	89	89	89	89	89	89
Heavy Vehicles, %	9	9	9	9	9	9
Mvmt Flow	11	6	6	79	45	11

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	143	52	57	0	-	0
Stage 1	52	-	-	-	-	-
Stage 2	91	-	-	-	-	-
Critical Hdwy	6.49	6.29	4.19	-	-	-
Critical Hdwy Stg 1	5.49	-	-	-	-	-
Critical Hdwy Stg 2	5.49	-	-	-	-	-
Follow-up Hdwy	3.581	3.381	2.281	-	-	-
Pot Cap-1 Maneuver	833	996	1504	-	-	-
Stage 1	953	-	-	-	-	-
Stage 2	915	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	828	995	1503	-	-	-
Mov Cap-2 Maneuver	828	-	-	-	-	-
Stage 1	948	-	-	-	-	-
Stage 2	914	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	9.2	0.5	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1503	-	877	-	-
HCM Lane V/C Ratio	0.004	-	0.019	-	-
HCM Control Delay (s)	7.4	0	9.2	-	-
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)	120	140	20	20	340	30	20	5	20	70	40	70
Future Volume (veh/h)	120	140	20	20	340	30	20	5	20	70	40	70
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1663	1663	1663	1663	1663	1663	1663	1663	1663	1663	1663	1663
Adj Flow Rate, veh/h	133	156	22	22	378	33	22	6	22	78	44	78
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	16	16	16	16	16	16	16	16	16	16	16	16
Cap, veh/h	170	346	49	74	644	56	39	11	39	121	68	165
Arrive On Green	0.11	0.24	0.24	0.05	0.22	0.22	0.06	0.06	0.06	0.12	0.12	0.12
Sat Flow, veh/h	1584	1426	201	1584	2941	255	664	181	664	1030	581	1409
Grp Volume(v), veh/h	133	0	178	22	202	209	50	0	0	122	0	78
Grp Sat Flow(s),veh/h/ln	1584	0	1627	1584	1580	1617	1510	0	0	1611	0	1409
Q Serve(g_s), s	4.5	0.0	5.1	0.7	6.3	6.4	1.8	0.0	0.0	4.0	0.0	2.8
Cycle Q Clear(g_c), s	4.5	0.0	5.1	0.7	6.3	6.4	1.8	0.0	0.0	4.0	0.0	2.8
Prop In Lane	1.00		0.12	1.00		0.16	0.44		0.44	0.64		1.00
Lane Grp Cap(c), veh/h	170	0	395	74	346	354	88	0	0	189	0	165
V/C Ratio(X)	0.78	0.00	0.45	0.30	0.58	0.59	0.57	0.00	0.00	0.64	0.00	0.47
Avail Cap(c_a), veh/h	751	0	893	867	1210	1239	441	0	0	823	0	720
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	1.00	1.00	1.00	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	23.8	0.0	17.6	25.3	19.2	19.2	25.1	0.0	0.0	23.1	0.0	22.6
Incr Delay (d2), s/veh	7.6	0.0	1.2	2.2	2.4	2.4	5.6	0.0	0.0	3.6	0.0	2.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.7	0.0	1.6	0.3	2.1	2.1	0.7	0.0	0.0	1.5	0.0	0.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	31.5	0.0	18.9	27.5	21.6	21.6	30.8	0.0	0.0	26.7	0.0	24.7
LnGrp LOS	C	A	B	C	C	C	C	A	A	C	A	C
Approach Vol, veh/h		311			433			50			200	
Approach Delay, s/veh		24.3			21.9			30.8			25.9	
Approach LOS		C			C			C			C	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	10.1	20.3		16.3	11.4	19.0		8.1				
Change Period (Y+Rc), s	7.5	* 7		* 9.9	5.5	7.0		4.9				
Max Green Setting (Gmax), s	30.0	* 30		* 28	26.0	42.0		16.0				
Max Q Clear Time (g_c+I1), s	2.7	7.1		6.0	6.5	8.4		3.8				
Green Ext Time (p_c), s	0.0	1.2		0.8	0.3	3.5		0.1				

Intersection Summary			
HCM 6th Ctrl Delay		23.9	
HCM 6th LOS		C	

Notes

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



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	90	120	20	5	200	160	20	30	5	30	0	170
Future Volume (veh/h)	90	120	20	5	200	160	20	30	5	30	0	170
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1663	1663	1663	1663	1663	1663	1663	1663	1663	1663	1663	1663
Adj Flow Rate, veh/h	100	133	22	6	222	178	22	33	6	33	0	189
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	16	16	16	16	16	16	16	16	16	16	16	16
Cap, veh/h	123	499	83	17	250	200	41	61	11	252	0	225
Arrive On Green	0.08	0.36	0.36	0.01	0.29	0.29	0.07	0.07	0.07	0.16	0.00	0.16
Sat Flow, veh/h	1584	1391	230	1584	854	685	579	869	158	1584	0	1409
Grp Volume(v), veh/h	100	0	155	6	0	400	61	0	0	33	0	189
Grp Sat Flow(s),veh/h/ln	1584	0	1621	1584	0	1540	1606	0	0	1584	0	1409
Q Serve(g_s), s	4.2	0.0	4.6	0.3	0.0	16.8	2.5	0.0	0.0	1.2	0.0	8.8
Cycle Q Clear(g_c), s	4.2	0.0	4.6	0.3	0.0	16.8	2.5	0.0	0.0	1.2	0.0	8.8
Prop In Lane	1.00		0.14	1.00		0.44	0.36		0.10	1.00		1.00
Lane Grp Cap(c), veh/h	123	0	582	17	0	450	113	0	0	252	0	225
V/C Ratio(X)	0.81	0.00	0.27	0.34	0.00	0.89	0.54	0.00	0.00	0.13	0.00	0.84
Avail Cap(c_a), veh/h	610	0	769	634	0	844	642	0	0	610	0	543
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	30.6	0.0	15.3	33.1	0.0	22.9	30.3	0.0	0.0	24.4	0.0	27.5
Incr Delay (d2), s/veh	4.7	0.0	0.1	4.2	0.0	2.5	1.5	0.0	0.0	0.1	0.0	3.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.6	0.0	1.4	0.1	0.0	5.9	0.9	0.0	0.0	0.4	0.0	2.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	35.3	0.0	15.4	37.4	0.0	25.3	31.8	0.0	0.0	24.4	0.0	30.8
LnGrp LOS	D	A	B	D	A	C	C	A	A	C	A	C
Approach Vol, veh/h		255			406			61			222	
Approach Delay, s/veh		23.2			25.5			31.8			29.9	
Approach LOS		C			C			C			C	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	7.0	31.2		18.7	11.6	26.7		10.6				
Change Period (Y+Rc), s	* 6.3	* 7		7.9	* 6.3	7.0		5.8				
Max Green Setting (Gmax), s	* 27	* 32		26.0	* 26	37.0		27.0				
Max Q Clear Time (g_c+I1), s	2.3	6.6		10.8	6.2	18.8		4.5				
Green Ext Time (p_c), s	0.0	0.1		0.1	0.0	0.9		0.1				

Intersection Summary	
HCM 6th Ctrl Delay	26.3
HCM 6th LOS	C

Notes

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



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	480	210	70	330	170	110
Future Volume (veh/h)	480	210	70	330	170	110
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1811	1811	1811	1811	1811	1811
Adj Flow Rate, veh/h	511	223	74	351	181	117
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	6	6	6	6	6	6
Cap, veh/h	791	670	106	1097	307	273
Arrive On Green	0.44	0.44	0.06	0.61	0.18	0.18
Sat Flow, veh/h	1811	1535	1725	1811	1725	1535
Grp Volume(v), veh/h	511	223	74	351	181	117
Grp Sat Flow(s),veh/h/ln	1811	1535	1725	1811	1725	1535
Q Serve(g_s), s	12.3	5.3	2.3	5.3	5.4	3.8
Cycle Q Clear(g_c), s	12.3	5.3	2.3	5.3	5.4	3.8
Prop In Lane		1.00	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	791	670	106	1097	307	273
V/C Ratio(X)	0.65	0.33	0.70	0.32	0.59	0.43
Avail Cap(c_a), veh/h	1304	1105	621	1304	621	552
HCM Platoon Ratio	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
Uniform Delay (d), s/veh	12.3	10.3	25.6	5.4	21.0	20.3
Incr Delay (d2), s/veh	3.2	1.0	8.1	0.6	6.4	3.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.0	1.4	1.0	1.1	2.3	1.4
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	15.5	11.4	33.7	6.0	27.4	24.1
LnGrp LOS	B	B	C	A	C	C
Approach Vol, veh/h	734			425	298	
Approach Delay, s/veh	14.2			10.8	26.1	
Approach LOS	B			B	C	

Timer - Assigned Phs	1	2		4		6
Phs Duration (G+Y+Rc), s	9.4	30.3		15.9		39.7
Change Period (Y+Rc), s	6.0	6.0		6.0		6.0
Max Green Setting (Gmax), s	20.0	40.0		20.0		40.0
Max Q Clear Time (g_c+I1), s	4.3	14.3		7.4		7.3
Green Ext Time (p_c), s	0.1	10.0		2.1		5.1

Intersection Summary	
HCM 6th Ctrl Delay	15.7
HCM 6th LOS	B



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	60	60	160	10	40	5	50	240	10	10	310	5
Future Volume (veh/h)	60	60	160	10	40	5	50	240	10	10	310	5
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1841	1811	1841	1811	1811	1811	1841	1841	1811	1811	1841	1841
Adj Flow Rate, veh/h	70	65	186	11	43	5	58	279	11	11	360	6
Peak Hour Factor	0.86	0.92	0.86	0.92	0.92	0.92	0.86	0.86	0.92	0.92	0.86	0.86
Percent Heavy Veh, %	4	6	4	6	6	6	4	4	6	6	4	4
Cap, veh/h	208	775	351	25	417	186	103	571	476	25	489	409
Arrive On Green	0.12	0.23	0.23	0.01	0.12	0.12	0.06	0.31	0.31	0.01	0.27	0.27
Sat Flow, veh/h	1753	3441	1560	1725	3441	1535	1753	1841	1535	1725	1841	1540
Grp Volume(v), veh/h	70	65	186	11	43	5	58	279	11	11	360	6
Grp Sat Flow(s),veh/h/ln	1753	1721	1560	1725	1721	1535	1753	1841	1535	1725	1841	1540
Q Serve(g_s), s	1.5	0.6	4.3	0.3	0.5	0.1	1.3	5.1	0.2	0.3	7.4	0.1
Cycle Q Clear(g_c), s	1.5	0.6	4.3	0.3	0.5	0.1	1.3	5.1	0.2	0.3	7.4	0.1
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	208	775	351	25	417	186	103	571	476	25	489	409
V/C Ratio(X)	0.34	0.08	0.53	0.44	0.10	0.03	0.56	0.49	0.02	0.44	0.74	0.01
Avail Cap(c_a), veh/h	764	2125	963	209	2125	948	212	802	669	209	1137	951
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	16.7	12.6	14.1	20.2	16.1	16.0	18.9	11.6	9.9	20.2	13.8	11.2
Incr Delay (d2), s/veh	1.0	0.0	1.2	12.0	0.1	0.1	4.7	0.6	0.0	12.0	2.2	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.5	0.2	1.1	0.2	0.2	0.0	0.5	1.4	0.0	0.2	2.3	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	17.7	12.7	15.3	32.2	16.3	16.1	23.6	12.2	9.9	32.2	16.0	11.2
LnGrp LOS	B	B	B	C	B	B	C	B	A	C	B	B
Approach Vol, veh/h		321			59			348			377	
Approach Delay, s/veh		15.3			19.2			14.1			16.4	
Approach LOS		B			B			B			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	5.1	13.8	6.9	15.5	9.4	9.5	5.1	17.3
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	5.0	25.5	5.0	25.5	18.0	25.5	5.0	18.0
Max Q Clear Time (g_c+I1), s	2.3	6.3	3.3	9.4	3.5	2.5	2.3	7.1
Green Ext Time (p_c), s	0.0	0.9	0.0	1.6	0.1	0.2	0.0	1.0

Intersection Summary	
HCM 6th Ctrl Delay	15.5
HCM 6th LOS	B

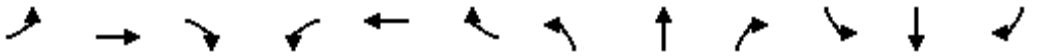
Intersection	
Int Delay, s/veh	1.8

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	20	60	80	310	450	40
Future Vol, veh/h	20	60	80	310	450	40
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	100	140	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	3	3	3	3	3	3
Mvmt Flow	22	67	90	348	506	45

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	883	276	551	0	-	0
Stage 1	529	-	-	-	-	-
Stage 2	354	-	-	-	-	-
Critical Hdwy	6.86	6.96	4.16	-	-	-
Critical Hdwy Stg 1	5.86	-	-	-	-	-
Critical Hdwy Stg 2	5.86	-	-	-	-	-
Follow-up Hdwy	3.53	3.33	2.23	-	-	-
Pot Cap-1 Maneuver	283	718	1008	-	-	-
Stage 1	553	-	-	-	-	-
Stage 2	678	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	258	718	1008	-	-	-
Mov Cap-2 Maneuver	258	-	-	-	-	-
Stage 1	504	-	-	-	-	-
Stage 2	678	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	13	1.8	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	1008	-	258	718	-	-
HCM Lane V/C Ratio	0.089	-	0.087	0.094	-	-
HCM Control Delay (s)	8.9	-	20.3	10.5	-	-
HCM Lane LOS	A	-	C	B	-	-
HCM 95th %tile Q(veh)	0.3	-	0.3	0.3	-	-



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	30	5	140	50	5	20	150	350	70	20	450	50
Future Volume (veh/h)	30	5	140	50	5	20	150	350	70	20	450	50
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		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	32	5	151	54	5	22	161	376	75	22	484	54
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, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	78	8	235	116	52	231	216	1067	210	57	877	97
Arrive On Green	0.04	0.15	0.15	0.06	0.17	0.17	0.12	0.36	0.36	0.03	0.27	0.27
Sat Flow, veh/h	1781	51	1539	1781	302	1329	1781	2947	581	1781	3216	357
Grp Volume(v), veh/h	32	0	156	54	0	27	161	225	226	22	266	272
Grp Sat Flow(s),veh/h/ln	1781	0	1590	1781	0	1631	1781	1777	1751	1781	1777	1797
Q Serve(g_s), s	0.8	0.0	4.2	1.3	0.0	0.6	4.0	4.3	4.4	0.6	5.9	6.0
Cycle Q Clear(g_c), s	0.8	0.0	4.2	1.3	0.0	0.6	4.0	4.3	4.4	0.6	5.9	6.0
Prop In Lane	1.00		0.97	1.00		0.81	1.00		0.33	1.00		0.20
Lane Grp Cap(c), veh/h	78	0	242	116	0	283	216	643	634	57	485	490
V/C Ratio(X)	0.41	0.00	0.64	0.47	0.00	0.10	0.75	0.35	0.36	0.39	0.55	0.55
Avail Cap(c_a), veh/h	812	0	794	812	0	815	1006	1543	1521	1006	1539	1557
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	1.00	1.00
Uniform Delay (d), s/veh	21.4	0.0	18.3	20.8	0.0	16.0	19.6	10.7	10.8	21.8	14.3	14.3
Incr Delay (d2), s/veh	3.4	0.0	2.9	2.9	0.0	0.1	5.1	0.5	0.5	4.2	1.4	1.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	0.0	1.6	0.6	0.0	0.2	1.7	1.3	1.3	0.3	2.0	2.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	24.9	0.0	21.2	23.7	0.0	16.1	24.6	11.2	11.2	26.1	15.7	15.7
LnGrp LOS	C	A	C	C	A	B	C	B	B	C	B	B
Approach Vol, veh/h		188			81			612			560	
Approach Delay, s/veh		21.8			21.2			14.7			16.1	
Approach LOS		C			C			B			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	5.5	22.0	7.0	11.6	9.6	17.9	6.0	12.6
Change Period (Y+Rc), s	4.0	5.3	4.0	4.6	4.0	5.3	4.0	4.6
Max Green Setting (Gmax), s	26.0	40.0	21.0	23.0	26.0	39.9	21.0	23.0
Max Q Clear Time (g_c+I1), s	2.6	6.4	3.3	6.2	6.0	8.0	2.8	2.6
Green Ext Time (p_c), s	0.0	3.8	0.1	0.8	0.4	4.6	0.0	0.1

Intersection Summary	
HCM 6th Ctrl Delay	16.6
HCM 6th LOS	B

Notes

User approved pedestrian interval to be less than phase max green.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	180	1120	150	310	1010	240	140	330	290	290	360	90
Future Volume (veh/h)	180	1120	150	310	1010	240	140	330	290	290	360	90
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		0.99	1.00		0.99	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856
Adj Flow Rate, veh/h	189	1179	158	326	1063	253	147	347	305	305	379	95
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	202	1184	521	316	1128	267	172	330	285	303	726	180
Arrive On Green	0.11	0.34	0.34	0.18	0.40	0.40	0.10	0.19	0.19	0.17	0.26	0.26
Sat Flow, veh/h	1767	3526	1553	1767	2820	668	1767	1779	1536	1767	2791	691
Grp Volume(v), veh/h	189	1179	158	326	662	654	147	344	308	305	238	236
Grp Sat Flow(s),veh/h/ln	1767	1763	1553	1767	1763	1725	1767	1763	1553	1767	1763	1720
Q Serve(g_s), s	14.9	46.7	10.5	25.0	50.5	51.3	11.5	26.0	26.0	24.0	16.1	16.5
Cycle Q Clear(g_c), s	14.9	46.7	10.5	25.0	50.5	51.3	11.5	26.0	26.0	24.0	16.1	16.5
Prop In Lane	1.00		1.00	1.00		0.39	1.00		0.99	1.00		0.40
Lane Grp Cap(c), veh/h	202	1184	521	316	705	690	172	327	288	303	458	447
V/C Ratio(X)	0.94	1.00	0.30	1.03	0.94	0.95	0.86	1.05	1.07	1.01	0.52	0.53
Avail Cap(c_a), veh/h	202	1184	521	316	705	690	252	327	288	303	458	447
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	61.5	46.4	34.4	57.5	40.4	40.6	62.2	57.0	57.0	58.0	44.3	44.4
Incr Delay (d2), s/veh	45.4	25.2	0.5	59.5	20.6	22.4	17.0	63.5	72.5	53.4	1.4	1.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	9.1	23.8	4.0	16.1	25.0	25.1	5.9	17.1	15.8	15.0	7.1	7.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	106.9	71.6	34.9	117.0	60.9	63.0	79.3	120.5	129.5	111.4	45.7	46.0
LnGrp LOS	F	E	C	F	E	E	E	F	F	F	D	D
Approach Vol, veh/h		1526			1642			799			779	
Approach Delay, s/veh		72.2			72.9			116.4			71.5	
Approach LOS		E			E			F			E	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	39.0	52.0	17.6	41.4	20.0	61.0	28.0	31.0
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	35.0	47.0	20.0	30.0	16.0	56.0	24.0	26.0
Max Q Clear Time (g_c+I1), s	27.0	48.7	13.5	18.5	16.9	53.3	26.0	28.0
Green Ext Time (p_c), s	0.0	0.0	0.2	2.7	0.0	2.2	0.0	0.0

Intersection Summary	
HCM 6th Ctrl Delay	79.7
HCM 6th LOS	E



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	190	110	370	140	0	0	0	0	390	0	40
Future Volume (veh/h)	0	190	110	370	140	0	0	0	0	390	0	40
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00				1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Work Zone On Approach		No			No						No	
Adj Sat Flow, veh/h/ln	0	1530	1530	1530	1530	0				1530	1530	1530
Adj Flow Rate, veh/h	0	202	117	394	149	0				455	0	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, %	0	25	25	25	25	0				25	25	25
Cap, veh/h	0	389	216	441	1759	0				571	300	0
Arrive On Green	0.00	0.22	0.22	0.30	0.61	0.00				0.20	0.00	0.00
Sat Flow, veh/h	0	1879	1000	1457	2983	0				2913	1530	0
Grp Volume(v), veh/h	0	161	158	394	149	0				455	0	0
Grp Sat Flow(s),veh/h/ln	0	1453	1350	1457	1453	0				1457	1530	0
Q Serve(g_s), s	0.0	4.5	4.8	12.0	1.0	0.0				6.9	0.0	0.0
Cycle Q Clear(g_c), s	0.0	4.5	4.8	12.0	1.0	0.0				6.9	0.0	0.0
Prop In Lane	0.00		0.74	1.00		0.00				1.00		0.00
Lane Grp Cap(c), veh/h	0	314	292	441	1759	0				571	300	0
V/C Ratio(X)	0.00	0.51	0.54	0.89	0.08	0.00				0.80	0.00	0.00
Avail Cap(c_a), veh/h	0	358	332	661	2285	0				906	476	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	1.00	1.00	1.00	0.00				1.00	0.00	0.00
Uniform Delay (d), s/veh	0.0	16.0	16.1	15.4	3.8	0.0				17.7	0.0	0.0
Incr Delay (d2), s/veh	0.0	1.3	1.6	7.6	0.0	0.0				1.0	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	1.3	1.3	4.0	0.1	0.0				1.9	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	17.3	17.7	23.0	3.8	0.0				18.7	0.0	0.0
LnGrp LOS	A	B	B	C	A	A				B	A	A
Approach Vol, veh/h		319			543						455	
Approach Delay, s/veh		17.5			17.8						18.7	
Approach LOS		B			B						B	

Timer - Assigned Phs	1	2		4		6
Phs Duration (G+Y+Rc), s	18.0	14.6		13.7		32.6
Change Period (Y+Rc), s	4.0	4.6		4.6		4.6
Max Green Setting (Gmax), s	21.0	11.4		14.4		36.4
Max Q Clear Time (g_c+I1), s	14.0	6.8		8.9		3.0
Green Ext Time (p_c), s	0.1	0.7		0.2		0.9

Intersection Summary	
HCM 6th Ctrl Delay	18.0
HCM 6th LOS	B

Notes

User approved volume balancing among the lanes for turning movement.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	50	530	0	0	430	290	80	0	230	0	0	0
Future Volume (veh/h)	50	530	0	0	430	290	80	0	230	0	0	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Work Zone On Approach		No			No			No				
Adj Sat Flow, veh/h/ln	1530	1530	0	0	1530	1530	1530	1530	1530			
Adj Flow Rate, veh/h	53	564	0	0	457	0	85	0	245			
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94			
Percent Heavy Veh, %	25	25	0	0	25	25	25	25	25			
Cap, veh/h	82	1586	0	0	591		316	0	281			
Arrive On Green	0.06	0.55	0.00	0.00	0.39	0.00	0.22	0.00	0.22			
Sat Flow, veh/h	1457	2983	0	0	1530	0	1457	0	1296			
Grp Volume(v), veh/h	53	564	0	0	457	0	85	0	245			
Grp Sat Flow(s),veh/h/ln	1457	1453	0	0	1530	0	1457	0	1296			
Q Serve(g_s), s	1.4	4.2	0.0	0.0	10.1	0.0	1.9	0.0	7.1			
Cycle Q Clear(g_c), s	1.4	4.2	0.0	0.0	10.1	0.0	1.9	0.0	7.1			
Prop In Lane	1.00		0.00	0.00		0.00	1.00		1.00			
Lane Grp Cap(c), veh/h	82	1586	0	0	591		316	0	281			
V/C Ratio(X)	0.65	0.36	0.00	0.00	0.77		0.27	0.00	0.87			
Avail Cap(c_a), veh/h	188	3554	0	0	1520		316	0	281			
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	1.00	1.00	0.00	0.00	1.00	0.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	17.9	5.0	0.0	0.0	10.4	0.0	12.6	0.0	14.7			
Incr Delay (d2), s/veh	3.2	0.1	0.0	0.0	2.2	0.0	0.2	0.0	23.7			
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	0.4	0.6	0.0	0.0	2.5	0.0	0.5	0.0	3.3			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	21.1	5.1	0.0	0.0	12.6	0.0	12.8	0.0	38.3			
LnGrp LOS	C	A	A	A	B		B	A	D			
Approach Vol, veh/h		617			457	A		330				
Approach Delay, s/veh		6.5			12.6			31.7				
Approach LOS		A			B			C				

Timer - Assigned Phs		2			5	6		8				
Phs Duration (G+Y+Rc), s		25.8			6.2	19.6		13.0				
Change Period (Y+Rc), s		4.6			4.0	* 4.6		4.6				
Max Green Setting (Gmax), s		47.4			5.0	* 39		8.4				
Max Q Clear Time (g_c+I1), s		6.2			3.4	12.1		9.1				
Green Ext Time (p_c), s		4.1			0.0	2.8		0.0				

Intersection Summary												
HCM 6th Ctrl Delay			14.4									
HCM 6th LOS			B									

Notes

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

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



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	120	410	140	10	150	10	80	550	10	10	430	190
Future Volume (veh/h)	120	410	140	10	150	10	80	550	10	10	430	190
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1678	1811	1678	1811	1811	1811	1678	1678	1811	1811	1678	1678
Adj Flow Rate, veh/h	140	446	163	11	163	11	93	640	11	11	500	221
Peak Hour Factor	0.86	0.92	0.86	0.92	0.92	0.92	0.86	0.86	0.92	0.92	0.86	0.86
Percent Heavy Veh, %	15	6	15	6	6	6	15	15	6	6	15	15
Cap, veh/h	180	891	368	24	228	15	105	1182	20	24	1011	451
Arrive On Green	0.11	0.26	0.26	0.01	0.14	0.14	0.07	0.37	0.37	0.01	0.32	0.32
Sat Flow, veh/h	1598	3441	1422	1725	1677	113	1598	3207	55	1725	3188	1422
Grp Volume(v), veh/h	140	446	163	11	0	174	93	318	333	11	500	221
Grp Sat Flow(s),veh/h/ln	1598	1721	1422	1725	0	1791	1598	1594	1668	1725	1594	1422
Q Serve(g_s), s	5.2	6.7	5.9	0.4	0.0	5.7	3.5	9.6	9.6	0.4	7.7	7.7
Cycle Q Clear(g_c), s	5.2	6.7	5.9	0.4	0.0	5.7	3.5	9.6	9.6	0.4	7.7	7.7
Prop In Lane	1.00		1.00	1.00		0.06	1.00		0.03	1.00		1.00
Lane Grp Cap(c), veh/h	180	891	368	24	0	243	105	588	615	24	1011	451
V/C Ratio(X)	0.78	0.50	0.44	0.46	0.00	0.72	0.89	0.54	0.54	0.46	0.49	0.49
Avail Cap(c_a), veh/h	838	2539	1049	141	0	529	105	889	930	141	1829	816
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	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	26.3	19.2	18.9	29.8	0.0	25.2	28.3	15.2	15.2	29.8	16.9	16.8
Incr Delay (d2), s/veh	7.1	0.4	0.8	13.0	0.0	3.9	54.9	2.8	2.7	13.0	1.4	3.0
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	2.2	2.5	1.9	0.2	0.0	2.5	2.8	3.1	3.2	0.2	2.4	2.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	33.4	19.7	19.7	42.8	0.0	29.1	83.1	18.0	17.9	42.8	18.2	19.8
LnGrp LOS	C	B	B	D	A	C	F	B	B	D	B	B
Approach Vol, veh/h		749			185			744			732	
Approach Delay, s/veh		22.3			29.9			26.1			19.1	
Approach LOS		C			C			C			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.5	25.3	5.4	21.8	5.4	28.5	12.9	14.3
Change Period (Y+Rc), s	4.5	6.0	4.5	6.0	4.5	6.0	6.0	* 6
Max Green Setting (Gmax), s	4.0	35.0	5.0	45.0	5.0	34.0	32.0	* 18
Max Q Clear Time (g_c+I1), s	5.5	9.7	2.4	8.7	2.4	11.6	7.2	7.7
Green Ext Time (p_c), s	0.0	9.6	0.0	3.9	0.0	8.4	0.4	0.6

Intersection Summary	
HCM 6th Ctrl Delay	23.1
HCM 6th LOS	C

Notes

User approved pedestrian interval to be less than phase max green.

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



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	1670	380	230	1650	0	0	0	0	370	0	610
Future Volume (veh/h)	0	1670	380	230	1650	0	0	0	0	370	0	610
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		1.00				1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Work Zone On Approach		No			No						No	
Adj Sat Flow, veh/h/ln	0	1841	1841	1841	1841	0				1841	1841	1841
Adj Flow Rate, veh/h	0	1856	245	256	1833	0				411	0	604
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90				0.90	0.90	0.90
Percent Heavy Veh, %	0	4	4	4	4	0				4	4	4
Cap, veh/h	0	2117	635	285	2248	0				776	0	691
Arrive On Green	0.00	0.42	0.42	0.16	0.64	0.00				0.22	0.00	0.22
Sat Flow, veh/h	0	5191	1506	1753	3589	0				3506	0	3120
Grp Volume(v), veh/h	0	1856	245	256	1833	0				411	0	604
Grp Sat Flow(s),veh/h/ln	0	1675	1506	1753	1749	0				1753	0	1560
Q Serve(g_s), s	0.0	23.0	7.6	9.7	26.6	0.0				7.0	0.0	12.7
Cycle Q Clear(g_c), s	0.0	23.0	7.6	9.7	26.6	0.0				7.0	0.0	12.7
Prop In Lane	0.00		1.00	1.00		0.00				1.00		1.00
Lane Grp Cap(c), veh/h	0	2117	635	285	2248	0				776	0	691
V/C Ratio(X)	0.00	0.88	0.39	0.90	0.82	0.00				0.53	0.00	0.87
Avail Cap(c_a), veh/h	0	2166	649	285	2282	0				859	0	765
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	1.00	1.00	1.00	0.00				1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	18.0	13.5	27.8	9.1	0.0				23.3	0.0	25.5
Incr Delay (d2), s/veh	0.0	4.3	0.3	28.3	2.3	0.0				0.2	0.0	9.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	8.0	2.2	5.9	6.8	0.0				2.6	0.0	5.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	22.3	13.9	56.1	11.4	0.0				23.5	0.0	35.0
LnGrp LOS	A	C	B	E	B	A				C	A	D
Approach Vol, veh/h		2101			2089						1015	
Approach Delay, s/veh		21.3			16.9						30.3	
Approach LOS		C			B						C	

Timer - Assigned Phs	1	2		4		6
Phs Duration (G+Y+Rc), s	15.0	33.1		19.6		48.1
Change Period (Y+Rc), s	4.0	4.6		4.6		4.6
Max Green Setting (Gmax), s	11.0	29.2		16.6		44.2
Max Q Clear Time (g_c+I1), s	11.7	25.0		14.7		28.6
Green Ext Time (p_c), s	0.0	3.6		0.3		10.6

Intersection Summary	
HCM 6th Ctrl Delay	21.3
HCM 6th LOS	C

Notes

User approved volume balancing among the lanes for turning movement.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	500	1540	0	0	1350	260	530	0	420	0	0	0
Future Volume (veh/h)	500	1540	0	0	1350	260	530	0	420	0	0	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.94	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Work Zone On Approach		No			No			No				
Adj Sat Flow, veh/h/ln	1841	1841	0	0	1841	1841	1841	1841	1841			
Adj Flow Rate, veh/h	556	1711	0	0	1500	227	589	0	398			
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90			
Percent Heavy Veh, %	4	4	0	0	4	4	4	4	4			
Cap, veh/h	605	2424	0	0	1624	684	667	0	593			
Arrive On Green	0.18	0.69	0.00	0.00	0.46	0.46	0.19	0.00	0.19			
Sat Flow, veh/h	3401	3589	0	0	3589	1472	3506	0	3120			
Grp Volume(v), veh/h	556	1711	0	0	1500	227	589	0	398			
Grp Sat Flow(s),veh/h/ln	1700	1749	0	0	1749	1472	1753	0	1560			
Q Serve(g_s), s	12.7	23.2	0.0	0.0	31.7	7.7	12.9	0.0	9.3			
Cycle Q Clear(g_c), s	12.7	23.2	0.0	0.0	31.7	7.7	12.9	0.0	9.3			
Prop In Lane	1.00		0.00	0.00		1.00	1.00		1.00			
Lane Grp Cap(c), veh/h	605	2424	0	0	1624	684	667	0	593			
V/C Ratio(X)	0.92	0.71	0.00	0.00	0.92	0.33	0.88	0.00	0.67			
Avail Cap(c_a), veh/h	605	2460	0	0	1661	699	686	0	610			
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	1.00	1.00	0.00	0.00	1.00	1.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	31.8	7.3	0.0	0.0	19.8	13.4	31.0	0.0	29.6			
Incr Delay (d2), s/veh	19.0	0.9	0.0	0.0	9.0	0.3	12.3	0.0	2.2			
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	6.4	5.6	0.0	0.0	12.7	2.2	6.1	0.0	3.4			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	50.9	8.2	0.0	0.0	28.7	13.6	43.3	0.0	31.8			
LnGrp LOS	D	A	A	A	C	B	D	A	C			
Approach Vol, veh/h		2267			1727			987				
Approach Delay, s/veh		18.6			26.7			38.7				
Approach LOS		B			C			D				
Timer - Assigned Phs		2			5	6		8				
Phs Duration (G+Y+Rc), s		59.2			18.0	41.2		19.6				
Change Period (Y+Rc), s		4.6			4.0	4.6		4.6				
Max Green Setting (Gmax), s		55.4			14.0	37.4		15.4				
Max Q Clear Time (g_c+I1), s		25.2			14.7	33.7		14.9				
Green Ext Time (p_c), s		14.8			0.0	2.9		0.1				

Intersection Summary	
HCM 6th Ctrl Delay	25.4
HCM 6th LOS	C

Notes

User approved volume balancing among the lanes for turning movement.

