APPENDICES VOL 2: DRAFT ENVIRONMENTAL IMPACT REPORT NO. 7896

Kamm Avenue Pistachio Processing Plant

February 2021

PREPARED FOR:

County of Fresno
Department of Public Works and Planning
2220 Tulare St., 6th Floor
Fresno, CA 93721

PREPARED BY:

Crawford & Bowen Planning, Inc.
113 N. Church Street, Suite 302
Visalia, CA 93291

TABLE OF CONTENTS

APPENDICES VOL 2:

Appendix B – Biological Analysis Report
Appendix C – Cultural Resources Survey and Report
Appendix D – Energy Analysis
Appendix E – Geotechnical Feasibility Report
Appendix F – Hydrology and Water Quality Analysis
Appendix G – Water Supply Analysis
Appendix H – Noise Assessment
Appendix I – Traffic Impact Analysis Report

Appendix B

Biological Analysis Report

BIOLOGICAL ANALYSIS REPORT

KAMM AVENUE PROCESSING PLANT, LLC

KAMM AVENUE PROCESSING PLANT PROJECT

DECEMBER 2020

BIOLOGICAL ANALYSIS REPORT

KAMM AVENUE PROCESSING PLANT PROJECT

Prepared for:

Kamm Avenue Processing Plant, LLC
1396 W Herndon Ave
Fresno, California 93711
Contact Person: Jeff Roberts
Phone: (559) 288-0688

Consultant:

Quad Knopf, Inc.
601 Pollasky Avenue, Suite 301
Clovis, CA 93612
Contact: Curtis Uptain
(559) 449-2400
(559) 733-7821 Fax

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Table of Contents

Executive Summary *1*

SECTION 1 - Introduction *1-1*

1.1 - Project Location 1-1
1.2 - Project Description 1-1
1.3 - Purpose, Goals, and Objectives 1-5

SECTION 2 - Methods *2-1*

2.1 - Definition of Biological Study Area 2-1
2.2 - Definition of Special-Status Species 2-1
2.3 - Literature Review and Database Analysis 2-3
2.4 - Reconnaissance-Level Field Survey 2-4
2.5 - Focused Field Surveys 2-5
    2.5.1 - San Joaquin Kit Fox Surveys 2-5
    2.5.2 - Small Mammal Trapping 2-8
    2.5.3 - Migratory Birds and Raptors Survey 2-11
    2.5.4 - Special-status Bat Species and Bat Maternity Colonies 2-11

SECTION 3 - Regulatory Setting *3-1*

SECTION 4 - Environmental Setting *4-1*

4.1 - Physical Characteristics 4-1
    4.1.1 - Topography 4-1
    4.1.2 - Climate 4-1
    4.1.3 - Land Use 4-1
    4.1.4 - Soils 4-2
    4.1.5 - Hydrology 4-4
4.2 - Vegetation and Other Land Cover 4-6
    4.2.1 - Annual Grassland 4-6
    4.2.2 - Deciduous orchard 4-10
4.3 - General Plant and Wildlife Observations 4-11

SECTION 5 - Sensitive Biological Resources *5-1*

5.1 - Special-Status Species 5-1
    5.1.1 - Special-Status Plant Species 5-4
    5.1.2 - Special-Status Animal Species 5-4
    5.1.3 - Other Protected Species 5-14
5.2 - Sensitive Natural Communities 5-15
    5.2.1 - Sensitive Plant Communities 5-15
    5.2.2 - Critical Habitats 5-15
5.3 - Jurisdictional Aquatic Resources 5-15

5.4 - Wildlife Movement 5-17
5.5 - Resources Protected by Local Policies and Ordinances 5-17
5.6 - Habitat Conservation Plans 5-17

SECTION 6 - Impact Analysis and Recommended Mitigation Measures 6-1

6.1 - Special-Status Species 6-1
6.1.1 - Project Impacts to Special-Status Plant Species 6-1
6.1.2 - Project Impacts to Special-Status Animal Species 6-2
6.2 - Sensitive Natural Communities and Critical Habitat 6-12
6.3 - Jurisdictional Aquatic Resources 6-12
6.4 - Wildlife Movement 6-13
6.5 - Local Policies and Ordinances 6-13
6.6 - Adopted or Approved Plans 6-13
6.7 - Irrigation Reuse Water Quality 6-14

SECTION 7 - Limitations, Assumptions, and Use Reliance 7-1

SECTION 8 - References 8-1

SECTION 9 - List of Preparers 9-1

Appendices

Appendix A Regulatory Setting
Appendix B Representative Photographs
Appendix C Small Mammal Trapping Results and Datasheets
Appendix D Special-Status Species Database Search Results
Appendix E California Native Species Field Form

List of Figures

Figure 1-1 Regional Map 1-2
Figure 1-2 Project Location Map 1-3
Figure 2-1 Biological Study Area Map 2-2
Figure 2-2 San Joaquin Kit Fox Survey Locations 2-6
Figure 2-3 Locations of Small Mammal Trapping Stations and Traps 2-10
Figure 4-1 Soils occurring within the BSA 4-3
Figure 4-2 NWI and NHD Records of Aquatic Resources within the BSA 4-5
Figure 4-3 Aquatic Resources within the BSA 4-7
Figure 4-4 FEMA Flood Zone Map 4-8
Figure 4-5 Vegetation Communities within the BSA 4-9
Figure 5-1 Biological Resources: Terrestrial Species Observed within the BSA 5-6
Figure 5-2 Biological Resources: Birds Species and Nests Observed within the BSA 5-10
Figure 5-3 Mapped Critical Habitat in the Project Vicinity 5-16
Figure 5-4 Wildlife Linkages and Corridors in the Project Vicinity 5-18

List of Tables

Table 2-1 Reconnaissance Survey Personnel and Timing 2-4
Table 2-2 Baited Track Stations Survey Personnel and Timing 2-7
Table 2-3 Night Spotlighting Survey Personnel and Timing
Kamm Avenue Pistachio Processing Project, Fresno County, California 2-7
Table 2-4 Small Mammal Trapping Personnel and Timing 2-9
Table 2-5 Migratory Birds and Raptor Survey Personnel and Timing 2-11
Table 2-6 Special-Status Bat and Maternity Colony Survey Personnel and Timing 2-12
Table 4-1 Soil Acreages On-Site and within the BSA 4-2
Table 4-2 Habitat Acreages Observed On-Site and within the BSA 4-6
Table 4-3 Plant Species Observed Within the Biological Study Area in July 2020 4-12
Table 4-4 Wildlife Species and Their Sign Observed within the Biological Study Area
in July 2020 4-13
Table 5-1 Special-Status Species with Potential to Occur within the BSA 5-1
Table 6-1 Irrigation Reuse Water Quality 6-15

Acronyms and Abbreviations

BAR	Biological Analysis Report
BOD	Biological Oxygen Demand
BSA	Biological Study Area
Cal-IPAC	California Invasive Plant Council
CDFW	California Department of Fish and Wildlife
CEQA	California Environmental Quality Act
CESA	California Endangered Species Act
CNDDB	California Natural Diversity Database
CNPS	California Native Plant Society
CRPR	California Rare Plant Rank
CWHR	California Wildlife Habitat Relationship System
ED	Electrical Conductivity
ESRI	Environmental Systems Research Institute
FDS	Fixed Dissolved Solids
FEMA	Federal Emergency Management Agency
FESA	Federal Endangered Species Act
GIS	Geographic Information System
GPS	Global Positioning System
HCP	Habitat Conservation Plan
HP	high pressure
KAPP	Kamm Avenue Processing Plant, LLC
MBTA	Migratory Bird Treaty Act
MMBtu	million British thermal unit
NHD	National Hydrography dataset
NMFS	National Marine Fisheries Service
NEPA	National Environmental Quality Act
NRCS	United States Department of Agriculture, Natural Resource Conservation Service
NWI	National Wetlands Inventory
PG&E	Pacific Gas and Electric Co.
QK	Quad Knopf, Inc.
ROW	Right of Way
RWQCB	Regional Water Quality Control Board
SR	State Route
TDS	Total Dissolved Solids
USACE	United States Army Corps of Engineers
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
WDR	waste discharge requirements

EXECUTIVE SUMMARY

Quad Knopf, Inc. (QK) prepared this Biological Analysis Report to evaluate the potential for special-status biological resources to be impacted by the construction of the Kamm Avenue Processing Plant Project (Project) in Fresno County, California.

The proposed Project is located on the Central Valley floor in western Fresno County, California, between the California Aqueduct and Interstate (I) 5 to the south of Kamm Avenue. The Project is west of Highway 33, and east of I 5. Kamm Avenue Processing Plant, LLC (the Applicant) proposes to construct, operate, and maintain a pistachio processing plant with the capacity to process 60 million pounds of finished pistachio products per year. The Project consists of a Processing Plant Site (155.8 acres), Water Settling and Cleaning Pond Site (160.0 acres), a Solid Materials Management Site (162 acres), and a natural gas service line consisting of three alternative routes (Route A, B, and C). Natural Gas Service Line Route B is the preferred alternative. The Project also includes a Land Application Area of approximately 2,614 acres of existing pistachio orchards where irrigation reuse water from the pistachio processing plant will be blended with supplied irrigation water and applied to irrigate the pistachio crop.

A database review, reconnaissance site visit, and focused biological surveys were completed by QK Environmental Scientists to characterize existing conditions and determine the potential for special-status species and other sensitive biological resources to occur on-site that may be impacted by the Project. Studies conducted included a complete examination of the Processing Plant Site, Water Settling and Cleaning Pond Site, and Solid Materials Management Site by walking transects across these areas. A windshield survey was conducted to identify nesting birds on the project and within 0.5 mile of the Project. Night spotlighting surveys, track station surveys, and a small mammal trapping effort were conducted to gather information about the presence of species on various Project components.