Intersection	
Int Delay, s/veh	0.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	1700	260	0	1540	0	0	0	40	0	0	70
Future Vol, veh/h	0	1700	260	0	1540	0	0	0	40	0	0	70
Conflicting Peds, #/hr	0	0	2	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	0	-	-	0
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	4	4	4	4	4	4	4	4	4	4	4	4
Mvmt Flow	0	1889	289	0	1711	0	0	0	44	0	0	78

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	-	0	0	-	-	0	-	-	1091	-	-	856
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	-	-	-	6.98	-	-	6.98
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	-	-	-	3.34	-	-	3.34
Pot Cap-1 Maneuver	0	-	-	0	-	0	0	0	207	0	0	297
Stage 1	0	-	-	0	-	0	0	0	-	0	0	-
Stage 2	0	-	-	0	-	0	0	0	-	0	0	-
Platoon blocked, %		-	-		-							
Mov Cap-1 Maneuver	-	-	-	-	-	-	-	-	207	-	-	297
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0	27.1	21.4
HCM LOS			D	C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBT	SBLn1
Capacity (veh/h)	207	-	-	-	297
HCM Lane V/C Ratio	0.215	-	-	-	0.262
HCM Control Delay (s)	27.1	-	-	-	21.4
HCM Lane LOS	D	-	-	-	C
HCM 95th %tile Q(veh)	0.8	-	-	-	1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	290	1210	220	110	1020	140	300	230	110	120	130	150
Future Volume (veh/h)	290	1210	220	110	1020	140	300	230	110	120	130	150
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		0.98	1.00		0.99	1.00		0.95
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	1841	1841	1841	1841	1841	1841	1841	1841	1841
Adj Flow Rate, veh/h	322	1344	234	122	1133	148	333	256	74	133	144	5
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	4	4	4	4	4	4	4	4	4	4	4	4
Cap, veh/h	269	1425	245	113	1210	158	298	515	146	158	387	13
Arrive On Green	0.15	0.48	0.48	0.06	0.39	0.39	0.17	0.19	0.19	0.09	0.11	0.11
Sat Flow, veh/h	1753	2974	511	1753	3101	404	1753	2684	758	1753	3442	119
Grp Volume(v), veh/h	322	783	795	122	638	643	333	165	165	133	73	76
Grp Sat Flow(s),veh/h/ln	1753	1749	1737	1753	1749	1757	1753	1749	1693	1753	1749	1813
Q Serve(g_s), s	19.0	52.2	54.3	8.0	43.3	43.6	21.0	10.4	10.8	9.2	4.8	4.8
Cycle Q Clear(g_c), s	19.0	52.2	54.3	8.0	43.3	43.6	21.0	10.4	10.8	9.2	4.8	4.8
Prop In Lane	1.00		0.29	1.00		0.23	1.00		0.45	1.00		0.07
Lane Grp Cap(c), veh/h	269	838	832	113	683	686	298	336	325	158	196	204
V/C Ratio(X)	1.20	0.93	0.96	1.08	0.93	0.94	1.12	0.49	0.51	0.84	0.37	0.37
Avail Cap(c_a), veh/h	269	842	836	113	686	689	298	523	507	269	495	513
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	52.3	30.4	30.9	57.8	36.2	36.3	51.3	44.6	44.7	55.4	50.8	50.9
Incr Delay (d2), s/veh	118.3	17.7	21.2	106.3	20.5	21.1	87.9	2.4	2.6	4.6	2.5	2.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	17.0	24.4	25.9	6.8	21.3	21.6	16.3	4.7	4.7	4.2	2.2	2.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	170.6	48.0	52.2	164.1	56.6	57.4	139.2	46.9	47.3	60.0	53.3	53.3
LnGrp LOS	F	D	D	F	E	E	F	D	D	E	D	D
Approach Vol, veh/h		1900			1403			663			282	
Approach Delay, s/veh		70.5			66.3			93.4			56.4	
Approach LOS		E			E			F			E	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	13.0	64.8	26.0	19.9	24.0	53.8	16.1	29.7
Change Period (Y+Rc), s	5.0	5.5	5.0	6.0	5.0	5.5	5.0	6.0
Max Green Setting (Gmax), s	8.0	59.5	21.0	35.0	19.0	48.5	19.0	37.0
Max Q Clear Time (g_c+I1), s	10.0	56.3	23.0	6.8	21.0	45.6	11.2	12.8
Green Ext Time (p_c), s	0.0	2.9	0.0	1.4	0.0	2.5	0.0	3.5

Intersection Summary	
HCM 6th Ctrl Delay	71.8
HCM 6th LOS	E

Notes

User approved pedestrian interval to be less than phase max green.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	100	980	290	180	930	120	170	450	270	170	420	90
Future Volume (veh/h)	100	980	290	180	930	120	170	450	270	170	420	90
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		0.99	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1811	1811	1811	1811	1811	1811	1811	1811	1811	1811	1811	1811
Adj Flow Rate, veh/h	101	990	293	182	939	121	172	455	273	172	424	91
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Percent Heavy Veh, %	6	6	6	6	6	6	6	6	6	6	6	6
Cap, veh/h	127	1114	497	217	1293	577	206	820	361	249	864	385
Arrive On Green	0.07	0.32	0.32	0.13	0.38	0.38	0.06	0.24	0.24	0.07	0.25	0.25
Sat Flow, veh/h	1725	3441	1535	1725	3441	1535	3346	3441	1515	3346	3441	1535
Grp Volume(v), veh/h	101	990	293	182	939	121	172	455	273	172	424	91
Grp Sat Flow(s),veh/h/ln	1725	1721	1535	1725	1721	1535	1673	1721	1515	1673	1721	1535
Q Serve(g_s), s	4.7	22.2	13.0	8.4	19.0	4.3	4.1	9.4	13.6	4.1	8.5	3.8
Cycle Q Clear(g_c), s	4.7	22.2	13.0	8.4	19.0	4.3	4.1	9.4	13.6	4.1	8.5	3.8
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	127	1114	497	217	1293	577	206	820	361	249	864	385
V/C Ratio(X)	0.79	0.89	0.59	0.84	0.73	0.21	0.83	0.55	0.76	0.69	0.49	0.24
Avail Cap(c_a), veh/h	149	1131	505	234	1301	580	206	1059	466	330	1186	529
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	37.0	26.1	23.0	34.7	21.8	17.2	37.7	27.1	28.7	36.7	26.0	24.2
Incr Delay (d2), s/veh	21.8	9.4	2.8	21.6	2.5	0.4	24.6	0.9	6.6	3.9	0.7	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	2.6	9.6	4.6	4.6	7.2	1.4	2.3	3.7	5.2	1.7	3.3	1.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	58.8	35.5	25.8	56.2	24.3	17.6	62.3	28.1	35.4	40.6	26.7	24.7
LnGrp LOS	E	D	C	E	C	B	E	C	D	D	C	C
Approach Vol, veh/h		1384			1242			900			687	
Approach Delay, s/veh		35.1			28.3			36.8			29.9	
Approach LOS		D			C			D			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	14.2	32.3	10.0	24.7	10.0	36.5	9.0	25.7
Change Period (Y+Rc), s	4.0	6.0	4.0	5.3	4.0	6.0	4.0	5.3
Max Green Setting (Gmax), s	10.3	26.7	8.0	25.0	7.0	30.7	5.0	28.0
Max Q Clear Time (g_c+I1), s	10.4	24.2	6.1	15.6	6.7	21.0	6.1	10.5
Green Ext Time (p_c), s	0.0	2.1	0.1	3.8	0.0	6.5	0.0	4.0

Intersection Summary	
HCM 6th Ctrl Delay	32.6
HCM 6th LOS	C

Intersection	
Int Delay, s/veh	16.7

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	90	1400	1220	50	30	120
Future Vol, veh/h	90	1400	1220	50	30	120
Conflicting Peds, #/hr	1	0	0	1	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	110	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	3	3	3	3	3	3
Mvmt Flow	95	1474	1284	53	32	126

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	1338	0	-	0	2239	670
Stage 1	-	-	-	-	1312	-
Stage 2	-	-	-	-	927	-
Critical Hdwy	4.16	-	-	-	6.86	6.96
Critical Hdwy Stg 1	-	-	-	-	5.86	-
Critical Hdwy Stg 2	-	-	-	-	5.86	-
Follow-up Hdwy	2.23	-	-	-	3.53	3.33
Pot Cap-1 Maneuver	506	-	-	-	35	397
Stage 1	-	-	-	-	214	-
Stage 2	-	-	-	-	343	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	506	-	-	-	~ 28	397
Mov Cap-2 Maneuver	-	-	-	-	~ 28	-
Stage 1	-	-	-	-	174	-
Stage 2	-	-	-	-	343	-

Approach	EB	WB	SB
HCM Control Delay, s	0.8	0	$ 317
HCM LOS			F

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	506	-	-	-	109
HCM Lane V/C Ratio	0.187	-	-	-	1.449
HCM Control Delay (s)	13.7	-	-	-	$ 317
HCM Lane LOS	B	-	-	-	F
HCM 95th %tile Q(veh)	0.7	-	-	-	11.3

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	1510	110	150	1430	70	70	20	140	90	30	20
Future Volume (veh/h)	5	1510	110	150	1430	70	70	20	140	90	30	20
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856
Adj Flow Rate, veh/h	5	1589	116	158	1505	74	74	21	147	95	32	21
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	12	2122	659	198	1793	88	96	27	192	141	170	111
Arrive On Green	0.01	0.42	0.42	0.11	0.52	0.52	0.05	0.14	0.14	0.08	0.16	0.16
Sat Flow, veh/h	1767	5066	1572	1767	3420	168	1767	200	1403	1767	1046	686
Grp Volume(v), veh/h	5	1589	116	158	773	806	74	0	168	95	0	53
Grp Sat Flow(s),veh/h/ln	1767	1689	1572	1767	1763	1825	1767	0	1603	1767	0	1732
Q Serve(g_s), s	0.2	19.4	3.4	6.4	27.2	27.5	3.0	0.0	7.4	3.8	0.0	1.9
Cycle Q Clear(g_c), s	0.2	19.4	3.4	6.4	27.2	27.5	3.0	0.0	7.4	3.8	0.0	1.9
Prop In Lane	1.00		1.00	1.00		0.09	1.00		0.88	1.00		0.40
Lane Grp Cap(c), veh/h	12	2122	659	198	924	957	96	0	219	141	0	281
V/C Ratio(X)	0.43	0.75	0.18	0.80	0.84	0.84	0.77	0.00	0.77	0.67	0.00	0.19
Avail Cap(c_a), veh/h	121	3932	1221	514	1761	1823	302	0	657	287	0	696
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	36.2	18.0	13.3	31.7	14.8	14.8	34.2	0.0	30.5	32.7	0.0	26.5
Incr Delay (d2), s/veh	9.0	0.2	0.0	2.8	0.8	0.8	12.3	0.0	2.1	5.5	0.0	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	6.4	1.1	2.7	8.6	9.0	1.6	0.0	2.9	1.8	0.0	0.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	45.2	18.2	13.4	34.5	15.6	15.6	46.5	0.0	32.6	38.2	0.0	26.6
LnGrp LOS	D	B	B	C	B	B	D	A	C	D	A	C
Approach Vol, veh/h		1710			1737			242			148	
Approach Delay, s/veh		18.0			17.3			36.8			34.0	
Approach LOS		B			B			D			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	4.6	44.1	9.9	14.6	12.3	36.3	8.1	16.5
Change Period (Y+Rc), s	4.1	5.7	4.1	4.6	4.1	5.7	4.1	4.6
Max Green Setting (Gmax), s	5.0	73.1	11.9	30.0	21.3	56.8	12.5	29.4
Max Q Clear Time (g_c+I1), s	2.2	29.5	5.8	9.4	8.4	21.4	5.0	3.9
Green Ext Time (p_c), s	0.0	1.3	0.1	0.6	0.1	9.2	0.1	0.1

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



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑	↱	↰↰	↑↑	↱	↰		↱↱	↰	↑↑	↱↱
Traffic Volume (veh/h)	0	1620	120	80	780	30	180	0	340	70	340	690
Future Volume (veh/h)	0	1620	120	80	780	30	180	0	340	70	340	690
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	0	1856	1856	1856	1856	1856	1856	0	1856	1856	1856	1856
Adj Flow Rate, veh/h	0	1705	67	84	821	14	189	0	358	74	358	594
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	0	3	3	3	3	3	3	0	3	3	3	3
Cap, veh/h	0	1875	646	123	1700	758	209	0	0	94	973	764
Arrive On Green	0.00	0.41	0.41	0.04	0.48	0.48	0.12	0.00	0.00	0.05	0.28	0.28
Sat Flow, veh/h	0	4899	1572	3428	3526	1572	1767	189		1767	3526	2768
Grp Volume(v), veh/h	0	1705	67	84	821	14	189	98.7		74	358	594
Grp Sat Flow(s),veh/h/ln	0	1522	1572	1714	1763	1572	1767	F		1767	1763	1384
Q Serve(g_s), s	0.0	48.8	3.6	3.4	21.8	0.6	14.7			5.7	11.4	27.5
Cycle Q Clear(g_c), s	0.0	48.8	3.6	3.4	21.8	0.6	14.7			5.7	11.4	27.5
Prop In Lane	0.00		1.00	1.00		1.00	1.00			1.00		1.00
Lane Grp Cap(c), veh/h	0	1875	646	123	1700	758	209			94	973	764
V/C Ratio(X)	0.00	0.91	0.10	0.68	0.48	0.02	0.91			0.79	0.37	0.78
Avail Cap(c_a), veh/h	0	1896	653	123	1711	763	209			164	1244	976
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00			1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	1.00	1.00	1.00	1.00	1.00			1.00	1.00	1.00
Uniform Delay (d), s/veh	0.0	38.5	25.2	66.2	24.3	18.8	60.5			65.0	40.5	46.4
Incr Delay (d2), s/veh	0.0	7.2	0.1	16.2	0.4	0.0	38.2			20.1	0.5	4.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0			0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	18.7	1.4	1.7	8.9	0.2	8.7			3.1	4.9	9.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	45.7	25.3	82.4	24.7	18.8	98.7			85.1	41.0	51.1
LnGrp LOS	A	D	C	F	C	B	F			F	D	D
Approach Vol, veh/h		1772			919						1026	
Approach Delay, s/veh		45.0			29.9						50.0	
Approach LOS		D			C						D	

Timer - Assigned Phs	1	2	3	4		6	7
Phs Duration (G+Y+Rc), s	9.9	63.1	21.1	44.8		73.0	12.1
Change Period (Y+Rc), s	4.9	* 6	* 4.7	6.5		6.0	* 4.7
Max Green Setting (Gmax), s	5.0	* 58	* 16	49.0		67.4	* 13
Max Q Clear Time (g_c+I1), s	5.4	50.8	16.7	29.5		23.8	7.7
Green Ext Time (p_c), s	0.0	6.3	0.0	8.9		12.4	0.1

Intersection Summary	
HCM 6th Ctrl Delay	45.3
HCM 6th LOS	D

Notes

User approved pedestrian interval to be less than phase max green.

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

User approved changes to right turn type.



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	400	810	60	340	550	40
Future Volume (veh/h)	400	810	60	340	550	40
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1856	1856	1856	1856	1856	1856
Adj Flow Rate, veh/h	421	0	63	358	579	42
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	3	3	3	3	3	3
Cap, veh/h	996		115	1625	773	355
Arrive On Green	0.28	0.00	0.07	0.46	0.23	0.23
Sat Flow, veh/h	3618	1572	1767	3618	3428	1572
Grp Volume(v), veh/h	421	0	63	358	579	42
Grp Sat Flow(s),veh/h/ln	1763	1572	1767	1763	1714	1572
Q Serve(g_s), s	3.4	0.0	1.2	2.2	5.6	0.8
Cycle Q Clear(g_c), s	3.4	0.0	1.2	2.2	5.6	0.8
Prop In Lane		1.00	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	996		115	1625	773	355
V/C Ratio(X)	0.42		0.55	0.22	0.75	0.12
Avail Cap(c_a), veh/h	2022		250	2879	1937	889
HCM Platoon Ratio	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	1.00
Uniform Delay (d), s/veh	10.3	0.0	16.0	5.7	12.8	10.9
Incr Delay (d2), s/veh	0.1	0.0	1.5	0.0	0.6	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.9	0.0	0.4	0.4	1.5	0.2
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	10.4	0.0	17.5	5.8	13.3	11.0
LnGrp LOS	B		B	A	B	B
Approach Vol, veh/h	421	A		421	621	
Approach Delay, s/veh	10.4			7.5	13.2	
Approach LOS	B			A	B	

Timer - Assigned Phs	1	2			6	8
Phs Duration (G+Y+Rc), s	6.3	16.2			22.5	12.9
Change Period (Y+Rc), s	4.0	* 6.2			6.2	4.9
Max Green Setting (Gmax), s	5.3	* 20			28.9	20.0
Max Q Clear Time (g_c+I1), s	3.2	5.4			4.2	7.6
Green Ext Time (p_c), s	0.0	0.4			0.4	0.4

Intersection Summary		
HCM 6th Ctrl Delay	10.8	
HCM 6th LOS	B	

Notes

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

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



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	0	5	30	5	60	5	600	40	50	530	5
Future Volume (veh/h)	5	0	5	30	5	60	5	600	40	50	530	5
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1767	1767	1767	1767	1767	1767	1767	1767	1767	1767	1767	1767
Adj Flow Rate, veh/h	6	0	6	34	6	68	6	682	45	57	602	6
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Percent Heavy Veh, %	9	9	9	9	9	9	9	9	9	9	9	9
Cap, veh/h	352	0	146	353	173	146	16	1123	501	204	1319	13
Arrive On Green	0.10	0.00	0.10	0.10	0.10	0.10	0.01	0.33	0.33	0.06	0.39	0.39
Sat Flow, veh/h	1213	0	1497	1332	1767	1497	1682	3357	1497	3264	3405	34
Grp Volume(v), veh/h	6	0	6	34	6	68	6	682	45	57	297	311
Grp Sat Flow(s),veh/h/ln	1213	0	1497	1332	1767	1497	1682	1678	1497	1632	1678	1761
Q Serve(g_s), s	0.1	0.0	0.1	0.7	0.1	1.3	0.1	5.2	0.6	0.5	4.1	4.1
Cycle Q Clear(g_c), s	0.2	0.0	0.1	1.0	0.1	1.3	0.1	5.2	0.6	0.5	4.1	4.1
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.02
Lane Grp Cap(c), veh/h	352	0	146	353	173	146	16	1123	501	204	650	682
V/C Ratio(X)	0.02	0.00	0.04	0.10	0.03	0.46	0.37	0.61	0.09	0.28	0.46	0.46
Avail Cap(c_a), veh/h	1446	0	1454	1517	1716	1454	327	1565	698	528	728	764
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	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	12.7	0.0	12.6	13.1	12.6	13.2	15.2	8.6	7.1	13.8	7.0	7.0
Incr Delay (d2), s/veh	0.0	0.0	0.0	0.0	0.0	0.9	5.0	0.8	0.1	0.3	0.7	0.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.0	0.0	0.2	0.0	0.3	0.0	0.8	0.1	0.1	0.6	0.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	12.7	0.0	12.7	13.2	12.6	14.0	20.2	9.3	7.2	14.1	7.8	7.7
LnGrp LOS	B	A	B	B	B	B	C	A	A	B	A	A
Approach Vol, veh/h		12			108			733			665	
Approach Delay, s/veh		12.7			13.7			9.3			8.3	
Approach LOS		B			B			A			A	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	6.6	16.5		7.7	5.0	18.2		7.7
Change Period (Y+Rc), s	* 4.7	6.2		* 4.7	* 4.7	6.2		* 4.7
Max Green Setting (Gmax), s	* 5	14.4		* 30	* 6	13.4		* 30
Max Q Clear Time (g_c+I1), s	2.5	7.2		2.2	2.1	6.1		3.3
Green Ext Time (p_c), s	0.0	3.1		0.0	0.0	2.5		0.2

Intersection Summary	
HCM 6th Ctrl Delay	9.2
HCM 6th LOS	A

Notes

User approved pedestrian interval to be less than phase max green.

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



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	30	0	10	0	570	90	20	580	0
Future Volume (veh/h)	0	0	0	30	0	10	0	570	90	20	580	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				1767	1811	1767	0	1767	1767	1767	1767	0
Adj Flow Rate, veh/h				33	0	11	0	620	98	22	630	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, %				9	6	9	0	9	9	9	9	0
Cap, veh/h				77	0	26	0	1189	188	56	1045	0
Arrive On Green				0.06	0.00	0.06	0.00	0.41	0.41	0.03	0.59	0.00
Sat Flow, veh/h				1255	0	418	0	2992	458	1682	1767	0
Grp Volume(v), veh/h				44	0	0	0	358	360	22	630	0
Grp Sat Flow(s),veh/h/ln				1673	0	0	0	1678	1683	1682	1767	0
Q Serve(g_s), s				0.8	0.0	0.0	0.0	4.8	4.9	0.4	6.8	0.0
Cycle Q Clear(g_c), s				0.8	0.0	0.0	0.0	4.8	4.9	0.4	6.8	0.0
Prop In Lane				0.75		0.25	0.00		0.27	1.00		0.00
Lane Grp Cap(c), veh/h				103	0	0	0	687	689	56	1045	0
V/C Ratio(X)				0.43	0.00	0.00	0.00	0.52	0.52	0.39	0.60	0.00
Avail Cap(c_a), veh/h				1383	0	0	0	1054	1057	334	1723	0
HCM Platoon Ratio				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)				1.00	0.00	0.00	0.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh				13.7	0.0	0.0	0.0	6.7	6.7	14.3	3.9	0.0
Incr Delay (d2), s/veh				2.8	0.0	0.0	0.0	1.3	1.3	4.4	1.2	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				0.3	0.0	0.0	0.0	0.9	0.9	0.2	0.3	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh				16.5	0.0	0.0	0.0	8.0	8.0	18.7	5.1	0.0
LnGrp LOS				B	A	A	A	A	A	B	A	A
Approach Vol, veh/h					44			718			652	
Approach Delay, s/veh					16.5			8.0			5.6	
Approach LOS					B			A			A	

Timer - Assigned Phs	1	2		4		6
Phs Duration (G+Y+Rc), s	5.5	18.4		6.4		23.9
Change Period (Y+Rc), s	4.5	6.0		4.5		6.0
Max Green Setting (Gmax), s	6.0	19.0		25.0		29.5
Max Q Clear Time (g_c+I1), s	2.4	6.9		2.8		8.8
Green Ext Time (p_c), s	0.0	5.5		0.2		6.9

Intersection Summary		
HCM 6th Ctrl Delay		7.2
HCM 6th LOS		A

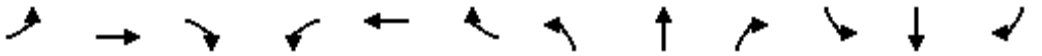
Intersection	
Int Delay, s/veh	0.6

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	5	5	5	90	130	5
Future Vol, veh/h	5	5	5	90	130	5
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	87	87	87	87	87	87
Heavy Vehicles, %	1	1	1	1	1	1
Mvmt Flow	6	6	6	103	149	6

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	267	152	155	0	-	0
Stage 1	152	-	-	-	-	-
Stage 2	115	-	-	-	-	-
Critical Hdwy	6.41	6.21	4.11	-	-	-
Critical Hdwy Stg 1	5.41	-	-	-	-	-
Critical Hdwy Stg 2	5.41	-	-	-	-	-
Follow-up Hdwy	3.509	3.309	2.209	-	-	-
Pot Cap-1 Maneuver	724	897	1431	-	-	-
Stage 1	878	-	-	-	-	-
Stage 2	912	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	721	897	1431	-	-	-
Mov Cap-2 Maneuver	721	-	-	-	-	-
Stage 1	874	-	-	-	-	-
Stage 2	912	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	9.6	0.4	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1431	-	799	-	-
HCM Lane V/C Ratio	0.004	-	0.014	-	-
HCM Control Delay (s)	7.5	0	9.6	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	0	-	-



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	150	400	40	10	210	40	30	5	40	220	20	110
Future Volume (veh/h)	150	400	40	10	210	40	30	5	40	220	20	110
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1767	1767	1767	1767	1767	1767	1767	1767	1767	1767	1767	1767
Adj Flow Rate, veh/h	155	412	41	10	216	41	31	5	41	227	21	113
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	9	9	9	9	9	9	9	9	9	9	9	9
Cap, veh/h	196	489	49	38	687	128	42	7	56	292	27	282
Arrive On Green	0.12	0.31	0.31	0.02	0.24	0.24	0.07	0.07	0.07	0.19	0.19	0.19
Sat Flow, veh/h	1682	1581	157	1682	2823	527	637	103	843	1546	143	1497
Grp Volume(v), veh/h	155	0	453	10	127	130	77	0	0	248	0	113
Grp Sat Flow(s),veh/h/ln	1682	0	1738	1682	1678	1672	1583	0	0	1689	0	1497
Q Serve(g_s), s	6.4	0.0	17.3	0.4	4.4	4.5	3.4	0.0	0.0	9.9	0.0	4.7
Cycle Q Clear(g_c), s	6.4	0.0	17.3	0.4	4.4	4.5	3.4	0.0	0.0	9.9	0.0	4.7
Prop In Lane	1.00		0.09	1.00		0.32	0.40		0.53	0.92		1.00
Lane Grp Cap(c), veh/h	196	0	537	38	408	407	105	0	0	319	0	282
V/C Ratio(X)	0.79	0.00	0.84	0.26	0.31	0.32	0.74	0.00	0.00	0.78	0.00	0.40
Avail Cap(c_a), veh/h	617	0	738	712	758	755	357	0	0	668	0	592
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	1.00	1.00	1.00	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	30.4	0.0	22.9	34.0	21.9	22.0	32.5	0.0	0.0	27.3	0.0	25.2
Incr Delay (d2), s/veh	6.9	0.0	7.8	3.6	0.7	0.7	9.6	0.0	0.0	4.1	0.0	0.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.7	0.0	7.0	0.2	1.6	1.6	1.5	0.0	0.0	4.0	0.0	1.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	37.3	0.0	30.7	37.6	22.6	22.7	42.1	0.0	0.0	31.4	0.0	26.1
LnGrp LOS	D	A	C	D	C	C	D	A	A	C	A	C
Approach Vol, veh/h		608			267			77			361	
Approach Delay, s/veh		32.4			23.2			42.1			29.8	
Approach LOS		C			C			D			C	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	9.1	28.9		23.3	13.8	24.2		9.6				
Change Period (Y+Rc), s	7.5	* 7		* 9.9	5.5	7.0		4.9				
Max Green Setting (Gmax), s	30.0	* 30		* 28	26.0	32.0		16.0				
Max Q Clear Time (g_c+I1), s	2.4	19.3		11.9	8.4	6.5		5.4				
Green Ext Time (p_c), s	0.0	2.6		1.5	0.3	1.9		0.2				

Intersection Summary			
HCM 6th Ctrl Delay		30.4	
HCM 6th LOS		C	

Notes

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



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	170	440	50	0	100	60	20	20	5	20	0	140
Future Volume (veh/h)	170	440	50	0	100	60	20	20	5	20	0	140
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1767	1767	1767	1767	1767	1767	1767	1767	1767	1767	1767	1767
Adj Flow Rate, veh/h	175	454	52	0	103	62	21	21	5	21	0	144
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	9	9	9	9	9	9	9	9	9	9	9	9
Cap, veh/h	216	701	80	3	218	131	49	49	12	203	0	181
Arrive On Green	0.13	0.45	0.45	0.00	0.21	0.21	0.06	0.06	0.06	0.12	0.00	0.12
Sat Flow, veh/h	1682	1556	178	1682	1033	622	758	758	180	1682	0	1497
Grp Volume(v), veh/h	175	0	506	0	0	165	47	0	0	21	0	144
Grp Sat Flow(s),veh/h/ln	1682	0	1735	1682	0	1655	1696	0	0	1682	0	1497
Q Serve(g_s), s	5.7	0.0	12.9	0.0	0.0	5.0	1.5	0.0	0.0	0.6	0.0	5.3
Cycle Q Clear(g_c), s	5.7	0.0	12.9	0.0	0.0	5.0	1.5	0.0	0.0	0.6	0.0	5.3
Prop In Lane	1.00		0.10	1.00		0.38	0.45		0.11	1.00		1.00
Lane Grp Cap(c), veh/h	216	0	781	3	0	349	109	0	0	203	0	181
V/C Ratio(X)	0.81	0.00	0.65	0.00	0.00	0.47	0.43	0.00	0.00	0.10	0.00	0.80
Avail Cap(c_a), veh/h	770	0	977	799	0	1077	806	0	0	770	0	685
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	0.00	0.00	1.00	1.00	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	24.1	0.0	12.1	0.0	0.0	19.6	25.6	0.0	0.0	22.2	0.0	24.3
Incr Delay (d2), s/veh	2.8	0.0	0.5	0.0	0.0	0.4	1.0	0.0	0.0	0.1	0.0	3.0
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	2.1	0.0	3.4	0.0	0.0	1.8	0.6	0.0	0.0	0.2	0.0	1.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	26.8	0.0	12.6	0.0	0.0	20.0	26.6	0.0	0.0	22.3	0.0	27.3
LnGrp LOS	C	A	B	A	A	C	C	A	A	C	A	C
Approach Vol, veh/h		681			165			47			165	
Approach Delay, s/veh		16.3			20.0			26.6			26.7	
Approach LOS		B			C			C			C	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	10.0	32.6		14.8	13.6	19.0		9.5				
Change Period (Y+Rc), s	* 6.3	* 7		7.9	* 6.3	7.0		5.8				
Max Green Setting (Gmax), s	* 27	* 32		26.0	* 26	37.0		27.0				
Max Q Clear Time (g_c+I1), s	10.0	14.9		7.3	7.7	7.0		3.5				
Green Ext Time (p_c), s	0.0	0.3		0.1	0.0	0.4		0.1				

Intersection Summary	
HCM 6th Ctrl Delay	18.9
HCM 6th LOS	B

Notes

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



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	220	110	100	400	170	110
Future Volume (veh/h)	220	110	100	400	170	110
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1737	1737	1737	1737	1737	1737
Adj Flow Rate, veh/h	234	117	106	426	181	117
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	11	11	11	11	11	11
Cap, veh/h	465	394	139	855	376	334
Arrive On Green	0.27	0.27	0.08	0.49	0.23	0.23
Sat Flow, veh/h	1737	1472	1654	1737	1654	1472
Grp Volume(v), veh/h	234	117	106	426	181	117
Grp Sat Flow(s),veh/h/ln	1737	1472	1654	1737	1654	1472
Q Serve(g_s), s	4.9	2.7	2.7	7.1	4.1	2.9
Cycle Q Clear(g_c), s	4.9	2.7	2.7	7.1	4.1	2.9
Prop In Lane		1.00	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	465	394	139	855	376	334
V/C Ratio(X)	0.50	0.30	0.77	0.50	0.48	0.35
Avail Cap(c_a), veh/h	1626	1378	774	1626	774	689
HCM Platoon Ratio	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
Uniform Delay (d), s/veh	13.2	12.4	19.2	7.3	14.3	13.9
Incr Delay (d2), s/veh	3.0	1.5	8.5	1.6	3.4	2.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.7	0.8	1.1	1.5	1.4	0.9
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	16.3	14.0	27.6	8.9	17.8	16.1
LnGrp LOS	B	B	C	A	B	B
Approach Vol, veh/h	351			532	298	
Approach Delay, s/veh	15.5			12.7	17.1	
Approach LOS	B			B	B	

Timer - Assigned Phs	1	2		4		6
Phs Duration (G+Y+Rc), s	9.6	17.4		15.7		27.0
Change Period (Y+Rc), s	6.0	6.0		6.0		6.0
Max Green Setting (Gmax), s	20.0	40.0		20.0		40.0
Max Q Clear Time (g_c+I1), s	4.7	6.9		6.1		9.1
Green Ext Time (p_c), s	0.2	4.6		2.2		6.4

Intersection Summary						
HCM 6th Ctrl Delay			14.6			
HCM 6th LOS			B			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	20	40	170	10	20	30	240	230	10	50	160	30
Future Volume (veh/h)	20	40	170	10	20	30	240	230	10	50	160	30
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1781	1811	1781	1811	1811	1811	1781	1781	1811	1811	1781	1781
Adj Flow Rate, veh/h	22	43	191	11	22	33	270	258	11	54	180	34
Peak Hour Factor	0.89	0.92	0.89	0.92	0.92	0.92	0.89	0.89	0.92	0.92	0.89	0.89
Percent Heavy Veh, %	8	6	8	6	6	6	8	8	6	6	8	8
Cap, veh/h	204	802	352	25	438	195	216	424	365	98	298	253
Arrive On Green	0.12	0.23	0.23	0.01	0.13	0.13	0.13	0.24	0.24	0.06	0.17	0.17
Sat Flow, veh/h	1697	3441	1510	1725	3441	1535	1697	1781	1535	1725	1781	1510
Grp Volume(v), veh/h	22	43	191	11	22	33	270	258	11	54	180	34
Grp Sat Flow(s),veh/h/ln	1697	1721	1510	1725	1721	1535	1697	1781	1535	1725	1781	1510
Q Serve(g_s), s	0.5	0.4	4.4	0.2	0.2	0.8	5.0	5.1	0.2	1.2	3.7	0.8
Cycle Q Clear(g_c), s	0.5	0.4	4.4	0.2	0.2	0.8	5.0	5.1	0.2	1.2	3.7	0.8
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	204	802	352	25	438	195	216	424	365	98	298	253
V/C Ratio(X)	0.11	0.05	0.54	0.44	0.05	0.17	1.25	0.61	0.03	0.55	0.60	0.13
Avail Cap(c_a), veh/h	777	2670	1171	219	2670	1191	216	816	703	219	1382	1171
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	15.4	11.7	13.2	19.2	15.1	15.3	17.2	13.3	11.5	18.1	15.2	13.9
Incr Delay (d2), s/veh	0.2	0.0	1.3	11.9	0.0	0.4	145.3	1.4	0.0	4.8	2.0	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	0.1	1.1	0.2	0.1	0.2	10.1	1.5	0.1	0.5	1.2	0.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	15.6	11.7	14.5	31.1	15.1	15.7	162.5	14.8	11.5	22.9	17.1	14.2
LnGrp LOS	B	B	B	C	B	B	F	B	B	C	B	B
Approach Vol, veh/h		256			66			539			268	
Approach Delay, s/veh		14.2			18.1			88.7			17.9	
Approach LOS		B			B			F			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	5.1	13.7	9.5	11.1	9.2	9.5	6.7	13.9
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	5.6	30.5	5.0	30.5	18.0	30.5	5.0	18.0
Max Q Clear Time (g_c+I1), s	2.2	6.4	7.0	5.7	2.5	2.8	3.2	7.1
Green Ext Time (p_c), s	0.0	0.8	0.0	0.9	0.0	0.2	0.0	0.9

Intersection Summary	
HCM 6th Ctrl Delay	50.9
HCM 6th LOS	D

Intersection	
Int Delay, s/veh	108.1

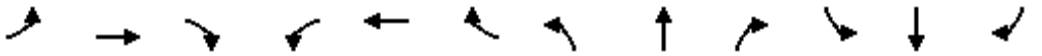
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	30	5	90	260	5	60	40	550	90	30	500	20
Future Vol, veh/h	30	5	90	260	5	60	40	550	90	30	500	20
Conflicting Peds, #/hr	0	0	0	0	0	0	1	0	0	0	0	1
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	0	-	100	100	-	-	140	-	-	140	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	87	92	87	92	92	92	87	87	92	92	87	87
Heavy Vehicles, %	7	6	7	6	6	6	7	7	6	6	7	7
Mvmt Flow	34	5	103	283	5	65	46	632	98	33	575	23

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1065	1476	300	1129	1438	365	599	0	0	730	0	0
Stage 1	654	654	-	773	773	-	-	-	-	-	-	-
Stage 2	411	822	-	356	665	-	-	-	-	-	-	-
Critical Hdwy	7.64	6.62	7.04	7.62	6.62	7.02	4.24	-	-	4.22	-	-
Critical Hdwy Stg 1	6.64	5.62	-	6.62	5.62	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.64	5.62	-	6.62	5.62	-	-	-	-	-	-	-
Follow-up Hdwy	3.57	4.06	3.37	3.56	4.06	3.36	2.27	-	-	2.26	-	-
Pot Cap-1 Maneuver	170	121	681	~ 154	127	620	940	-	-	844	-	-
Stage 1	410	452	-	349	397	-	-	-	-	-	-	-
Stage 2	575	377	-	623	446	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	137	110	680	~ 118	116	620	939	-	-	844	-	-
Mov Cap-2 Maneuver	137	110	-	~ 118	116	-	-	-	-	-	-	-
Stage 1	390	434	-	332	378	-	-	-	-	-	-	-
Stage 2	482	359	-	501	428	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	19.7	$ 572.3	0.5	0.5
HCM LOS	C	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	939	-	-	137	540	118	465	844	-	-
HCM Lane V/C Ratio	0.049	-	-	0.252	0.202	2.395	0.152	0.039	-	-
HCM Control Delay (s)	9	-	-	39.9	13.3	$ 711.9	14.1	9.4	-	-
HCM Lane LOS	A	-	-	E	B	F	B	A	-	-
HCM 95th %tile Q(veh)	0.2	-	-	0.9	0.7	24.8	0.5	0.1	-	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	40	10	110	80	5	20	90	640	50	5	810	20
Future Volume (veh/h)	40	10	110	80	5	20	90	640	50	5	810	20
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		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1811	1811	1811	1811	1811	1811	1811	1811	1811	1811	1811	1811
Adj Flow Rate, veh/h	49	12	134	98	6	24	110	780	61	6	988	24
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Percent Heavy Veh, %	6	6	6	6	6	6	6	6	6	6	6	6
Cap, veh/h	96	16	176	137	47	189	144	1590	124	16	1433	35
Arrive On Green	0.06	0.13	0.13	0.08	0.15	0.15	0.08	0.49	0.49	0.01	0.42	0.42
Sat Flow, veh/h	1725	126	1402	1725	316	1264	1725	3233	253	1725	3431	83
Grp Volume(v), veh/h	49	0	146	98	0	30	110	415	426	6	495	517
Grp Sat Flow(s),veh/h/ln	1725	0	1527	1725	0	1580	1725	1721	1766	1725	1721	1794
Q Serve(g_s), s	1.7	0.0	5.6	3.4	0.0	1.0	3.8	9.9	9.9	0.2	14.4	14.4
Cycle Q Clear(g_c), s	1.7	0.0	5.6	3.4	0.0	1.0	3.8	9.9	9.9	0.2	14.4	14.4
Prop In Lane	1.00		0.92	1.00		0.80	1.00		0.14	1.00		0.05
Lane Grp Cap(c), veh/h	96	0	192	137	0	237	144	846	868	16	718	749
V/C Ratio(X)	0.51	0.00	0.76	0.71	0.00	0.13	0.76	0.49	0.49	0.37	0.69	0.69
Avail Cap(c_a), veh/h	594	0	576	594	0	596	735	1128	1158	735	1128	1176
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	1.00	1.00
Uniform Delay (d), s/veh	28.0	0.0	25.8	27.4	0.0	22.5	27.3	10.4	10.4	30.0	14.5	14.5
Incr Delay (d2), s/veh	4.2	0.0	6.1	6.7	0.0	0.2	8.0	0.6	0.6	13.1	1.7	1.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.8	0.0	2.3	1.6	0.0	0.4	1.7	2.9	3.0	0.1	4.7	4.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	32.2	0.0	31.9	34.1	0.0	22.7	35.4	11.0	11.0	43.1	16.2	16.2
LnGrp LOS	C	A	C	C	A	C	D	B	B	D	B	B
Approach Vol, veh/h		195			128			951			1018	
Approach Delay, s/veh		32.0			31.4			13.8			16.3	
Approach LOS		C			C			B			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	4.6	35.3	8.9	12.3	9.1	30.8	7.4	13.7
Change Period (Y+Rc), s	4.0	5.3	4.0	4.6	4.0	5.3	4.0	4.6
Max Green Setting (Gmax), s	26.0	40.0	21.0	23.0	26.0	40.0	21.0	23.0
Max Q Clear Time (g_c+I1), s	2.2	11.9	5.4	7.6	5.8	16.4	3.7	3.0
Green Ext Time (p_c), s	0.0	7.7	0.2	0.7	0.2	9.1	0.1	0.1