The Processing Plant Site is a recently disked agricultural field with mowed grasses dominating the site. There are various structures and stored materials on the site, and it is fenced with chain-link fencing. The Water Settling and Cleaning Pond Site and Solid Materials Management Site are recently disked agricultural fields of mostly bare ground. The Land Application Area is composed of highly managed, producing, pistachio orchards. Alternative natural gas pipeline Routes A and B would be constructed within existing dirt roads that separate orchards. Alternative natural gas pipeline Route C would be constructed within the County of Fresno Right-of-Way along Kamm Avenue. The Right-of-Way is maintained, but the westernmost portion of the route is bordered by annual grassland habitat to the south and west.

The database and literature review identified 48 special-status plant species that had a potential of occurring on the site. Of those, 24 special status plant species were eliminated from consideration because the Project occurs outside of the species known range, outside of the elevation range of the species, or because habitat that could support the species was absent from the BSA. The remaining 24 special-status plant species are unlikely to occur on

the Project, except perhaps to the south and west of the extreme western end of Natural Gas Service Line Route C where disturbed annual grassland habitat exists.

The database and literature search identified 45 special status wildlife species with potential to occur at the Project. Of those, all but 21 were eliminated from consideration due to lack of habitat or otherwise unsuitable conditions. Seven additional species were eliminated because those species lack any type of legal protection. Many of the remaining species were determined to not occur on the site, would only occur to the west and south of the extreme western end of Natural Gas Service Line Route C, or were determined to be potentially present on the Project as transient foragers.

Three special-status species were positively identified as occurring on the Project – the San Joaquin kit fox, the Swainson's hawk, and the loggerhead shrike. The San Joaquin kit fox is known to occur in grassland habitat to the west of the Project and was confirmed to be a transient forager on the Project. The Swainson's hawk was observed overflying the site and potential nesting sites were discovered within 0.5 mile of the Project. The loggerhead shrike was observed on the Processing Plant Site as a transient forager. Nesting birds protected by the California Fish and Game Code and Migratory Bird Treaty Act have a potential to occur on-site and a few aquatic resources were present.

Direct and indirect impacts of the Project to these and other potentially occurring species could include injury or mortality of individuals and loss of habitat. Avoidance and minimization measures are recommended which, when implemented, would reduce Project impacts to biological resources to less than significant levels.

We conducted a water quality analysis of processed water and evaluated potential exposure and effects to wildlife. Our findings indicate that if existing water quality standards are met, impacts to wildlife would be minimal.

SECTION 1 - INTRODUCTION

Quad Knopf, Inc. (QK) prepared this Biological Analysis Report (BAR) to evaluate the potential for sensitive biological resources to be impacted by the construction of the Kamm Avenue Processing Plant Project (Project) in Fresno County, California.

1.1 - Project Location

The proposed Project is on the Central Valley floor in western Fresno County, California, between the California Aqueduct and Interstate (I) 5. The Project is south of Kamm Avenue, west of Highway 33, and east of I-5 (Figures 1-1 and 1-2). The Project is within the Levis and Lillis Ranch U.S. Geological Survey (USGS) 7.5-minute quadrangles, and within Sections 19, 20, 21, 22, 23, 25, 26, 27, 34, 35, and 36, Township 16 South, Range 14 East, Mount Diablo Base and Meridian.

1.2 - Project Description

Kamm Avenue Processing Plant, LLC (Applicant) proposes to construct, operate, and maintain a pistachio processing plant with the capacity to process 60 million pounds of finished pistachio products per year. The Project consists of an 80-acre Processing Plant Site (constructed within a 155.8-acre parcel) that is surrounded by a chain link fence, Water Settling and Cleaning Ponds Site (160.0 acres), and a Solid Materials Management Site (162.0 acres). There are three alternative natural gas service lines (Alternative Route A, B, and C), and an irrigation reuse water area encompassing approximately 2,614 acres of orchards. This 2,614-acre area is referred to as the Land Application Area.

The Processing Plant Site will be built on the northern 80-acre portion of APN 038-300-17S (155.8 acres), which is south of Kamm Avenue (Figure 1-2). Two water settling and cleaning ponds, each with 50 acre-feet storage capacity and with appurtenant dewatering and pumping equipment, underground process water conveyance pipeline, and access roads will be located on portions of the southern half of the 160-acre APN 038-300-17S and on APN 038-300-30S (see Figure 1-2). The settling and cleaning ponds will be connected to the processing plant via an underground pipeline. A Solid Materials Management Site that encompasses approximately 162 acres will be established on APN 038-300-14S, located to the west of the Water Settling and Cleaning Ponds Site (see Figure 1-2).

Major components of the Processing Plant would include:

- A 130,000 square foot processing and packing building with appurtenant equipment.
- A 15,000 square foot cold storage building.
- Forty-nine (49) storage silos with a base diameter of 48 feet and a height of approximately 65 feet with appurtenant scaffolding and access equipment.
- A 21,600 square foot huller canopy and related equipment. Thirteen (13) natural gas fired column dryers, each with a 27 million British thermal unit (MMBtu) per hour capacity.

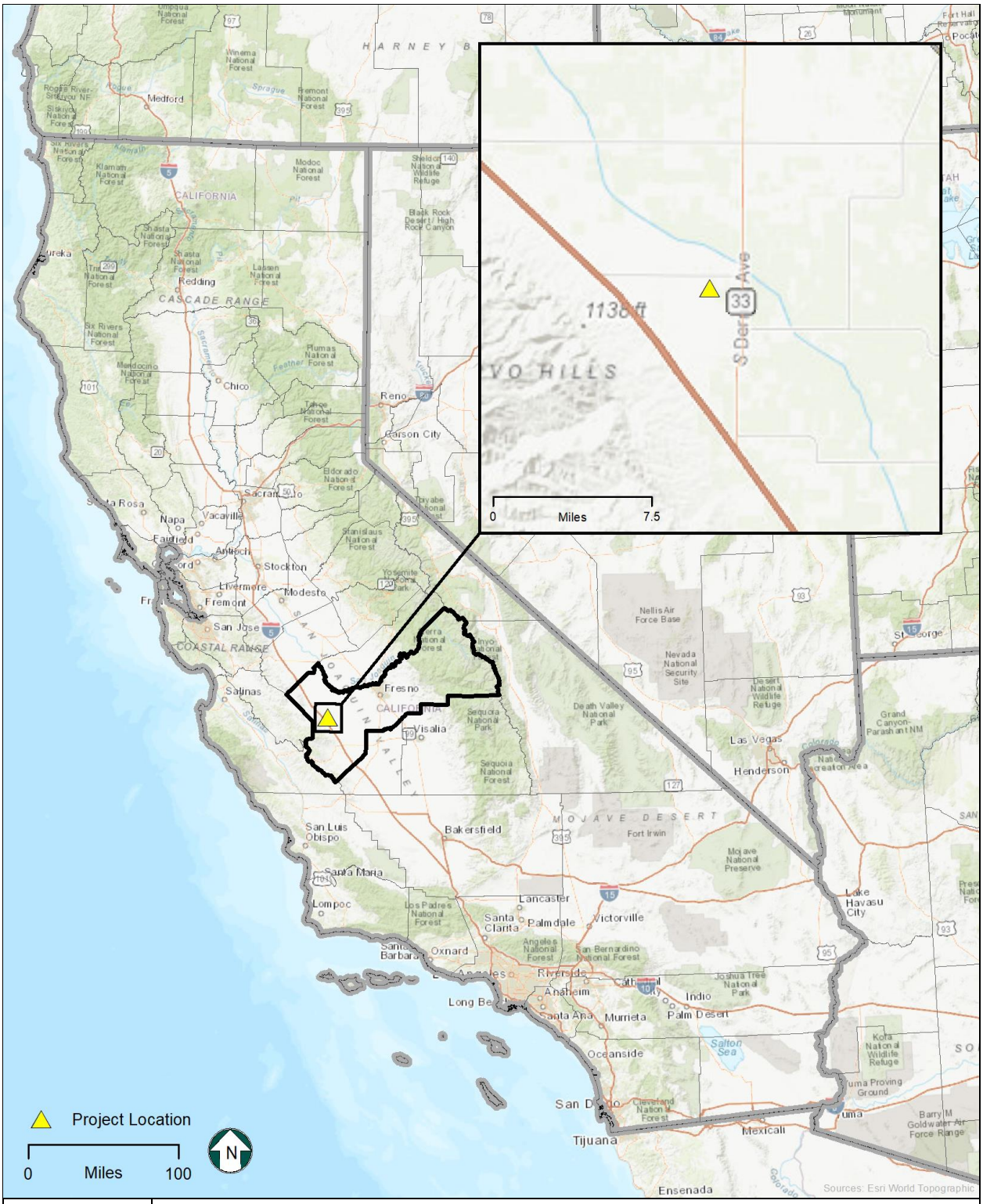

Figure 1-1
Regional Map,
Kamm Avenue Processing Plant Project, Fresno County, California