Intersection Summary	
HCM 6th Ctrl Delay	17.5
HCM 6th LOS	B

Notes

User approved pedestrian interval to be less than phase max green.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	240	890	170	320	820	360	120	310	380	370	520	250
Future Volume (veh/h)	240	890	170	320	820	360	120	310	380	370	520	250
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		0.99	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1811	1811	1811	1811	1811	1811	1811	1811	1811	1811	1811	1811
Adj Flow Rate, veh/h	273	1011	193	364	932	409	136	352	432	420	591	284
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Percent Heavy Veh, %	6	6	6	6	6	6	6	6	6	6	6	6
Cap, veh/h	234	983	439	345	817	355	158	320	281	345	659	317
Arrive On Green	0.14	0.29	0.29	0.20	0.35	0.35	0.09	0.19	0.19	0.20	0.29	0.29
Sat Flow, veh/h	1725	3441	1535	1725	2335	1014	1725	1721	1513	1725	2242	1076
Grp Volume(v), veh/h	273	1011	193	364	684	657	136	352	432	420	453	422
Grp Sat Flow(s),veh/h/ln	1725	1721	1535	1725	1721	1629	1725	1721	1513	1725	1721	1598
Q Serve(g_s), s	19.0	40.0	14.4	28.0	49.0	49.0	10.9	26.0	26.0	28.0	35.4	35.4
Cycle Q Clear(g_c), s	19.0	40.0	14.4	28.0	49.0	49.0	10.9	26.0	26.0	28.0	35.4	35.4
Prop In Lane	1.00		1.00	1.00		0.62	1.00		1.00	1.00		0.67
Lane Grp Cap(c), veh/h	234	983	439	345	602	570	158	320	281	345	506	470
V/C Ratio(X)	1.17	1.03	0.44	1.06	1.14	1.15	0.86	1.10	1.54	1.22	0.90	0.90
Avail Cap(c_a), veh/h	234	983	439	345	602	570	160	320	281	345	506	470
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	60.5	50.0	40.9	56.0	45.5	45.5	62.7	57.0	57.0	56.0	47.4	47.4
Incr Delay (d2), s/veh	111.1	36.2	1.0	63.7	80.2	87.4	34.6	80.4	259.1	121.4	18.7	20.0
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	15.4	21.6	5.5	18.0	33.5	32.9	6.2	18.3	30.0	23.5	17.3	16.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	171.6	86.2	41.8	119.7	125.7	132.9	97.3	137.4	316.1	177.4	66.1	67.4
LnGrp LOS	F	F	D	F	F	F	F	F	F	F	E	E
Approach Vol, veh/h		1477			1705			920			1295	
Approach Delay, s/veh		96.2			127.2			215.4			102.6	
Approach LOS		F			F			F			F	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	32.0	45.0	16.8	46.2	23.0	54.0	32.0	31.0
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	28.0	40.0	13.0	41.0	19.0	49.0	28.0	26.0
Max Q Clear Time (g_c+I1), s	30.0	42.0	12.9	37.4	21.0	51.0	30.0	28.0
Green Ext Time (p_c), s	0.0	0.0	0.0	2.1	0.0	0.0	0.0	0.0

Intersection Summary	
HCM 6th Ctrl Delay	127.8
HCM 6th LOS	F



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	100	50	310	130	0	0	0	0	360	0	60
Future Volume (veh/h)	0	100	50	310	130	0	0	0	0	360	0	60
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00				1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Work Zone On Approach		No			No						No	
Adj Sat Flow, veh/h/ln	0	1352	1352	1352	1352	0				1352	1352	1352
Adj Flow Rate, veh/h	0	115	57	356	149	0				478	0	0
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87				0.87	0.87	0.87
Percent Heavy Veh, %	0	37	37	37	37	0				37	37	37
Cap, veh/h	0	321	151	395	1493	0				577	303	0
Arrive On Green	0.00	0.19	0.19	0.31	0.58	0.00				0.22	0.00	0.00
Sat Flow, veh/h	0	1765	795	1287	2636	0				2575	1352	0
Grp Volume(v), veh/h	0	85	87	356	149	0				478	0	0
Grp Sat Flow(s),veh/h/ln	0	1284	1208	1287	1284	0				1287	1352	0
Q Serve(g_s), s	0.0	2.7	3.0	12.5	1.2	0.0				8.4	0.0	0.0
Cycle Q Clear(g_c), s	0.0	2.7	3.0	12.5	1.2	0.0				8.4	0.0	0.0
Prop In Lane	0.00		0.66	1.00		0.00				1.00		0.00
Lane Grp Cap(c), veh/h	0	243	229	395	1493	0				577	303	0
V/C Ratio(X)	0.00	0.35	0.38	0.90	0.10	0.00				0.83	0.00	0.00
Avail Cap(c_a), veh/h	0	310	291	654	2140	0				893	469	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	1.00	1.00	1.00	0.00				1.00	0.00	0.00
Uniform Delay (d), s/veh	0.0	16.6	16.7	15.7	4.4	0.0				17.5	0.0	0.0
Incr Delay (d2), s/veh	0.0	0.9	1.0	5.9	0.0	0.0				2.1	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.7	0.7	3.5	0.2	0.0				2.1	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	17.5	17.8	21.6	4.4	0.0				19.6	0.0	0.0
LnGrp LOS	A	B	B	C	A	A				B	A	A
Approach Vol, veh/h		172			505						478	
Approach Delay, s/veh		17.6			16.5						19.6	
Approach LOS		B			B						B	

Timer - Assigned Phs	1	2		4		6
Phs Duration (G+Y+Rc), s	18.5	13.6		15.2		32.1
Change Period (Y+Rc), s	4.0	4.6		4.6		4.6
Max Green Setting (Gmax), s	24.0	11.4		16.4		39.4
Max Q Clear Time (g_c+I1), s	14.5	5.0		10.4		3.2
Green Ext Time (p_c), s	0.1	0.4		0.3		0.9

Intersection Summary	
HCM 6th Ctrl Delay	18.0
HCM 6th LOS	B

Notes

User approved volume balancing among the lanes for turning movement.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	30	430	0	0	370	310	70	0	260	0	0	0
Future Volume (veh/h)	30	430	0	0	370	310	70	0	260	0	0	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Work Zone On Approach		No			No			No				
Adj Sat Flow, veh/h/ln	1352	1352	0	0	1352	1352	1352	1352	1352			
Adj Flow Rate, veh/h	34	494	0	0	425	0	80	0	299			
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87			
Percent Heavy Veh, %	37	37	0	0	37	37	37	37	37			
Cap, veh/h	49	1308	0	0	521		379	0	337			
Arrive On Green	0.04	0.51	0.00	0.00	0.39	0.00	0.29	0.00	0.29			
Sat Flow, veh/h	1287	2636	0	0	1352	0	1287	0	1145			
Grp Volume(v), veh/h	34	494	0	0	425	0	80	0	299			
Grp Sat Flow(s),veh/h/ln	1287	1284	0	0	1352	0	1287	0	1145			
Q Serve(g_s), s	1.2	5.5	0.0	0.0	13.2	0.0	2.2	0.0	11.7			
Cycle Q Clear(g_c), s	1.2	5.5	0.0	0.0	13.2	0.0	2.2	0.0	11.7			
Prop In Lane	1.00		0.00	0.00		0.00	1.00		1.00			
Lane Grp Cap(c), veh/h	49	1308	0	0	521		379	0	337			
V/C Ratio(X)	0.69	0.38	0.00	0.00	0.82		0.21	0.00	0.89			
Avail Cap(c_a), veh/h	138	4484	0	0	2100		525	0	468			
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	1.00	1.00	0.00	0.00	1.00	0.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	22.2	7.0	0.0	0.0	12.9	0.0	12.4	0.0	15.8			
Incr Delay (d2), s/veh	6.3	0.2	0.0	0.0	3.2	0.0	0.1	0.0	11.5			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	0.4	1.0	0.0	0.0	3.4	0.0	0.5	0.0	3.4			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	28.5	7.2	0.0	0.0	16.1	0.0	12.5	0.0	27.3			
LnGrp LOS	C	A	A	A	B		B	A	C			
Approach Vol, veh/h		528			425	A		379				
Approach Delay, s/veh		8.5			16.1			24.2				
Approach LOS		A			B			C				
Timer - Assigned Phs		2			5	6		8				
Phs Duration (G+Y+Rc), s		28.4			5.8	22.6		18.4				
Change Period (Y+Rc), s		4.6			4.0	4.6		4.6				
Max Green Setting (Gmax), s		81.7			5.0	72.7		19.1				
Max Q Clear Time (g_c+I1), s		7.5			3.2	15.2		13.7				
Green Ext Time (p_c), s		3.6			0.0	2.9		0.2				

Intersection Summary	
HCM 6th Ctrl Delay	15.4
HCM 6th LOS	B

Notes

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



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	110	190	70	10	290	20	80	360	10	10	310	150
Future Volume (veh/h)	110	190	70	10	290	20	80	360	10	10	310	150
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1604	1811	1604	1811	1811	1811	1604	1604	1811	1811	1604	1604
Adj Flow Rate, veh/h	117	207	24	11	315	20	85	383	9	11	330	103
Peak Hour Factor	0.94	0.92	0.94	0.92	0.92	0.92	0.94	0.94	0.92	0.92	0.94	0.94
Percent Heavy Veh, %	20	6	20	6	6	6	20	20	6	6	20	20
Cap, veh/h	148	1156	457	24	383	24	102	850	20	24	691	308
Arrive On Green	0.10	0.34	0.34	0.01	0.23	0.23	0.07	0.28	0.28	0.01	0.23	0.23
Sat Flow, veh/h	1527	3441	1359	1725	1685	107	1527	3043	71	1725	3047	1359
Grp Volume(v), veh/h	117	207	24	11	0	335	85	191	201	11	330	103
Grp Sat Flow(s),veh/h/ln	1527	1721	1359	1725	0	1792	1527	1523	1591	1725	1523	1359
Q Serve(g_s), s	4.4	2.5	0.7	0.4	0.0	10.5	3.2	6.1	6.1	0.4	5.5	3.7
Cycle Q Clear(g_c), s	4.4	2.5	0.7	0.4	0.0	10.5	3.2	6.1	6.1	0.4	5.5	3.7
Prop In Lane	1.00		1.00	1.00		0.06	1.00		0.04	1.00		1.00
Lane Grp Cap(c), veh/h	148	1156	457	24	0	407	102	426	445	24	691	308
V/C Ratio(X)	0.79	0.18	0.05	0.46	0.00	0.82	0.83	0.45	0.45	0.46	0.48	0.33
Avail Cap(c_a), veh/h	830	2629	1038	146	0	548	104	879	918	146	1810	807
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	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	26.0	13.8	13.2	28.8	0.0	21.6	27.2	17.5	17.5	28.8	19.8	19.1
Incr Delay (d2), s/veh	8.9	0.1	0.0	12.8	0.0	7.3	42.3	2.7	2.6	12.8	1.9	2.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.9	0.9	0.2	0.2	0.0	4.8	2.2	2.0	2.1	0.2	1.8	1.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	34.9	13.9	13.3	41.7	0.0	29.0	69.4	20.2	20.1	41.7	21.6	21.4
LnGrp LOS	C	B	B	D	A	C	E	C	C	D	C	C
Approach Vol, veh/h		348			346			477			444	
Approach Delay, s/veh		20.9			29.4			28.9			22.1	
Approach LOS		C			C			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.4	19.4	5.3	25.8	5.3	22.5	11.7	19.4
Change Period (Y+Rc), s	4.5	6.0	4.5	6.0	4.5	6.0	6.0	* 6
Max Green Setting (Gmax), s	4.0	35.0	5.0	45.0	5.0	34.0	32.0	* 18
Max Q Clear Time (g_c+I1), s	5.2	7.5	2.4	4.5	2.4	8.1	6.4	12.5
Green Ext Time (p_c), s	0.0	5.8	0.0	1.5	0.0	5.1	0.3	0.9

Intersection Summary	
HCM 6th Ctrl Delay	25.4
HCM 6th LOS	C

Notes

User approved pedestrian interval to be less than phase max green.

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



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	1630	360	290	1670	0	0	0	0	230	0	400
Future Volume (veh/h)	0	1630	360	290	1670	0	0	0	0	230	0	400
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		1.00				1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Work Zone On Approach		No			No						No	
Adj Sat Flow, veh/h/ln	0	1811	1811	1811	1811	0				1811	1811	1811
Adj Flow Rate, veh/h	0	1852	148	330	1898	0				261	0	379
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88				0.88	0.88	0.88
Percent Heavy Veh, %	0	6	6	6	6	0				6	6	6
Cap, veh/h	0	2147	651	354	2417	0				526	0	468
Arrive On Green	0.00	0.43	0.43	0.21	0.70	0.00				0.15	0.00	0.15
Sat Flow, veh/h	0	5107	1499	1725	3532	0				3450	0	3070
Grp Volume(v), veh/h	0	1852	148	330	1898	0				261	0	379
Grp Sat Flow(s),veh/h/ln	0	1648	1499	1725	1721	0				1725	0	1535
Q Serve(g_s), s	0.0	21.5	3.9	11.9	23.2	0.0				4.4	0.0	7.6
Cycle Q Clear(g_c), s	0.0	21.5	3.9	11.9	23.2	0.0				4.4	0.0	7.6
Prop In Lane	0.00		1.00	1.00		0.00				1.00		1.00
Lane Grp Cap(c), veh/h	0	2147	651	354	2417	0				526	0	468
V/C Ratio(X)	0.00	0.86	0.23	0.93	0.79	0.00				0.50	0.00	0.81
Avail Cap(c_a), veh/h	0	2215	672	354	2465	0				566	0	504
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	1.00	1.00	1.00	0.00				1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	16.2	11.3	24.8	6.3	0.0				24.6	0.0	26.0
Incr Delay (d2), s/veh	0.0	3.7	0.2	30.7	1.7	0.0				0.3	0.0	8.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	7.1	1.1	7.3	4.1	0.0				1.6	0.0	3.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	19.9	11.4	55.5	7.9	0.0				24.9	0.0	34.2
LnGrp LOS	A	B	B	E	A	A				C	A	C
Approach Vol, veh/h		2000			2228						640	
Approach Delay, s/veh		19.2			15.0						30.4	
Approach LOS		B			B						C	

Timer - Assigned Phs	1	2		4		6
Phs Duration (G+Y+Rc), s	17.0	32.1		14.3		49.1
Change Period (Y+Rc), s	4.0	4.6		4.6		4.6
Max Green Setting (Gmax), s	13.0	28.4		10.4		45.4
Max Q Clear Time (g_c+I1), s	13.9	23.5		9.6		25.2
Green Ext Time (p_c), s	0.0	4.1		0.1		13.3

Intersection Summary	
HCM 6th Ctrl Delay	18.8
HCM 6th LOS	B

Notes

User approved volume balancing among the lanes for turning movement.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	610	1250	0	0	1470	250	490	0	260	0	0	0
Future Volume (veh/h)	610	1250	0	0	1470	250	490	0	260	0	0	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		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			
Work Zone On Approach		No			No			No				
Adj Sat Flow, veh/h/ln	1811	1811	0	0	1811	1811	1811	1811	1811			
Adj Flow Rate, veh/h	693	1420	0	0	1670	243	557	0	154			
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88			
Percent Heavy Veh, %	6	6	0	0	6	6	6	6	6			
Cap, veh/h	700	2546	0	0	1702	730	608	0	541			
Arrive On Green	0.21	0.74	0.00	0.00	0.49	0.49	0.18	0.00	0.18			
Sat Flow, veh/h	3346	3532	0	0	3532	1476	3450	0	3070			
Grp Volume(v), veh/h	693	1420	0	0	1670	243	557	0	154			
Grp Sat Flow(s),veh/h/ln	1673	1721	0	0	1721	1476	1725	0	1535			
Q Serve(g_s), s	22.7	20.1	0.0	0.0	52.4	11.0	17.4	0.0	4.8			
Cycle Q Clear(g_c), s	22.7	20.1	0.0	0.0	52.4	11.0	17.4	0.0	4.8			
Prop In Lane	1.00		0.00	0.00		1.00	1.00		1.00			
Lane Grp Cap(c), veh/h	700	2546	0	0	1702	730	608	0	541			
V/C Ratio(X)	0.99	0.56	0.00	0.00	0.98	0.33	0.92	0.00	0.28			
Avail Cap(c_a), veh/h	700	2546	0	0	1702	730	608	0	541			
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	1.00	1.00	0.00	0.00	1.00	1.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	43.4	6.3	0.0	0.0	27.3	16.8	44.5	0.0	39.3			
Incr Delay (d2), s/veh	31.5	0.3	0.0	0.0	17.5	0.2	18.3	0.0	0.1			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	12.1	5.4	0.0	0.0	23.4	3.5	8.7	0.0	1.8			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	74.9	6.6	0.0	0.0	44.8	17.1	62.8	0.0	39.4			
LnGrp LOS	E	A	A	A	D	B	E	A	D			
Approach Vol, veh/h		2113			1913			711				
Approach Delay, s/veh		29.0			41.3			57.7				
Approach LOS		C			D			E				
Timer - Assigned Phs		2			5	6		8				
Phs Duration (G+Y+Rc), s		86.0			27.0	59.0		24.0				
Change Period (Y+Rc), s		4.6			4.0	4.6		4.6				
Max Green Setting (Gmax), s		81.4			23.0	54.4		19.4				
Max Q Clear Time (g_c+I1), s		22.1			24.7	54.4		19.4				
Green Ext Time (p_c), s		13.1			0.0	0.0		0.0				

Intersection Summary	
HCM 6th Ctrl Delay	38.3
HCM 6th LOS	D

Notes

User approved volume balancing among the lanes for turning movement.

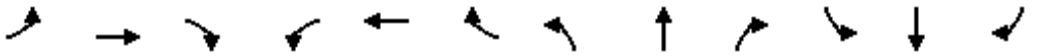
Intersection	
Int Delay, s/veh	1.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	1360	150	0	1600	0	0	0	20	0	0	120
Future Vol, veh/h	0	1360	150	0	1600	0	0	0	20	0	0	120
Conflicting Peds, #/hr	0	0	2	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	0	-	-	0
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	88	88	88	88	88	88	88	88	88	88	88	88
Heavy Vehicles, %	6	6	6	6	6	6	6	6	6	6	6	6
Mvmt Flow	0	1545	170	0	1818	0	0	0	23	0	0	136

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	-	0	0	-	-	0	-	-	860	-	-	909
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	-	-	-	7.02	-	-	7.02
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	-	-	-	3.36	-	-	3.36
Pot Cap-1 Maneuver	0	-	-	0	-	0	0	0	291	0	0	270
Stage 1	0	-	-	0	-	0	0	0	-	0	0	-
Stage 2	0	-	-	0	-	0	0	0	-	0	0	-
Platoon blocked, %		-	-		-							
Mov Cap-1 Maneuver	-	-	-	-	-	-	-	-	290	-	-	270
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0	18.5	31.2
HCM LOS			C	D

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBT	SBLn1
Capacity (veh/h)	290	-	-	-	270
HCM Lane V/C Ratio	0.078	-	-	-	0.505
HCM Control Delay (s)	18.5	-	-	-	31.2
HCM Lane LOS	C	-	-	-	D
HCM 95th %tile Q(veh)	0.3	-	-	-	2.6



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	300	940	170	80	1100	60	240	120	90	70	100	210
Future Volume (veh/h)	300	940	170	80	1100	60	240	120	90	70	100	210
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.98	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	1811	1811	1811	1811	1811	1811	1811	1811	1811	1811	1811	1811
Adj Flow Rate, veh/h	341	1068	183	91	1250	66	273	136	8	80	114	0
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Percent Heavy Veh, %	6	6	6	6	6	6	6	6	6	6	6	6
Cap, veh/h	328	1550	265	113	1338	71	246	591	34	100	325	0
Arrive On Green	0.19	0.53	0.53	0.07	0.40	0.40	0.14	0.18	0.18	0.06	0.09	0.00
Sat Flow, veh/h	1725	2938	502	1725	3321	175	1725	3302	193	1725	3532	0
Grp Volume(v), veh/h	341	624	627	91	647	669	273	70	74	80	114	0
Grp Sat Flow(s),veh/h/ln	1725	1721	1719	1725	1721	1775	1725	1721	1774	1725	1721	0
Q Serve(g_s), s	24.0	34.0	34.2	6.6	45.4	45.6	18.0	4.4	4.5	5.8	3.9	0.0
Cycle Q Clear(g_c), s	24.0	34.0	34.2	6.6	45.4	45.6	18.0	4.4	4.5	5.8	3.9	0.0
Prop In Lane	1.00		0.29	1.00		0.10	1.00		0.11	1.00		0.00
Lane Grp Cap(c), veh/h	328	908	907	113	693	716	246	308	317	100	325	0
V/C Ratio(X)	1.04	0.69	0.69	0.81	0.93	0.94	1.11	0.23	0.23	0.80	0.35	0.00
Avail Cap(c_a), veh/h	328	908	907	150	701	724	246	545	562	177	953	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	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	51.2	22.1	22.2	58.2	36.1	36.1	54.2	44.4	44.4	58.8	53.6	0.0
Incr Delay (d2), s/veh	60.7	2.8	2.9	22.1	19.9	19.8	90.4	0.8	0.8	5.4	1.4	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	15.6	13.5	13.5	3.5	21.9	22.6	13.8	1.9	2.0	2.6	1.7	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	111.9	25.0	25.1	80.3	56.0	56.0	144.6	45.2	45.2	64.2	55.0	0.0
LnGrp LOS	F	C	C	F	E	E	F	D	D	E	D	A
Approach Vol, veh/h		1592			1407			417			194	
Approach Delay, s/veh		43.6			57.5			110.3			58.8	
Approach LOS		D			E			F			E	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	13.3	72.2	23.0	17.9	29.0	56.4	12.3	28.6
Change Period (Y+Rc), s	5.0	5.5	5.0	6.0	5.0	5.5	5.0	6.0
Max Green Setting (Gmax), s	11.0	64.5	18.0	35.0	24.0	51.5	13.0	40.0
Max Q Clear Time (g_c+I1), s	8.6	36.2	20.0	5.9	26.0	47.6	7.8	6.5
Green Ext Time (p_c), s	0.0	16.9	0.0	1.1	0.0	3.3	0.0	1.5

Intersection Summary	
HCM 6th Ctrl Delay	57.6
HCM 6th LOS	E

Notes

User approved pedestrian interval to be less than phase max green.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	100	790	130	230	990	130	230	300	240	80	300	60
Future Volume (veh/h)	100	790	130	230	990	130	230	300	240	80	300	60
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		0.99	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1781	1781	1781	1781	1781	1781	1781	1781	1781	1781	1781	1781
Adj Flow Rate, veh/h	115	908	149	264	1138	149	264	345	276	92	345	69
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Percent Heavy Veh, %	8	8	8	8	8	8	8	8	8	8	8	8
Cap, veh/h	143	1065	475	292	1364	600	334	813	357	169	643	283
Arrive On Green	0.08	0.31	0.31	0.17	0.40	0.40	0.10	0.24	0.24	0.05	0.19	0.19
Sat Flow, veh/h	1697	3385	1510	1697	3385	1490	3291	3385	1488	3291	3385	1490
Grp Volume(v), veh/h	115	908	149	264	1138	149	264	345	276	92	345	69
Grp Sat Flow(s),veh/h/ln	1697	1692	1510	1697	1692	1490	1646	1692	1488	1646	1692	1490
Q Serve(g_s), s	5.8	21.9	6.5	13.3	26.3	5.8	6.8	7.5	15.1	2.4	8.0	3.4
Cycle Q Clear(g_c), s	5.8	21.9	6.5	13.3	26.3	5.8	6.8	7.5	15.1	2.4	8.0	3.4
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	143	1065	475	292	1364	600	334	813	357	169	643	283
V/C Ratio(X)	0.81	0.85	0.31	0.90	0.83	0.25	0.79	0.42	0.77	0.55	0.54	0.24
Avail Cap(c_a), veh/h	156	1115	497	292	1387	611	340	1166	513	265	1088	479
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	39.2	27.9	22.7	35.3	23.4	17.2	38.2	28.0	30.9	40.3	31.8	30.0
Incr Delay (d2), s/veh	24.2	7.0	0.8	29.2	5.0	0.5	11.8	0.6	6.3	2.7	1.1	0.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.3	9.1	2.3	7.5	10.3	1.9	3.2	2.9	5.6	1.0	3.2	1.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	63.4	35.0	23.5	64.6	28.4	17.7	50.0	28.6	37.2	43.1	32.9	30.7
LnGrp LOS	E	C	C	E	C	B	D	C	D	D	C	C
Approach Vol, veh/h		1172			1551			885			506	
Approach Delay, s/veh		36.3			33.5			37.7			34.5	
Approach LOS		D			C			D			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	9.0	33.4	8.5	26.2	11.3	41.1	12.8	21.9
Change Period (Y+Rc), s	4.0	6.0	4.0	5.3	4.0	6.0	4.0	5.3
Max Green Setting (Gmax), s	5.0	28.7	7.0	30.0	8.0	35.7	9.0	28.0
Max Q Clear Time (g_c+I1), s	15.3	23.9	4.4	17.1	7.8	28.3	8.8	10.0
Green Ext Time (p_c), s	0.0	3.5	0.0	3.8	0.0	5.8	0.0	3.2

Intersection Summary	
HCM 6th Ctrl Delay	35.3
HCM 6th LOS	D

Intersection	
Int Delay, s/veh	44.8

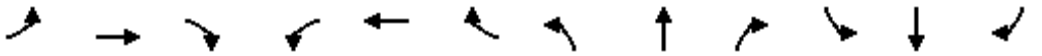
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	90	1210	1200	20	40	110
Future Vol, veh/h	90	1210	1200	20	40	110
Conflicting Peds, #/hr	1	0	0	1	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	110	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	86	86	86	86	86	86
Heavy Vehicles, %	7	7	7	7	7	7
Mvmt Flow	105	1407	1395	23	47	128

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	1419	0	-	0	2322	710
Stage 1	-	-	-	-	1408	-
Stage 2	-	-	-	-	914	-
Critical Hdwy	4.24	-	-	-	6.94	7.04
Critical Hdwy Stg 1	-	-	-	-	5.94	-
Critical Hdwy Stg 2	-	-	-	-	5.94	-
Follow-up Hdwy	2.27	-	-	-	3.57	3.37
Pot Cap-1 Maneuver	451	-	-	-	~ 29	365
Stage 1	-	-	-	-	183	-
Stage 2	-	-	-	-	339	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	451	-	-	-	~ 22	365
Mov Cap-2 Maneuver	-	-	-	-	~ 22	-
Stage 1	-	-	-	-	140	-
Stage 2	-	-	-	-	339	-

Approach	EB	WB	SB
HCM Control Delay, s	1.1	0	$ 787.7
HCM LOS			F

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	451	-	-	-	71
HCM Lane V/C Ratio	0.232	-	-	-	2.457
HCM Control Delay (s)	15.4	-	-	-	$ 787.7
HCM Lane LOS	C	-	-	-	F
HCM 95th %tile Q(veh)	0.9	-	-	-	16.8

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	20	1420	70	120	1320	80	70	10	150	90	10	5
Future Volume (veh/h)	20	1420	70	120	1320	80	70	10	150	90	10	5
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		0.98	1.00		1.00	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1811	1811	1811	1811	1811	1811	1811	1811	1811	1811	1811	1811
Adj Flow Rate, veh/h	22	1596	79	135	1483	90	79	11	169	101	11	6
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Percent Heavy Veh, %	6	6	6	6	6	6	6	6	6	6	6	6
Cap, veh/h	43	2115	643	170	1652	100	101	14	211	129	177	96
Arrive On Green	0.02	0.43	0.43	0.10	0.50	0.50	0.06	0.15	0.15	0.07	0.16	0.16
Sat Flow, veh/h	1725	4944	1503	1725	3292	199	1725	95	1455	1725	1096	598
Grp Volume(v), veh/h	22	1596	79	135	772	801	79	0	180	101	0	17
Grp Sat Flow(s),veh/h/ln	1725	1648	1503	1725	1721	1770	1725	0	1549	1725	0	1694
Q Serve(g_s), s	0.9	19.9	2.3	5.6	29.6	30.0	3.3	0.0	8.2	4.2	0.0	0.6
Cycle Q Clear(g_c), s	0.9	19.9	2.3	5.6	29.6	30.0	3.3	0.0	8.2	4.2	0.0	0.6
Prop In Lane	1.00		1.00	1.00		0.11	1.00		0.94	1.00		0.35
Lane Grp Cap(c), veh/h	43	2115	643	170	863	888	101	0	225	129	0	273
V/C Ratio(X)	0.52	0.75	0.12	0.79	0.89	0.90	0.78	0.00	0.80	0.79	0.00	0.06
Avail Cap(c_a), veh/h	121	3981	1210	457	1720	1770	312	0	637	284	0	669
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	35.1	17.6	12.6	32.1	16.4	16.5	33.9	0.0	30.1	33.2	0.0	25.9
Incr Delay (d2), s/veh	3.6	0.2	0.0	3.1	1.4	1.4	4.9	0.0	2.5	3.9	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	6.4	0.7	2.3	9.5	9.9	1.5	0.0	3.1	1.8	0.0	0.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	38.7	17.8	12.6	35.3	17.8	18.0	38.8	0.0	32.6	37.1	0.0	25.9
LnGrp LOS	D	B	B	D	B	B	D	A	C	D	A	C
Approach Vol, veh/h		1697			1708			259			118	
Approach Delay, s/veh		17.9			19.3			34.5			35.5	
Approach LOS		B			B			C			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	5.9	42.3	9.5	15.2	11.3	36.9	8.4	16.4
Change Period (Y+Rc), s	4.1	5.7	4.1	4.6	4.1	5.7	4.1	4.6
Max Green Setting (Gmax), s	5.1	72.9	12.0	30.0	19.3	58.7	13.2	28.8
Max Q Clear Time (g_c+I1), s	2.9	32.0	6.2	10.2	7.6	21.9	5.3	2.6
Green Ext Time (p_c), s	0.0	1.3	0.0	0.7	0.1	9.3	0.0	0.0

Intersection Summary	
HCM 6th Ctrl Delay	20.2
HCM 6th LOS	C



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	1500	160	100	760	60	300	0	370	50	300	460
Future Volume (veh/h)	0	1500	160	100	760	60	300	0	370	50	300	460
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		0.98	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	0	1811	1811	1811	1811	1811	1811	0	1811	1811	1811	1811
Adj Flow Rate, veh/h	0	1685	92	112	854	28	337	0	416	56	337	408
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Percent Heavy Veh, %	0	6	6	6	6	6	6	0	6	6	6	6
Cap, veh/h	0	1776	604	132	1638	715	297	0	0	72	752	590
Arrive On Green	0.00	0.40	0.40	0.04	0.48	0.48	0.17	0.00	0.00	0.04	0.22	0.22
Sat Flow, veh/h	0	4781	1516	3346	3441	1502	1725	337		1725	3441	2701
Grp Volume(v), veh/h	0	1685	92	112	854	28	337	146.5		56	337	408
Grp Sat Flow(s),veh/h/ln	0	1485	1516	1673	1721	1502	1725	F		1725	1721	1351
Q Serve(g_s), s	0.0	47.3	5.0	4.3	22.4	1.3	22.3			4.2	11.0	18.0
Cycle Q Clear(g_c), s	0.0	47.3	5.0	4.3	22.4	1.3	22.3			4.2	11.0	18.0
Prop In Lane	0.00		1.00	1.00		1.00	1.00			1.00		1.00
Lane Grp Cap(c), veh/h	0	1776	604	132	1638	715	297			72	752	590
V/C Ratio(X)	0.00	0.95	0.15	0.85	0.52	0.04	1.13			0.78	0.45	0.69
Avail Cap(c_a), veh/h	0	1781	606	132	1638	715	297			143	1304	1024
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00			1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	1.00	1.00	1.00	1.00	1.00			1.00	1.00	1.00
Uniform Delay (d), s/veh	0.0	37.6	24.9	61.7	23.6	18.1	53.5			61.4	43.8	46.5
Incr Delay (d2), s/veh	0.0	11.7	0.2	39.0	0.6	0.0	93.0			24.5	0.9	3.2
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
%ile BackOfQ(50%),veh/ln	0.0	18.2	1.8	2.5	8.8	0.4	17.1			2.3	4.7	6.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	49.3	25.1	100.7	24.2	18.1	146.5			85.8	44.7	49.7
LnGrp LOS	A	D	C	F	C	B	F			F	D	D
Approach Vol, veh/h		1777			994						801	
Approach Delay, s/veh		48.0			32.6						50.2	
Approach LOS		D			C						D	

Timer - Assigned Phs	1	2	3	4		6	7
Phs Duration (G+Y+Rc), s	10.0	57.6	27.0	34.8		67.6	10.1
Change Period (Y+Rc), s	4.9	* 6	* 4.7	6.5		6.0	* 4.7
Max Green Setting (Gmax), s	5.1	* 52	* 22	49.0		61.5	* 11
Max Q Clear Time (g_c+I1), s	6.3	49.3	24.3	20.0		24.4	6.2
Green Ext Time (p_c), s	0.0	2.3	0.0	8.3		12.6	0.1

Intersection Summary	
HCM 6th Ctrl Delay	53.0
HCM 6th LOS	D

Notes

User approved pedestrian interval to be less than phase max green.

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



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	310	790	80	360	560	20
Future Volume (veh/h)	310	790	80	360	560	20
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1811	1811	1811	1811	1811	1811
Adj Flow Rate, veh/h	348	0	90	404	629	22
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Percent Heavy Veh, %	6	6	6	6	6	6
Cap, veh/h	930		141	1582	804	369
Arrive On Green	0.27	0.00	0.08	0.46	0.24	0.24
Sat Flow, veh/h	3532	1535	1725	3532	3346	1535
Grp Volume(v), veh/h	348	0	90	404	629	22
Grp Sat Flow(s),veh/h/ln	1721	1535	1725	1721	1673	1535
Q Serve(g_s), s	3.0	0.0	1.9	2.7	6.5	0.4
Cycle Q Clear(g_c), s	3.0	0.0	1.9	2.7	6.5	0.4
Prop In Lane		1.00	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	930		141	1582	804	369
V/C Ratio(X)	0.37		0.64	0.26	0.78	0.06
Avail Cap(c_a), veh/h	1887		233	2687	1808	829
HCM Platoon Ratio	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	1.00
Uniform Delay (d), s/veh	11.0	0.0	16.5	6.1	13.2	10.8
Incr Delay (d2), s/veh	0.1	0.0	1.8	0.0	0.6	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.8	0.0	0.6	0.5	1.7	0.1
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	11.1	0.0	18.3	6.2	13.8	10.9
LnGrp LOS	B		B	A	B	B
Approach Vol, veh/h	348	A		494	651	
Approach Delay, s/veh	11.1			8.4	13.7	
Approach LOS	B			A	B	

Timer - Assigned Phs	1	2			6	8
Phs Duration (G+Y+Rc), s	7.0	16.2			23.2	13.8
Change Period (Y+Rc), s	4.0	* 6.2			6.2	4.9
Max Green Setting (Gmax), s	5.0	* 20			28.9	20.0
Max Q Clear Time (g_c+I1), s	3.9	5.0			4.7	8.5
Green Ext Time (p_c), s	0.0	0.3			0.4	0.4

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

Notes

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

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



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	5	5	80	20	60	5	390	70	40	370	5
Future Volume (veh/h)	5	5	5	80	20	60	5	390	70	40	370	5
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1693	1693	1693	1693	1693	1693	1693	1693	1693	1693	1693	1693
Adj Flow Rate, veh/h	6	6	6	91	23	68	6	443	80	45	420	6
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Percent Heavy Veh, %	14	14	14	14	14	14	14	14	14	14	14	14
Cap, veh/h	243	143	190	409	225	190	16	888	396	164	1035	15
Arrive On Green	0.13	0.13	0.13	0.13	0.13	0.13	0.01	0.28	0.28	0.05	0.32	0.32
Sat Flow, veh/h	429	1078	1434	1269	1693	1434	1612	3216	1434	3127	3245	46
Grp Volume(v), veh/h	12	0	6	91	23	68	6	443	80	45	208	218
Grp Sat Flow(s),veh/h/ln	1507	0	1434	1269	1693	1434	1612	1608	1434	1564	1608	1683
Q Serve(g_s), s	0.0	0.0	0.1	2.0	0.3	1.3	0.1	3.3	1.2	0.4	2.9	2.9
Cycle Q Clear(g_c), s	0.2	0.0	0.1	2.1	0.3	1.3	0.1	3.3	1.2	0.4	2.9	2.9
Prop In Lane	0.50		1.00	1.00		1.00	1.00		1.00	1.00		0.03
Lane Grp Cap(c), veh/h	386	0	190	409	225	190	16	888	396	164	513	537
V/C Ratio(X)	0.03	0.00	0.03	0.22	0.10	0.36	0.38	0.50	0.20	0.27	0.41	0.41
Avail Cap(c_a), veh/h	1643	0	1486	1555	1753	1486	334	1044	466	540	513	537
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	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	11.0	0.0	10.9	11.9	11.0	11.4	14.3	8.8	8.0	13.2	7.7	7.7
Incr Delay (d2), s/veh	0.0	0.0	0.0	0.1	0.1	0.4	5.5	0.6	0.4	0.3	0.7	0.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	0.0	0.0	0.3	0.1	0.3	0.0	0.5	0.2	0.1	0.5	0.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	11.0	0.0	11.0	12.0	11.1	11.9	19.8	9.4	8.4	13.5	8.5	8.4
LnGrp LOS	B	A	B	B	B	B	B	A	A	B	A	A
Approach Vol, veh/h		18			182			529			471	
Approach Delay, s/veh		11.0			11.8			9.4			8.9	
Approach LOS		B			B			A			A	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	6.2	14.2		8.5	5.0	15.4		8.5
Change Period (Y+Rc), s	* 4.7	6.2		* 4.7	* 4.7	6.2		* 4.7
Max Green Setting (Gmax), s	* 5	9.4		* 30	* 6	8.4		* 30
Max Q Clear Time (g_c+I1), s	2.4	5.3		2.2	2.1	4.9		4.1
Green Ext Time (p_c), s	0.0	1.4		0.0	0.0	0.9		0.3

Intersection Summary	
HCM 6th Ctrl Delay	9.6
HCM 6th LOS	A

Notes

User approved pedestrian interval to be less than phase max green.

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



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	50	0	20	0	460	20	5	370	0
Future Volume (veh/h)	0	0	0	50	0	20	0	460	20	5	370	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		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
Work Zone On Approach					No			No			No	
Adj Sat Flow, veh/h/ln				1722	1811	1722	0	1722	1722	1722	1722	0
Adj Flow Rate, veh/h				61	0	24	0	561	24	6	451	0
Peak Hour Factor				0.82	0.92	0.82	0.92	0.82	0.82	0.82	0.82	0.92
Percent Heavy Veh, %				12	6	12	0	12	12	12	12	0
Cap, veh/h				123	0	48	0	1170	50	16	1742	0
Arrive On Green				0.10	0.00	0.10	0.00	0.37	0.37	0.01	0.53	0.00
Sat Flow, veh/h				1196	0	471	0	3280	136	1640	3358	0
Grp Volume(v), veh/h				85	0	0	0	287	298	6	451	0
Grp Sat Flow(s),veh/h/ln				1667	0	0	0	1636	1694	1640	1636	0
Q Serve(g_s), s				1.4	0.0	0.0	0.0	3.9	3.9	0.1	2.2	0.0
Cycle Q Clear(g_c), s				1.4	0.0	0.0	0.0	3.9	3.9	0.1	2.2	0.0
Prop In Lane				0.72		0.28	0.00		0.08	1.00		0.00
Lane Grp Cap(c), veh/h				171	0	0	0	600	621	16	1742	0
V/C Ratio(X)				0.50	0.00	0.00	0.00	0.48	0.48	0.37	0.26	0.00
Avail Cap(c_a), veh/h				1447	0	0	0	1080	1118	342	3353	0
HCM Platoon Ratio				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)				1.00	0.00	0.00	0.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh				12.2	0.0	0.0	0.0	7.0	7.0	14.2	3.6	0.0
Incr Delay (d2), s/veh				2.2	0.0	0.0	0.0	1.3	1.2	13.9	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				0.5	0.0	0.0	0.0	0.7	0.8	0.1	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh				14.4	0.0	0.0	0.0	8.3	8.2	28.0	3.8	0.0
LnGrp LOS				B	A	A	A	A	A	C	A	A
Approach Vol, veh/h					85			585			457	
Approach Delay, s/veh					14.4			8.3			4.1	
Approach LOS					B			A			A	

Timer - Assigned Phs	1	2		4		6
Phs Duration (G+Y+Rc), s	4.8	16.6		7.5		21.3
Change Period (Y+Rc), s	4.5	6.0		4.5		6.0
Max Green Setting (Gmax), s	6.3	19.0		25.0		29.5
Max Q Clear Time (g_c+I1), s	2.1	5.9		3.4		4.2
Green Ext Time (p_c), s	0.0	4.7		0.4		5.0

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

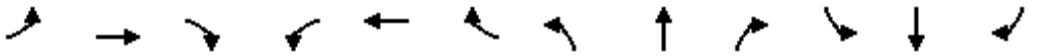
Intersection	
Int Delay, s/veh	0.8

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	10	5	5	110	100	10
Future Vol, veh/h	10	5	5	110	100	10
Conflicting Peds, #/hr	0	0	1	0	0	1
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	89	89	89	89	89	89
Heavy Vehicles, %	9	9	9	9	9	9
Mvmt Flow	11	6	6	124	112	11

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	255	119	124	0	-	0
Stage 1	119	-	-	-	-	-
Stage 2	136	-	-	-	-	-
Critical Hdwy	6.49	6.29	4.19	-	-	-
Critical Hdwy Stg 1	5.49	-	-	-	-	-
Critical Hdwy Stg 2	5.49	-	-	-	-	-
Follow-up Hdwy	3.581	3.381	2.281	-	-	-
Pot Cap-1 Maneuver	719	914	1421	-	-	-
Stage 1	889	-	-	-	-	-
Stage 2	874	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	714	913	1420	-	-	-
Mov Cap-2 Maneuver	714	-	-	-	-	-
Stage 1	884	-	-	-	-	-
Stage 2	873	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	9.8	0.3	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1420	-	770	-	-
HCM Lane V/C Ratio	0.004	-	0.022	-	-
HCM Control Delay (s)	7.5	0	9.8	-	-
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)	120	170	20	20	340	30	20	10	30	70	40	150
Future Volume (veh/h)	120	170	20	20	340	30	20	10	30	70	40	150
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1663	1663	1663	1663	1663	1663	1663	1663	1663	1663	1663	1663
Adj Flow Rate, veh/h	133	189	22	22	378	33	22	11	33	78	44	167
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	16	16	16	16	16	16	16	16	16	16	16	16
Cap, veh/h	169	345	40	73	613	53	33	17	50	167	94	229
Arrive On Green	0.11	0.24	0.24	0.05	0.21	0.21	0.07	0.07	0.07	0.16	0.16	0.16
Sat Flow, veh/h	1584	1462	170	1584	2941	255	501	250	751	1030	581	1409
Grp Volume(v), veh/h	133	0	211	22	202	209	66	0	0	122	0	167
Grp Sat Flow(s),veh/h/ln	1584	0	1632	1584	1580	1617	1503	0	0	1611	0	1409
Q Serve(g_s), s	4.9	0.0	6.8	0.8	7.0	7.0	2.6	0.0	0.0	4.1	0.0	6.7
Cycle Q Clear(g_c), s	4.9	0.0	6.8	0.8	7.0	7.0	2.6	0.0	0.0	4.1	0.0	6.7
Prop In Lane	1.00		0.10	1.00		0.16	0.33		0.50	0.64		1.00
Lane Grp Cap(c), veh/h	169	0	385	73	329	337	100	0	0	262	0	229
V/C Ratio(X)	0.79	0.00	0.55	0.30	0.61	0.62	0.66	0.00	0.00	0.47	0.00	0.73
Avail Cap(c_a), veh/h	687	0	820	793	1107	1133	401	0	0	753	0	658
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	1.00	1.00	1.00	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	26.1	0.0	20.1	27.7	21.5	21.6	27.3	0.0	0.0	22.7	0.0	23.8
Incr Delay (d2), s/veh	7.8	0.0	1.9	2.3	2.8	2.8	7.1	0.0	0.0	1.3	0.0	4.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.9	0.0	2.3	0.3	2.4	2.5	1.0	0.0	0.0	1.5	0.0	2.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	33.9	0.0	22.0	29.9	24.4	24.4	34.4	0.0	0.0	24.0	0.0	28.3
LnGrp LOS	C	A	C	C	C	C	C	A	A	C	A	C
Approach Vol, veh/h		344			433			66			289	
Approach Delay, s/veh		26.6			24.7			34.4			26.5	
Approach LOS		C			C			C			C	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	10.3	21.1		19.6	11.9	19.5		8.9				
Change Period (Y+Rc), s	7.5	* 7		* 9.9	5.5	7.0		4.9				
Max Green Setting (Gmax), s	30.0	* 30		* 28	26.0	42.0		16.0				
Max Q Clear Time (g_c+I1), s	2.8	8.8		8.7	6.9	9.0		4.6				
Green Ext Time (p_c), s	0.0	1.5		1.1	0.3	3.5		0.2				

Intersection Summary			
HCM 6th Ctrl Delay		26.3	
HCM 6th LOS		C	

Notes

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



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	120	130	20	10	200	160	20	30	10	30	10	170
Future Volume (veh/h)	120	130	20	10	200	160	20	30	10	30	10	170
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1663	1663	1663	1663	1663	1663	1663	1663	1663	1663	1663	1663
Adj Flow Rate, veh/h	133	144	22	11	222	178	22	33	11	33	11	189
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	16	16	16	16	16	16	16	16	16	16	16	16
Cap, veh/h	163	526	80	30	248	199	38	57	19	191	64	224
Arrive On Green	0.10	0.37	0.37	0.02	0.29	0.29	0.07	0.07	0.07	0.16	0.16	0.16
Sat Flow, veh/h	1584	1409	215	1584	854	685	530	794	265	1202	401	1409
Grp Volume(v), veh/h	133	0	166	11	0	400	66	0	0	44	0	189
Grp Sat Flow(s),veh/h/ln	1584	0	1624	1584	0	1540	1589	0	0	1603	0	1409
Q Serve(g_s), s	5.9	0.0	5.1	0.5	0.0	17.8	2.9	0.0	0.0	1.7	0.0	9.3
Cycle Q Clear(g_c), s	5.9	0.0	5.1	0.5	0.0	17.8	2.9	0.0	0.0	1.7	0.0	9.3
Prop In Lane	1.00		0.13	1.00		0.44	0.33		0.17	0.75		1.00
Lane Grp Cap(c), veh/h	163	0	607	30	0	447	114	0	0	254	0	224
V/C Ratio(X)	0.82	0.00	0.27	0.36	0.00	0.90	0.58	0.00	0.00	0.17	0.00	0.84
Avail Cap(c_a), veh/h	575	0	726	597	0	795	599	0	0	582	0	512
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	31.5	0.0	15.7	34.7	0.0	24.4	32.2	0.0	0.0	26.1	0.0	29.3
Incr Delay (d2), s/veh	3.8	0.0	0.1	2.7	0.0	2.8	1.7	0.0	0.0	0.1	0.0	3.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.2	0.0	1.6	0.2	0.0	6.4	1.1	0.0	0.0	0.6	0.0	3.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	35.3	0.0	15.7	37.3	0.0	27.2	34.0	0.0	0.0	26.2	0.0	32.6
LnGrp LOS	D	A	B	D	A	C	C	A	A	C	A	C
Approach Vol, veh/h		299			411			66			233	
Approach Delay, s/veh		24.4			27.4			34.0			31.4	
Approach LOS		C			C			C			C	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	7.7	33.8		19.3	13.7	27.8		10.9
Change Period (Y+Rc), s	* 6.3	* 7		7.9	* 6.3	7.0		5.8
Max Green Setting (Gmax), s	* 27	* 32		26.0	* 26	37.0		27.0
Max Q Clear Time (g_c+I1), s	2.5	7.1		11.3	7.9	19.8		4.9
Green Ext Time (p_c), s	0.0	0.1		0.1	0.0	0.9		0.1

Intersection Summary		
HCM 6th Ctrl Delay	27.9	
HCM 6th LOS	C	

Notes

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

Intersection	
Int Delay, s/veh	0.2

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	20	610	30	0	550
Future Vol, veh/h	0	20	610	30	0	550
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, %	6	6	6	6	6	6
Mvmt Flow	0	22	663	33	0	598

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	-	348	0	0	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	7.02	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.36	-	-	-	-
Pot Cap-1 Maneuver	0	637	-	-	0	-
Stage 1	0	-	-	-	0	-
Stage 2	0	-	-	-	0	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	-	637	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	10.9	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBT
Capacity (veh/h)	-	-	637	-
HCM Lane V/C Ratio	-	-	0.034	-
HCM Control Delay (s)	-	-	10.9	-
HCM Lane LOS	-	-	B	-
HCM 95th %tile Q(veh)	-	-	0.1	-

Intersection	
Int Delay, s/veh	2.4

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	60	70	370	30	30	330
Future Vol, veh/h	60	70	370	30	30	330
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	-	-	-	250	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	6	6	6	6	6	6
Mvmt Flow	65	76	402	33	33	359

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	665	218	0	0	435	0
Stage 1	419	-	-	-	-	-
Stage 2	246	-	-	-	-	-
Critical Hdwy	6.92	7.02	-	-	4.22	-
Critical Hdwy Stg 1	5.92	-	-	-	-	-
Critical Hdwy Stg 2	5.92	-	-	-	-	-
Follow-up Hdwy	3.56	3.36	-	-	2.26	-
Pot Cap-1 Maneuver	384	774	-	-	1093	-
Stage 1	620	-	-	-	-	-
Stage 2	760	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	372	774	-	-	1093	-
Mov Cap-2 Maneuver	372	-	-	-	-	-
Stage 1	620	-	-	-	-	-
Stage 2	737	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	14.6	0	0.7
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	516	1093	-
HCM Lane V/C Ratio	-	-	0.274	0.03	-
HCM Control Delay (s)	-	-	14.6	8.4	-
HCM Lane LOS	-	-	B	A	-
HCM 95th %tile Q(veh)	-	-	1.1	0.1	-

Intersection	
Int Delay, s/veh	2.2

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	50	70	410	30	30	310
Future Vol, veh/h	50	70	410	30	30	310
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	-	-	-	300	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	6	6	6	6	6	6
Mvmt Flow	54	76	446	33	33	337

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	698	240	0	0	479	0
Stage 1	463	-	-	-	-	-
Stage 2	235	-	-	-	-	-
Critical Hdwy	6.92	7.02	-	-	4.22	-
Critical Hdwy Stg 1	5.92	-	-	-	-	-
Critical Hdwy Stg 2	5.92	-	-	-	-	-
Follow-up Hdwy	3.56	3.36	-	-	2.26	-
Pot Cap-1 Maneuver	366	749	-	-	1052	-
Stage 1	589	-	-	-	-	-
Stage 2	770	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	355	749	-	-	1052	-
Mov Cap-2 Maneuver	355	-	-	-	-	-
Stage 1	589	-	-	-	-	-
Stage 2	746	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	14.4	0	0.8
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	512	1052	-
HCM Lane V/C Ratio	-	-	0.255	0.031	-
HCM Control Delay (s)	-	-	14.4	8.5	-
HCM Lane LOS	-	-	B	A	-
HCM 95th %tile Q(veh)	-	-	1	0.1	-

Intersection	
Int Delay, s/veh	3.4

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	20	50	30	90	60	10
Future Vol, veh/h	20	50	30	90	60	10
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	120	0	200	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	6	6	6	6	6	6
Mvmt Flow	22	54	33	98	65	11

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	235	71	76	0	-	0
Stage 1	71	-	-	-	-	-
Stage 2	164	-	-	-	-	-
Critical Hdwy	6.46	6.26	4.16	-	-	-
Critical Hdwy Stg 1	5.46	-	-	-	-	-
Critical Hdwy Stg 2	5.46	-	-	-	-	-
Follow-up Hdwy	3.554	3.354	2.254	-	-	-
Pot Cap-1 Maneuver	744	980	1498	-	-	-
Stage 1	942	-	-	-	-	-
Stage 2	856	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	728	980	1498	-	-	-
Mov Cap-2 Maneuver	728	-	-	-	-	-
Stage 1	921	-	-	-	-	-
Stage 2	856	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	9.2	1.9	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	1498	-	728	980	-	-
HCM Lane V/C Ratio	0.022	-	0.03	0.055	-	-
HCM Control Delay (s)	7.5	-	10.1	8.9	-	-
HCM Lane LOS	A	-	B	A	-	-
HCM 95th %tile Q(veh)	0.1	-	0.1	0.2	-	-



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	480	230	140	330	190	130
Future Volume (veh/h)	480	230	140	330	190	130
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1811	1811	1811	1811	1811	1811
Adj Flow Rate, veh/h	511	245	149	351	202	138
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	6	6	6	6	6	6
Cap, veh/h	761	645	192	1138	306	272
Arrive On Green	0.42	0.42	0.11	0.63	0.18	0.18
Sat Flow, veh/h	1811	1535	1725	1811	1725	1535
Grp Volume(v), veh/h	511	245	149	351	202	138
Grp Sat Flow(s),veh/h/ln	1811	1535	1725	1811	1725	1535
Q Serve(g_s), s	14.1	6.8	5.2	5.5	6.7	5.0
Cycle Q Clear(g_c), s	14.1	6.8	5.2	5.5	6.7	5.0
Prop In Lane		1.00	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	761	645	192	1138	306	272
V/C Ratio(X)	0.67	0.38	0.78	0.31	0.66	0.51
Avail Cap(c_a), veh/h	1173	994	559	1173	559	497
HCM Platoon Ratio	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
Uniform Delay (d), s/veh	14.5	12.4	26.7	5.3	23.7	23.0
Incr Delay (d2), s/veh	3.7	1.3	6.6	0.6	8.6	5.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.0	2.0	2.2	1.2	3.0	1.9
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	18.2	13.7	33.2	5.8	32.2	28.2
LnGrp LOS	B	B	C	A	C	C
Approach Vol, veh/h	756			500	340	
Approach Delay, s/veh	16.7			14.0	30.6	
Approach LOS	B			B	C	

Timer - Assigned Phs	1	2		4		6
Phs Duration (G+Y+Rc), s	12.9	31.9		16.9		44.8
Change Period (Y+Rc), s	6.0	6.0		6.0		6.0
Max Green Setting (Gmax), s	20.0	40.0		20.0		40.0
Max Q Clear Time (g_c+I1), s	7.2	16.1		8.7		7.5
Green Ext Time (p_c), s	0.3	9.9		2.2		5.1

Intersection Summary	
HCM 6th Ctrl Delay	18.8
HCM 6th LOS	B



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	60	110	280	10	100	40	100	280	10	30	360	5
Future Volume (veh/h)	60	110	280	10	100	40	100	280	10	30	360	5
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1841	1811	1841	1811	1811	1811	1841	1841	1811	1811	1841	1841
Adj Flow Rate, veh/h	70	120	326	11	109	43	116	326	11	33	419	6
Peak Hour Factor	0.86	0.92	0.86	0.92	0.92	0.92	0.86	0.86	0.92	0.92	0.86	0.86
Percent Heavy Veh, %	4	6	4	6	6	6	4	4	6	6	4	4
Cap, veh/h	165	897	407	24	622	278	185	539	450	162	518	434
Arrive On Green	0.09	0.26	0.26	0.01	0.18	0.18	0.11	0.29	0.29	0.09	0.28	0.28
Sat Flow, veh/h	1753	3441	1560	1725	3441	1535	1753	1841	1535	1725	1841	1540
Grp Volume(v), veh/h	70	120	326	11	109	43	116	326	11	33	419	6
Grp Sat Flow(s),veh/h/ln	1753	1721	1560	1725	1721	1535	1753	1841	1535	1725	1841	1540
Q Serve(g_s), s	2.0	1.4	10.4	0.3	1.4	1.3	3.4	8.1	0.3	0.9	11.3	0.1
Cycle Q Clear(g_c), s	2.0	1.4	10.4	0.3	1.4	1.3	3.4	8.1	0.3	0.9	11.3	0.1
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	165	897	407	24	622	278	185	539	450	162	518	434
V/C Ratio(X)	0.43	0.13	0.80	0.45	0.18	0.15	0.63	0.60	0.02	0.20	0.81	0.01
Avail Cap(c_a), veh/h	593	1649	748	162	1649	735	840	882	735	583	882	738
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	22.8	15.1	18.4	26.0	18.4	18.4	22.8	16.2	13.4	22.3	17.8	13.8
Incr Delay (d2), s/veh	1.7	0.1	3.7	12.6	0.1	0.3	3.5	1.1	0.0	0.6	3.1	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.8	0.5	3.3	0.2	0.5	0.4	1.3	2.7	0.1	0.3	4.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	24.5	15.1	22.1	38.6	18.6	18.6	26.3	17.3	13.4	22.9	20.8	13.8
LnGrp LOS	C	B	C	D	B	B	C	B	B	C	C	B
Approach Vol, veh/h		516			163			453			458	
Approach Delay, s/veh		20.8			19.9			19.5			20.9	
Approach LOS		C			B			B			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	5.3	18.4	10.1	19.5	9.5	14.1	9.5	20.1
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	5.0	25.5	25.5	25.5	18.0	25.5	18.0	25.5
Max Q Clear Time (g_c+I1), s	2.3	12.4	5.4	13.3	4.0	3.4	2.9	10.1
Green Ext Time (p_c), s	0.0	1.5	0.2	1.7	0.1	0.7	0.0	1.4

Intersection Summary	
HCM 6th Ctrl Delay	20.4
HCM 6th LOS	C

Intersection	
Int Delay, s/veh	38.7

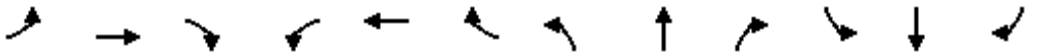
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	20	5	60	150	5	45	80	360	190	100	480	40
Future Vol, veh/h	20	5	60	150	5	45	80	360	190	100	480	40
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	0	-	100	100	-	-	140	-	-	140	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	89	92	89	92	92	92	89	89	92	92	89	89
Heavy Vehicles, %	3	6	3	6	6	6	3	3	6	6	3	3
Mvmt Flow	22	5	67	163	5	49	90	404	207	109	539	45

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1165	1571	292	1178	1490	306	584	0	0	611	0	0
Stage 1	780	780	-	688	688	-	-	-	-	-	-	-
Stage 2	385	791	-	490	802	-	-	-	-	-	-	-
Critical Hdwy	7.56	6.62	6.96	7.62	6.62	7.02	4.16	-	-	4.22	-	-
Critical Hdwy Stg 1	6.56	5.62	-	6.62	5.62	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.56	5.62	-	6.62	5.62	-	-	-	-	-	-	-
Follow-up Hdwy	3.53	4.06	3.33	3.56	4.06	3.36	2.23	-	-	2.26	-	-
Pot Cap-1 Maneuver	148	105	701	~ 141	118	678	980	-	-	937	-	-
Stage 1	352	395	-	393	435	-	-	-	-	-	-	-
Stage 2	607	390	-	518	385	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	112	84	701	~ 103	95	678	980	-	-	937	-	-
Mov Cap-2 Maneuver	112	84	-	~ 103	95	-	-	-	-	-	-	-
Stage 1	320	349	-	357	395	-	-	-	-	-	-	-
Stage 2	504	354	-	407	340	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	21.7	285.9	1.2	1.5
HCM LOS	C	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	980	-	-	112	453	103	420	937	-	-
HCM Lane V/C Ratio	0.092	-	-	0.201	0.161	1.583	0.129	0.116	-	-
HCM Control Delay (s)	9	-	-	45	14.5	$ 376.3	14.8	9.3	-	-
HCM Lane LOS	A	-	-	E	B	F	B	A	-	-
HCM 95th %tile Q(veh)	0.3	-	-	0.7	0.6	12.4	0.4	0.4	-	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	30	5	140	50	5	20	150	650	70	20	580	80
Future Volume (veh/h)	30	5	140	50	5	20	150	650	70	20	580	80
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		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	32	5	151	54	5	22	161	699	75	22	624	86
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, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	76	7	217	112	49	214	214	1350	145	56	1030	142
Arrive On Green	0.04	0.14	0.14	0.06	0.16	0.16	0.12	0.42	0.42	0.03	0.33	0.33
Sat Flow, veh/h	1781	51	1539	1781	302	1329	1781	3230	346	1781	3128	430
Grp Volume(v), veh/h	32	0	156	54	0	27	161	384	390	22	354	356
Grp Sat Flow(s),veh/h/ln	1781	0	1590	1781	0	1631	1781	1777	1799	1781	1777	1782
Q Serve(g_s), s	0.9	0.0	4.8	1.5	0.0	0.7	4.5	8.3	8.3	0.6	8.6	8.6
Cycle Q Clear(g_c), s	0.9	0.0	4.8	1.5	0.0	0.7	4.5	8.3	8.3	0.6	8.6	8.6
Prop In Lane	1.00		0.97	1.00		0.81	1.00		0.19	1.00		0.24
Lane Grp Cap(c), veh/h	76	0	224	112	0	262	214	742	752	56	585	587
V/C Ratio(X)	0.42	0.00	0.70	0.48	0.00	0.10	0.75	0.52	0.52	0.39	0.61	0.61
Avail Cap(c_a), veh/h	726	0	709	726	0	728	898	1379	1396	898	1375	1379
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	1.00	1.00
Uniform Delay (d), s/veh	24.0	0.0	21.1	23.4	0.0	18.5	21.9	11.1	11.2	24.5	14.5	14.5
Incr Delay (d2), s/veh	3.6	0.0	3.9	3.2	0.0	0.2	5.3	0.8	0.8	4.4	1.4	1.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	0.0	1.9	0.7	0.0	0.3	1.9	2.5	2.5	0.3	2.9	2.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	27.7	0.0	25.0	26.6	0.0	18.6	27.2	11.9	11.9	28.9	15.9	15.9
LnGrp LOS	C	A	C	C	A	B	C	B	B	C	B	B
Approach Vol, veh/h		188			81			935			732	
Approach Delay, s/veh		25.4			23.9			14.6			16.3	
Approach LOS		C			C			B			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	5.6	26.8	7.2	11.9	10.2	22.3	6.2	12.9
Change Period (Y+Rc), s	4.0	5.3	4.0	4.6	4.0	5.3	4.0	4.6
Max Green Setting (Gmax), s	26.0	40.0	21.0	23.0	26.0	39.9	21.0	23.0
Max Q Clear Time (g_c+I1), s	2.6	10.3	3.5	6.8	6.5	10.6	2.9	2.7
Green Ext Time (p_c), s	0.0	7.1	0.1	0.8	0.4	6.3	0.0	0.1

Intersection Summary	
HCM 6th Ctrl Delay	16.7
HCM 6th LOS	B

Notes

User approved pedestrian interval to be less than phase max green.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	280	1140	150	310	1010	290	140	460	290	310	420	140
Future Volume (veh/h)	280	1140	150	310	1010	290	140	460	290	310	420	140
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		0.99	1.00		0.99	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856
Adj Flow Rate, veh/h	295	1200	158	326	1063	305	147	484	305	326	442	147
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	278	1259	555	278	964	274	171	384	241	303	676	223
Arrive On Green	0.16	0.36	0.36	0.16	0.36	0.36	0.10	0.19	0.19	0.17	0.26	0.26
Sat Flow, veh/h	1767	3526	1553	1767	2700	768	1767	2066	1297	1767	2595	855
Grp Volume(v), veh/h	295	1200	158	326	691	677	147	413	376	326	299	290
Grp Sat Flow(s),veh/h/ln	1767	1763	1553	1767	1763	1706	1767	1763	1600	1767	1763	1688
Q Serve(g_s), s	22.0	46.4	10.2	22.0	50.0	50.0	11.5	26.0	26.0	24.0	21.1	21.5
Cycle Q Clear(g_c), s	22.0	46.4	10.2	22.0	50.0	50.0	11.5	26.0	26.0	24.0	21.1	21.5
Prop In Lane	1.00		1.00	1.00		0.45	1.00		0.81	1.00		0.51
Lane Grp Cap(c), veh/h	278	1259	555	278	630	609	171	327	297	303	459	440
V/C Ratio(X)	1.06	0.95	0.28	1.17	1.10	1.11	0.86	1.26	1.27	1.08	0.65	0.66
Avail Cap(c_a), veh/h	278	1259	555	278	630	609	202	327	297	303	459	440
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	59.0	43.9	32.2	59.0	45.0	45.0	62.3	57.0	57.0	58.0	46.1	46.2
Incr Delay (d2), s/veh	71.4	15.6	0.4	109.5	65.3	71.1	26.5	139.6	144.0	73.4	3.7	4.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	15.1	22.2	3.9	18.1	32.4	32.3	6.3	24.1	22.2	16.7	9.5	9.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	130.4	59.5	32.6	168.5	110.3	116.1	88.8	196.6	201.0	131.4	49.8	50.3
LnGrp LOS	F	E	C	F	F	F	F	F	F	F	D	D
Approach Vol, veh/h		1653			1694			936			915	
Approach Delay, s/veh		69.6			123.8			181.4			79.0	
Approach LOS		E			F			F			E	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	26.0	55.0	17.5	41.5	26.0	55.0	28.0	31.0
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	22.0	50.0	16.0	34.0	22.0	50.0	24.0	26.0
Max Q Clear Time (g_c+I1), s	24.0	48.4	13.5	23.5	24.0	52.0	26.0	28.0
Green Ext Time (p_c), s	0.0	1.3	0.1	3.3	0.0	0.0	0.0	0.0

Intersection Summary	
HCM 6th Ctrl Delay	109.1
HCM 6th LOS	F



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	200	110	370	140	0	0	0	0	420	0	40
Future Volume (veh/h)	0	200	110	370	140	0	0	0	0	420	0	40
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00				1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Work Zone On Approach		No			No						No	
Adj Sat Flow, veh/h/ln	0	1530	1530	1530	1530	0				1530	1530	1530
Adj Flow Rate, veh/h	0	213	117	394	149	0				487	0	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, %	0	25	25	25	25	0				25	25	25
Cap, veh/h	0	389	205	440	1740	0				601	316	0
Arrive On Green	0.00	0.21	0.21	0.30	0.60	0.00				0.21	0.00	0.00
Sat Flow, veh/h	0	1915	970	1457	2983	0				2913	1530	0
Grp Volume(v), veh/h	0	167	163	394	149	0				487	0	0
Grp Sat Flow(s),veh/h/ln	0	1453	1355	1457	1453	0				1457	1530	0
Q Serve(g_s), s	0.0	4.8	5.1	12.2	1.0	0.0				7.5	0.0	0.0
Cycle Q Clear(g_c), s	0.0	4.8	5.1	12.2	1.0	0.0				7.5	0.0	0.0
Prop In Lane	0.00		0.72	1.00		0.00				1.00		0.00
Lane Grp Cap(c), veh/h	0	308	287	440	1740	0				601	316	0
V/C Ratio(X)	0.00	0.54	0.57	0.90	0.09	0.00				0.81	0.00	0.00
Avail Cap(c_a), veh/h	0	336	313	648	2210	0				920	483	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	1.00	1.00	1.00	0.00				1.00	0.00	0.00
Uniform Delay (d), s/veh	0.0	16.6	16.7	15.8	4.0	0.0				17.9	0.0	0.0
Incr Delay (d2), s/veh	0.0	1.5	2.1	8.3	0.0	0.0				1.7	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	1.4	1.5	4.2	0.2	0.0				2.1	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	18.0	18.7	24.0	4.0	0.0				19.5	0.0	0.0
LnGrp LOS	A	B	B	C	A	A				B	A	A
Approach Vol, veh/h		330			543						487	
Approach Delay, s/veh		18.4			18.5						19.5	
Approach LOS		B			B						B	

Timer - Assigned Phs	1	2		4		6
Phs Duration (G+Y+Rc), s	18.3	14.6		14.3		32.9
Change Period (Y+Rc), s	4.0	4.6		4.6		4.6
Max Green Setting (Gmax), s	21.0	10.9		14.9		35.9
Max Q Clear Time (g_c+I1), s	14.2	7.1		9.5		3.0
Green Ext Time (p_c), s	0.1	0.6		0.2		0.9

Intersection Summary	
HCM 6th Ctrl Delay	18.9
HCM 6th LOS	B

Notes

User approved volume balancing among the lanes for turning movement.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	50	570	0	0	430	330	80	0	230	0	0	0
Future Volume (veh/h)	50	570	0	0	430	330	80	0	230	0	0	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Work Zone On Approach		No			No			No				
Adj Sat Flow, veh/h/ln	1530	1530	0	0	1530	1530	1530	1530	1530			
Adj Flow Rate, veh/h	53	606	0	0	457	0	85	0	245			
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94			
Percent Heavy Veh, %	25	25	0	0	25	25	25	25	25			
Cap, veh/h	81	1579	0	0	591		328	0	292			
Arrive On Green	0.06	0.54	0.00	0.00	0.39	0.00	0.23	0.00	0.23			
Sat Flow, veh/h	1457	2983	0	0	1530	0	1457	0	1296			
Grp Volume(v), veh/h	53	606	0	0	457	0	85	0	245			
Grp Sat Flow(s),veh/h/ln	1457	1453	0	0	1530	0	1457	0	1296			
Q Serve(g_s), s	1.4	4.8	0.0	0.0	10.4	0.0	1.9	0.0	7.2			
Cycle Q Clear(g_c), s	1.4	4.8	0.0	0.0	10.4	0.0	1.9	0.0	7.2			
Prop In Lane	1.00		0.00	0.00		0.00	1.00		1.00			
Lane Grp Cap(c), veh/h	81	1579	0	0	591		328	0	292			
V/C Ratio(X)	0.65	0.38	0.00	0.00	0.77		0.26	0.00	0.84			
Avail Cap(c_a), veh/h	183	4127	0	0	1826		345	0	307			
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	1.00	1.00	0.00	0.00	1.00	0.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	18.4	5.2	0.0	0.0	10.7	0.0	12.7	0.0	14.7			
Incr Delay (d2), s/veh	3.3	0.2	0.0	0.0	2.2	0.0	0.2	0.0	16.5			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	0.5	0.7	0.0	0.0	2.6	0.0	0.5	0.0	2.8			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	21.6	5.4	0.0	0.0	12.8	0.0	12.8	0.0	31.2			
LnGrp LOS	C	A	A	A	B		B	A	C			
Approach Vol, veh/h		659			457	A		330				
Approach Delay, s/veh		6.7			12.8			26.5				
Approach LOS		A			B			C				
Timer - Assigned Phs		2			5	6		8				
Phs Duration (G+Y+Rc), s		26.2			6.2	20.0		13.5				
Change Period (Y+Rc), s		4.6			4.0	4.6		4.6				
Max Green Setting (Gmax), s		56.4			5.0	47.4		9.4				
Max Q Clear Time (g_c+I1), s		6.8			3.4	12.4		9.2				
Green Ext Time (p_c), s		4.5			0.0	3.0		0.0				

Intersection Summary	
HCM 6th Ctrl Delay	13.2
HCM 6th LOS	B

Notes

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



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	120	480	140	10	190	10	80	590	10	30	440	190
Future Volume (veh/h)	120	480	140	10	190	10	80	590	10	30	440	190
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1678	1811	1678	1811	1811	1811	1678	1678	1811	1811	1678	1678
Adj Flow Rate, veh/h	140	522	41	11	207	9	93	686	10	33	512	51
Peak Hour Factor	0.86	0.92	0.86	0.92	0.92	0.92	0.86	0.86	0.92	0.92	0.86	0.86
Percent Heavy Veh, %	15	6	15	6	6	6	15	15	6	6	15	15
Cap, veh/h	179	961	397	24	272	12	100	1104	16	60	1005	448
Arrive On Green	0.11	0.28	0.28	0.01	0.16	0.16	0.06	0.34	0.34	0.03	0.32	0.32
Sat Flow, veh/h	1598	3441	1422	1725	1723	75	1598	3216	47	1725	3188	1422
Grp Volume(v), veh/h	140	522	41	11	0	216	93	340	356	33	512	51
Grp Sat Flow(s),veh/h/ln	1598	1721	1422	1725	0	1798	1598	1594	1669	1725	1594	1422
Q Serve(g_s), s	5.4	8.2	1.4	0.4	0.0	7.3	3.7	11.4	11.4	1.2	8.4	1.6
Cycle Q Clear(g_c), s	5.4	8.2	1.4	0.4	0.0	7.3	3.7	11.4	11.4	1.2	8.4	1.6
Prop In Lane	1.00		1.00	1.00		0.04	1.00		0.03	1.00		1.00
Lane Grp Cap(c), veh/h	179	961	397	24	0	283	100	547	573	60	1005	448
V/C Ratio(X)	0.78	0.54	0.10	0.46	0.00	0.76	0.93	0.62	0.62	0.55	0.51	0.11
Avail Cap(c_a), veh/h	801	2424	1002	135	0	507	100	836	876	149	1747	779
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	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	27.6	19.5	17.1	31.3	0.0	25.8	29.8	17.5	17.5	30.3	17.8	15.5
Incr Delay (d2), s/veh	7.2	0.5	0.1	13.1	0.0	4.2	68.0	4.1	4.0	7.7	1.5	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.3	3.1	0.4	0.2	0.0	3.3	3.1	3.9	4.1	0.6	2.7	0.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	34.8	20.0	17.2	44.4	0.0	30.0	97.8	21.7	21.5	38.0	19.3	15.9
LnGrp LOS	C	C	B	D	A	C	F	C	C	D	B	B
Approach Vol, veh/h		703			227			789			596	
Approach Delay, s/veh		22.8			30.7			30.6			20.0	
Approach LOS		C			C			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.5	26.1	5.4	23.8	6.7	27.9	13.2	16.1
Change Period (Y+Rc), s	4.5	6.0	4.5	6.0	4.5	6.0	6.0	* 6
Max Green Setting (Gmax), s	4.0	35.0	5.0	45.0	5.5	33.5	32.0	* 18
Max Q Clear Time (g_c+I1), s	5.7	10.4	2.4	10.2	3.2	13.4	7.4	9.3
Green Ext Time (p_c), s	0.0	7.8	0.0	4.1	0.0	8.5	0.4	0.7

Intersection Summary	
HCM 6th Ctrl Delay	25.5
HCM 6th LOS	C

Notes

User approved pedestrian interval to be less than phase max green.