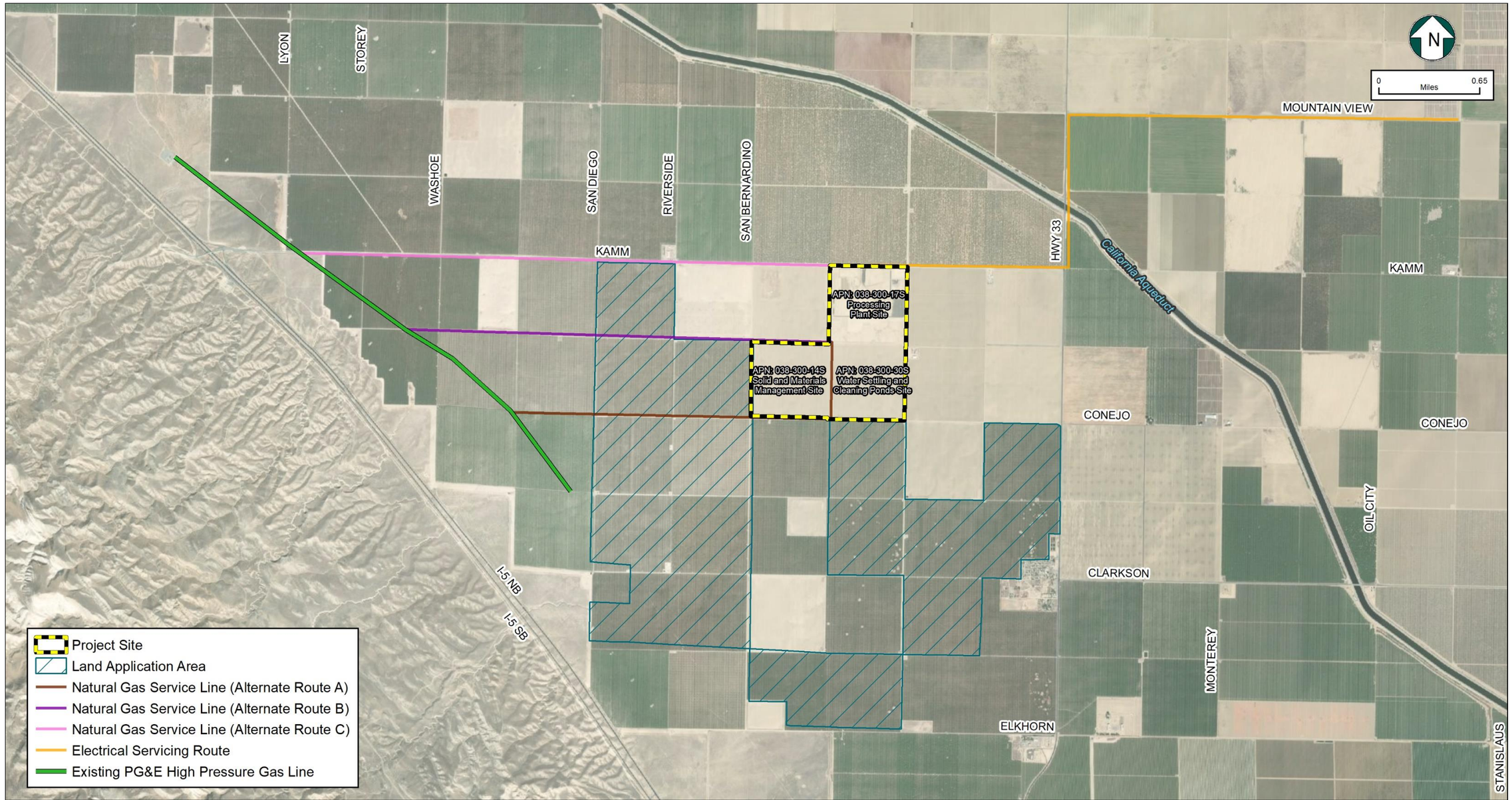

Figure 1-2
Project Location Map,
Kamm Avenue Processing Plant Project, Fresno County, California

- A 353,000-gallon process water storage tank and a 70,000 domestic water storage tank.
- An onsite domestic water treatment facility, including a facility control room and domestic water treatment filers.
- Access roads, scales, signage and related facilities for harvest and shipping truck loading and unloading and employee and other vehicular access and parking facilities.
- Other necessary infrastructure for Project operations and maintenance, including a shop building, a chemical storage warehouse, a fire pumphouse, a motor control center, a compressor building, an administration office building, breakroom and supervisor office building, guard shacks, sand and media raw water filters and process water separators and screens.

Project water would be supplied by the Westlands Water District from existing conveyance facilities that extend from the California Aqueduct to a pipeline traversing the east side of the processing plant. Total Project process water demand will be approximately 65.4 million gallons (200.7 acre-feet) per year. Hulling operations would require up to 1.8 million gallons (5.5 acre-feet) per day and a total of 64.9 million gallons (199.3 acre-feet) per harvest each year. The huller tank will maintain a supply of 100,000 gallons (0.3 acre-feet) for fire suppression and approximately 350,400 gallons (1.07 acre-feet) per year of water would be used for onsite irrigation. Approximately 80 to 90 percent (or from 167 to 188 acre-feet per year) of all water used by the Project will be recaptured, cleaned, and used by local pistachio growers for irrigation. This water will be conveyed from the ponds through existing offsite irrigation water distribution facilities. Based on water quality information from existing pistachio processing plants using similar source water, including anticipated nitrogen, potassium, and biochemical oxygen demand (BOD) levels that have been permitted in existing WDR orders adopted by the Regional Board, irrigation water from the Project would be used on a minimum of two acres of land per acre-foot to meet applicable water quality requirements. The Land Application Area (see Figure 1-2) would include the 2,614 acres of land contracted to supply water for the Project, which would provide sufficient acreage to apply water from the facility at agronomical rates and in amounts that will meet applicable water quality requirements in the vicinity of the proposed facility.

Electrical and natural gas service will be provided by the Pacific Gas and Electric Company (PG&E). Natural gas service will be extended by installing a pipeline from existing distribution facilities to the west of the Project along one of three proposed routes (Alternative Route A, B, and C) (see Figure 1-2). The installation of the Natural Gas Service Line Route B is the preferred option. Electrical power would be provided by connecting with an existing powerline located on the north side of Kamm Avenue near the northern border of the Project site which connects to a PG&E substation in the east (see Figure 1-2).

The Project would operate year-round to package and process harvested pistachios for retail and wholesale customers. During an approximately 6-week harvest period, which typically occurs during August to October, the Project will operate seven days a week and 24 hours per day to receive, hull, heat, dry and store pistachio crops in onsite storage silos. During non-harvest operations, the Project will operate two shifts per day five or six days per week depending on pistachio product market conditions.

Construction equipment, including welding equipment, forklifts, grade-alls, scissor lifts, and boom lifts would be brought to the site by independent contractors as required for construction. Construction materials and equipment, including pipelines, cement, storage silos and scaffolding, building construction materials, roadway paving and pervious materials, precleaning, hulling, and processing equipment, dryers, pumps and conveyor systems, refrigerators for cold storage, and natural gas and electrical distribution equipment would be brought to the site for installation. No offsite staging or laydown areas would be required for construction. The construction areas would be secured by temporary or permanent fencing and security personnel as necessary for public safety. Temporary power would be provided via mobile generators or local distribution lines.

Organic solids will be produced from Project operations, primarily during the harvest period. Up to an estimated 24 million pounds of solid material would be produces, mostly consisting of pretreatment twigs, stems and other solids extracted prior to hulling, dewatered hull material, and pistachio shell blanks. Organic materials will also be generated by periodic cleaning of the process water settling and cleaning ponds. Project operations, such as employee food consumption and paper and packaging material use, will generate organic and inorganic solid wastes which will be recycled to the extent feasible.

The Project will market solids generated by the facility for beneficial reuse as soil amendments, cement filler (e.g., pistachio blanks), livestock feed, or mulch. The beneficial reuse of these solids is subject to demand variability based on the market conditions that occur in each year. Hulling and processing solids that are not beneficially reused will be conveyed to an adjacent solid materials management site, shredded and/or dried, and disked into the soil. The site will be operated in accordance with all applicable laws, regulations, and permit requirements. The Project will be served by a private disposal service to collect and convey recycled and other waste generated from daily operations.

The selected high pressure (HP) gas pipeline (Alternative Routes A or B) would be constructed within existing dirt roads. Alternative Route C would be constructed within the County Right of Way (ROW) along the south side of Kamm Avenue. Equipment used for the installation of the high-pressure gas pipeline would include backhoe, trencher, grader, welder, weld x-ray machine, and high-pressure testing equipment.

1.3 - Purpose, Goals, and Objectives

The purpose of this BAR is to identify where potential sensitive biological resources may occur within the Project site, determine how those resources may be impacted by the proposed Project, and recommend avoidance and minimization measures to reduce impacts to a less than significant level. This BAR was prepared to support an analysis of biological conditions as required by the California Environmental Quality Act (CEQA) and the National Environmental Policy Act (NEPA), and to support regulatory permit applications, if needed.

SECTION 2 - METHODS

2.1 - Definition of Biological Study Area

The Biological Study Area (BSA) consists of the Project site (Processing Plant Site, Water Settling and Cleaning Pond Site, and Solid Materials Management Site), natural gas service line consisting of three alternative routes (Alternative Routes A, B, and C), Land Application Area consisting of approximately 2,614 acres of orchards, and a surrounding 500-foot buffer where access was available (Figure 2-1).

2.2 - Definition of Special-Status Species

Special-status species evaluated in this report include:

- Species listed as threatened or endangered under the Federal Endangered Species Act (FESA). Species that are under review by the United States fish and Wildlife Service (USFWS) or National Marine Fisheries Service (NMFS) may be included if there is a reasonable expectation of listing within the life of the Project,
- Species listed as candidate, threatened, or endangered under the California Endangered Species Act (CESA),
- Species designated as Fully Protected, Species of Special Concern, or included on a Watch List by the California Department of Fish and Wildlife (CDFW),
- Other species included on the CDFW's Special Animals List,
- Plant species with a California Rare Plant Rank (CRPR), and
- Species designated as locally important by a Local Agency and/or otherwise protected through ordinance or local policy.