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



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	1700	380	230	1650	0	0	0	0	370	0	680
Future Volume (veh/h)	0	1700	380	230	1650	0	0	0	0	370	0	680
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		1.00				1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Work Zone On Approach		No			No						No	
Adj Sat Flow, veh/h/ln	0	1841	1841	1841	1841	0				1841	1841	1841
Adj Flow Rate, veh/h	0	1889	289	256	1833	0				411	0	713
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90				0.90	0.90	0.90
Percent Heavy Veh, %	0	4	4	4	4	0				4	4	4
Cap, veh/h	0	2134	640	270	2204	0				883	0	786
Arrive On Green	0.00	0.42	0.42	0.15	0.63	0.00				0.25	0.00	0.25
Sat Flow, veh/h	0	5191	1507	1753	3589	0				3506	0	3120
Grp Volume(v), veh/h	0	1889	289	256	1833	0				411	0	713
Grp Sat Flow(s),veh/h/ln	0	1675	1507	1753	1749	0				1753	0	1560
Q Serve(g_s), s	0.0	27.0	10.6	11.3	31.7	0.0				7.7	0.0	17.3
Cycle Q Clear(g_c), s	0.0	27.0	10.6	11.3	31.7	0.0				7.7	0.0	17.3
Prop In Lane	0.00		1.00	1.00		0.00				1.00		1.00
Lane Grp Cap(c), veh/h	0	2134	640	270	2204	0				883	0	786
V/C Ratio(X)	0.00	0.89	0.45	0.95	0.83	0.00				0.47	0.00	0.91
Avail Cap(c_a), veh/h	0	2181	654	270	2236	0				945	0	841
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	1.00	1.00	1.00	0.00				1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	20.7	16.0	32.6	11.2	0.0				24.7	0.0	28.3
Incr Delay (d2), s/veh	0.0	4.7	0.5	40.3	2.8	0.0				0.1	0.0	12.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	9.9	3.3	7.4	9.4	0.0				3.0	0.0	7.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	25.3	16.4	72.9	14.0	0.0				24.8	0.0	40.7
LnGrp LOS	A	C	B	E	B	A				C	A	D
Approach Vol, veh/h		2178			2089						1124	
Approach Delay, s/veh		24.2			21.2						34.9	
Approach LOS		C			C						C	

Timer - Assigned Phs	1	2		4		6
Phs Duration (G+Y+Rc), s	16.0	37.7		24.2		53.7
Change Period (Y+Rc), s	4.0	4.6		4.6		4.6
Max Green Setting (Gmax), s	12.0	33.8		21.0		49.8
Max Q Clear Time (g_c+I1), s	13.3	29.0		19.3		33.7
Green Ext Time (p_c), s	0.0	4.1		0.3		10.9

Intersection Summary	
HCM 6th Ctrl Delay	25.2
HCM 6th LOS	C

Notes

User approved volume balancing among the lanes for turning movement.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	510	1560	0	0	1350	270	530	0	430	0	0	0
Future Volume (veh/h)	510	1560	0	0	1350	270	530	0	430	0	0	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.97	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Work Zone On Approach		No			No			No				
Adj Sat Flow, veh/h/ln	1841	1841	0	0	1841	1841	1841	1841	1841			
Adj Flow Rate, veh/h	567	1733	0	0	1500	236	589	0	409			
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90			
Percent Heavy Veh, %	4	4	0	0	4	4	4	4	4			
Cap, veh/h	605	2424	0	0	1624	703	667	0	593			
Arrive On Green	0.18	0.69	0.00	0.00	0.46	0.46	0.19	0.00	0.19			
Sat Flow, veh/h	3401	3589	0	0	3589	1513	3506	0	3120			
Grp Volume(v), veh/h	567	1733	0	0	1500	236	589	0	409			
Grp Sat Flow(s),veh/h/ln	1700	1749	0	0	1749	1513	1753	0	1560			
Q Serve(g_s), s	13.0	23.7	0.0	0.0	31.7	7.8	12.9	0.0	9.6			
Cycle Q Clear(g_c), s	13.0	23.7	0.0	0.0	31.7	7.8	12.9	0.0	9.6			
Prop In Lane	1.00		0.00	0.00		1.00	1.00		1.00			
Lane Grp Cap(c), veh/h	605	2424	0	0	1624	703	667	0	593			
V/C Ratio(X)	0.94	0.72	0.00	0.00	0.92	0.34	0.88	0.00	0.69			
Avail Cap(c_a), veh/h	605	2460	0	0	1661	718	686	0	610			
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	1.00	1.00	0.00	0.00	1.00	1.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	32.0	7.4	0.0	0.0	19.8	13.4	31.0	0.0	29.7			
Incr Delay (d2), s/veh	22.2	1.0	0.0	0.0	9.0	0.3	12.3	0.0	2.6			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	6.8	5.7	0.0	0.0	12.7	2.3	6.1	0.0	3.5			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	54.2	8.3	0.0	0.0	28.7	13.6	43.3	0.0	32.3			
LnGrp LOS	D	A	A	A	C	B	D	A	C			
Approach Vol, veh/h		2300			1736			998				
Approach Delay, s/veh		19.6			26.7			38.8				
Approach LOS		B			C			D				
Timer - Assigned Phs		2			5	6		8				
Phs Duration (G+Y+Rc), s		59.2			18.0	41.2		19.6				
Change Period (Y+Rc), s		4.6			4.0	4.6		4.6				
Max Green Setting (Gmax), s		55.4			14.0	37.4		15.4				
Max Q Clear Time (g_c+I1), s		25.7			15.0	33.7		14.9				
Green Ext Time (p_c), s		14.9			0.0	2.9		0.1				

Intersection Summary	
HCM 6th Ctrl Delay	25.9
HCM 6th LOS	C

Notes

User approved volume balancing among the lanes for turning movement.

Intersection	
Int Delay, s/veh	0.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	1730	260	0	1550	0	0	0	40	0	0	70
Future Vol, veh/h	0	1730	260	0	1550	0	0	0	40	0	0	70
Conflicting Peds, #/hr	0	0	2	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	0	-	-	0
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	4	4	4	4	4	4	4	4	4	4	4	4
Mvmt Flow	0	1922	289	0	1722	0	0	0	44	0	0	78

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	-	0	0	-	-	0	-	-	1108	-	-	861
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	-	-	-	6.98	-	-	6.98
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	-	-	-	3.34	-	-	3.34
Pot Cap-1 Maneuver	0	-	-	0	-	0	0	0	201	0	0	295
Stage 1	0	-	-	0	-	0	0	0	-	0	0	-
Stage 2	0	-	-	0	-	0	0	0	-	0	0	-
Platoon blocked, %		-	-		-							
Mov Cap-1 Maneuver	-	-	-	-	-	-	-	-	201	-	-	295
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0	27.9	21.5
HCM LOS			D	C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBT	SBLn1
Capacity (veh/h)	201	-	-	-	295
HCM Lane V/C Ratio	0.221	-	-	-	0.264
HCM Control Delay (s)	27.9	-	-	-	21.5
HCM Lane LOS	D	-	-	-	C
HCM 95th %tile Q(veh)	0.8	-	-	-	1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	290	1280	220	110	1060	140	300	230	130	120	130	150
Future Volume (veh/h)	290	1280	220	110	1060	140	300	230	130	120	130	150
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		0.98	1.00		0.99	1.00		0.95
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	1841	1841	1841	1841	1841	1841	1841	1841	1841
Adj Flow Rate, veh/h	322	1422	235	122	1178	148	333	256	81	133	144	6
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	4	4	4	4	4	4	4	4	4	4	4	4
Cap, veh/h	269	1442	235	127	1246	156	283	481	149	158	383	16
Arrive On Green	0.15	0.48	0.48	0.07	0.40	0.40	0.16	0.18	0.18	0.09	0.11	0.11
Sat Flow, veh/h	1753	3002	488	1753	3118	390	1753	2622	809	1753	3415	141
Grp Volume(v), veh/h	322	819	838	122	659	667	333	169	168	133	73	77
Grp Sat Flow(s),veh/h/ln	1753	1749	1742	1753	1749	1760	1753	1749	1682	1753	1749	1807
Q Serve(g_s), s	19.0	56.7	59.5	8.6	45.0	45.4	20.0	10.8	11.3	9.3	4.8	4.9
Cycle Q Clear(g_c), s	19.0	56.7	59.5	8.6	45.0	45.4	20.0	10.8	11.3	9.3	4.8	4.9
Prop In Lane	1.00		0.28	1.00		0.22	1.00		0.48	1.00		0.08
Lane Grp Cap(c), veh/h	269	840	836	127	699	703	283	321	309	158	196	203
V/C Ratio(X)	1.20	0.98	1.00	0.96	0.94	0.95	1.18	0.53	0.55	0.84	0.37	0.38
Avail Cap(c_a), veh/h	269	840	836	127	699	703	283	508	489	269	494	511
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	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	52.4	31.5	32.2	57.3	35.8	36.0	51.9	45.7	45.9	55.5	51.0	51.0
Incr Delay (d2), s/veh	119.2	25.2	31.6	66.7	21.7	22.6	110.1	2.8	3.2	4.6	2.5	2.5
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	17.0	27.9	30.4	6.1	22.3	22.8	17.3	4.9	4.9	4.2	2.2	2.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	171.7	56.7	63.8	124.0	57.6	58.6	162.1	48.5	49.1	60.1	53.5	53.5
LnGrp LOS	F	E	F	F	E	E	F	D	D	E	D	D
Approach Vol, veh/h		1979			1448			670			283	
Approach Delay, s/veh		78.4			63.6			105.1			56.6	
Approach LOS		E			E			F			E	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	14.0	65.0	25.0	19.9	24.0	55.0	16.2	28.7
Change Period (Y+Rc), s	5.0	5.5	5.0	6.0	5.0	5.5	5.0	6.0
Max Green Setting (Gmax), s	9.0	59.5	20.0	35.0	19.0	49.5	19.0	36.0
Max Q Clear Time (g_c+I1), s	10.6	61.5	22.0	6.9	21.0	47.4	11.3	13.3
Green Ext Time (p_c), s	0.0	0.0	0.0	1.4	0.0	1.8	0.0	3.5

Intersection Summary	
HCM 6th Ctrl Delay	76.2
HCM 6th LOS	E

Notes

User approved pedestrian interval to be less than phase max green.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	190	990	290	180	940	120	170	500	290	170	430	90
Future Volume (veh/h)	190	990	290	180	940	120	170	500	290	170	430	90
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		0.99	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1811	1811	1811	1811	1811	1811	1811	1811	1811	1811	1811	1811
Adj Flow Rate, veh/h	192	1000	293	182	949	121	172	505	293	172	434	91
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Percent Heavy Veh, %	6	6	6	6	6	6	6	6	6	6	6	6
Cap, veh/h	186	1125	502	207	1166	520	201	854	376	247	901	402
Arrive On Green	0.11	0.33	0.33	0.12	0.34	0.34	0.06	0.25	0.25	0.07	0.26	0.26
Sat Flow, veh/h	1725	3441	1535	1725	3441	1535	3346	3441	1515	3346	3441	1535
Grp Volume(v), veh/h	192	1000	293	182	949	121	172	505	293	172	434	91
Grp Sat Flow(s),veh/h/ln	1725	1721	1535	1725	1721	1535	1673	1721	1515	1673	1721	1535
Q Serve(g_s), s	9.0	23.0	13.2	8.7	21.0	4.7	4.2	10.8	15.0	4.2	8.9	3.9
Cycle Q Clear(g_c), s	9.0	23.0	13.2	8.7	21.0	4.7	4.2	10.8	15.0	4.2	8.9	3.9
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	186	1125	502	207	1166	520	201	854	376	247	901	402
V/C Ratio(X)	1.03	0.89	0.58	0.88	0.81	0.23	0.86	0.59	0.78	0.70	0.48	0.23
Avail Cap(c_a), veh/h	186	1143	510	207	1184	528	201	1031	454	321	1155	515
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	37.2	26.6	23.4	36.1	25.2	19.8	38.9	27.6	29.2	37.7	26.0	24.1
Incr Delay (d2), s/veh	74.5	9.4	2.7	32.4	5.0	0.5	28.9	1.0	8.3	4.4	0.6	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	7.4	9.9	4.7	5.3	8.5	1.6	2.5	4.2	5.9	1.8	3.4	1.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	111.7	36.0	26.1	68.5	30.2	20.3	67.8	28.7	37.6	42.1	26.6	24.6
LnGrp LOS	F	D	C	E	C	C	E	C	D	D	C	C
Approach Vol, veh/h		1485			1252			970			697	
Approach Delay, s/veh		43.8			34.8			38.3			30.2	
Approach LOS		D			C			D			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	14.0	33.3	10.2	26.0	13.0	34.3	9.0	27.2
Change Period (Y+Rc), s	4.0	6.0	4.0	5.3	4.0	6.0	4.0	5.3
Max Green Setting (Gmax), s	10.0	27.7	8.0	25.0	9.0	28.7	5.0	28.0
Max Q Clear Time (g_c+I1), s	10.7	25.0	6.2	17.0	11.0	23.0	6.2	10.9
Green Ext Time (p_c), s	0.0	2.3	0.1	3.7	0.0	4.2	0.0	4.0

Intersection Summary	
HCM 6th Ctrl Delay	37.9
HCM 6th LOS	D

Intersection	
Int Delay, s/veh	17.3

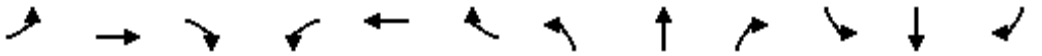
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	90	1470	1220	50	30	120
Future Vol, veh/h	90	1470	1220	50	30	120
Conflicting Peds, #/hr	1	0	0	1	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	110	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	3	3	3	3	3	3
Mvmt Flow	95	1547	1284	53	32	126

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	1338	0	-	0	2276	670
Stage 1	-	-	-	-	1312	-
Stage 2	-	-	-	-	964	-
Critical Hdwy	4.16	-	-	-	6.86	6.96
Critical Hdwy Stg 1	-	-	-	-	5.86	-
Critical Hdwy Stg 2	-	-	-	-	5.86	-
Follow-up Hdwy	2.23	-	-	-	3.53	3.33
Pot Cap-1 Maneuver	506	-	-	-	33	397
Stage 1	-	-	-	-	214	-
Stage 2	-	-	-	-	328	-
Platoon blocked, %			-	-	-	
Mov Cap-1 Maneuver	506	-	-	-	~ 27	397
Mov Cap-2 Maneuver	-	-	-	-	~ 27	-
Stage 1	-	-	-	-	174	-
Stage 2	-	-	-	-	328	-

Approach	EB	WB	SB
HCM Control Delay, s	0.8	0	$ 335.9
HCM LOS			F

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	506	-	-	-	106
HCM Lane V/C Ratio	0.187	-	-	-	1.49
HCM Control Delay (s)	13.7	-	-	-	-$ 335.9
HCM Lane LOS	B	-	-	-	F
HCM 95th %tile Q(veh)	0.7	-	-	-	11.6

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	1520	110	150	1430	160	70	20	140	180	30	20
Future Volume (veh/h)	5	1520	110	150	1430	160	70	20	140	180	30	20
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856
Adj Flow Rate, veh/h	5	1600	116	158	1505	168	74	21	147	189	32	21
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	12	2060	640	194	1632	180	96	27	186	231	218	143
Arrive On Green	0.01	0.41	0.41	0.11	0.51	0.51	0.05	0.13	0.13	0.13	0.21	0.21
Sat Flow, veh/h	1767	5066	1572	1767	3201	354	1767	200	1403	1767	1046	686
Grp Volume(v), veh/h	5	1600	116	158	822	851	74	0	168	189	0	53
Grp Sat Flow(s),veh/h/ln	1767	1689	1572	1767	1763	1792	1767	0	1603	1767	0	1732
Q Serve(g_s), s	0.2	23.0	4.0	7.3	35.9	37.2	3.5	0.0	8.5	8.7	0.0	2.1
Cycle Q Clear(g_c), s	0.2	23.0	4.0	7.3	35.9	37.2	3.5	0.0	8.5	8.7	0.0	2.1
Prop In Lane	1.00		1.00	1.00		0.20	1.00		0.88	1.00		0.40
Lane Grp Cap(c), veh/h	12	2060	640	194	899	914	96	0	212	231	0	362
V/C Ratio(X)	0.43	0.78	0.18	0.82	0.91	0.93	0.77	0.00	0.79	0.82	0.00	0.15
Avail Cap(c_a), veh/h	105	3460	1074	348	1446	1469	263	0	573	341	0	696
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	41.5	21.6	15.9	36.5	18.9	19.2	39.2	0.0	35.3	35.5	0.0	27.1
Incr Delay (d2), s/veh	9.1	0.2	0.1	3.2	4.0	5.2	12.3	0.0	2.5	9.5	0.0	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	8.0	1.3	3.2	13.2	14.1	1.8	0.0	3.4	4.2	0.0	0.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	50.7	21.8	16.0	39.7	22.9	24.4	51.4	0.0	37.8	45.0	0.0	27.2
LnGrp LOS	D	C	B	D	C	C	D	A	D	D	A	C
Approach Vol, veh/h		1721			1831			242			242	
Approach Delay, s/veh		21.5			25.0			41.9			41.1	
Approach LOS		C			C			D			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	4.6	48.5	15.1	15.7	13.3	39.8	8.7	22.1
Change Period (Y+Rc), s	4.1	5.7	4.1	4.6	4.1	5.7	4.1	4.6
Max Green Setting (Gmax), s	5.0	68.8	16.2	30.0	16.5	57.3	12.5	33.7
Max Q Clear Time (g_c+I1), s	2.2	39.2	10.7	10.5	9.3	25.0	5.5	4.1
Green Ext Time (p_c), s	0.0	1.4	0.2	0.6	0.1	9.1	0.1	0.1

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)	0	1680	160	80	860	30	190	0	340	70	340	690
Future Volume (veh/h)	0	1680	160	80	860	30	190	0	340	70	340	690
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	0	1856	1856	1856	1856	1856	1856	0	1856	1856	1856	1856
Adj Flow Rate, veh/h	0	1768	106	84	905	14	200	0	358	74	358	623
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	0	3	3	3	3	3	3	0	3	3	3	3
Cap, veh/h	0	1835	632	121	1665	743	217	0	0	94	998	784
Arrive On Green	0.00	0.40	0.40	0.04	0.47	0.47	0.12	0.00	0.00	0.05	0.28	0.28
Sat Flow, veh/h	0	4899	1572	3428	3526	1572	1767	200		1767	3526	2768
Grp Volume(v), veh/h	0	1768	106	84	905	14	200	102.2		74	358	623
Grp Sat Flow(s),veh/h/ln	0	1522	1572	1714	1763	1572	1767	F		1767	1763	1384
Q Serve(g_s), s	0.0	53.3	6.1	3.4	25.7	0.7	15.8			5.8	11.4	29.4
Cycle Q Clear(g_c), s	0.0	53.3	6.1	3.4	25.7	0.7	15.8			5.8	11.4	29.4
Prop In Lane	0.00		1.00	1.00		1.00	1.00			1.00		1.00
Lane Grp Cap(c), veh/h	0	1835	632	121	1665	743	217			94	998	784
V/C Ratio(X)	0.00	0.96	0.17	0.69	0.54	0.02	0.92			0.79	0.36	0.79
Avail Cap(c_a), veh/h	0	1838	633	121	1665	743	217			162	1224	961
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00			1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	1.00	1.00	1.00	1.00	1.00			1.00	1.00	1.00
Uniform Delay (d), s/veh	0.0	41.2	27.0	67.3	26.4	19.8	61.2			66.0	40.3	46.8
Incr Delay (d2), s/veh	0.0	13.5	0.3	17.5	0.6	0.0	41.0			20.2	0.5	5.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0			0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	21.4	2.3	1.8	10.6	0.2	9.4			3.1	5.0	10.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	54.7	27.3	84.8	27.1	19.8	102.2			86.2	40.8	52.1
LnGrp LOS	A	D	C	F	C	B	F			F	D	D
Approach Vol, veh/h		1874			1003						1055	
Approach Delay, s/veh		53.2			31.8						50.7	
Approach LOS		D			C						D	

Timer - Assigned Phs	1	2	3	4		6	7
Phs Duration (G+Y+Rc), s	9.9	62.7	22.0	46.5		72.6	12.2
Change Period (Y+Rc), s	4.9	* 6	* 4.7	6.5		6.0	* 4.7
Max Green Setting (Gmax), s	5.0	* 57	* 17	49.0		66.5	* 13
Max Q Clear Time (g_c+I1), s	5.4	55.3	17.8	31.4		27.7	7.8
Green Ext Time (p_c), s	0.0	1.4	0.0	8.6		13.6	0.1

Intersection Summary	
HCM 6th Ctrl Delay	49.7
HCM 6th LOS	D

Notes

User approved pedestrian interval to be less than phase max green.

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

User approved changes to right turn type.



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	400	840	60	360	610	40
Future Volume (veh/h)	400	840	60	360	610	40
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1856	1856	1856	1856	1856	1856
Adj Flow Rate, veh/h	421	0	63	379	642	42
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	3	3	3	3	3	3
Cap, veh/h	975		115	1593	827	379
Arrive On Green	0.28	0.00	0.06	0.45	0.24	0.24
Sat Flow, veh/h	3618	1572	1767	3618	3428	1572
Grp Volume(v), veh/h	421	0	63	379	642	42
Grp Sat Flow(s),veh/h/ln	1763	1572	1767	1763	1714	1572
Q Serve(g_s), s	3.5	0.0	1.3	2.4	6.3	0.8
Cycle Q Clear(g_c), s	3.5	0.0	1.3	2.4	6.3	0.8
Prop In Lane		1.00	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	975		115	1593	827	379
V/C Ratio(X)	0.43		0.55	0.24	0.78	0.11
Avail Cap(c_a), veh/h	1491		244	2329	1896	869
HCM Platoon Ratio	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	1.00
Uniform Delay (d), s/veh	10.8	0.0	16.4	6.1	12.8	10.7
Incr Delay (d2), s/veh	0.1	0.0	1.5	0.0	0.6	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.9	0.0	0.4	0.4	1.7	0.2
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	10.9	0.0	17.9	6.1	13.4	10.7
LnGrp LOS	B		B	A	B	B
Approach Vol, veh/h	421	A		442	684	
Approach Delay, s/veh	10.9			7.8	13.2	
Approach LOS	B			A	B	

Timer - Assigned Phs	1	2			6	8
Phs Duration (G+Y+Rc), s	6.3	16.2			22.5	13.6
Change Period (Y+Rc), s	4.0	* 6.2			6.2	4.9
Max Green Setting (Gmax), s	5.0	* 15			23.9	20.0
Max Q Clear Time (g_c+I1), s	3.3	5.5			4.4	8.3
Green Ext Time (p_c), s	0.0	0.4			0.4	0.4

Intersection Summary		
HCM 6th Ctrl Delay	11.0	
HCM 6th LOS	B	

Notes

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

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



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	0	5	80	5	60	5	640	90	50	540	5
Future Volume (veh/h)	5	0	5	80	5	60	5	640	90	50	540	5
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1767	1767	1767	1767	1767	1767	1767	1767	1767	1767	1767	1767
Adj Flow Rate, veh/h	6	0	6	91	6	68	6	727	102	57	614	6
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Percent Heavy Veh, %	9	9	9	9	9	9	9	9	9	9	9	9
Cap, veh/h	366	0	178	370	210	178	16	1144	510	202	1338	13
Arrive On Green	0.12	0.00	0.12	0.12	0.12	0.12	0.01	0.34	0.34	0.06	0.39	0.39
Sat Flow, veh/h	1221	0	1497	1332	1767	1497	1682	3357	1497	3264	3406	33
Grp Volume(v), veh/h	6	0	6	91	6	68	6	727	102	57	303	317
Grp Sat Flow(s),veh/h/ln	1221	0	1497	1332	1767	1497	1682	1678	1497	1632	1678	1761
Q Serve(g_s), s	0.1	0.0	0.1	2.1	0.1	1.4	0.1	5.9	1.6	0.5	4.4	4.4
Cycle Q Clear(g_c), s	0.2	0.0	0.1	2.4	0.1	1.4	0.1	5.9	1.6	0.5	4.4	4.4
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.02
Lane Grp Cap(c), veh/h	366	0	178	370	210	178	16	1144	510	202	659	692
V/C Ratio(X)	0.02	0.00	0.03	0.25	0.03	0.38	0.37	0.64	0.20	0.28	0.46	0.46
Avail Cap(c_a), veh/h	1369	0	1378	1437	1626	1378	310	1483	661	501	690	724
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	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	12.8	0.0	12.7	13.8	12.7	13.3	16.0	9.0	7.6	14.6	7.3	7.3
Incr Delay (d2), s/veh	0.0	0.0	0.0	0.1	0.0	0.5	5.0	0.8	0.3	0.3	0.7	0.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.0	0.0	0.4	0.0	0.3	0.1	1.0	0.3	0.1	0.7	0.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	12.8	0.0	12.7	13.9	12.7	13.8	21.1	9.9	7.9	14.9	8.0	8.0
LnGrp LOS	B	A	B	B	B	B	C	A	A	B	A	A
Approach Vol, veh/h		12			165			835			677	
Approach Delay, s/veh		12.8			13.8			9.7			8.6	
Approach LOS		B			B			A			A	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	6.7	17.3		8.6	5.0	19.0		8.6
Change Period (Y+Rc), s	* 4.7	6.2		* 4.7	* 4.7	6.2		* 4.7
Max Green Setting (Gmax), s	* 5	14.4		* 30	* 6	13.4		* 30
Max Q Clear Time (g_c+I1), s	2.5	7.9		2.2	2.1	6.4		4.4
Green Ext Time (p_c), s	0.0	3.2		0.0	0.0	2.5		0.2

Intersection Summary	
HCM 6th Ctrl Delay	9.7
HCM 6th LOS	A

Notes

User approved pedestrian interval to be less than phase max green.

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



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	30	0	10	0	660	140	20	640	0
Future Volume (veh/h)	0	0	0	30	0	10	0	660	140	20	640	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				1767	1811	1767	0	1767	1767	1767	1767	0
Adj Flow Rate, veh/h				33	0	11	0	717	152	22	696	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, %				9	6	9	0	9	9	9	9	0
Cap, veh/h				76	0	25	0	1222	259	56	1088	0
Arrive On Green				0.06	0.00	0.06	0.00	0.44	0.44	0.03	0.62	0.00
Sat Flow, veh/h				1255	0	418	0	2844	584	1682	1767	0
Grp Volume(v), veh/h				44	0	0	0	437	432	22	696	0
Grp Sat Flow(s),veh/h/ln				1673	0	0	0	1678	1661	1682	1767	0
Q Serve(g_s), s				0.8	0.0	0.0	0.0	6.3	6.4	0.4	8.1	0.0
Cycle Q Clear(g_c), s				0.8	0.0	0.0	0.0	6.3	6.4	0.4	8.1	0.0
Prop In Lane				0.75		0.25	0.00		0.35	1.00		0.00
Lane Grp Cap(c), veh/h				101	0	0	0	744	737	56	1088	0
V/C Ratio(X)				0.43	0.00	0.00	0.00	0.59	0.59	0.39	0.64	0.00
Avail Cap(c_a), veh/h				1290	0	0	0	984	973	311	1607	0
HCM Platoon Ratio				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)				1.00	0.00	0.00	0.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh				14.7	0.0	0.0	0.0	6.8	6.8	15.4	4.0	0.0
Incr Delay (d2), s/veh				2.9	0.0	0.0	0.0	1.6	1.6	4.4	1.3	0.0
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				0.3	0.0	0.0	0.0	1.2	1.2	0.2	0.4	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh				17.6	0.0	0.0	0.0	8.4	8.4	19.8	5.3	0.0
LnGrp LOS				B	A	A	A	A	A	B	A	A
Approach Vol, veh/h					44			869			718	
Approach Delay, s/veh					17.6			8.4			5.7	
Approach LOS					B			A			A	

Timer - Assigned Phs	1	2		4		6
Phs Duration (G+Y+Rc), s	5.6	20.4		6.5		26.0
Change Period (Y+Rc), s	4.5	6.0		4.5		6.0
Max Green Setting (Gmax), s	6.0	19.0		25.0		29.5
Max Q Clear Time (g_c+I1), s	2.4	8.4		2.8		10.1
Green Ext Time (p_c), s	0.0	6.0		0.2		7.6

Intersection Summary		
HCM 6th Ctrl Delay		7.5
HCM 6th LOS		A

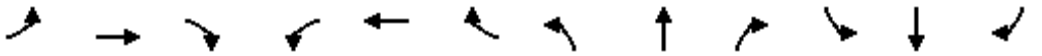
Intersection	
Int Delay, s/veh	0.3

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	5	5	5	180	220	5
Future Vol, veh/h	5	5	5	180	220	5
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	87	87	87	87	87	87
Heavy Vehicles, %	1	1	1	1	1	1
Mvmt Flow	6	6	6	207	253	6

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	475	256	259	0	-	0
Stage 1	256	-	-	-	-	-
Stage 2	219	-	-	-	-	-
Critical Hdwy	6.41	6.21	4.11	-	-	-
Critical Hdwy Stg 1	5.41	-	-	-	-	-
Critical Hdwy Stg 2	5.41	-	-	-	-	-
Follow-up Hdwy	3.509	3.309	2.209	-	-	-
Pot Cap-1 Maneuver	550	785	1311	-	-	-
Stage 1	789	-	-	-	-	-
Stage 2	820	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	547	785	1311	-	-	-
Mov Cap-2 Maneuver	547	-	-	-	-	-
Stage 1	785	-	-	-	-	-
Stage 2	820	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	10.7	0.2	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1311	-	645	-	-
HCM Lane V/C Ratio	0.004	-	0.018	-	-
HCM Control Delay (s)	7.8	0	10.7	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0.1	-	-



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	150	410	40	20	210	40	30	5	50	220	40	200
Future Volume (veh/h)	150	410	40	20	210	40	30	5	50	220	40	200
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1767	1767	1767	1767	1767	1767	1767	1767	1767	1767	1767	1767
Adj Flow Rate, veh/h	155	423	41	21	216	41	31	5	52	227	41	206
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	9	9	9	9	9	9	9	9	9	9	9	9
Cap, veh/h	194	488	47	71	735	137	39	6	66	287	52	299
Arrive On Green	0.12	0.31	0.31	0.04	0.26	0.26	0.07	0.07	0.07	0.20	0.20	0.20
Sat Flow, veh/h	1682	1585	154	1682	2823	527	554	89	929	1436	259	1497
Grp Volume(v), veh/h	155	0	464	21	127	130	88	0	0	268	0	206
Grp Sat Flow(s),veh/h/ln	1682	0	1739	1682	1678	1672	1572	0	0	1695	0	1497
Q Serve(g_s), s	6.9	0.0	19.5	0.9	4.7	4.8	4.3	0.0	0.0	11.6	0.0	9.9
Cycle Q Clear(g_c), s	6.9	0.0	19.5	0.9	4.7	4.8	4.3	0.0	0.0	11.6	0.0	9.9
Prop In Lane	1.00		0.09	1.00		0.32	0.35		0.59	0.85		1.00
Lane Grp Cap(c), veh/h	194	0	536	71	437	435	112	0	0	339	0	299
V/C Ratio(X)	0.80	0.00	0.87	0.30	0.29	0.30	0.79	0.00	0.00	0.79	0.00	0.69
Avail Cap(c_a), veh/h	565	0	677	652	694	692	325	0	0	613	0	542
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	1.00	1.00	1.00	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	33.3	0.0	25.3	35.9	22.9	22.9	35.3	0.0	0.0	29.4	0.0	28.7
Incr Delay (d2), s/veh	7.3	0.0	10.7	2.3	0.6	0.6	11.4	0.0	0.0	4.2	0.0	2.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.0	0.0	8.5	0.4	1.7	1.7	1.9	0.0	0.0	4.7	0.0	3.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	40.6	0.0	36.0	38.2	23.4	23.5	46.8	0.0	0.0	33.6	0.0	31.5
LnGrp LOS	D	A	D	D	C	C	D	A	A	C	A	C
Approach Vol, veh/h		619			278			88			474	
Approach Delay, s/veh		37.1			24.6			46.8			32.7	
Approach LOS		D			C			D			C	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	10.8	30.8		25.4	14.4	27.2		10.4				
Change Period (Y+Rc), s	7.5	* 7		* 9.9	5.5	7.0		4.9				
Max Green Setting (Gmax), s	30.0	* 30		* 28	26.0	32.0		16.0				
Max Q Clear Time (g_c+I1), s	2.9	21.5		13.6	8.9	6.8		6.3				
Green Ext Time (p_c), s	0.0	2.3		1.8	0.3	1.9		0.2				

Intersection Summary			
HCM 6th Ctrl Delay		33.9	
HCM 6th LOS		C	

Notes

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



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	180	450	50	10	100	60	20	20	10	10	10	150
Future Volume (veh/h)	180	450	50	10	100	60	20	20	10	10	10	150
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1767	1767	1767	1767	1767	1767	1767	1767	1767	1767	1767	1767
Adj Flow Rate, veh/h	186	464	52	10	103	62	21	21	10	10	10	155
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	9	9	9	9	9	9	9	9	9	9	9	9
Cap, veh/h	228	507	57	30	214	129	46	46	22	111	111	192
Arrive On Green	0.14	0.32	0.32	0.02	0.21	0.21	0.07	0.07	0.07	0.13	0.13	0.13
Sat Flow, veh/h	1682	1560	175	1682	1033	622	676	676	322	862	862	1497
Grp Volume(v), veh/h	186	0	516	10	0	165	52	0	0	20	0	155
Grp Sat Flow(s),veh/h/ln	1682	0	1735	1682	0	1655	1675	0	0	1724	0	1497
Q Serve(g_s), s	6.3	0.0	16.8	0.3	0.0	5.1	1.8	0.0	0.0	0.6	0.0	5.9
Cycle Q Clear(g_c), s	6.3	0.0	16.8	0.3	0.0	5.1	1.8	0.0	0.0	0.6	0.0	5.9
Prop In Lane	1.00		0.10	1.00		0.38	0.40		0.19	0.50		1.00
Lane Grp Cap(c), veh/h	228	0	564	30	0	343	114	0	0	222	0	192
V/C Ratio(X)	0.82	0.00	0.92	0.33	0.00	0.48	0.46	0.00	0.00	0.09	0.00	0.81
Avail Cap(c_a), veh/h	746	0	947	775	0	1044	771	0	0	764	0	664
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	24.6	0.0	19.0	28.4	0.0	20.5	26.3	0.0	0.0	22.5	0.0	24.8
Incr Delay (d2), s/veh	2.7	0.0	5.0	2.3	0.0	0.4	1.0	0.0	0.0	0.1	0.0	3.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.3	0.0	5.9	0.2	0.0	1.9	0.7	0.0	0.0	0.2	0.0	2.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	27.4	0.0	24.0	30.8	0.0	20.8	27.3	0.0	0.0	22.6	0.0	27.8
LnGrp LOS	C	A	C	C	A	C	C	A	A	C	A	C
Approach Vol, veh/h		702			175			52			175	
Approach Delay, s/veh		24.9			21.4			27.3			27.2	
Approach LOS		C			C			C			C	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	7.4	26.0		15.4	14.2	19.2		9.8
Change Period (Y+Rc), s	* 6.3	* 7		7.9	* 6.3	7.0		5.8
Max Green Setting (Gmax), s	* 27	* 32		26.0	* 26	37.0		27.0
Max Q Clear Time (g_c+I1), s	2.3	18.8		7.9	8.3	7.1		3.8
Green Ext Time (p_c), s	0.0	0.3		0.1	0.0	0.4		0.1

Intersection Summary		
HCM 6th Ctrl Delay		24.8
HCM 6th LOS		C

Notes

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

Intersection	
Int Delay, s/veh	0.1

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	15	365	60	0	620
Future Vol, veh/h	0	15	365	60	0	620
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, %	6	6	6	6	6	6
Mvmt Flow	0	16	397	65	0	674

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	-	231	0	0	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	7.02	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.36	-	-	-	-
Pot Cap-1 Maneuver	0	759	-	-	0	-
Stage 1	0	-	-	-	0	-
Stage 2	0	-	-	-	0	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	-	759	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	9.8	0	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBT
Capacity (veh/h)	-	-	759	-
HCM Lane V/C Ratio	-	-	0.021	-
HCM Control Delay (s)	-	-	9.8	-
HCM Lane LOS	-	-	A	-
HCM 95th %tile Q(veh)	-	-	0.1	-

Intersection	
Int Delay, s/veh	2

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	40	40	350	50	90	520
Future Vol, veh/h	40	40	350	50	90	520
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	-	-	-	250	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	6	6	6	6	6	6
Mvmt Flow	43	43	380	54	98	565

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	886	217	0	0	434	0
Stage 1	407	-	-	-	-	-
Stage 2	479	-	-	-	-	-
Critical Hdwy	6.92	7.02	-	-	4.22	-
Critical Hdwy Stg 1	5.92	-	-	-	-	-
Critical Hdwy Stg 2	5.92	-	-	-	-	-
Follow-up Hdwy	3.56	3.36	-	-	2.26	-
Pot Cap-1 Maneuver	276	775	-	-	1094	-
Stage 1	629	-	-	-	-	-
Stage 2	578	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	251	775	-	-	1094	-
Mov Cap-2 Maneuver	251	-	-	-	-	-
Stage 1	629	-	-	-	-	-
Stage 2	526	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	17.3	0	1.3
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	379	1094	-
HCM Lane V/C Ratio	-	-	0.229	0.089	-
HCM Control Delay (s)	-	-	17.3	8.6	-
HCM Lane LOS	-	-	C	A	-
HCM 95th %tile Q(veh)	-	-	0.9	0.3	-

Intersection	
Int Delay, s/veh	1.8

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	30	50	340	50	90	570
Future Vol, veh/h	30	50	340	50	90	570
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	-	-	-	300	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	6	6	6	6	6	6
Mvmt Flow	33	54	370	54	98	620

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	903	212	0	0	424	0
Stage 1	397	-	-	-	-	-
Stage 2	506	-	-	-	-	-
Critical Hdwy	6.92	7.02	-	-	4.22	-
Critical Hdwy Stg 1	5.92	-	-	-	-	-
Critical Hdwy Stg 2	5.92	-	-	-	-	-
Follow-up Hdwy	3.56	3.36	-	-	2.26	-
Pot Cap-1 Maneuver	270	781	-	-	1104	-
Stage 1	636	-	-	-	-	-
Stage 2	559	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	246	781	-	-	1104	-
Mov Cap-2 Maneuver	246	-	-	-	-	-
Stage 1	636	-	-	-	-	-
Stage 2	509	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	15.5	0	1.2
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	430	1104	-
HCM Lane V/C Ratio	-	-	0.202	0.089	-
HCM Control Delay (s)	-	-	15.5	8.6	-
HCM Lane LOS	-	-	C	A	-
HCM 95th %tile Q(veh)	-	-	0.7	0.3	-

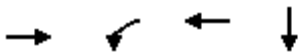
Intersection	
Int Delay, s/veh	1.8

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	10	30	50	140	200	20
Future Vol, veh/h	10	30	50	140	200	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	120	0	200	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	6	6	6	6	6	6
Mvmt Flow	11	33	54	152	217	22

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	488	228	239	0	-	0
Stage 1	228	-	-	-	-	-
Stage 2	260	-	-	-	-	-
Critical Hdwy	6.46	6.26	4.16	-	-	-
Critical Hdwy Stg 1	5.46	-	-	-	-	-
Critical Hdwy Stg 2	5.46	-	-	-	-	-
Follow-up Hdwy	3.554	3.354	2.254	-	-	-
Pot Cap-1 Maneuver	532	801	1305	-	-	-
Stage 1	801	-	-	-	-	-
Stage 2	774	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	510	801	1305	-	-	-
Mov Cap-2 Maneuver	510	-	-	-	-	-
Stage 1	768	-	-	-	-	-
Stage 2	774	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	10.3	2.1	0
HCM LOS	B		

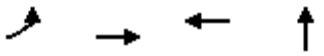
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	1305	-	510	801	-	-
HCM Lane V/C Ratio	0.042	-	0.021	0.041	-	-
HCM Control Delay (s)	7.9	-	12.2	9.7	-	-
HCM Lane LOS	A	-	B	A	-	-
HCM 95th %tile Q(veh)	0.1	-	0.1	0.1	-	-



Lane Group	EBT	WBL	WBT	SBT
Lane Group Flow (vph)	670	375	761	381
v/c Ratio	0.62	0.66	0.70	0.83
Control Delay	28.6	31.9	15.9	41.5
Queue Delay	0.0	0.0	0.1	0.0
Total Delay	28.6	31.9	15.9	41.5
Queue Length 50th (ft)	98	148	216	159
Queue Length 95th (ft)	154	#345	454	276
Internal Link Dist (ft)	1067		499	1231
Turn Bay Length (ft)				
Base Capacity (vph)	2869	567	1675	895
Starvation Cap Reductn	0	0	113	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.23	0.66	0.49	0.43

Intersection Summary

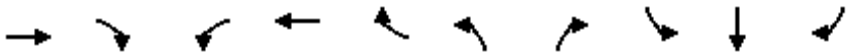
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



Lane Group	EBL	EBT	WBT	NBT
Lane Group Flow (vph)	91	739	1329	415
v/c Ratio	0.54	0.33	0.76	0.88
Control Delay	52.3	7.8	22.0	40.9
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	52.3	7.8	22.0	40.9
Queue Length 50th (ft)	48	79	283	147
Queue Length 95th (ft)	106	157	#569	264
Internal Link Dist (ft)		499	110	1373
Turn Bay Length (ft)				
Base Capacity (vph)	512	2919	1754	839
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.18	0.25	0.76	0.49

Intersection Summary

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



Lane Group	EBT	EBR	WBL	WBT	WBR	NBL	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	910	236	112	596	112	191	416	56	337	247
v/c Ratio	0.66	0.37	0.33	0.38	0.15	0.61	0.51	0.32	0.54	0.36
Control Delay	33.5	5.4	48.7	19.0	3.6	50.9	35.1	51.9	42.7	6.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	33.5	5.4	48.7	19.0	3.6	50.9	35.1	51.9	42.7	6.5
Queue Length 50th (ft)	210	0	36	132	0	115	130	35	106	0
Queue Length 95th (ft)	293	53	73	191	30	#239	225	84	173	36
Internal Link Dist (ft)	477			173					1565	
Turn Bay Length (ft)		380	500		150	700	575	550		800
Base Capacity (vph)	2680	1007	658	2869	1273	339	1018	339	1255	1144
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.34	0.23	0.17	0.21	0.09	0.56	0.41	0.17	0.27	0.22

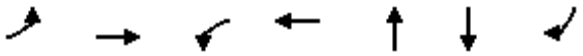
Intersection Summary

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



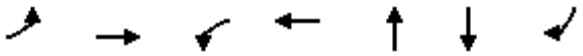
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Group Flow (vph)	348	528	90	371	449	34
v/c Ratio	0.35	0.65	0.32	0.25	0.53	0.08
Control Delay	13.7	6.3	19.7	7.0	16.0	6.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	13.7	6.3	19.7	7.0	16.0	6.7
Queue Length 50th (ft)	33	0	18	21	45	0
Queue Length 95th (ft)	74	58	56	46	94	16
Internal Link Dist (ft)	511			633	1003	
Turn Bay Length (ft)		165	325		550	675
Base Capacity (vph)	2994	1386	934	3406	2084	974
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.12	0.38	0.10	0.11	0.22	0.03

Intersection Summary



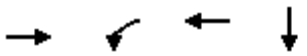
Lane Group	EBL	EBT	WBL	WBT	NBT	SBT	SBR
Lane Group Flow (vph)	133	222	22	400	77	122	89
v/c Ratio	0.51	0.34	0.11	0.56	0.39	0.48	0.28
Control Delay	40.1	22.3	39.5	31.4	27.9	40.3	6.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	40.1	22.3	39.5	31.4	27.9	40.3	6.8
Queue Length 50th (ft)	58	62	9	88	17	54	0
Queue Length 95th (ft)	139	182	39	169	68	129	28
Internal Link Dist (ft)		1678		931	134	1504	
Turn Bay Length (ft)	200		155				550
Base Capacity (vph)	560	816	647	1798	360	615	609
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.24	0.27	0.03	0.22	0.21	0.20	0.15

Intersection Summary



Lane Group	EBL	EBT	WBL	WBT	NBT	SBT	SBR
Lane Group Flow (vph)	156	166	11	389	66	33	189
v/c Ratio	0.68	0.19	0.08	0.72	0.38	0.23	0.63
Control Delay	50.9	11.3	43.0	31.4	43.1	43.4	17.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	50.9	11.3	43.0	31.4	43.1	43.4	17.0
Queue Length 50th (ft)	74	34	5	152	29	16	0
Queue Length 95th (ft)	166	107	26	325	83	51	68
Internal Link Dist (ft)		931		1550	630	1917	
Turn Bay Length (ft)	236		170				400
Base Capacity (vph)	545	944	565	774	576	555	610
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.29	0.18	0.02	0.50	0.11	0.06	0.31

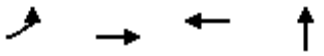
Intersection Summary



Lane Group	EBT	WBL	WBT	SBT
Lane Group Flow (vph)	767	333	456	566
v/c Ratio	0.64	0.84	0.48	0.86
Control Delay	31.9	54.6	16.1	40.0
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	31.9	54.6	16.1	40.0
Queue Length 50th (ft)	139	181	161	273
Queue Length 95th (ft)	179	#361	239	#514
Internal Link Dist (ft)	1067		499	1231
Turn Bay Length (ft)				
Base Capacity (vph)	1966	396	1229	691
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.39	0.84	0.37	0.82

Intersection Summary

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



Lane Group	EBL	EBT	WBT	NBT
Lane Group Flow (vph)	89	1000	1011	629
v/c Ratio	0.45	0.59	0.84	0.89
Control Delay	46.4	17.0	32.5	39.6
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	46.4	17.0	32.5	39.6
Queue Length 50th (ft)	50	196	263	305
Queue Length 95th (ft)	98	251	#373	#568
Internal Link Dist (ft)		499	110	1373
Turn Bay Length (ft)				
Base Capacity (vph)	399	2355	1329	707
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.22	0.42	0.76	0.89

Intersection Summary

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



Lane Group	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	1095	158	84	705	74	168	179	179	74	389	316
v/c Ratio	0.67	0.24	0.26	0.43	0.10	0.65	0.28	0.28	0.38	0.55	0.39
Control Delay	30.3	4.9	49.2	18.2	3.8	56.9	1.1	1.1	51.9	40.5	5.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	30.3	4.9	49.2	18.2	3.8	56.9	1.1	1.1	51.9	40.5	5.8
Queue Length 50th (ft)	243	0	26	147	0	103	0	0	45	120	0
Queue Length 95th (ft)	346	44	59	222	24	#252	0	0	106	197	40
Internal Link Dist (ft)	464			214			1058			1601	
Turn Bay Length (ft)		380	500		150	700		575	550		800
Base Capacity (vph)	2379	897	534	2543	1158	275	688	688	275	1102	1084
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.46	0.18	0.16	0.28	0.06	0.61	0.26	0.26	0.27	0.35	0.29

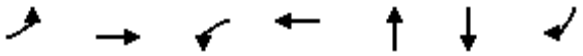
Intersection Summary

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



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Group Flow (vph)	400	568	63	358	505	42
v/c Ratio	0.37	0.65	0.20	0.23	0.54	0.09
Control Delay	14.4	6.0	20.4	7.3	17.1	6.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	14.4	6.0	20.4	7.3	17.1	6.7
Queue Length 50th (ft)	45	0	15	24	58	0
Queue Length 95th (ft)	87	60	47	47	119	19
Internal Link Dist (ft)	482			632	1003	
Turn Bay Length (ft)		165	325		550	675
Base Capacity (vph)	2228	1191	668	3220	1297	624
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.18	0.48	0.09	0.11	0.39	0.07

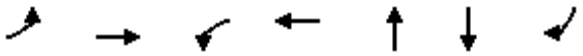
Intersection Summary



Lane Group	EBL	EBT	WBL	WBT	NBT	SBT	SBR
Lane Group Flow (vph)	165	433	21	237	93	247	93
v/c Ratio	0.58	0.67	0.11	0.38	0.45	0.66	0.22
Control Delay	44.5	33.9	44.5	34.6	34.6	41.9	5.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	44.5	33.9	44.5	34.6	34.6	41.9	5.0
Queue Length 50th (ft)	79	171	10	57	27	117	0
Queue Length 95th (ft)	174	#488	40	117	89	240	27
Internal Link Dist (ft)		1628		931	136	1501	
Turn Bay Length (ft)			155				550
Base Capacity (vph)	541	790	624	1729	338	588	597
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.30	0.55	0.03	0.14	0.28	0.42	0.16

Intersection Summary

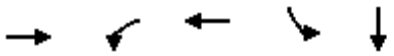
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



Lane Group	EBL	EBT	WBL	WBT	NBT	SBT	SBR
Lane Group Flow (vph)	124	526	10	155	52	20	144
v/c Ratio	0.43	0.54	0.05	0.25	0.23	0.10	0.46
Control Delay	30.5	18.7	31.2	21.2	27.3	30.5	10.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	30.5	18.7	31.2	21.2	27.3	30.5	10.6
Queue Length 50th (ft)	43	143	4	43	15	7	0
Queue Length 95th (ft)	105	#446	20	110	52	29	44
Internal Link Dist (ft)		931		1558	725	1917	
Turn Bay Length (ft)	236		170				400
Base Capacity (vph)	574	976	574	866	583	590	617
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.22	0.54	0.02	0.18	0.09	0.03	0.23

Intersection Summary

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



Lane Group	EBT	WBL	WBT	SBL	SBT
Lane Group Flow (vph)	172	356	149	244	239
v/c Ratio	0.30	0.76	0.10	0.75	0.62
Control Delay	17.6	29.8	5.6	37.9	20.8
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	17.6	29.8	5.6	37.9	20.8
Queue Length 50th (ft)	18	113	11	82	44
Queue Length 95th (ft)	44	#227	20	#196	118
Internal Link Dist (ft)	157		364		1109
Turn Bay Length (ft)					
Base Capacity (vph)	643	665	1938	431	481
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.27	0.54	0.08	0.57	0.50

Intersection Summary

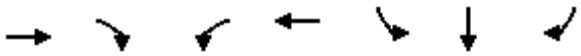
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



Lane Group	EBL	EBT	WBT	NBT	NBR
Lane Group Flow (vph)	34	494	781	80	299
v/c Ratio	0.32	0.26	0.88	0.45	0.72
Control Delay	55.6	3.7	23.7	46.8	15.9
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	55.6	3.7	23.7	46.8	15.9
Queue Length 50th (ft)	17	27	254	40	0
Queue Length 95th (ft)	#69	64	#667	95	74
Internal Link Dist (ft)		364	153	914	
Turn Bay Length (ft)					
Base Capacity (vph)	105	2388	1112	400	566
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.32	0.21	0.70	0.20	0.53

Intersection Summary

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



Lane Group	EBT	EBR	WBL	WBT	SBL	SBT	SBR
Lane Group Flow (vph)	1852	409	330	1898	130	131	455
v/c Ratio	0.86	0.50	0.96	0.79	0.52	0.52	0.92
Control Delay	22.0	6.2	70.6	9.8	33.1	33.3	47.8
Queue Delay	0.0	0.0	0.0	0.3	0.0	0.0	0.0
Total Delay	22.0	6.2	70.6	10.1	33.1	33.3	47.8
Queue Length 50th (ft)	231	26	131	214	50	50	80
Queue Length 95th (ft)	285	78	#268	286	98	98	#163
Internal Link Dist (ft)	1067			499		1231	
Turn Bay Length (ft)		100	250		240		240
Base Capacity (vph)	2148	820	342	2390	259	259	510
Starvation Cap Reductn	0	0	0	109	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.86	0.50	0.96	0.83	0.50	0.51	0.89

Intersection Summary

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

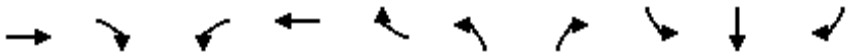


Lane Group	EBL	EBT	WBT	WBR	NBL	NBT	NBR
Lane Group Flow (vph)	693	1420	1670	284	278	279	295
v/c Ratio	1.00	0.56	0.99	0.38	0.98	0.98	0.49
Control Delay	79.3	7.4	48.2	14.4	93.5	94.4	22.8
Queue Delay	0.0	0.8	33.0	0.0	0.0	0.0	0.0
Total Delay	79.3	8.2	81.2	14.4	93.5	94.4	22.8
Queue Length 50th (ft)	~255	201	594	88	207	208	51
Queue Length 95th (ft)	#366	238	#748	147	#372	#373	94
Internal Link Dist (ft)		499	110			1373	
Turn Bay Length (ft)	200			60	300		300
Base Capacity (vph)	690	2520	1684	741	285	285	596
Starvation Cap Reductn	0	709	148	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	1.00	0.78	1.09	0.38	0.98	0.98	0.49

Intersection Summary

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

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



Lane Group	EBT	EBR	WBL	WBT	WBR	NBL	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	1685	180	112	854	67	337	416	56	337	517
v/c Ratio	0.96	0.27	0.86	0.53	0.09	1.15	0.45	0.44	0.45	0.75
Control Delay	52.1	10.1	111.6	26.3	2.0	147.6	35.4	70.2	45.3	42.4
Queue Delay	11.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	63.5	10.1	111.6	26.3	2.0	147.6	35.4	70.2	45.3	42.4
Queue Length 50th (ft)	550	26	48	256	0	~331	160	45	130	177
Queue Length 95th (ft)	#760	84	#114	362	13	#567	210	96	173	242
Internal Link Dist (ft)	477			173					1565	
Turn Bay Length (ft)		380	500		150	700	575	550		800
Base Capacity (vph)	1759	677	130	1616	756	293	1276	140	1287	1092
Starvation Cap Reductn	103	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.02	0.27	0.86	0.53	0.09	1.15	0.33	0.40	0.26	0.47

Intersection Summary

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

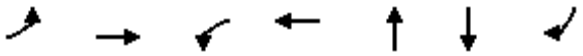
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Group Flow (vph)	348	888	90	404	629	22
v/c Ratio	0.34	0.83	0.43	0.26	0.68	0.05
Control Delay	14.0	10.0	31.5	8.1	18.8	7.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	14.0	10.0	31.5	8.1	18.8	7.0
Queue Length 50th (ft)	34	0	20	26	65	0
Queue Length 95th (ft)	73	#126	#89	62	138	13
Internal Link Dist (ft)	511			633	1003	
Turn Bay Length (ft)		165	325		550	675
Base Capacity (vph)	1687	1193	207	2402	1612	755
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.21	0.74	0.43	0.17	0.39	0.03

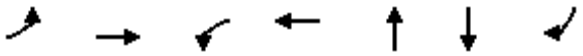
Intersection Summary

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



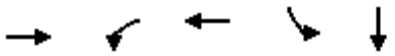
Lane Group	EBL	EBT	WBL	WBT	NBT	SBT	SBR
Lane Group Flow (vph)	133	211	22	411	66	122	167
v/c Ratio	0.52	0.32	0.11	0.57	0.35	0.49	0.46
Control Delay	40.4	21.9	39.5	31.1	29.7	40.4	10.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	40.4	21.9	39.5	31.1	29.7	40.4	10.7
Queue Length 50th (ft)	59	59	10	90	17	54	0
Queue Length 95th (ft)	138	172	39	172	65	129	57
Internal Link Dist (ft)		1678		931	134	1504	
Turn Bay Length (ft)	200		155				550
Base Capacity (vph)	562	818	648	1798	356	617	643
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.24	0.26	0.03	0.23	0.19	0.20	0.26

Intersection Summary



Lane Group	EBL	EBT	WBL	WBT	NBT	SBT	SBR
Lane Group Flow (vph)	133	166	11	400	66	44	189
v/c Ratio	0.65	0.18	0.08	0.70	0.39	0.30	0.63
Control Delay	51.3	11.4	42.3	29.7	43.0	44.6	16.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	51.3	11.4	42.3	29.7	43.0	44.6	16.8
Queue Length 50th (ft)	64	34	5	154	29	21	0
Queue Length 95th (ft)	144	107	25	326	81	62	66
Internal Link Dist (ft)		931		1550	630	1917	
Turn Bay Length (ft)	236		170				400
Base Capacity (vph)	537	930	557	764	568	545	604
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.25	0.18	0.02	0.52	0.12	0.08	0.31

Intersection Summary



Lane Group	EBT	WBL	WBT	SBL	SBT
Lane Group Flow (vph)	330	394	149	246	244
v/c Ratio	0.52	0.86	0.09	0.79	0.63
Control Delay	17.0	37.5	5.2	40.8	20.0
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	17.0	37.5	5.2	40.8	20.0
Queue Length 50th (ft)	34	119	10	81	43
Queue Length 95th (ft)	72	#256	20	#189	113
Internal Link Dist (ft)	157		364		1109
Turn Bay Length (ft)					
Base Capacity (vph)	667	585	2000	394	460
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.49	0.67	0.07	0.62	0.53

Intersection Summary

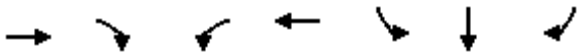
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



Lane Group	EBL	EBT	WBT	NBT	NBR
Lane Group Flow (vph)	53	606	808	85	245
v/c Ratio	0.40	0.30	0.86	0.48	0.66
Control Delay	43.5	3.4	20.4	38.6	14.3
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	43.5	3.4	20.4	38.6	14.3
Queue Length 50th (ft)	22	30	215	35	0
Queue Length 95th (ft)	#73	51	#524	80	#69
Internal Link Dist (ft)		364	153	914	
Turn Bay Length (ft)					
Base Capacity (vph)	133	2494	1150	250	426
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.40	0.24	0.70	0.34	0.58

Intersection Summary

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



Lane Group	EBT	EBR	WBL	WBT	SBL	SBT	SBR
Lane Group Flow (vph)	1889	422	256	1833	205	206	756
v/c Ratio	0.90	0.55	0.98	0.85	0.47	0.48	0.98
Control Delay	28.6	10.2	89.3	17.1	29.2	29.3	55.7
Queue Delay	0.0	0.0	0.0	2.1	0.0	0.0	0.0
Total Delay	28.6	10.2	89.3	19.2	29.2	29.3	55.7
Queue Length 50th (ft)	310	59	129	344	90	91	193
Queue Length 95th (ft)	#389	142	#274	456	157	158	#325
Internal Link Dist (ft)	1067			499		1231	
Turn Bay Length (ft)		100	250		240		240
Base Capacity (vph)	2107	771	260	2160	432	432	773
Starvation Cap Reductn	0	0	0	197	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.90	0.55	0.98	0.93	0.47	0.48	0.98

Intersection Summary

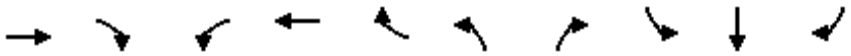
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



Lane Group	EBL	EBT	WBT	WBR	NBL	NBT	NBR
Lane Group Flow (vph)	567	1733	1500	300	294	295	478
v/c Ratio	0.95	0.72	0.93	0.41	0.94	0.94	0.82
Control Delay	61.2	9.7	31.7	10.5	72.1	72.8	39.5
Queue Delay	0.0	0.6	0.0	0.0	0.0	0.0	0.0
Total Delay	61.2	10.3	31.7	10.5	72.1	72.8	39.5
Queue Length 50th (ft)	146	235	353	56	153	153	110
Queue Length 95th (ft)	#246	311	#513	115	#307	#309	#193
Internal Link Dist (ft)		499	110			1373	
Turn Bay Length (ft)	200			60	300		300
Base Capacity (vph)	596	2430	1640	747	321	321	593
Starvation Cap Reductn	0	324	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.95	0.82	0.91	0.40	0.92	0.92	0.81

Intersection Summary

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



Lane Group	EBT	EBR	WBL	WBT	WBR	NBL	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	1768	168	84	905	32	200	358	74	358	726
v/c Ratio	0.97	0.24	0.70	0.55	0.04	0.93	0.37	0.53	0.36	0.82
Control Delay	56.6	13.6	97.7	29.2	1.2	107.9	36.1	77.8	40.9	46.1
Queue Delay	42.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	98.8	13.6	97.7	29.2	1.2	107.9	36.1	77.8	40.9	46.1
Queue Length 50th (ft)	651	40	40	312	0	187	144	66	138	294
Queue Length 95th (ft)	#854	100	#89	414	5	#369	194	127	183	380
Internal Link Dist (ft)	464			214					1601	
Turn Bay Length (ft)		380	500		150	700	575	550		800
Base Capacity (vph)	1825	689	120	1650	770	214	1051	159	1216	1047
Starvation Cap Reductn	259	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.13	0.24	0.70	0.55	0.04	0.93	0.34	0.47	0.29	0.69

Intersection Summary

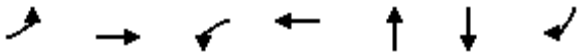
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Group Flow (vph)	421	884	63	379	642	42
v/c Ratio	0.37	0.80	0.26	0.28	0.63	0.08
Control Delay	12.4	9.2	22.0	8.5	15.5	5.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	12.4	9.2	22.0	8.5	15.5	5.5
Queue Length 50th (ft)	27	0	10	24	42	0
Queue Length 95th (ft)	86	#193	49	56	124	16
Internal Link Dist (ft)	482			632	1003	
Turn Bay Length (ft)		165	325		550	675
Base Capacity (vph)	1496	1167	244	2337	1897	893
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.28	0.76	0.26	0.16	0.34	0.05

Intersection Summary

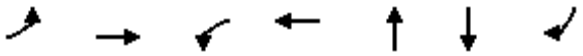
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



Lane Group	EBL	EBT	WBL	WBT	NBT	SBT	SBR
Lane Group Flow (vph)	155	464	21	257	88	268	206
v/c Ratio	0.57	0.71	0.11	0.39	0.44	0.69	0.41
Control Delay	44.9	35.3	44.2	32.6	31.5	42.2	7.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	44.9	35.3	44.2	32.6	31.5	42.2	7.4
Queue Length 50th (ft)	74	188	10	59	21	125	0
Queue Length 95th (ft)	165	#530	39	120	78	257	57
Internal Link Dist (ft)		1628		931	136	1501	
Turn Bay Length (ft)	200		155				550
Base Capacity (vph)	531	652	612	1428	346	577	646
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.29	0.71	0.03	0.18	0.25	0.46	0.32

Intersection Summary

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



Lane Group	EBL	EBT	WBL	WBT	NBT	SBT	SBR
Lane Group Flow (vph)	186	516	10	165	52	20	155
v/c Ratio	0.69	0.58	0.05	0.35	0.26	0.11	0.53
Control Delay	40.6	17.5	31.6	22.0	30.2	31.8	13.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	40.6	17.5	31.6	22.0	30.2	31.8	13.5
Queue Length 50th (ft)	72	138	4	48	17	7	0
Queue Length 95th (ft)	154	#388	20	116	56	30	54
Internal Link Dist (ft)		931		1558	725	1917	
Turn Bay Length (ft)	236		170				400
Base Capacity (vph)	698	1018	725	996	733	717	715
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.27	0.51	0.01	0.17	0.07	0.03	0.22

Intersection Summary

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

Appendix B – Signal Warrant Calculations

FEHR PEERS

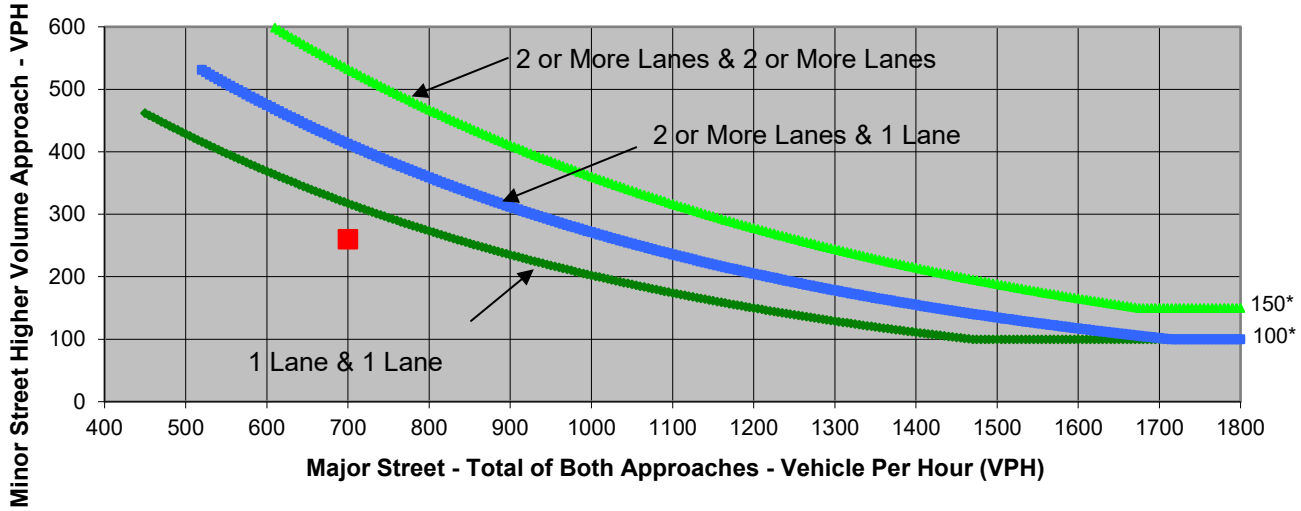
Major Street	Union Rd	Project	Manteca Annexation
Minor Street	Shady Pines St	Scenario	Existing Plus Project
		Peak Hour	AM

Turn Movement Volumes

	NB	SB	EB	WB
Left	20	20	10	200
Through	290	270	0	0
Right	90	10	30	60
Total	400	300	40	260

Major Street Direction

x	North/South
	East/West



* Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

Source: *California Manual on Uniform Traffic Control Devices*, Caltrans, 2014

	Major Street	Minor Street	Warrant Met
	Union Rd	Shady Pines St	
Number of Approach Lanes	**2**	**2**	**NO**
Traffic Volume (VPH) *	**700**	**260**	

* Note: Traffic Volume for Major Street is Total Volume of Both Approches.
Traffic Volume for Minor Street is the Volume of High Volume Approach.

FEHR PEERS

Major Street	Union Rd	Project	Manteca Annexation
Minor Street	Shady Pines St	Scenario	Existing Plus Project
		Peak Hour	AM

Turn Movement Volumes

	NB	SB	EB	WB
Left	20	20	10	200
Through	290	270	0	0
Right	90	10	30	60
Total	400	300	40	260

Major Street Direction

x	North/South
	East/West

Intersection Geometry

Number of Approach Lanes for Minor Street	2
Total Approaches	4

Worst Case Delay for Minor Street

Stopped Delay (seconds per vehicle)	55
Approach with Worst Case Delay	WB
Total Vehicles on Approach	260

Warrant 3A, Peak Hour			
	Peak Hour Delay on Minor Approach (vehicle-hours)	**Peak Hour Volume on Minor Approach (vph)**	**Peak Hour Entering Volume Serviced (vph)**
Existing Plus Project	**4**	**260**	**1,000**
Limiting Value	**5**	**150**	**800**
Condition Satisfied?	**Not Met**	**Met**	**Met**
Warrant Met	**NO**		

FEHR PEERS

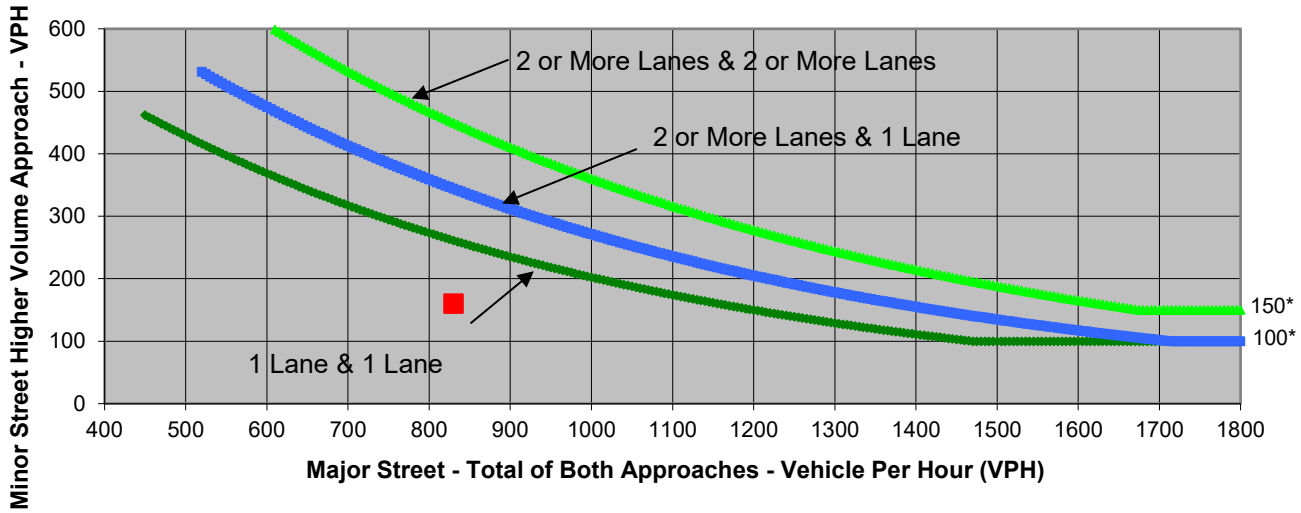
Major Street	Union Rd	Project	Manteca Annexation
Minor Street	Shady Pines St	Scenario	Existing Plus Project
		Peak Hour	PM

Turn Movement Volumes

	NB	SB	EB	WB
Left	30	80	10	110
Through	260	300	0	0
Right	140	20	20	50
Total	430	400	30	160

Major Street Direction

x	North/South
	East/West



* Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

Source: *California Manual on Uniform Traffic Control Devices*, Caltrans, 2014

	Major Street	Minor Street	Warrant Met
	Union Rd	Shady Pines St	
Number of Approach Lanes	**2**	**2**	**NO**
Traffic Volume (VPH) *	**830**	**160**	

* Note: Traffic Volume for Major Street is Total Volume of Both Approches.
Traffic Volume for Minor Street is the Volume of High Volume Approach.

FEHR PEERS

Project	Manteca Annexation
Major Street	Union Rd
Scenario	Existing Plus Project
Minor Street	Shady Pines St
Peak Hour	PM

Turn Movement Volumes

	NB	SB	EB	WB
Left	30	80	10	110
Through	260	300	0	0
Right	140	20	20	50
Total	430	400	30	160

Major Street Direction

x	North/South
	East/West

Intersection Geometry

Number of Approach Lanes for Minor Street	2
Total Approaches	4

Worst Case Delay for Minor Street

Stopped Delay (seconds per vehicle)	46.7
Approach with Worst Case Delay	WB
Total Vehicles on Approach	160

Warrant 3A, Peak Hour			
	Peak Hour Delay on Minor Approach (vehicle-hours)	**Peak Hour Volume on Minor Approach (vph)**	**Peak Hour Entering Volume Serviced (vph)**
Existing Plus Project	**2.1**	**160**	**1,020**
Limiting Value	**5**	**150**	**800**
Condition Satisfied?	**Not Met**	**Met**	**Met**
Warrant Met	**NO**		

FEHR PEERS

Major Street	Union Rd
Minor Street	Lovelace Road

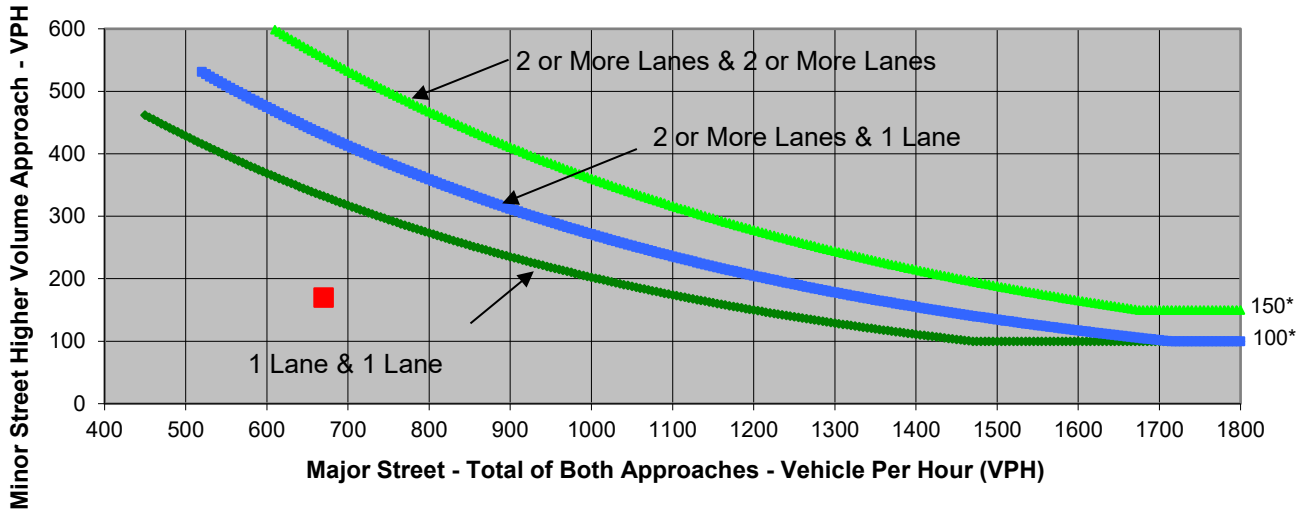
Project	Manteca Annexation
Scenario	Existing Plus Project
Peak Hour	AM

Turn Movement Volumes

	NB	SB	EB	WB
Left	190	40	20	10
Through	220	160	90	30
Right	20	40	60	30
Total	430	240	170	70

Major Street Direction

x	North/South
	East/West



* Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

Source: *California Manual on Uniform Traffic Control Devices*, Caltrans, 2014

	Major Street	Minor Street	Warrant Met
	Union Rd	Lovelace Road	
Number of Approach Lanes	**2**	**2**	**NO**
Traffic Volume (VPH) *	**670**	**170**	

* Note: Traffic Volume for Major Street is Total Volume of Both Approches.
Traffic Volume for Minor Street is the Volume of High Volume Approach.

FEHR PEERS

Project	Manteca Annexation
Major Street	Union Rd
Scenario	Existing Plus Project
Minor Street	Lovelace Road
Peak Hour	AM

Turn Movement Volumes

	NB	SB	EB	WB
Left	190	40	20	10
Through	220	160	90	30
Right	20	40	60	30
Total	430	240	170	70

Major Street Direction

x	North/South
	East/West

Intersection Geometry

Number of Approach Lanes for Minor Street	2
Total Approaches	4

Worst Case Delay for Minor Street

Stopped Delay (seconds per vehicle)	52.3
Approach with Worst Case Delay	EB
Total Vehicles on Approach	170

Warrant 3A, Peak Hour			
	Peak Hour Delay on Minor Approach (vehicle-hours)	**Peak Hour Volume on Minor Approach (vph)**	**Peak Hour Entering Volume Serviced (vph)**
Existing Plus Project	**2.5**	**170**	**910**
Limiting Value	**5**	**150**	**800**
Condition Satisfied?	**Not Met**	**Met**	**Met**
Warrant Met	**NO**		

FEHR PEERS

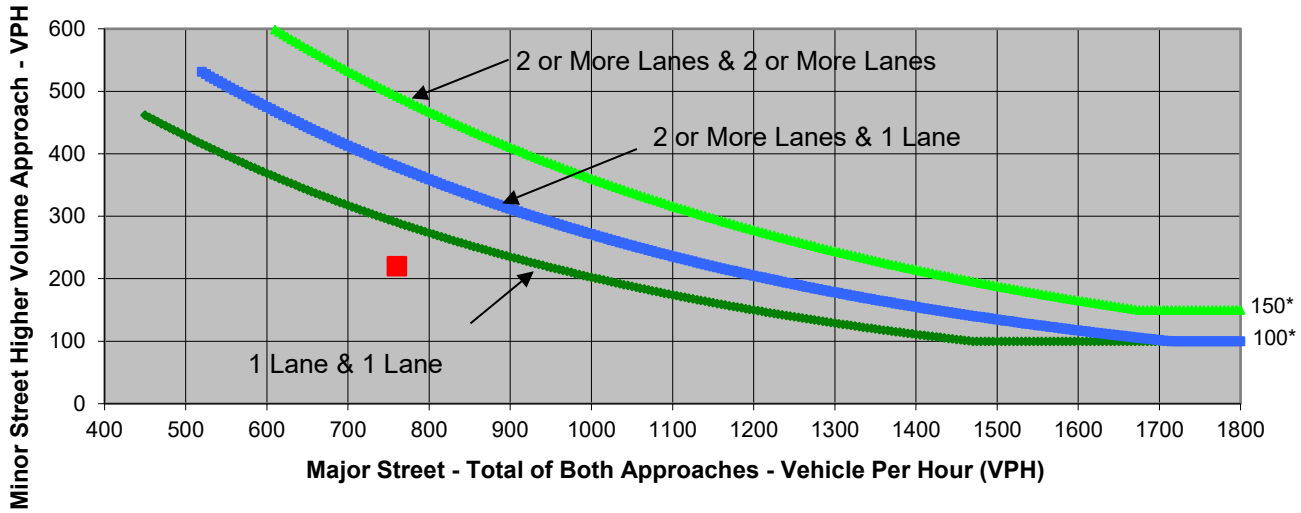
Major Street	Union Rd	Project	Manteca Annexation
Minor Street	Lovelace Road	Scenario	Existing Plus Project
		Peak Hour	PM

Turn Movement Volumes

	NB	SB	EB	WB
Left	60	40	20	70
Through	260	350	140	110
Right	40	10	60	40
Total	360	400	220	220

Major Street Direction

x	North/South
	East/West



* Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

Source: *California Manual on Uniform Traffic Control Devices*, Caltrans, 2014

	Major Street	Minor Street	Warrant Met
	Union Rd	Lovelace Road	
Number of Approach Lanes	**2**	**2**	**NO**
Traffic Volume (VPH) *	**760**	**220**	

* Note: Traffic Volume for Major Street is Total Volume of Both Approches.
Traffic Volume for Minor Street is the Volume of High Volume Approach.