The potential for each special-status species to occur in the BSA was evaluated according to the following criteria:

- No. Habitat on and adjacent to the site is clearly unsuitable to meet the needs of the species (foraging, breeding, cover, substrate, elevation, hydrology, plant community, site history, disturbance regime), and species would have been identified on-site if present (e.g., oak trees).
- Yes. Conditions on the site may, in some way, support a portion of the species ecology (foraging, reproduction, movement/migration). Negative survey results independent of other information does not exclude the potential for a species to occur.
- Present. Species was observed on the site or has been recorded (e.g., California Natural Diversity Database, California Native Plant Society) on the site recently (within the last 5 years).

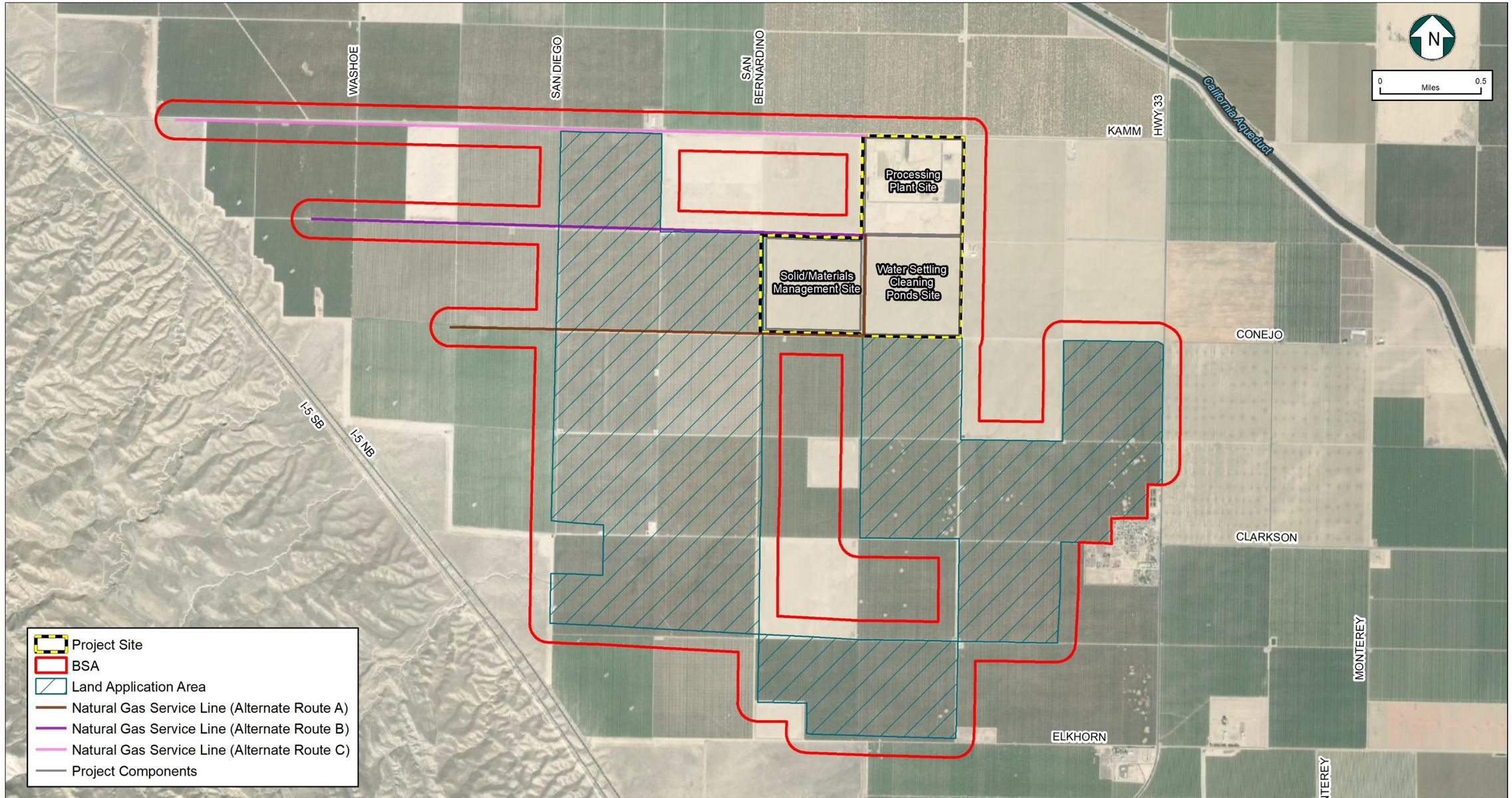

Figure 2-1
Biological Study Area Map,
Kamm Avenue Processing Plant Project, Fresno County, California

2.3 - Literature Review and Database Analysis

The following sources were reviewed for information on sensitive biological resources in the Project vicinity:

- CDFW's California Natural Diversity Database (CDFW 2020a)
- CDFW's Biogeographic Information and Observation System (CDFW 2020b)
- CDFW's Special Animals List (CDFW 2020c)
- CDFW's California Wildlife Habitat Relationships (CWHR) System (Mayer and Laudenslayer 1988)
- California Native Plant Society (CNPS) Inventory of Rare and Endangered Plants of California (CNPS 2020)
- USFWS Information for Planning and Consultation system (USFWS 2020a)
- USFWS Critical Habitat Mapper (USFWS 2020b)
- USFWS National Wetlands Inventory (USFWS 2020c)
- USGS National Hydrography Dataset (USGS 2020a)
- Federal Emergency Management Agency (FEMA) flood zone maps (FEMA 2020)
- U.S. Department of Agriculture, Natural Resources Conservation Service (NRCS) Web Soil Survey (NRCS 2020a)
- NRCS List of Hydric Soils (NRCS 2020b)
- Current and historical aerial imagery (Google LLC 2020, Netroline 2020)
- Topographic maps (USGS 2020b)

For each of these data sources, the search was focused on the Levis and Lillis Ranch USGS 7.5-minute quadrangles in which the Project is located, plus the surrounding ten quadrangles including Chaney Ranch, Coit Ranch, Tranquillity, Monocline Ridge, Cantua Creek, Ciervo Mountain, Tres Picos Farms, Santa Rita Peak, Joaquin Rocks, and Domengine Ranch. For the California Natural Diversity Database (CNDDB) query, a 10-mile search radius was used.

The CNDDB provides element-specific spatial information on individually documented occurrences of special-status species and sensitive natural communities. Some of the information available for review in the CNDDB is still undergoing review by the CDFW; these records are identified as unprocessed data. The CNPS database provides similar information as the CNDDB, but at a much lower spatial resolution. Much of this information in these databases is submitted opportunistically and is often focused on protected lands or on lands where various developments have been proposed. Neither database represents data collected during comprehensive surveys for special-status resources in the region. As such, the absence of recorded occurrences in these databases at any specific location does not preclude the possibility that a special-status species could be present. The National Wetlands Inventory (NWI), National Hydrography Dataset (NHD), and Web Soil Survey provide comprehensive data, but at a low resolution that requires confirmation in the field. The CDFW Special Animals List and USFWS Information for Planning and Consultation system provide no spatial data on wildlife occurrences and provide only lists of species that might potentially be present.

The results of database inquiries were reviewed to develop a comprehensive list of sensitive biological resources that may be present in the vicinity of the Project. This list was then evaluated against existing conditions observed during the site visit of the BSA to determine which sensitive resources are or could be present, and then the potential for impacts to those resources to occur from Project implementation.

2.4 - Reconnaissance-Level Field Survey

A reconnaissance survey of the BSA was conducted on July 2, 3, 7, and 8, 2020, by QK Environmental Scientists Julie Hausknecht, Karissa Denney, Sarah Yates, and Eric Madueno (Table 2-1). The survey consisted of walking meandering pedestrian transects spaced 50 to 100 feet apart throughout the Project site (Processing Plant Site, Water Settling and Cleaning Pond Site, and Solid Materials Management Site) and the surrounding 500-foot buffer. A windshield survey was conducted along the three alternative natural gas service lines and areas along and between the pistachio orchards in the Land Application Area, which also included a windshield survey of annual grassland habitat that occurs within the BSA to the south and southwest of the Land Application Area. Parcel 27, north of Three Rocks, was added to the Project in December 2020 and was examined by conducting a windshield survey in December 2020.

Table 2-1
Reconnaissance Survey Personnel and Timing,
Kamm Avenue Pistachio Processing Project, Fresno County, California

Date	Personnel	Weather Conditions	Temperature	Location
07/02/2020	Hausknecht, Yates, Denney, Madueno	Clear, no wind	70 – 85°F	Plant Processing Site
07/03/2020	Hausknecht, Yates, Denney, Madueno	Clear, no wind	60 – 94°F	Water Settling and Cleaning Pond Site, Natural Gas Service Line Route A
07/07/2020	Hausknecht, Yates, Madueno	Clear, 5 – 20 mph wind	80 – 90°F	Land Application Area, Natural Gas Service Line Routes B and C
07/08/2020	Hausknecht, Yates, Madueno	Clear, <5 mph wind	87 – 95°F	Land Application Area, Solid Materials Management Site, Processing Plant Site buffer
12/31/2020	Yates	Overcast, <5 mph wind	55	Land Application Area Parcel 27

General tasks completed during the survey included developing an inventory of plant and wildlife species, characterizing vegetation associations and habitat conditions within the BSA, assessing the potential for federally- and State- listed and other special-status plant and wildlife species to occur on and near the Project, and assessing the potential for migratory birds and raptors to nest on and near the Project. In addition, all historical wetland and water features documented by NWI and NHD were visit and verified. All spatial data were recorded using Environmental Systems Research Institute (ESRI) Collector for ArcGIS software installed on an iPad. Where sub-meter accuracy was needed, iPads were tethered to an EOS

Arrow Global Positioning System (GPS) unit. Site conditions were documented with representative photographs.

2.5 - Focused Field Surveys

To evaluate the presence/absence of certain high-profile species that are known to occur in the Project region, focused field surveys were conducted. Focused surveys were conducted for the San Joaquin kit fox (*Vulpes macrotis mutica*), special-status small mammals, special-status bat species and bat maternity colonies, and nesting migratory birds and raptors including Swainson's hawk (*Buteo swainsoni*). The potential for presence/absence of other special-status species such as the American badger (*Taxidea taxus*) and western burrowing owl (*Athene cunicularia*) was evaluated using a combination of surveys conducted including the on-site field evaluation effort and focused surveys for other species.

2.5.1 - San Joaquin Kit Fox Surveys

Scattered areas that could support denning and foraging San Joaquin kit fox exist near the Project. Standardized surveys for determining kit fox presence were used, which consist of conducting transect surveys focusing on visual searches for dens and other sign of foxes (e.g., scat, prey remains, tracks), baited track station surveys, and night spotlighting surveys. These focused surveys were conducted on and within the immediate vicinity of the BSA and the methods used for each survey type are described below.

Transect Surveys

Pedestrian transects to detect known, natal, and potential kit fox dens and other diagnostic sign of kit foxes (e.g. tracks, scat, prey remains) were walked within the Project site including the Processing Plant Site, Water Settling and Cleaning Pond Site, and Solid Materials Management Site (Figure 2-2). These pedestrian transects were performed concurrently with the pedestrian transects conducted during the site reconnaissance survey (see Section 2.4) A windshield survey was conducted along the three alternative natural gas service lines and in areas along and between the Pistachio orchards in the water reuse areas. A windshield survey was also conducted within the BSA in areas of annual grassland habitat to the south and southwest of the orchards.

The pedestrian transect surveys were conducted by QK Environmental Scientists Julie Hausknecht, Sarah Yates, Karissa Denney, and Eric Madueno on July 2, 3, 7, and 8, 2020 (see Table 2-1). Meandering pedestrian transects were spaced 50 to 100 feet apart depending on conditions and visibility. The spacing of transects ensured that nearly 100% visual coverage of the survey area was achieved. Transect surveys were conducted prior to conducting spotlighting surveys and the baited track station survey, as required in the *U.S. Fish and Wildlife Service Standardized Recommendations for Protection of the Endangered San Joaquin Kit Fox Survey prior to or During Ground Disturbance* (USFWS 2011).

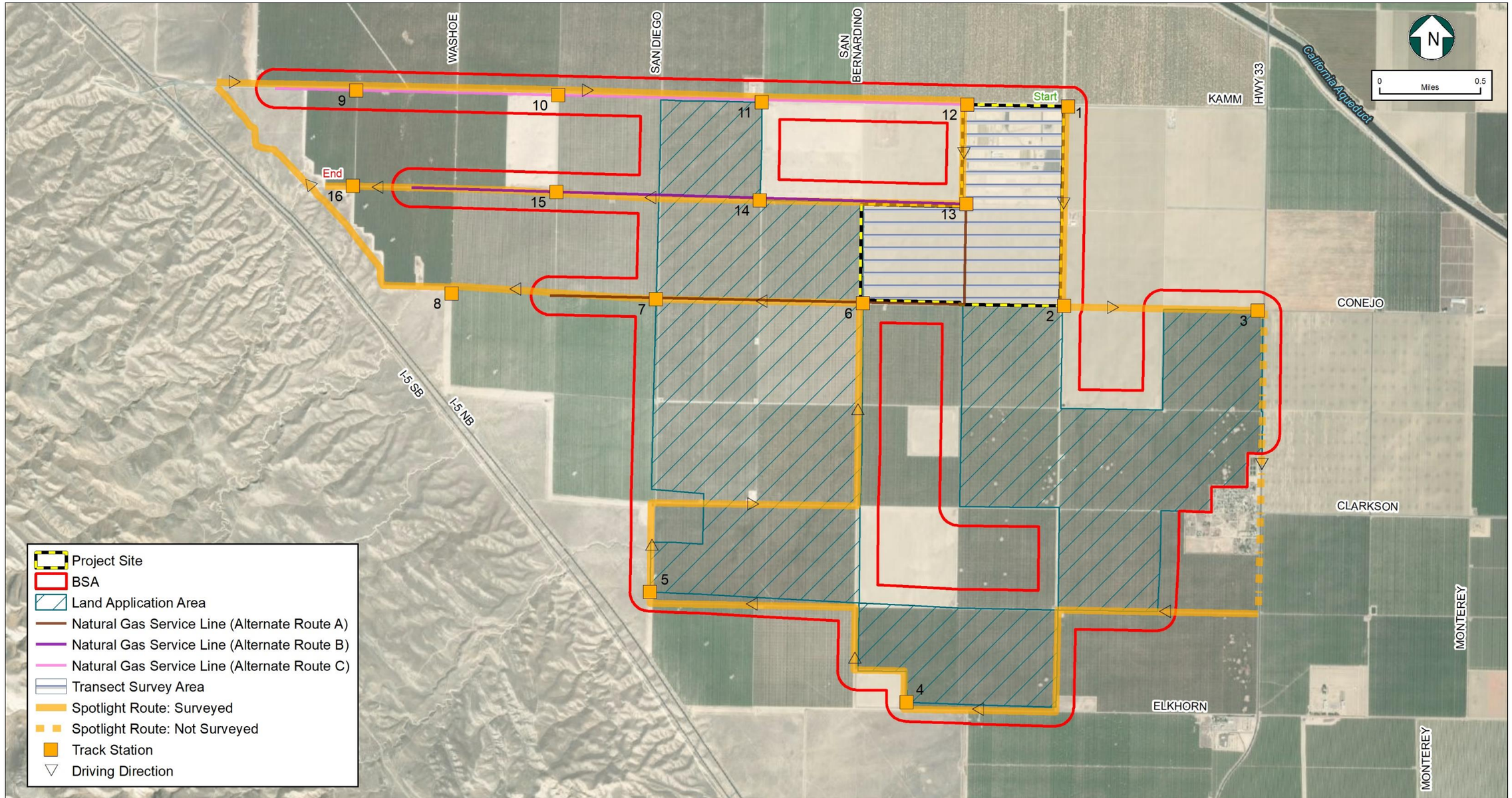

Figure 2-2
San Joaquin Kit Fox Survey Locations,
Kamm Avenue Processing Plant Project, Fresno County, California

Table 2-2
Baited Track Stations Survey Personnel and Timing,
Kamm Avenue Pistachio Processing Project, Fresno County, California

Date	Personnel	Weather Conditions		Temperature (F)		Location
		evening	morning	evening	morning	
July 20 – 21, 2020	Denney	sunny	partly cloudy	84 - 78	64 - 74	Station 1 - 16
July 21 - 22, 2020	Denney	partly cloudy	sunny	91 - 82	60 - 72	Station 1 - 16
July 22 - 23, 2020	Denney	sunny	sunny	85 - 82	61 - 73	Station 1 - 16

Baited Track Station Survey

QK Environmental Scientist Karissa Denney conducted the baited track station survey for San Joaquin kit fox between July 20 and July 23, 2020. There were 16 stations established throughout the BSA. Track stations were established at each corner of the Processing Plant Site, Water Settling and Cleaning Pond Site, and Solid Materials Management Site and at approximately one-mile intervals along the three alternative natural gas service lines routes (Table 2-2, see Figure 2-2).

Each station consisted of a one-meter diameter circle of diatomaceous earth that provided a medium for recording tracks of visiting animals. Each station was baited in the center with a tin of chicken or chicken & liver flavored cat food. All stations were baited in the evening and checked on the subsequent morning. Bait was replaced as needed. Tracks of visiting animals were identified to at least the ordinal level and canid tracks were identified to species when possible. Results including the dates when stations were checked, start and end times, names of observers, weather conditions, and track observations were recorded. Representative photographs of each station were taken.

Night Spotlighting Survey

QK Environmental Scientists Curtis Uptain, Julie Hausknecht, and Sarah Yates performed spotlighting surveys for San Joaquin kit fox between July 20 and 24, 2020 (Table 2-3, Figure 2-2). A standardized continuous route established along approximately 21.1 miles of existing roads in the Project area was spotlighted (see Figure 2-2). This entire route was spotlighted along both sides of the route except for the section along State Route (SR) 33 that was not spotlighted due to a high speed of the traffic and the area north of Kamm Avenue along the Natural Gas Service Line Route C.