FEHR PEERS

Project	Manteca Annexation
Major Street	Union Rd
Scenario	Existing Plus Project
Minor Street	Lovelace Road
Peak Hour	PM

Turn Movement Volumes

	NB	SB	EB	WB
Left	60	40	20	70
Through	260	350	140	110
Right	40	10	60	40
Total	360	400	220	220

Major Street Direction

x	North/South
	East/West

Intersection Geometry

Number of Approach Lanes for Minor Street	2
Total Approaches	4

Worst Case Delay for Minor Street

Stopped Delay (seconds per vehicle)	250.1
Approach with Worst Case Delay	WB
Total Vehicles on Approach	220

Warrant 3A, Peak Hour			
	Peak Hour Delay on Minor Approach (vehicle-hours)	**Peak Hour Volume on Minor Approach (vph)**	**Peak Hour Entering Volume Serviced (vph)**
Existing Plus Project	**15.3**	**220**	**1,200**
Limiting Value	**5**	**150**	**800**
Condition Satisfied?	**Met**	**Met**	**Met**
Warrant Met	**YES**		

FEHR PEERS

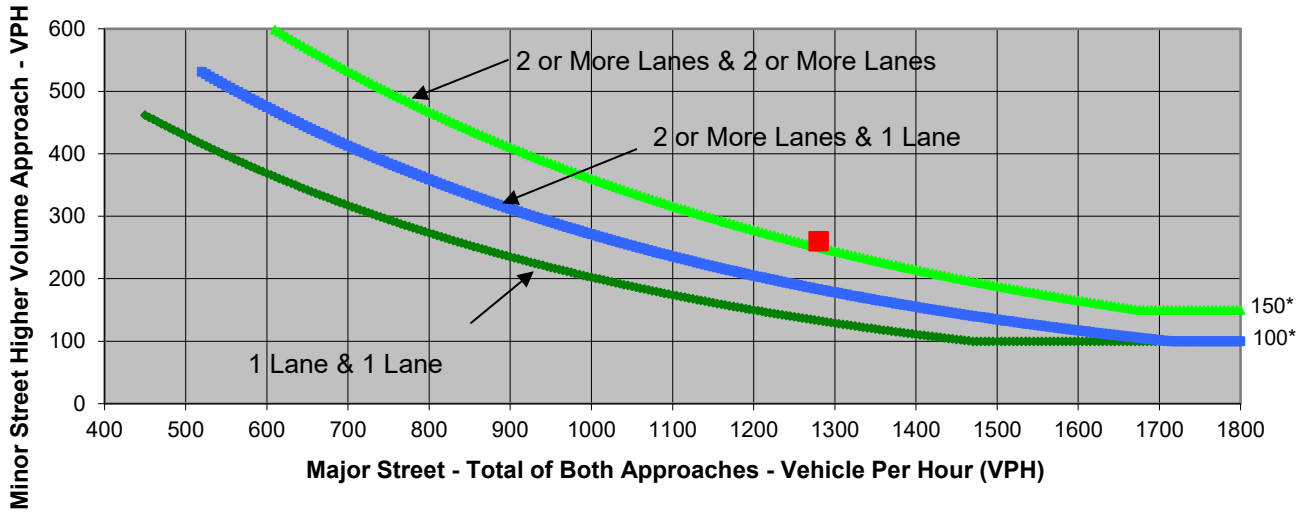
Major Street	Union Rd	Project	Manteca Annexation
Minor Street	Shady Pines St	Scenario	Cumulative Plus Project
		Peak Hour	AM

Turn Movement Volumes

	NB	SB	EB	WB
Left	40	20	30	200
Through	550	560	0	0
Right	90	20	90	60
Total	680	600	120	260

Major Street Direction

x	North/South
	East/West



* Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

Source: *California Manual on Uniform Traffic Control Devices*, Caltrans, 2014

	Major Street	Minor Street	Warrant Met
	Union Rd	Shady Pines St	
Number of Approach Lanes	**2**	**2**	**YES**
Traffic Volume (VPH) *	**1,280**	**260**	

* Note: Traffic Volume for Major Street is Total Volume of Both Approches.
Traffic Volume for Minor Street is the Volume of High Volume Approach.

FEHR PEERS

Major Street	Union Rd	Project	Manteca Annexation
Minor Street	Shady Pines St	Scenario	Cumulative Plus Project
		Peak Hour	AM

Turn Movement Volumes

	NB	SB	EB	WB
Left	40	20	30	200
Through	550	560	0	0
Right	90	20	90	60
Total	680	600	120	260

Major Street Direction

x	North/South
	East/West

Intersection Geometry

Number of Approach Lanes for Minor Street	2
Total Approaches	4

Worst Case Delay for Minor Street

Stopped Delay (seconds per vehicle)	411.4
Approach with Worst Case Delay	WB
Total Vehicles on Approach	260

Warrant 3A, Peak Hour			
	Peak Hour Delay on Minor Approach (vehicle-hours)	**Peak Hour Volume on Minor Approach (vph)**	**Peak Hour Entering Volume Serviced (vph)**
Cumulative Plus Project	**29.7**	**260**	**1,660**
Limiting Value	**5**	**150**	**800**
Condition Satisfied?	**Met**	**Met**	**Met**
Warrant Met	**YES**		

FEHR PEERS

Major Street	Union Rd
Minor Street	Shady Pines St

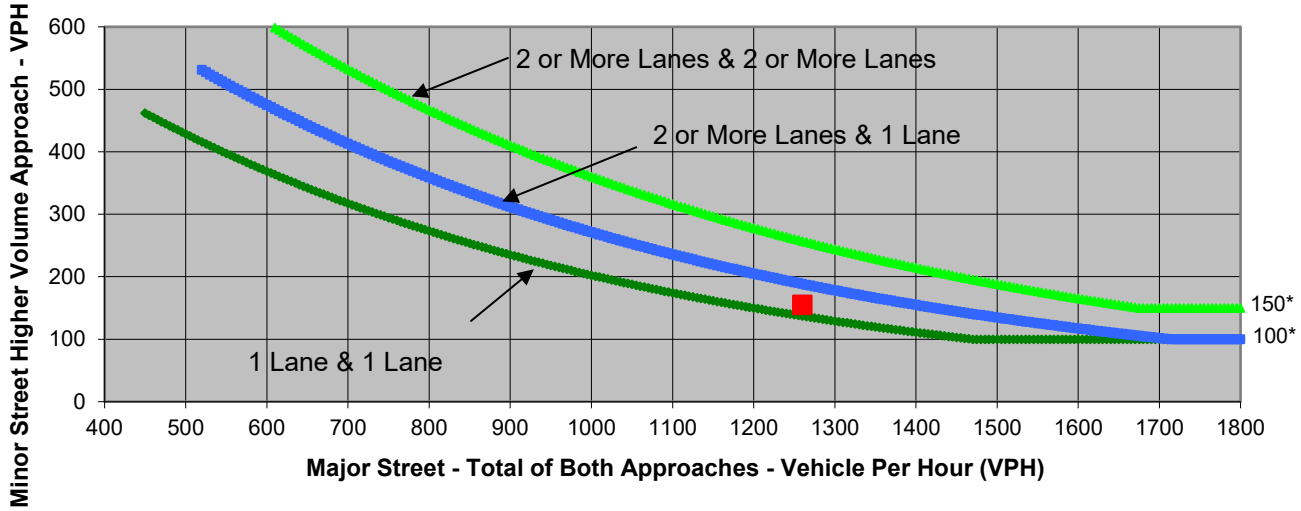
Project	Manteca Annexation
Scenario	Cumulative Plus Project
Peak Hour	PM

Turn Movement Volumes

	NB	SB	EB	WB
Left	80	70	20	110
Through	360	520	0	0
Right	190	40	60	45
Total	630	630	80	155

Major Street Direction

x	North/South
	East/West



* Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

Source: *California Manual on Uniform Traffic Control Devices*, Caltrans, 2014

	Major Street	Minor Street	Warrant Met
	Union Rd	Shady Pines St	
Number of Approach Lanes	**2**	**2**	**NO**
Traffic Volume (VPH) *	**1,260**	**155**	

* Note: Traffic Volume for Major Street is Total Volume of Both Approches.
Traffic Volume for Minor Street is the Volume of High Volume Approach.

FEHR PEERS

Major Street	Union Rd	Project	Manteca Annexation
Minor Street	Shady Pines St	Scenario	Cumulative Plus Project
		Peak Hour	PM

Turn Movement Volumes

	NB	SB	EB	WB
Left	80	70	20	110
Through	360	520	0	0
Right	190	40	60	45
Total	630	630	80	155

Major Street Direction

x	North/South
	East/West

Intersection Geometry

Number of Approach Lanes for Minor Street	2
Total Approaches	4

Worst Case Delay for Minor Street

Stopped Delay (seconds per vehicle)	135.8
Approach with Worst Case Delay	WB
Total Vehicles on Approach	155

Warrant 3A, Peak Hour			
	Peak Hour Delay on Minor Approach (vehicle-hours)	**Peak Hour Volume on Minor Approach (vph)**	**Peak Hour Entering Volume Serviced (vph)**
Cumulative Plus Project	**5.8**	**155**	**1,495**
Limiting Value	**5**	**150**	**800**
Condition Satisfied?	**Met**	**Met**	**Met**
Warrant Met	**YES**		

FEHR PEERS

Major Street	Lathrop Rd
Minor Street	Madison Grove Dr

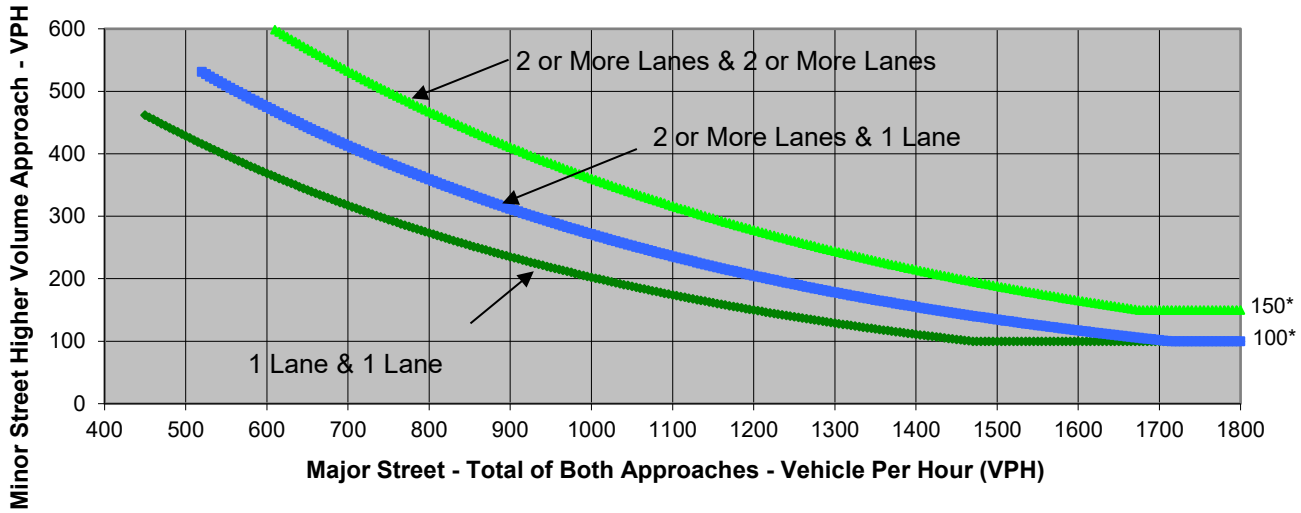
Project	Manteca Annexation
Scenario	Cumulative Plus Project
Peak Hour	AM

Turn Movement Volumes

	NB	SB	EB	WB
Left		40	90	
Through			1,210	1,200
Right		110		20
Total	0	150	1,300	1,220

Major Street Direction

	North/South
x	East/West



* Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

Source: *California Manual on Uniform Traffic Control Devices*, Caltrans, 2014

	Major Street	Minor Street	Warrant Met
	Lathrop Rd	Madison Grove Dr	
Number of Approach Lanes	**2**	**1**	**YES**
Traffic Volume (VPH) *	**2,520**	**150**	

* Note: Traffic Volume for Major Street is Total Volume of Both Approches.
Traffic Volume for Minor Street is the Volume of High Volume Approach.

FEHR PEERS

Project	Manteca Annexation
Major Street	Lathrop Rd
Scenario	Cumulative Plus Project
Minor Street	Madison Grove Dr
Peak Hour	AM

Turn Movement Volumes

	NB	SB	EB	WB
Left	0	40	90	0
Through	0	0	1,210	1,200
Right	0	110	0	20
Total	0	150	1,300	1,220

Major Street Direction

	North/South
x	East/West

Intersection Geometry

Number of Approach Lanes for Minor Street	1
Total Approaches	3

Worst Case Delay for Minor Street

Stopped Delay (seconds per vehicle)	787.7
Approach with Worst Case Delay	SB
Total Vehicles on Approach	150

Warrant 3A, Peak Hour			
	Peak Hour Delay on Minor Approach (vehicle-hours)	**Peak Hour Volume on Minor Approach (vph)**	**Peak Hour Entering Volume Serviced (vph)**
Cumulative Plus Project	**32.8**	**150**	**2,670**
Limiting Value	**4**	**100**	**650**
Condition Satisfied?	**Met**	**Met**	**Met**
Warrant Met	**YES**		

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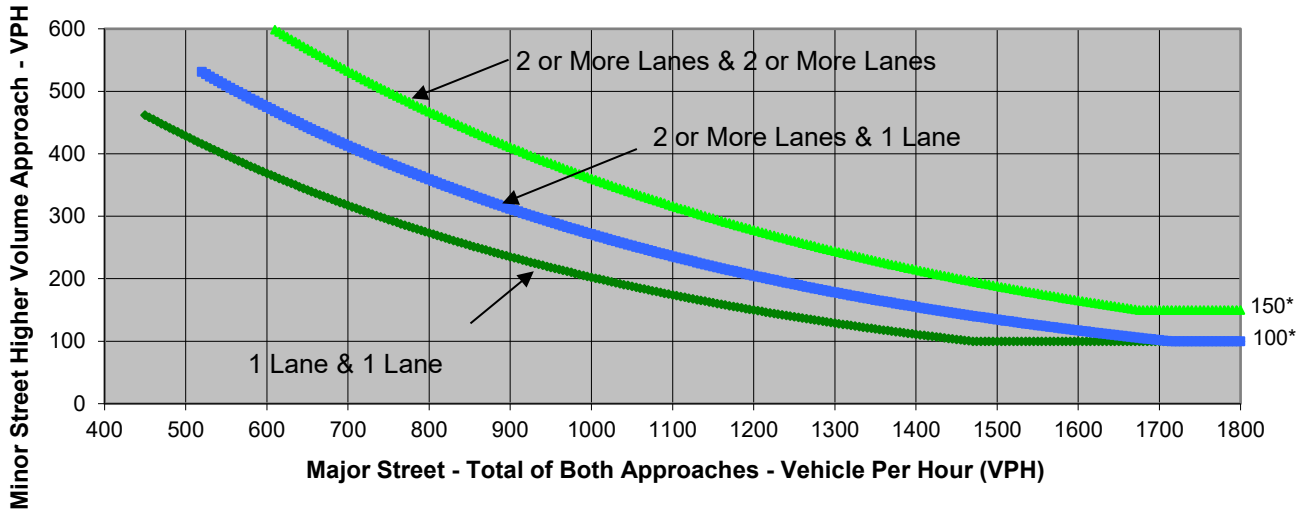
Major Street	Lathrop Rd	Project	Manteca Annexation
Minor Street	Madison Grove Dr	Scenario	Cumulative Plus Project
		Peak Hour	PM

Turn Movement Volumes

	NB	SB	EB	WB
Left		30	90	
Through			1,470	1,220
Right		120		50
Total	0	150	1,560	1,270

Major Street Direction

x	North/South
	East/West



* Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

Source: *California Manual on Uniform Traffic Control Devices*, Caltrans, 2014

	Major Street	Minor Street	Warrant Met
	Lathrop Rd	Madison Grove Dr	
Number of Approach Lanes	**2**	**1**	**YES**
Traffic Volume (VPH) *	**150**	**1,560**	

* Note: Traffic Volume for Major Street is Total Volume of Both Approches.
Traffic Volume for Minor Street is the Volume of High Volume Approach.

FEHR PEERS

Project	Manteca Annexation
Major Street	Lathrop Rd
Scenario	Cumulative Plus Project
Minor Street	Madison Grove Dr
Peak Hour	PM

Turn Movement Volumes

	NB	SB	EB	WB
Left	0	30	90	0
Through	0	0	1,470	1,220
Right	0	120	0	50
Total	0	150	1,560	1,270

Major Street Direction

x	North/South
	East/West

Intersection Geometry

Number of Approach Lanes for Minor Street	1
Total Approaches	3

Worst Case Delay for Minor Street

Stopped Delay (seconds per vehicle)	335.9
Approach with Worst Case Delay	SB
Total Vehicles on Approach	150

Warrant 3A, Peak Hour			
	Peak Hour Delay on Minor Approach (vehicle-hours)	**Peak Hour Volume on Minor Approach (vph)**	**Peak Hour Entering Volume Serviced (vph)**
Cumulative Plus Project	**14**	**1,560**	**2,980**
Limiting Value	**4**	**100**	**650**
Condition Satisfied?	**Met**	**Met**	**Met**
Warrant Met	**YES**		

Appendix F

Water Supply Assessment

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North Manteca Annexation No. 1
Water Supply Assessment

PREPARED FOR

City of Manteca

PREPARED BY

WEST YOST
Water. Engineered.

DRAFT

North Manteca Annexation No. 1
Water Supply Assessment

Prepared for

City of Manteca

Project No. 487-60-21-27

DRAFT

Project Manager: Roger Chu, PE _____ Date _____

QA/QC Review: Elizabeth T. Drayer, PE _____ Date _____

WEST YOST
Water. Engineered.

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Appendix A. City of Manteca – General Plan Update Water Supply Report
Appendix B. [add name of infrastructure report]

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LIST OF ACRONYMS AND ABBREVIATIONS

AF	Acre-Feet
AFY	Acre-Feet Per Year
AMI	Advanced Metering Infrastructure
CASGEM	California Statewide Groundwater Elevation Monitoring
CEQA	California Environmental Quality Act
CIMIS	California Irrigation Management Information System
City	City of Manteca
DU	Dwelling Units
DWR	Department of Water Resources
EIR	Environmental Impact Report
ESJ	Eastern San Joaquin
ESJGB-GMP	Eastern San Joaquin Groundwater Basin Management Plan
ETo	Evapotranspiration
GPCD	Gallons Per Capita Per Day
gpd	Gallons Per Day
GSA	Groundwater Sustainability Agency
GSP	Groundwater Sustainability Plan
LDR	Low Density Residential
MUSD	Manteca Unified School District
NOAA	National Oceanic and Atmospheric Administration
OID	Oakdale Irrigation District
SB 610	California Senate Bill 610
SB 221	California Senate Bill 221
SB X7-7	California Senate Bill X7-7 Water Conservation Act of 2009
SCWSP	South County Water Supply Program
SGMA	Sustainable Groundwater Management Act
SOI	Sphere of Influence
SSJID	South San Joaquin Irrigation District
SWRCB	State Water Resources Control Board
UAFW	Unaccounted-For Water
UWMP	Urban Water Management Plan
WSA	Water Supply Assessment
WTP	Nick C. DeGroot Water Treatment Plant

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EXECUTIVE SUMMARY

The proposed North Manteca Annexation No. 1 Project (Proposed Project), if approved, would be constructed within the General Plan boundary of the City of Manteca (City). The purpose of this Water Supply Assessment (WSA) is to perform the evaluation required by Water Code sections 10910 through 10915 in connection with the Proposed Project. This WSA is not intended to reserve water, or to function as a "will serve" letter or any other form of commitment to supply water (see Water Code section 10914). The provision of water service will continue to be undertaken in a manner consistent with applicable City policies and procedures, consistent with existing law.

This WSA includes discussion of the projected water demands of the Proposed Project (Section 2), determinations required under applicable regulations (Section 3), the City's water service area (Section 4), the City's projected water demands through the year 2045 (Section 5), and the City's projected water supply sources and reliability through the year 2045 (Section 6). This WSA also documents the plan to ensure that sufficient water supplies will be available to serve the Proposed Project and the other planned development in the City's water service area through the planning period (Section 7). Finally, the water supply assessment approval process (Section 8) is discussed.

The projected potable water demand and supplies documented in this WSA are based on several available documents, including the City's 2015 Urban Water Management Plan (2015 UWMP), the Eastern San Joaquin Groundwater Subbasin Groundwater Sustainability Plan (2019), the South San Joaquin Irrigation District 2020 UWMP (2020), and the draft City of Manteca General Plan Update (2021). Water Code section 10910(c)(4) states that:

> *"…the water supply assessment for the project shall include a discussion with regard to whether the total projected water supplies, determined to be available by the city or county for the project during normal, single dry, and multiple dry water 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, including agricultural and manufacturing uses."*

Based on the technical analyses described in this WSA, the total projected water supplies documented to be available for the Proposed Project during Normal, Single Dry and Multiple Dry water years during a 20-year projection are sufficient to meet the projected water demands associated with the Proposed Project, in addition to existing and planned future uses. Documentation of the availability of this water to be allocated to the Proposed Project is provided in this WSA. This analysis has determined that the City's total projected water supplies will meet the above requirement from Water Code section 10910(c)(4), as documented in this WSA.

The following are three major findings that resulted from this effort:

- The projected water demand at buildout of the Proposed Project is approximately 523.4 acre-feet per year (AFY). Of this water demand, approximately 461 AFY is potable water; the remaining 62.4 AFY is raw water for irrigating park and open space areas.
- Water demand within the City's service area is not expected to exceed the City's supplies in any normal year between 2020 and 2045.
- During Single Dry Years, and Multiple Dry Years, the City's total annual water demand is not expected to exceed the City's water supplies from 2020 to 2045.

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Senate Bill 221 (SB 221) applies to residential subdivisions of over 500 dwelling units (DUs) and requires that the water supplier provide a written verification that the water supply for the project is sufficient, prior to issuance of the final permits. Because the Proposed Project includes 915 DUs, it is subject to the requirements of SB 221 (Government Code section 66473.7) and a verification of sufficient water supply (SB 221) report will be required prior to final approvals.

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1.0 INTRODUCTION

The Proposed Project, if approved, would be constructed in the north portion of the City of Manteca General Plan boundary. The purpose of this WSA is to perform the evaluation required by Water Code sections 10910 through 10915 in connection with the Proposed Project. Key topics covered in this introduction include:

- Legal Requirements for the WSA
- Need for and Purpose of WSA
- Water Supply Assessment Preparation, Format and Organization

1.1 Legal Requirements for the Water Supply Assessment

California Senate Bill 610 (SB 610) and Senate Bill 221 (SB 221) amended state law, effective January 1, 2002, to improve the link between information on water supply availability and certain land use decisions made by cities and counties. SB 610 and SB 221 were companion measures that sought to promote more collaborative planning between local water suppliers and cities and counties. Both statutes require that detailed information regarding water availability be provided to the city and county decision-makers prior to approval of large development projects. The purpose of providing such information is to ensure that prudent water supply planning has been conducted, and that planned water supplies are adequate to meet existing demands, anticipated demands from approved projects, and the demands of proposed projects.

SB 610 amended California Water Code sections 10910 through 10915 to require agencies responsible for land use decisions:

- To identify the public water purveyor(s) that may supply water for a proposed development project; and
- To request a WSA from the identified water purveyor(s).

The City is the identified water purveyor for the Proposed Project. The purpose of the WSA is to demonstrate the sufficiency of the purveyor's water supplies to satisfy the water demands of the Proposed Project, while still meeting the water purveyor's obligations with regard to existing and planned future uses. Water Code sections 10910 through 10915 delineate the specific information that must be included in the WSA.

SB 221 amended State law (California Government Code section 66473.7) to require that approval by a city or county of certain residential subdivisions[1] requires an affirmative written verification of sufficient water supply. SB 221 was intended as a fail-safe mechanism to ensure that collaboration on finding the needed water supplies to serve a new large residential subdivision occurs before construction begins.

[1] Per Government Code Section 66473.7(a)(1) subdivision means a proposed residential development of more than 500 dwelling units.

1.2 Need for and Purpose of Water Supply Assessment

The purpose of this WSA is to perform the evaluation required by Water Code Sections 10910 through 10915 (SB 610) in connection with the Proposed Project. This WSA is not intended to reserve water, or to function as a "will serve" letter or any other form of commitment to supply water (see Water Code section 10914), nor is it intended to meet the requirements of SB 221. The provision of water service will continue to be undertaken in a manner consistent with applicable City policies and procedures, consistent with existing law.

1.3 Water Supply Assessment Preparation, Format and Organization

The format of this WSA is intended to clearly delineate compliance with the specific requirements for a WSA, per Water Code sections 10910 through 10915. This WSA includes the following sections:

- Section 1: Introduction
- Section 2: Description of Proposed Project
- Section 3: Required SB 610 Determinations
- Section 4: City of Manteca Water Service Area
- Section 5: City of Manteca Water Demands
- Section 6: City of Manteca Water Supplies
- Section 7: Determination of Water Supply Sufficiency Based on the Requirements of SB 610
- Section 8: Water Supply Assessment Approval Process
- Section 9: References

Relevant citations of Water Code sections 10910 through 10915 are included throughout this WSA to demonstrate compliance with the specific requirements of SB 610.

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2.0 DESCRIPTION OF PROPOSED PROJECT

A general description of the Proposed Project location, proposed land uses, projected water demand, and proposed water supply is provided below.

2.1 Proposed Project Location

The Proposed Project is an annexation of approximately 202.81 acres north of the City of Manteca city boundary, within the City's Sphere of Influence (SOI). The Project site is adjacent to the north boundary of the City of Manteca, situated east of State Highway 99 and west of Union Road. The location of the Proposed Project in relation to the current City limits and Manteca General Plan boundary is shown on Figure 2-1.

2.2 Proposed Land Uses

Of the Project site's 202.81 total acres, 175.67 acres will be developed. Land uses for the Proposed Project are summarized in Table 2-1, and the location of these land uses is shown on Figure 2-2.

Table 2-1. Proposed Land Uses for the Proposed Project

Proposed Land Use	Approximate Area, acres	Average DUs per Acre	Number of DUs
Low Density Residential	152.36	4.69	715
High Density Residential	8.76	22.83	200
Parks/Open Space	14.55	-	-
Subtotal Development Area	**175.67**	**-**	**915**
Non-Development Area	27.14	-	-
Total	**202.81**	**-**	**915**

Source: City of Manteca. Notice of Preparation of an Environmental Impact Report (EIR) for the Proposed Annexation No. 1 Project. October 2021.

2.3 Adjusted City Water Demand Factors

The City of Manteca 2005 Water Master Plan developed unit water use factors for projecting water demand based on the proposed future land uses within the City's General Plan. These unit water use factors assume a per capita water use of approximately 225 gallons per capita per day (GPCD) and do not account for conservation goals, water recycling, and other possible conservation-derived sources. In the City's 2015 Urban Water Management Plan (UWMP), water demand projections assume that the City is able to meet its SB X7-7 (Water Conservation Act of 2009) 2020 per capita water use target of 179 GPCD. Therefore, to reflect the City's 2020 conservation goals, the water use factors for Low Density Residential (LDR) and High Density Residential (HDR) were reduced by 20 percent, corresponding to the overall per capita water use reduction from 225 GPCD to 179 GPCD. The water use factors for Parks were reduced by 10 percent to correspond with the climate data discussed in Section 4 of this WSA.

The unit water use factors for the land use designations applicable to the Proposed Project are summarized in Table 2-2.

Table 2-2. Water Use Factors by Land Use Type

Land Use Designation	Water Use Factor, gpd per acre	
	2005 Water Master Plan[a]	Adjusted for SB X7-7[b]
Low Density Residential	2,800	2,240
High Density Residential	6,500	5,200
Park	4,000	3,600

(a) Based on unit water demand factors established in the City of Manteca 2005 Water Master Plan. These factors assume a per capita water use of approximately 225 GPCD and do not account for conservation measures.

(b) Based on a 20 percent reduction (10 percent reduction for Park land use) of factors shown in the City of Manteca 2005 Water Master Plan. These factors assume that the City is able to meet its 2020 per capita water use target of 179 GPCD.

gpd = gallons per day

Potable water losses documented in the City's 2015 UWMP were calculated using a historical loss estimate of 12 percent of potable demands. It is anticipated that the implementation of advanced metering infrastructure (AMI) by 2018 will reduce losses to 8 percent by 2020, 7 percent by 2025, 6 percent by 2030, and 5 percent thereafter. Because the Proposed Project is anticipated to have AMI, this WSA assumes that unaccounted-for water (UAFW) will be 6 percent of the Project's potable demands.

2.4 Projected Buildout Water Demand of Proposed Project

Based on the water use factors shown in Table 2-2 and a UAFW of 6 percent, the projected water demand at buildout of the Proposed Project is approximately 523.4 AFY, as shown in Table 2-3. This includes approximately 62.4 AFY of raw water demand for the park and open space land uses, which will be served by a non-potable irrigation well.

The Proposed Project does not intend to use recycled water at this time. The City currently uses undisinfected secondary effluent to irrigate fodder crops in the land adjacent to the City's wastewater treatment plant. Tertiary treated recycled water is used for dust control at construction sites and for irrigation at the Great Wolf Lodge. Although a Recycled Water Master Plan is being prepared with the intent that the City would use recycled water to offset potable water demands for outdoor uses in the future, recycled water infrastructure is not planned to be constructed in time to serve the buildout of the Proposed Project. Therefore, recycled water supplies are not assumed for use at the Proposed Project in this WSA.

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Table 2-3. Projected Water Demand for Buildout of the Proposed Project

Land Use Designation	Gross Area, acres	Dwelling Units	Water Use Factor		Water Demand, AFY
Potable Water					
Low Density Residential	152.36	715	477[(a)]	gpd/DU	382.3
High Density Residential	8.76	200	228[(b)]	gpd/DU	51.0
Potable Water Subtotal	161.12	915	-	-	433.3
				UAFW[(c)]	27.7
				Potable Water Total	461.0
Raw Water					
Parks/Open Space[(d)]	14.55	-	3,600	gpd/acre	58.7
				UAFW[(c)]	3.7
				Raw Water Total	62.4
				Total Demand (Potable and Raw Water)	**523.4**

(a) Based on LDR water use factor of 2,240 gpd/acre and an average density of 4.7 DU/acre.
(b) Based on HDR water use factor of 5,200 gpd/acre and an average density of 22.8 DU/acre.
(c) Based on 6 percent of project water demands.
(d) Parks/Open Space land use will be served by a non-potable irrigation well.

2.5 Projected Water Supply for Proposed Project

Water demands for the Proposed Project will be served using the City's existing and future portfolio of water supplies. The inclusion of existing and planned future supplies is specifically allowed by the Water Code:

> *Water Code section 10631(b): Identify and quantify, to the extent practicable, the existing and planned sources of water available to the supplier over the same five-year increments described in subdivision (a).*

Proponents of 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 area. Figure 2-1 shows the Proposed Project Vicinity and Figure 2-2 shows the proposed land use.

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Figure 2-1. Proposed Project Vicinity

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Figure 2-2. Conceptual Land Use Plan

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3.0 REQUIRED SB 610 DETERMINATIONS

The following determinations must be made, pursuant to SB 610.

3.1 Does SB 610 Apply to the Proposed Project?

Water Code sections 10910 and 10912 state:

> *10910 (a) Any city or county that determines that a project, as defined in Section 10912, is subject to the California Environmental Quality Act (Division 13 (commencing with Section 21000) of the Public Resources Code) under Section 21080 of the Public Resources Code shall comply with this part.*
>
> *10912 (a) "Project" means any of the following:*
>
> *(1) A proposed residential development of more than 500 dwelling units.*
>
> *(2) A proposed shopping center or business establishment employing more than 1,000 persons or having more than 500,000 square feet of floor space.*
>
> *(3) A proposed commercial office building employing more than 1,000 persons or having more than 250,000 square feet of floor space.*
>
> *(4) A proposed hotel or motel, or both, having more than 500 rooms.*
>
> *(5) A proposed industrial, manufacturing, or processing plant, or industrial park planned to house more than 1,000 persons, occupying more than 40 acres of land, or having more than 650,000 square feet of floor area.*
>
> *(6) A mixed-use project that includes one or more of the projects specified in this subdivision.*
>
> *(7) A project that would demand an amount of water equivalent to, or greater than, the amount of water required by a 500-dwelling unit project.*

Based on the following assumptions, SB 610 does apply to the Proposed Project.

- The Proposed Project is subject to California Environmental Quality Act (CEQA) and an Environmental Impact Report (EIR) is required.
- The Proposed Project, with its proposed 915 residential DUs meets the definition of a "Project" as specified in Water Code section 10912(a) paragraph (1) as defined for residential development (see above).

The Proposed Project has not been the subject of a previously adopted WSA and has not been included in an adopted WSA for a larger project. Therefore, according to Water Code section 10910(a), a WSA is required for the Proposed Project. The Proposed Project is included in the General Plan Water Supply Report.

3.2 Does SB 221 Apply to the Proposed Project?

In 2001, SB 221 amended State law to require that approval by a city or county of certain residential subdivisions requires an affirmative written verification of sufficient water supply. Per California Government Code section 66473.7(a)(1), a subdivision means a proposed residential development of more than 500 DUs. The Proposed Project, with its proposed 915 residential DUs, is therefore subject to the requirements of SB 221. A verification of sufficient water supply (SB 221) report will be required prior to final approvals.

3.3 Who is the Identified Public Water System?

Water Code sections 10910 and 10912 states:

> *10910(b) The city or county, at the time that it determines whether an environmental impact report, a negative declaration, or a mitigated negative declaration is required for any project subject to the California Environmental Quality Act pursuant to Section 21080.1 of the Public Resources Code, shall identify any water system that is, or may become as a result of supplying water to the project identified pursuant to this subdivision, a public water system, as defined by Section 10912, that may supply water for the project.*
>
> *10912 (c) "Public water system" means a system for the provision of piped water to the public for human consumption that has 3,000 or more service connections…*

The Proposed Project area is within the City's SOI. Therefore, the City is the identified public water system for the Proposed Project.

3.4 Does the City have an adopted UWMP and does the UWMP include the projected water demand for the Proposed Project?

Water Code section 10910 states:

> *10910(c)(1) The city or county, at the time it makes the determination required under Section 21080.1 of the Public Resources Code, shall request each public water system identified pursuant to subdivision (b) to determine whether the projected water demand associated with a proposed project was included as part of the most recently adopted urban water management plan adopted pursuant to Part 2.6 (commencing with Section 10610).*

The City's 2015 UWMP is incorporated by reference into this WSA. The City's existing potable and raw water demand is 16,253 AFY[2], which may be greater than normal due to stay-at-home orders and mandated closure of non-essential businesses in response to the pandemic. West Yost estimated the City's projected water demand for the future land use areas of the General Plan Update.

According to the General Plan Update, the Proposed Project is located within the City's SOI. The Proposed Project is included in the General Plan Water Supply Report demand projections.

The City's ability to meet the projected water demands for the Proposed Project is described in Section 7.0 of this WSA.

[2] Provided by City. July 2021.

4.0 CITY OF MANTECA WATER SERVICE AREA

This section presents the City's water service area including history and growth information for the City.

4.1 City of Manteca Water Service Area

The City is located in the flat plain at the northern end of California's San Joaquin Valley in south San Joaquin County. The City is located approximately 10 miles south of Stockton and 15 miles north of Modesto. Rich agricultural lands abut Manteca on the north, east, and south, while areas to the west are used primarily for industry. The Southern Pacific Railroad cuts the City diagonally from southeast to northwest. State Highway 120 crosses the southern portion of the City and provides a connection between Interstate 5, located about four miles to the west of the City, and Highway 99 along the eastern boundary of the City. This location creates a good setting for Bay Area commuter housing, as well as new commercial and industrial locations.

The City's water service planning area corresponds with the City SOI established in the City's 2023 General Plan. The 2023 General Plan includes a designation of area planned to be developed by 2023. The City's current water distribution service area coincides with the City limits. It is assumed that the City's water distribution system will extend to areas within the SOI beyond the existing City limits as those areas are approved for development and annexed into the City.