Table 2-3
Night Spotlighting Survey Personnel and Timing, Kamm Avenue Pistachio Processing Project, Fresno County, California

Date	Personnel	Weather Conditions	Temperature	Location
07/20/2020	Hausknecht, Uptain	Clear, < 5 mph wind	71 – 81°F	Entire Route
07/21/2020	Hausknecht, Uptain	Cloud cover 60 – 20%, < 5 mph wind	73 – 82°F	Entire Route
07/22/2020	Hausknecht, Uptain	Clear, no wind	70 – 84°F	Entire Route
07/23/2020	Hausknecht, Uptain, Yates	Clear, < 5 mph wind	73 – 78°F	Entire Route
07/24/2020	Hausknecht, Uptain	Clear, no wind	71 – 82°F	Entire Route

The spotlighting route was established to allow for the maximum coverage of the highest quality potential San Joaquin kit fox habitats within and adjacent to the Project, while also attempting to cover the entire area, as well as taking into account route conditions, vehicle access, and length of time required to cover the route. The established route was driven at speeds of no greater than 10 miles per hour. Spotlighting began 20 to 30 minutes after sunset and continued until the entire route was driven. The terrain on both sides of the vehicle was examined using one million candlepower spotlights. All species that were observed were recorded and information about the dates of surveys, start and end times, names of observers, weather conditions, and animal observations were collected. Whenever eye shine or animal movement was detected, the vehicle was stopped, and the animal identified using binoculars. All animals observed, including potential prey and predator species, were noted. Spatial information was gathered using Environmental Systems Research Institute (ESRI) Collector for ArcGIS software installed on an iPad.

2.5.2 - SMALL MAMMAL TRAPPING

Scattered small mammal burrows were encountered throughout the BSA during the reconnaissance survey, but the highest concentration of burrows occurred on and near the plant processing site.

Small mammal trapping was conducted to identify the species of small mammals that could potentially be impacted by the project and to establish baseline information for prey availability for the San Joaquin kit fox and American badger. An initial site examination conducted prior to the studies for this BAR indicated that small mammals were present in the area and on the Processing Plant Site. Signs of small mammals did not indicate the presence of endangered species such as the giant kangaroo rat (*Dipodomys ingens*) or Fresno kangaroo rat (*D. nitratoides exilis*), but other species of concern such as the short-nosed kangaroo rat (*D. nitratoides brevinasus*) and Tulare grasshopper mouse (*Onychomys torridus tularensis*) were potentially present and the Heermann's kangaroo rat (*Dipodomys heermanni*), a common species of kangaroo rat, was known to be present. Trapping was conducted by Principal Environmental Scientist Curtis Uptain, who holds a valid California Scientific Collecting permit (No. 0002797) allowing for trapping and handling of those species suspected as being present. In the event a listed species would have been captured, Mr. Uptain also has a valid federal 10(a)1(A) Recovery Permit (No. TE-119861-2) and valid California State MOU that would authorize captures of those species. Small mammal trapping was conducted between July 21 and 25, 2020 by Mr. Uptain, assisted by QK Environmental Scientists Julie Hausknecht and Sarah Yates (Table 2-4).

Table 2-4
Small Mammal Trapping Personnel and Timing,
Kamm Avenue Pistachio Processing Project, Fresno County, California

Date	Personnel	Weather Conditions	Temperature	Location
07/21/2020	Hausknecht, Uptain	0 to 5% cloud cover, <5 mph wind	64 – 70°F	Trap Stations 1 - 5
07/22/2020	Hausknecht, Uptain	20 to 40% cloud cover, <5 mph wind	67 – 69°F	Trap Stations 1 - 5
07/23/2020	Hausknecht, Uptain	0 to 5% cloud cover, no wind	62 – 69°F	Trap Stations 1 - 5
07/24/2020	Hausknecht, Uptain, Yates	0 to 5% cloud cover, no wind	68 – 70°F	Trap Stations 1 - 5
07/25/2020	Hausknecht, Uptain	0 to 5% cloud cover, <5 mph wind	62 – 68°F	Trap Stations 1 - 5

The following methodology was employed:

1. Trapping was conducted at each high-density cluster of burrows identified during the reconnaissance survey, with minor adjustments dictated by field conditions at the time of the trapping effort. Traps were placed near existing burrows and were marked with permit numbers assigned to the Principal Biologist. Each trap station location was flagged and numbered and each trap at each station was numbered using a unique binomial naming convention.
2. Trapping was conducted for five consecutive nights and total of 55 traps were deployed in and near the plant processing site where the small mammal burrow concentrations were the highest. Trap stations were numbered 1 through 5. There were 10 traps used at Station 1 in the northwest corner of the site, 10 traps at Station 2 in the west-central portion of this site, 15 traps at Station 3 in the north-central portion of the site, 10 traps at Station 4 in the southeastern portion of the site and 10 traps at Station 5, which followed an existing water line along the eastern site boundary (Figure 2-3). Trap Station 5 was outside of the fenced boundary of the site. All trap stations were spatially recorded using a sub-meter Eos Arrow GPS unit and representative photographs of trap stations were taken.
3. Live traps (Sherman live traps [Model XLKR: 13 inches x 3.5 inches x 3 inches]) were placed near burrows or within a cluster of burrows, close to burrow entrances, along runways, dust-baths, and near another rodent sign.
4. Each trap was baited with a mixture of rolled oats, millet, and peanut butter. A wad of paper towel was placed in each trap to provide some thermal protection and to reduce trap chewing behavior, which can result in injuries to captured kangaroo rats.
5. In the event that ants began entering traps, the use of peanut butter was suspended, and affected traps were relocated.
6. The traps were opened and baited prior to the onset of evening darkness, between 6:00 PM and 8:00 PM. Traps were checked and closed between approximately 1:00 AM and 4:15 AM the following morning.

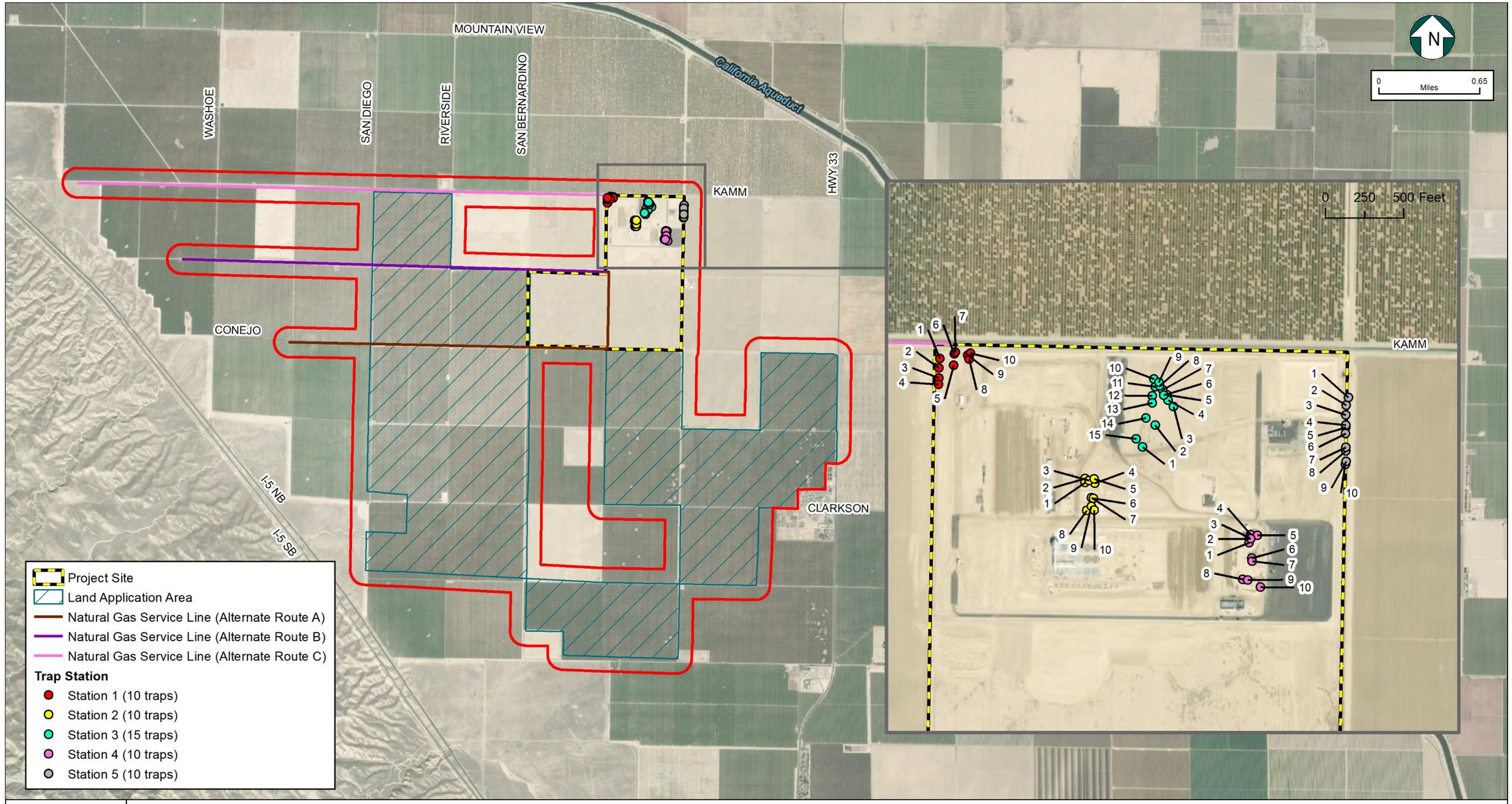

Figure 2-3
Locations of Small Mammal Trapping Stations and Traps,
Kamm Avenue Processing Plant Project, Fresno County, California

7. All captured animals were identified to species. They were weighed and their sex, age, and reproductive condition were determined before being marked with a non-toxic felt-tipped marker on the abdomen and released at the point of capture. The number of toes on the hindfoot of all kangaroo rats was recorded to assist in the identification of species. General health was evaluated by noting all visible conditions including gait and behavior, diarrhea, emaciation, salivation, hair loss, ectoparasites, and injuries. Data was recorded on standardized data sheets. Information gathered included specific animal capture data, date, time, names of observers, the name of the person who handled the captured animal, and weather conditions including air temperature, wind, cloud cover, and moon phase.

2.5.3 - MIGRATORY BIRDS AND RAPTORS SURVEY

A survey for migratory birds and raptors was conducted on July 7 and 8, 2020, by QK Environmental Scientists Julie Hausknecht, Sarah Yates, and Eric Madueno (Table 2-5). All suitable areas providing nesting substrates were surveyed on and within 250-foot of the Project for nesting migratory birds and on and with within a 500-foot of the Project for nesting raptors. This included all structures, utility poles/cell towers, and trees within these buffers.

Table 2-5
Migratory Birds and Raptor Survey Personnel and Timing,
Kamm Avenue Pistachio Processing Project, Fresno County, California

Date	Personnel	Weather Conditions	Temperature	Location
07/07/2020	Hausknecht, Yates	Clear, <5mph wind	58 – 84°F	Land Application Area
07/08/2020	Hausknecht, Yates	Clear, <5mph wind	67 – 92°F	Land Application Area, natural gas service lines
07/08/2020	Madueno	Clear, <5mph wind	87 – 92°F	0.5-mile buffer

On July 8, 2020, QK Environmental Scientist Eric Madueno conducted a survey within a 0.5-mile radius of all Project components to search for potential Swainson's hawk nests. All trees and structures that provided potential nesting sites were viewed with binoculars and spotting scopes from multiple angles to increase the probability of detecting nests. Efforts were focused on visual cues such as perching, provisioning, and territoriality, all of which are good indicators of breeding status. Aural cues were also noted; vocalizations often occur during territorial displays, courtships, and provisioning of young, and nestlings can sometimes be heard begging for food.

2.5.4 - SPECIAL-STATUS BAT SPECIES AND BAT MATERNITY COLONIES

Potential roosting sites for bats occurs within the Processing Plant Site. To determine if bats are roosting at the site, a focused survey was conducted on July 21 and 22, 2020, by QK Environmental Scientist Karissa Denney (Table 2-6). All potential roosting sites were searched for sign (guano, urine stains, prey remnants, or bat vocalization) of roosting bats.

Table 2-6
Special-Status Bat and Maternity Colony Survey Personnel and Timing,
Kamm Avenue Pistachio Processing Project, Fresno County, California

Date	Personnel	Weather Conditions	Temperature	Location
07/20/2020	Denney	Clear, sunny, warm	75 – 87°F	plant processing site
07/21/2020	Denney	Clear, sunny, warm	75 – 89°F	plant processing site

SECTION 3 - REGULATORY SETTING

Regulated or sensitive resources that were studied and analyzed include special-status plant and animal species, sensitive plant communities, nesting birds and raptors, jurisdictional waters and wetlands, wildlife movement areas, and locally protected resources such as protected trees. Regulatory authority over biological resources is shared by federal, State, and local authorities. Primary authority for regulation of general biological resources lies within the land use control and planning authority of local jurisdictions (in this instance, Fresno County).

Potential impacts to biological resources were analyzed based on the following list of statutes. Summaries of these statues are provided in Appendix A.

- CEQA
- FESA
- CESA
- Federal Clean Water Act
- California Fish and Game Code
- Migratory Bird Treaty Act
- The Bald and Golden Eagle Protection Act
- Porter-Cologne Water Quality Control Act
- Fresno County General Plan

SECTION 4 - ENVIRONMENTAL SETTING

This section identifies the regional and local environmental setting of the Project and describes existing baseline conditions. The environmental setting of the BSA was obtained from various sources of literature, databases, and aerial photographs. Site conditions were verified and updated during multiple site surveys conducted by QK Environmental Scientists.

4.1 - Physical Characteristics

The BSA is dominated by agricultural land consisting of orchards, disk lands, agricultural operation facilities, and paved and unpaved agricultural access roads. It is located approximately 2.5 miles to the southeast of the eastern edge of the Diablo Range foothills and 1 mile to the southwest of the California Aqueduct. Representative photographs of the BSA are included in Appendix B.

4.1.1 - TOPOGRAPHY

The topography of the BSA is relatively flat, varying in elevation from 515 to 650 feet above mean sea level, with the lowest elevation occurring within the Processing Plant Site and the highest elevation occurring along the most western portion of natural gas pipeline Alternative Route A.

4.1.2 - CLIMATE

The Project is within a region with a Mediterranean climate of hot summers and mild, wet winters. Average high temperatures range from 54.1° Fahrenheit (F) in January to 98°F in July, but it is not uncommon for temperatures to exceed 100°F in the summer (WRCC 2020). Average low temperatures range from 38.4°F in December to 63.7°F in July. Precipitation occurs primarily as rain, most of which falls from November to April, with an average of 5.78 inches of rainfall per year. Precipitation may also occur as dense fog during the winter known as Tule fog. Rain rarely falls during the summer months.

4.1.3 - LAND USE

The Processing Plant Site, Water Settling and Cleaning Pond Site, and Solid Materials Management Site is comprised of land maintained by disking and mowing. These areas were all recently disked at the time of the site investigations (Photographs 1 through 4 in Appendix B). The Processing Plant Site had been recently disked, but grasses had sprouted and were mowed short (Photographs 1 and 2 in Appendix B). The Water Settling and Cleaning Pond Site was recently disked and was bare, as was the Solid Materials Management Site (Photographs 3 and 4 in Appendix B). There were various farm-related equipment, supplies, and outbuildings present on the Processing Plant Site including five outbuildings, two silos, several storage containers, and various prefabricated scaffolding and other related materials as well as a chain link fence that surrounds this site (see aerial depiction in Figure 2-1). The land within the footprints of the three alternative natural gas service lines

consisted of paved and/or dirt roadways or maintained road shoulder (in the case of Alternative Route C). These roadways were surrounded by actively managed pistachio orchards (Photographs 6 and 7 in Appendix B), some of which will be used for the irrigation reuse water. There were some disked fields interspersed within the orchards.

4.1.4 - SOILS

The BSA is underlain by six soil types including Cerini sandy loam, Cerini clay loam, Panoche loam, Kimberlina sandy loam, and Panoche clay loam (Table 4-1, Figure 4-1, NRCS 2020).

Table 4-1
Soil Acreages On-Site and within the BSA,
Kamm Avenue Pistachio Processing Project, Fresno County, California

Soil Type	Acreages	
	BSA	Project
Cerini Clay Loam	618.78	421.43
Cerini Sandy Loam	955.91	667.72
Kimberlina Sandy Loam	182.69	110.95
Panoche Clay Loam	574.35	299.46
Panoche Loam	2,355.18	1,498.98
Polvadero-Guijarral complex	2.47	0

Cerini Sandy Loam

The Cerini series consists of very deep, well-drained soils formed in alluvium derived dominantly from sedimentary rock (NRCS 2020). They occur on alluvial fans and have slopes of 0 to 5 percent and can be found at elevations between 165 to 1,000 feet in the San Joaquin Valley floor. The climate is arid with hot, dry summers and cool, moist winters. Mean precipitation is 6 to 8 inches annually and the mean annual air temperature ranges from 62 to 64°F. Cerini soils are used mostly for irrigated crops such as cotton (*Gossypium* sp.), tomatoes (*Solanum lycopersicum*), cantaloupes (*Cucumis melo* var. *cantalupensis*), garlic (*Allium sativum*), onions, and wheat (*Triticum* sp.). Native vegetation is mostly annual grasses, forbs, and desert saltbush (*Atriplex* spp.).

Cerini Clay Loam

This soil type is a member of Cerini series which consists of very deep, well-drained soils formed in alluvium derived dominantly from sedimentary rock (NRCS 2020). Cerini clay loam typically occurs in fallow fields on slopes of less than 2 percent. Cerini soils are used mostly for irrigated crops such as cotton, tomatoes, cantaloupes, garlic, onions, and wheat. Native vegetation is mostly annual grasses, forbs, and desert saltbush.