Presently, the City limits encompass an area of about 13,746 acres. The total existing developed land is made up of approximately 64 percent residential land uses, 18 percent commercial, industrial, and institutional land uses, and 18 percent agriculture, parks, landscape, and other land uses. Water demands not served by the City (e.g., agriculture, schools) rely on private groundwater wells and the South San Joaquin Irrigation District (SSJID) groundwater for their supply.

4.2 Current and Projected Population

Between 1980 and 2020 the City experienced an average annual population growth rate of 3.1 percent, from 24,925 persons in 1980 to 84,800 persons in 2020. During this period, peak population growth occurred between 1980 and 1990 with an average growth rate of over 5 percent. Recent population growth since 2010 has averaged about 2.4 percent per year.

By comparison, the City's boundary area has grown from about 6,300 acres in 1990 to about 13,400 acres in 2015, an annual average area growth rate of about 3.1 percent. The greatest growth in area occurred between 1990 and 2000. Since 2000, the City's area has grown about 1.8 percent per year.

For purposes of this WSA, the City elected to use the 1980-2020 average annual population growth rate of 3.1 percent to project the population of the water service area through 2045. It is assumed that this population growth includes population acquired through City annexations of the surrounding area, as well as City infill development. The current and projected water service area populations for the City are summarized in Table 4-1. According to California Department of Finance, the City's population in 2020 was 84,800[3].

Table 4-1. Historical and Projected Population for City of Manteca Water Service Area	
Calendar Year	Estimated Population[(b)]
2020[(a)]	84,800
2025	98,833
2030	115,187
2035	134,248
2040	156,463
2045	182,354

(a) According to California Department of Finance, the City's 2020 population is estimated at 84,800.
(b) Population projected at the 1980-2020 average growth rate of 3.1 percent.

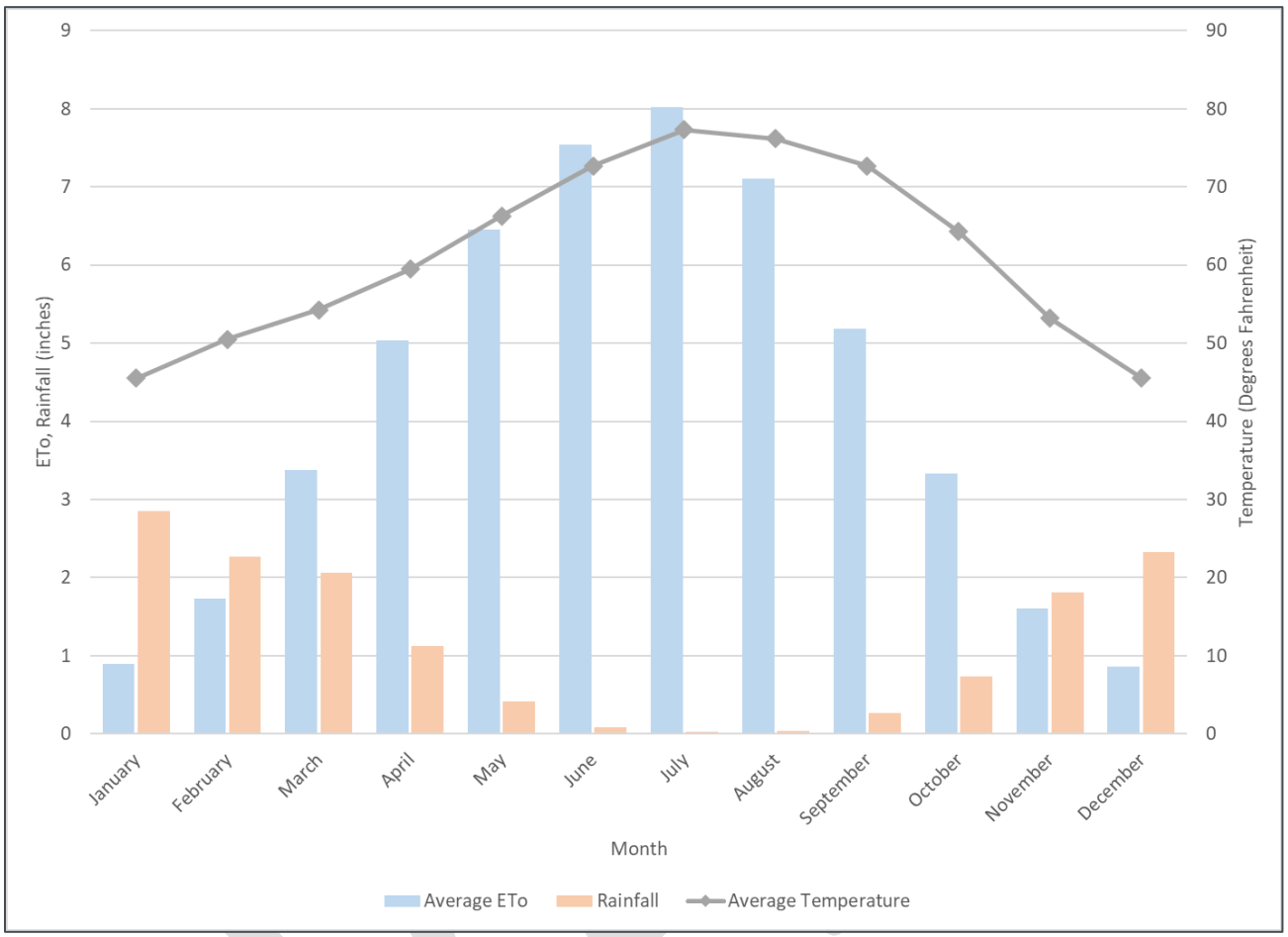
4.3 Climate

Climate and precipitation information are described in the City's 2015 UWMP. The City experiences hot summer temperatures with many days over 100°F during July and August. Nighttime temperatures during July and August drop into the fifties. The winter temperatures are much colder, with daytime highs in the forties and fifties. Winter lows are in the thirties and forties. Overnight freezes are infrequent. Spring and fall provide moderate temperature ranges. The mean annual precipitation is 13 inches.

Average monthly climate data from 1987 through 2005 is provided in Figure 4-1. The evapotranspiration (ETo) data in Figure 4-1 was obtained from the California Irrigation Management Information System (CIMIS) for Station 70-Manteca in the San Joaquin Region. Rainfall and temperature data were obtained by City staff from the National Oceanic and Atmospheric Administration (NOAA) website.

As indicated by the data in Figure 4-1, a greater quantity of water is evaporated during May through August in correlation to high temperatures and low humidity, which results in high water demand for landscape irrigation.

California Department of Finance. Cities, Counties, and the State Population Estimates with Annual Percent Change. January 2021



Source: California Department of Water Resources, California Irrigation Management Information System, Station 70, November 1987 – 2005. Rainfall and temperature data were obtained by City staff from the NOAA website.

Figure 4-1. City of Manteca Average Monthly Climate Data

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5.0 CITY OF MANTECA WATER DEMANDS

Water Code section 10910 states:

> *10910(c)(2) If the projected water demand associated with the proposed project was accounted for in the most recently adopted urban water management plan, the public water system may incorporate the requested information from the urban water management plan in preparing the elements of the assessment required to comply with subdivisions (d), (e), (f), and (g).*

As indicated in Section 3, the water demand for the Proposed Project was included in the City of Manteca General Plan Update Water Supply Report, attached as Appendix A. The Water Supply Report has been updated to reflect the current (September 2021) understanding of the City's General Plan Update. The General Plan Update land use is being updated and a revised version of the Water Supply Report will be provided in the coming months as that land use data are evaluated.

The following topics are covered in this section:

- Existing and Projected Water Demand
- Dry Year Water Demand

5.1 Existing and Projected Water Demand

City potable and raw water demand in 2020 was approximately 16,253 acre-feet (AF), which may have been caused by a higher daytime population than normal due to stay-at-home orders and mandated closure of non-essential businesses in response to the COVID-19 pandemic.

The projected water demand for future land use area for the buildout of the General Plan areas, which includes the Proposed Project in the City's General Plan Update, was calculated by multiplying the projected land uses by the unit water demand factor. The resulting water demand projection was 17,971 AFY.

Therefore, the projected potable and raw water demand at buildout of the General Plan is 34,224 AFY (16,253 AFY existing plus 17,971 AFY projected). Buildout of the General Plan planning area is projected to occur shortly before 2050.

The City's existing and projected potable and raw water demand is shown in Table 5-1. The 2020 data reflect actual 2020 demand. The projected water demands shown in Table 5-1 will be used throughout this WSA.

Table 5-1. City of Manteca Existing and Projected Total Water Demand in Normal Years, AFY

	2020, Current	2025	2030	2035	2040	2045
Total Water Demand	16,253	18,480	21,012	23,891	27,164	30,885

Sources: 2020 Water demand per City of Manteca; demand projections assume a constant growth rate between 2020 and buildout of the General Plan, which translates to 2.60 percent per year.

The City's projected water demand at buildout (based on existing water demand and buildout of the General Plan Update, and the projected water demand of the Proposed Project) is summarized in Table 5-2. The City's preliminary water demand projections for future developments with approved water supply, as of March 2021, have been updated by West Yost to be based on water use factors that were adjusted for SB X7-7 (see Table 2-2). These revised demand projections for future developments within the City are included in Appendix A of this WSA.

Table 5-2. City of Manteca Projected Buildout Water Demand, AFY

	Total
Existing 2020 Water Demand	16,253
2040 General Plan Horizon Water Demand[(a)]	10,911
2045 Water Demand[(b)]	3,721
Buildout of General Plan[(c)]	3,339
Total Water Demand	**34,224**

Sources: 2020 Water demand per City of Manteca; demand projections assume a constant growth rate between 2020 and buildout of the General Plan, which translates to 2.60 percent per year.

(a) 2040 General Plan Horizon Water Demand represents incremental increase in water demand beyond existing demand.

(b) 2045 Water Demand represents incremental increase in water demand beyond existing and 2040 General Plan demand.

(c) General Plan Buildout represents incremental increase in water demand beyond the existing, 2040 General Plan, and 2045 water demand.

5.2 Dry Year Water Demand

The City currently has a water conservation program in place, as described in Chapter 8 of the City's 2015 UWMP. The City's Water Shortage Contingency Plan includes a five-stage plan describing water conservation measures to reduce water demand by up to 50 percent in the event of a water supply shortage or emergency. The water shortage stages, and their respective anticipated reduction in potable water demand, are shown in Table 5-3.

Table 5-3. Water Shortage Contingency Plan Projected Demand Reduction

Stage	Percent Supply Reduction
I	Up to 10 percent
II	11 – 20 percent
III	21 – 30 percent
IV	31 – 40 percent
V	41 – 50 percent

Source: City of Manteca 2015 UWMP, Table 8-1 Stages of WSCP

When comparing potable water supply to demand in the City's 2015 UWMP and in this WSA, the dry year water demands are assumed to not include implementation of the City's Water Shortage Contingency Plan. This is a conservative assumption as additional water conservation will likely occur as a result of the City's implementation of its Water Shortage Contingency Plan in response to dry years or other water supply shortages. Table 5-4 presents the projected future dry year potable water demand.

Table 5-4. Projected Future Dry Year Potable and Raw Water Demand

Hydrologic Condition	Demand Reduction[a]	2020	2025	2030	2035	2040	2045
Single Dry Year, AFY	0	16,253	18,480	21,012	23,891	27,164	30,885
Multiple Dry Year 1	0	16,253	18,480	21,012	23,891	27,164	30,885
Multiple Dry Year 2	0	16,253	18,480	21,012	23,891	27,164	30,885
Multiple Dry Year 3	0	16,253	18,480	21,012	23,891	27,164	30,885
Multiple Dry Year 4	0	16,253	18,480	21,012	23,891	27,164	30,885
Multiple Dry Year 5	0	16,253	18,480	21,012	23,891	27,164	30,885

(a) Conservatively assumes no demand reduction in dry years.

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6.0 CITY OF MANTECA WATER SUPPLIES

Key topics addressed in this section include:

- Regulatory Background
- City's Surface Water Supply
- City's Groundwater Supply
- City's Potable Water Supply Availability and Reliability

6.1 Regulatory Background

Water Code section 10910 states:

10910(c)(2) If the projected water demand associated with the proposed project was accounted for in the most recently adopted urban water management plan, the public water system may incorporate the requested information from the urban water management plan in preparing the elements of the assessment required to comply with subdivisions (d), (e), (f) and (g).

10910(d)(1) The assessment required by this section shall include an identification of any existing water supply entitlements, water rights, or water service contracts relevant to the identified water supply for the proposed project, and a description of the quantities of water received in prior years by the public water system, or the city or county if either is required to comply with this part pursuant to subdivision (b), under the existing water supply entitlements, water rights, or water service contracts.

10910(d)(2) An identification of existing water supply entitlements, water rights, or water service contracts held by the public water system, or the city or county if either is required to comply with this part pursuant to subdivision (b), shall be demonstrated by providing information related to all of the following:

(A) Written contracts or other proof of entitlement to an identified water supply.

(B) Copies of a capital outlay program for financing the delivery of a water supply that has been adopted by the public water system.

(C) Federal, state, and local permits for construction of necessary infrastructure associated with delivering the water supply.

(D) Any necessary regulatory approvals that are required in order to be able to convey or deliver the water supply.

10910(e) If no water has been received in prior years by the public water system, or the city or county if either is required to comply with this part pursuant to subdivision (b), under the existing water supply entitlements, water rights, or water service contracts, the public water system, or the city or county if either is required to comply with this part pursuant to subdivision (b), shall also include in its water supply assessment pursuant to subdivision (c), an identification of the other public water systems or water service contract-holders that receive a water supply or have existing water supply entitlements, water rights, or water service contracts, to the same source of water as the public water system, or the city or county if either is required to comply with this part pursuant to subdivision (b), has identified as a source of water supply within its water supply assessments.

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).

Proponents of 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 area through connection fees and other means. This arrangement will be outlined within the Conditions of Approval between the project applicant and the City. The Conditions of Approval will be completed as part of the City's formal land use actions.

The summaries of the City's water supplies provided below have been taken, for the most part, from the City's 2015 Urban Water Management Plan (2015 UWMP), South San Joaquin Irrigation District 2020 UWMP (2020), and the Eastern San Joaquin Groundwater Subbasin Groundwater Sustainability Plan (2019).

6.2 Surface Water Supply

The principal component of future water supply for the City is deliveries from the SCWSP. The City, along with three other cities/retail water suppliers (Escalon, Lathrop, and Tracy), signed water supply agreements with SSJID to supply treated potable water to the participating cities.

The Nick C. DeGroot Water Treatment Plant (WTP) is commissioned for the SCWSP and is currently operated by SSJID. The WTP has a total Phase 1 capacity of 31,522 AFY and the Phase 2 capacity is anticipated to be 43,090 AFY. Phase 2 has not yet been implemented but is expected by 2040, according to the SSJID 2020 UWMP. Currently, the City is allotted 11,500 AFY under Phase 1 and 18,500 AFY under Phase 2. The term of the City's water supply agreement with SSJID is through December 2029. The City and SSJID signed a new contract to extend this contract through 2049. Historically, the City has not utilized its full allocation of surface water due to system constraints and State and SSJID supply limits in response to the drought conditions.

6.3 Groundwater Supply

Water Code section 10910 states:

> *10910(f) If a water supply for a proposed project includes groundwater, the following additional information shall be included in the water supply assessment.*
>
> *10910(f)(1) A review of any information contained in the urban water management plan relevant to the identified water supply for the proposed project.*
>
> *10910(f)(2) A description of any groundwater basin or basins from which the proposed project will be supplied. For those basins for which a court or the board has adjudicated the rights to pump groundwater, a copy of the order or decree adopted by the court or the board and a description of the amount of groundwater the public water system, or the city or county if either is required to comply with this part pursuant to subdivision (b), has the legal right to pump under the order or decree. For basins that have not been adjudicated, information as to whether the department has identified the basin or basins as over drafted or has projected that the basin will become over drafted if present management conditions continue, in the most current bulletin of the department that characterizes the condition of the groundwater basin, and a detailed description by the public water system, or the city or county if either is required to comply with this part pursuant to subdivision (b), of the efforts being undertaken in the basin or basins to eliminate the long term overdraft condition.*
>
> *10910(f)(3) A detailed description and analysis of the amount and location of groundwater pumped by the public water system, or the city or county if either is required to comply with this part pursuant to subdivision (b), for the past five years from any groundwater basin from which the proposed project will be supplied. The description and analysis shall be based on information that is reasonably available, including, but not limited to, historical use records.*

A detailed description and analysis of the amount and location of groundwater that is projected to be pumped by the public water system, or the city or county if either is required to comply with this part pursuant to subdivision (b), from any basin from which the proposed project will be supplied. The description and analysis shall be based on information that is reasonably available, including, but not limited to, historical use records.

10910(f)(4) An analysis of the sufficiency of the groundwater from the basin or basins from which the proposed project will be supplied to meet the projected water demand associated with the proposed project.

A water assessment shall not be required to include the information required by this paragraph if the public water system determines, as part of the review required by paragraph (1), that the sufficiency of groundwater necessary to meet the initial and projected water demand associated with the project was addressed in the description and analysis required by paragraph (4) of subdivision (b) of Section 10631.

The local groundwater basin and City groundwater use are described in the City's 2015 UWMP. A summary of the groundwater basin and historical and projected groundwater pumping are provided below.

6.3.1.1 Basin Description

The City's wells are located in the Eastern San Joaquin (ESJ) Subbasin, which is a subbasin of the San Joaquin Valley Groundwater Basin. The groundwater aquifers underlying the City have been identified to include four geologic formations. In increasing depth from the surface, the identified aquifers are Victor Formation, Laguna Formation, Mehrten Formation, and Valley Springs Formation. Due to the alluvial generation of these aquifers, there is significant variation in grain size, with lenses and strata of high yield gravel, permeable sandy material, and lower permeability clays. In general, the strata slope from the hills east of the City downward to the west, providing good recharge from hill runoff as well as from the Stanislaus River. The City's wells primarily withdraw water from the Laguna and Victor Formations.

The basin is not adjudicated; however, a basin management plan has been created. The Eastern San Joaquin Groundwater Basin Groundwater Management Plan (ESJGB-GMP) (NSJCGB, 2004) was prepared in September 2004. According to Department of Water Resources (DWR) Bulletin 118 (DWR, 2006), the ESJ Subbasin is in a critical condition of overdraft[4]. Groundwater levels have been historically declining at an average rate of 1.7 feet per year. Groundwater overdraft in the overall basin and the City's groundwater withdrawal rate is of vital concern to the City as this poses a long-term risk to the reliability of the groundwater supply.

In 2014, the Sustainable Groundwater Management Act (SGMA) was signed into law to provide a framework for management of groundwater supplies by local agencies and restricts state intervention, if required. SGMA provides an opportunity for local agencies overlying the basin to form a Groundwater Sustainability Agency (GSA), which is the primary agency responsible for achieving sustainability. As part of the region's compliance with SGMA, the Eastern San Joaquin Groundwater Authority was formed in 2017, and includes representatives from Calaveras County Water District / Stanislaus County, California Water Service Company, Central Delta Water Agency, Central San Joaquin Water Conservation District, City of Lathrop, City of Lodi, City of Manteca, City of Stockton, Linden County Water District, Lockeford Community Services District, North San Joaquin Water Conservation District, Oakdale Irrigation District,

[4] The Eastern San Joaquin County Groundwater Subbasin was confirmed to be in critical condition of overdraft in the DWR Bulletin 118 Interim Update 2016.

San Joaquin County, South Delta Water Agency, South San Joaquin Groundwater Sustainability Agency, Stockton East Water District, and the Woodbridge Irrigation District GSA. This GSA adopted a Groundwater Sustainability Plan (GSP) in late 2019, because the Eastern San Joaquin Groundwater Subbasin has been identified as being in a state of critical overdraft and is considered a high priority. Two projects for the City that were identified in the GSP are the implementation of AMI, mentioned above, and the transfer of recycled water to agricultural uses to offset groundwater pumping.

6.3.1.2 Groundwater Production

The sustainable yield of the groundwater basin was estimated in the 2019 GSP[5] to be approximately 1 acre-foot per acre per year (715,000 AFY plus or minus 10 percent over the subbasin area of 1,195 square miles, an average of 0.935 AF/acre). In 2005, the City began receiving treated surface water from SCWSP and the City has had limited groundwater pumping since the implementation of the SCWSP. Although groundwater pumping in some years prior to 2005 has exceeded that rate, as part of the SCWSP, the City intends to limit groundwater pumping to that rate or less. Projected groundwater availability is therefore based on an assumption that up to 1 AFY of groundwater is available per acre of City service area.

The total groundwater pumping that occurs within the City boundaries include City-owned municipal wells and City-owned park irrigation wells, in addition to irrigation and domestic wells owned and operated by others. This section provides a summary of the estimated groundwater pumping that occurs within the current City limits and planning area. According to the City's 2015 UWMP, groundwater pumping data collection is on-going and there are potentially many groundwater pumping wells that are unmetered and unidentified.

6.3.1.2.1 City-Produced Groundwater

The City currently (2021) owns and operates 17 potable water wells and 31 irrigation wells. The City's annual potable groundwater production has steadily increased historically, reaching a peak of 14,900 AF in 2004. Commissioning of the surface water treatment plant in 2005 decreased groundwater use considerably and currently supplies an average of 52 percent of the City's annual potable water supply. Since 2005, the City has constructed dedicated irrigation wells at many parks in an effort to reduce potable demand, which requires wellhead treatment at many wells for arsenic and other constituents to meet drinking water standards. In 2000, the City pumped about 1.2 AFY/acre, but has since decreased pumping to about 0.7 AFY/acre in 2010 and to about 0.5 AFY/acre in 2015. When the City annexes new areas, the safe yield remains unchanged; however, the volume of available groundwater increases with the annexation of land into the City. However, the 1 AFY/acre does not provide sufficient water supply for most projects.

6.3.1.2.2 Pumping by Others

Because there are numerous wells not owned by the City that are drawing from the ESJ Subbasin, this pumping could affect the amount of groundwater available to the City within the groundwater basin safe yield. Wells currently in operation not owned by the City include private domestic wells, agricultural wells, wells for school irrigation owned by the Manteca Unified School District (MUSD), and irrigation wells owned by SSJID, among others. Well completion reports obtained from DWR suggest that approximately 1,000 water wells have been constructed within the General Plan area since record keeping began in the

[5] "Eastern San Joaquin County Groundwater Subbasin. Groundwater Sustainability Plan." Eastern San Joaquin Groundwater Authority, November 2019.

1960s; however, many may not have been registered as abandoned. It is anticipated that most domestic wells are no longer in use, though further investigation would be needed to verify this assumption.

It is known that MUSD and others own and operate wells within the City and its planning area. It is also assumed that pumping by MUSD and other known pumpers within the City and its planning area should be included in the groundwater safe yield accounting for purposes of this evaluation. Groundwater pumping by others may also be included in future updates of this initial estimate.

Metered pumping records for MUSD have not been provided. The MUSD is assumed to irrigate 25 percent of its parcels at 4 AFY/acre. According to the City's 2015 UWMP, the groundwater pumping from other ESJ entities were estimated as follows:

- Given that the MUSD has approximately 500 total acres, the total annual water use is estimated at approximately 500 AFY.
- According to SSJID pumping records for 2010 through 2015, an average of 4,860 AFY groundwater was pumped from SSJID-leased wells. Of this, an average of 2,860 AFY was pumped within the City of Manteca and the City's Planning Area. Therefore, groundwater pumping from SSJID-leased wells is projected to be 2,860 AFY.
- Other known industrial groundwater pumpers include Eckerts Cold Storage. The City treats over 130 AF of wastewater produced by Eckerts each year. Based upon this average, groundwater pumping is estimated at 150 AFY assuming a return-to-sewer ratio of approximately 85 percent.

6.3.1.3 Historical Groundwater Pumping

Historically, the City extracted groundwater at a rate as high as 1.6 AFY/acre, based on the developed City area. As discussed previously, the SCWSP allowed the City to reduce local groundwater extraction to less than the estimated basin safe yield of 1 AFY/acre.

Since 2006, after the commissioning of the SCWSP, the total groundwater pumping for the City of Manteca has ranged from 8,062 AFY to 10,374 AFY averaging about 8,700 AFY. Pumping amounts were generally consistent over the years 2011 to 2015, with a decrease in 2014 and 2015, likely attributable to statewide mandatory demand reduction regulations. With this exception, there were no limitations or challenges for obtaining groundwater during the last 5 years, and the available groundwater quantity was sufficient. Groundwater pumping by City wells (potable and irrigation) from 2011 to 2015 is summarized in Table 6-1.

Table 6-1. Historical Groundwater Production

	2011	2012	2013	2014	2015
Groundwater Supply, AFY	9,156	10,374	9,922	6,546	7,249

Source: City of Manteca 2015 UWMP, Table 6-2 Groundwater Volume Pumped

6.4 Potable Water Supply Availability and Reliability

The City's surface water and groundwater supply reliability as described in the City's 2015 UWMP is summarized below.

6.4.1 Surface Water Reliability

SSJID has existing agreements to provide surface water to agricultural interests, federal and state agencies, and cities in the south San Joaquin area. Some of these agreements are long-term, while others are as short as one week for agricultural deliveries.

Surface water reliability is in part reliant on storage and releases from upstream dams along the Stanislaus River with respect to the Nick C. DeGroot WTP intake location. While SSJID has surface water rights to approximately 600,000 AFY jointly held with the Oakdale Irrigation District (OID), the full allocation to SSJID and OID is subject to runoff from the Stanislaus River and other constraints per the 1988 Stipulation and Agreement with the U.S. Bureau of Reclamation that constructed and operates New Melones Reservoir on the Stanislaus River.

According to the 1988 Agreement, SSJID is entitled to 300,000 AFY during normal water years, however drought conditions and seasonal variations have the potential to reduce the allocation to SSJID and the contracted cities it delivers water to, including the City. The New Melones Reservoir inflow has a direct effect on surface water availability to SSJID. The following equation governs water supply availability to SSJID when inflows are less than 600,000 AF:

New Melones Inflow + [(600,000 - New Melones Inflow) / 3]

Currently, SSJID is expected to provide total supplies (including irrigation and potable) ranging from 225,000 AFY to 300,000 AFY, though the lowest supply on record was 225,000 AF in both 2014 and 2015 (2015 UWMP). In the event that shortages do occur, SSJID and OID share the deficiencies equally.

As mentioned in Section 6.2, the City is allotted 11,500 AFY from SSJID under Phase 1 and a total of 18,500 AFY under Phase 2. It is anticipated that SSJID will implement Phase 2 of the SCWSP by 2040, providing an additional 7,000 AFY in surface water supply to the City.

6.4.1.1 Reliability of SCWSP Deliveries

Under single year and multiple year dry period scenarios, deliveries to the City by SSJID could be reduced. The availability and reliability of the City's SCWSP surface water deliveries during dry years according to SSJID's 2020 UWMP are described below:

- For Single Dry Year reliability, the City has based its projected SSJID allocations on the single driest hydrologic year (Year 2020). With this assumption, it is anticipated that the City will receive between 79 and 100 percent of its normal year water supply during a single dry year.
- For Multiple Dry Years reliability, the City has based its projected SSJID allocations on the most recent five-year multiple dry year hydrologic cycle (Year 2012 through 2016). With this assumption, it is anticipated that the City will receive 100 percent of its normal year water supply during the first, second, and fifth years of a multiple dry year scenario and between 79 percent and 100 percent of its normal year supply during the third and fourth years of a multiple dry year scenario.

In December 2018, the State Water Resources Control Board (SWRCB) released an updated Water Quality Control Plan for the San Francisco Bay/Sacramento San Joaquin Delta Estuary with significant changes to the previous Bay Delta Water Quality Control Plan. The updated plan (Bay-Delta Plan Amendment) requires releases of approximately 40 percent of what would naturally flow in watersheds tributary to the

San Joaquin River (including the Stanislaus River) during the February to June period. This means that surface water users on those watersheds would be restricted from using and storing water until 40 percent of unimpaired flows are rededicated for water quality and instream fishery purposes. For the Stanislaus River, the resulting surface water cutbacks would be significant. Because over a dozen lawsuits have been filed in both state and federal courts, the SSJID 2020 UWMP indicates that SSJID has opted to make no near-term planning assumptions related to the implementation of the Bay-Delta Plan Amendment for the purposes of its 2020 UWMP. Should conditions change or consequential resolution of the issues come to be, SSJID indicates it will revise and re-adopt a 2020 UWMP to reflect changes to its impacted water supply.

The projected surface water deliveries available to the City through 2045 as derived from the SSJID 2020 UWMP, are presented in Table 6-2. The City's 2020 UWMP is in progress and the water, sewer, recycled water, and stormwater master plans will be updated within the next one to two years.

The projected surface water deliveries available to the City are presented in Table 6-2.

Table 6-2. SCWSP Surface Water Deliveries to the City of Manteca during Hydrologic Normal, Single Dry, and Multiple Dry Years, AFY

	2025	2030	2035	2040	2045
Normal Year	11,500	11,500	11,500	18,500	18,500
Single Dry Year	9,649	10,566	11,483	14,592	15,671
Multiple Dry Year 1	11,500	11,500	11,500	18,500	18,500
Multiple Dry Year 2	11,500	11,500	11,500	18,500	18,500
Multiple Dry Year 3	9,649	10,566	11,483	14,592	15,671
Multiple Dry Year 4	9,649	10,566	11,483	14,592	15,671
Multiple Dry Year 5	11,500	11,500	11,500	18,500	18,500

Source: Derived from SSJID 2020 UWMP, Table 7-2 Basis of Water Year Data.

6.4.2 Groundwater Reliability

There are many factors that can affect groundwater supply reliability, including current storage conditions, water quality, seasonal groundwater level variations and climate change. Reduced use by the City, combined with seasonal variations such as intense wet seasons, can result in increased groundwater table elevation. Additionally, all wells are located in the western portion of the SSJID service area and draw from the Eastern San Joaquin Subbasin, the same basin that the City, the City of Lathrop, the City of Stockton, and other groundwater users draw from. For the purposes of this evaluation, only groundwater pumping estimated to be occurring within the City General Plan Update area is included.

While seasonal fluctuations do have a noticeable effect on groundwater elevation, the overall trend showed a decline over time until the City began to use imported surface water in 2005. Historical trends from California Statewide Groundwater Elevation Monitoring (CASGEM) indicate that the basin has experienced groundwater overdraft conditions. The introduction of surface water supply has helped groundwater elevation trends recover within the City by reducing pumping in the area.

Groundwater supply projections include approved developments outside of the City boundaries, but within the planning area, and estimated groundwater pumping by others within the planning area. The projected groundwater supply reliability does not account for groundwater pumping outside the City planning area, nor undocumented privately owned domestic or irrigation wells. Groundwater use may increase as population increases, and groundwater use by others (including MUSD and agricultural users) may also increase in single dry years and multiple dry years (when surface water cutbacks occur). Constant groundwater demands from the MUSD and agricultural users have been assumed for all hydrologic scenarios.

The GSP indicates that the sustainable yield of the groundwater basin is approximately 1 AFY/acre (0.935 AFY/acre plus or minus 10 percent). For purposes of this WSA, West Yost assumes the City will limit groundwater use to approximately 24,877 AFY (the projected City area at Buildout of the General Plan planning area). The projected groundwater availability (for potable and irrigation wells combined), assuming a constant growth rate through 2045, is shown in Table 6-3.

Table 6-3. Projected Groundwater Production during Hydrologic Normal, Single Dry, and Multiple Dry Years, AFY

	2020[a]	2025[b]	2030[b]	2035[b]	2040[b]	2045[b]
Assumed Groundwater Supply	10,060	11,760	13,747	16,069	18,784	21,957

(a) City of Manteca 2015 UWMP, Table 6-10.

(b) Based on 1 AFY of groundwater is available per acre of City surface area as discussed in Section 6.3 of this WSA. The projected groundwater production during 2025 to 2045 were interpolated using a constant growth rate and the 2020 (10,060) and General Plan Buildout (24,877) values. It is noted that General Plan Buildout is anticipated to occur between 2049 and 2050.

The 2020 value of 10,060 AFY accounts for the area within the City limits and then subtracts out other estimated groundwater uses within City limits. As development continues, the largest groundwater usage inside City limits, agricultural use, would decrease. The groundwater supply shown in Table 6-3 assumes the City's available groundwater supply within the safe yield would increase as area outside the current City limits, and within the Planning Area, are annexed into the City for development.

6.5 Potable Water Infrastructure Evaluation

A technical memorandum describing the expected infrastructure that would be needed to serve the Project has been prepared by the project applicant. This infrastructure technical memorandum is included as Appendix B. The City's Water System Master Plan, currently in development, will identify infrastructure needed to serve buildout of the General Plan planning area.

7.0 DETERMINATION OF WATER SUPPLY SUFFICIENCY BASED ON THE REQUIREMENTS OF SB 610

Water Code section 10910 states:

> *10910(c)(4) If the city or county is required to comply with this part pursuant to subdivision (b), the water supply assessment for the project shall include a discussion with regard to whether the total projected water supplies, determined to be available by the city or county for the project during normal, single dry, and multiple dry water 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, including agricultural and manufacturing uses.*

Pursuant to Water Code section 10910(c)(4) and based on the technical analyses described in this WSA, 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.

A comparison of the City's projected potable and raw water supplies and demands is shown in Table 7-1 for Normal, Single Dry, and Multiple Dry Years.

As shown in Table 7-1, demand within the City's service area is not expected to exceed the City's supplies in any Normal year between 2020 and 2045.

For purposes of this WSA, 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.

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Table 7-1. 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	2045
Normal Year						
Available Potable and Raw Water Supply[a]		23,260	25,247	27,569	37,284	40,457
Total Water Demand[b]		18,480	21,012	23,891	27,164	30,885
	Potential Surplus (Deficit)	4,780	4,235	3,678	10,120	9,572
	Supply Shortfall, Percent of Demand	-	-	-	-	-
Single Dry Year						
Available Potable and Raw Water Supply[a]		21,409	24,313	27,552	33,376	37,628
Total Water Demand[b]		18,480	21,012	23,891	27,164	30,885
	Potential Surplus (Deficit)	2,929	3,301	3,661	6,212	6,743
	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	40,457
	Total Water Demand[b]	18,480	21,012	23,891	27,164	30,885
	Potential Surplus (Deficit)	4,780	4,235	3,678	10,120	9,572
	Supply Shortfall, Percent of Demand	-	-	-	-	-
Multiple Dry Year 2	Available Potable and Raw Water Supply[a]	23,260	25,247	27,569	37,284	40,457
	Total Water Demand[b]	18,480	21,012	23,891	27,164	30,885
	Potential Surplus (Deficit)	4,780	4,235	3,678	10,120	9,572
	Supply Shortfall, Percent of Demand	-	-	-	-	-
Multiple Dry Year 3	Available Potable and Raw Water Supply[a]	21,409	24,313	27,552	33,376	37,628
	Total Water Demand[b]	18,480	21,012	23,891	27,164	30,885
	Potential Surplus (Deficit)	2,929	3,301	3,661	6,212	6,743
	Supply Shortfall, Percent of Demand	-	-	-	-	-
Multiple Dry Year 4	Available Potable and Raw Water Supply[a]	21,409	24,313	27,552	33,376	37,628
	Total Water Demand[b]	18,480	21,012	23,891	27,164	30,885
	Potential Surplus (Deficit)	2,929	3,301	3,661	6,212	6,743
	Supply Shortfall, Percent of Demand	-	-	-	-	-
Multiple Dry Year 5	Available Potable and Raw Water Supply[a]	23,260	25,247	27,569	37,284	40,457
	Total Water Demand[b]	18,480	21,012	23,891	27,164	30,885
	Potential Surplus (Deficit)	4,780	4,235	3,678	10,120	9,572
	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).

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8.0 WATER SUPPLY ASSESSMENT APPROVAL PROCESS

Water Code sections 10910 and 10911 state:

> *10910 (g)(1) Subject to paragraph (2), the governing body of each public water system shall submit the assessment to the city or county not later than 90 days from the date on which the request was received. The governing body of each public water system, or the city or county if either is required to comply with this act pursuant to subdivision (b), shall approve the assessment prepared pursuant to this section at a regular or special meeting.*
>
> *10911 (b) The city or county shall include the water supply assessment provided pursuant to Section 10910, and any information provided pursuant to subdivision (a), in any environmental document prepared for the project pursuant to Division 13 (commencing with Section 21000) of the Public Resources Code.*

As indicated above, this WSA must be included in the Draft EIR being prepared for the Proposed Project.

In addition, SB 221 applies to residential subdivisions of over 500 DUs and requires that the water supplier provide a written verification that the water supply for the project is sufficient, prior to issuance of the final permits. Because the Proposed Project includes 915 residential DUs, it is subject to the requirements of SB 221 (Government Code section 66473.7) and a verification of sufficient water supply (SB 221) report will be required prior to final approvals.

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9.0 REFERENCES

California Department of Water Resources. Bulletin 118, *California's Groundwater*, 2006 Update and Interim Update 2016.

City of Manteca. 2015 Final Urban Water Management Plan. September 2016.

City of Manteca. 2005 Water Master Plan. May 2005.

City of Manteca. General Plan 2023. Adopted on October 6, 2003.

City of Manteca. Notice of Preparation of an Environmental Impact Report (EIR) for the Proposed Annexation No. 1 Project. October 2021.

Eastern San Joaquin Groundwater Authority. Eastern San Joaquin Groundwater Subbasin Groundwater Sustainability Plan. November 2019.

South San Joaquin Irrigation District. 2020 Urban Water Management Plan. June 2021.

West Yost. City of Manteca - General Plan Update Water Supply Report. September 2021.

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Appendix A

City of Manteca - General Plan Update
Water Supply Report

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Appendix B

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