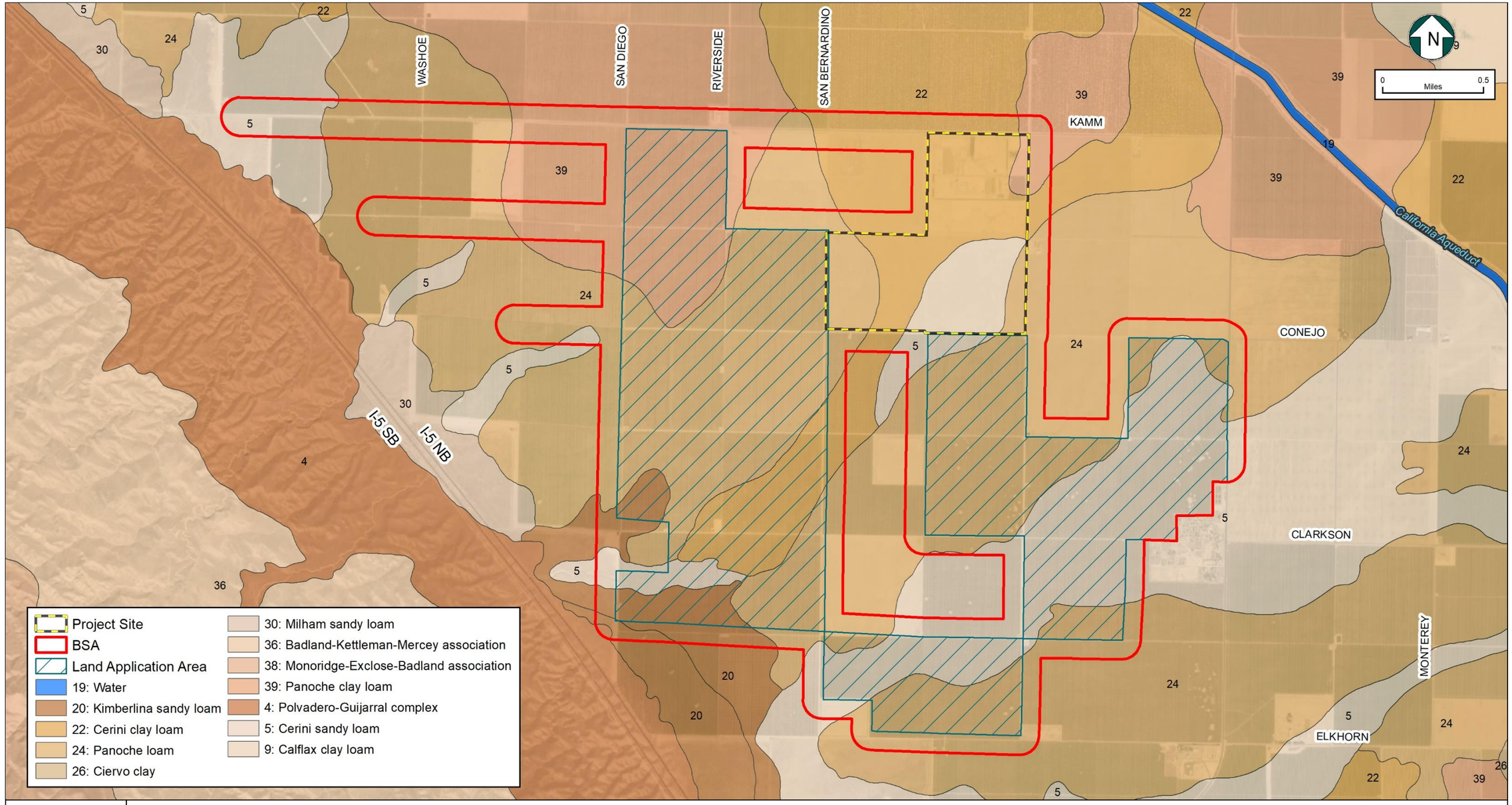

Figure 4-1
Soils occurring within the BSA,
Kamm Avenue Processing Plant Project, Fresno County, California

Panoche Loam and Panoche Clay loam

The Panoche series consists of very deep, well drained soils on alluvial fans and flood plains (NRCS 2020). These soils formed in loamy calcareous alluvium from sedimentary rock and are found on slopes from 0 to 15 percent. The mean annual precipitation is about 6 inches and the mean annual temperature is about 63°F. Panoche soils are used for irrigated crops such as alfalfa (*Medicago sativa)*, almonds (*Prunus* sp.), barley (*Hordeum* sp.*)*, cotton, sugar beets (*Beta* sp.) and sorghum (*Sorghum* sp.). Dryland areas are used as range following seasonal rains. A few areas are used for dryland grain but are seldom successful.

Kimberlina Sandy Loam

The Kimberlina series consists of very deep, well drained soils on flood plains and recent alluvial fans (NRCS 2020). These soils formed in mixed alluvium derived dominantly from igneous and/or sedimentary rock sources. Slope is 0 to 9 percent. The mean annual precipitation is about 6 inches and the mean annual temperature is about 64°F. These soils are used for growing irrigated field, forage, and row crops. Some areas used for livestock grazing. When not irrigated, native vegetation consists of annual grasses, forbs, and Atriplex spp. in the San Joaquin Valley.

Polvadero-Guijarral complex

This complex contains soils from the Polvadero and Guijarral series. The Polvadero series consists of very deep, well drained, sodic soils on alluvial fan remnants (NRCS 2020). These soils formed in alluvium derived dominantly from calcareous sedimentary rock and occur on slopes from 0 to 15 percent. The mean annual precipitation is about 7 inches and the mean annual temperature is about 64°F. These soils are used for livestock grazing, feedlots, wildlife habitat, oil fields and as cropland growing irrigated crops. The vegetation in non-irrigated areas is mainly red brome (*Bromus madritensis)*, rattail fescue (*Vulpia myuros)*, filaree (*Erodium* sp.), and saltbush (Atriplex). The main irrigated crops are almonds, pistachios, barley, cotton, and wheat.

4.1.5 - HYDROLOGY

The BSA is within the Tumey Gulch-Fresno Slough watershed which drains water from the Ciervo Hills towards the Fresno Slough near Mendota (USGS 2020). Six waterways designated by NHD as intermittent streams occur within the BSA (Figure 4-2). Three of these originate in the Diablo Range foothills and intersect or drain into the BSA in the western portion of the Project. The remaining three are in the eastern portion of the Project; two of these intersect the Project site in a north-to-south direction and the other is present within the BSA to the east of the Project site. These three features are artificial drainages and do not connect to any other waterways. Ten wetland features including six Riverine features (R4SBA and R4SBC) and four Freshwater Ponds (PUBFx, PUSAx, and PUSCx) were identified within the BSA (see Figure 4-2). None of these features, except one, were present on the

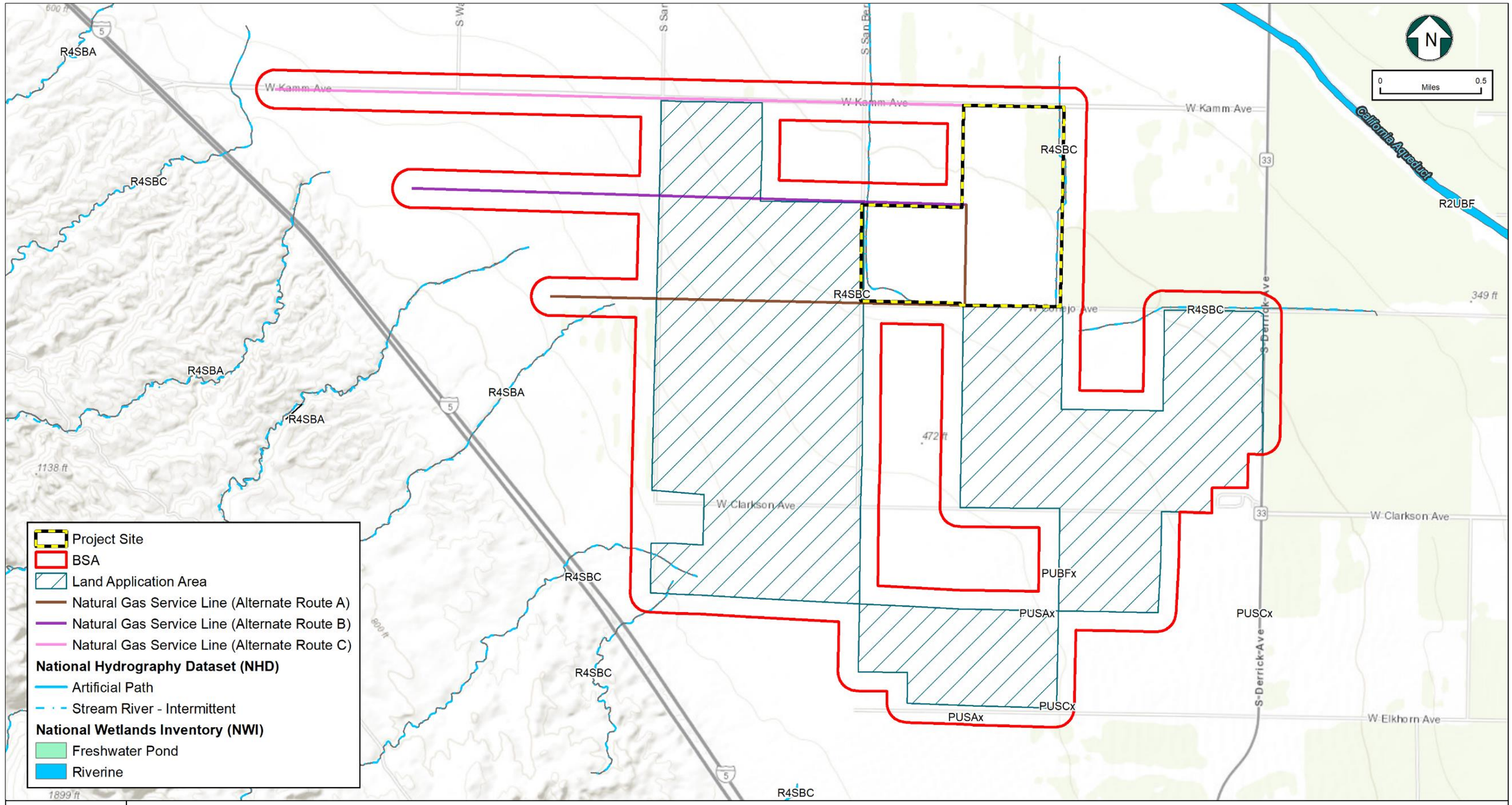

Figure 4-2
NWI and NHD Records of Aquatic Resources within the BSA,
Kamm Avenue Processing Plant Project, Fresno County, California

Project site, presumably because of land surface manipulation related to agricultural conversion (Figure 4-3). The one exception was the feature within the BSA occurring to the east of the Project site.

Several additional features were identified during the reconnaissance survey. These included seven irrigation basins (Basins numbered 1 through 7) that are present within the BSA (Figure 4-3). These basins were situated along and/or between the Land Application Area and, except for Basin 1 and 2, all basins contained water during the time of the survey.

One Percent Annual Chance Flood Hazard zone encroaches into the BSA (FEMA 2020; Figure 4-4). There are multiple areas within the BSA that would be subjected to flooding, with most of these areas along exiting roadways or in areas that are slightly lower that surrounding lands. There is a lower that 1 percent annual chance of the Processing Plant Site being flooded.

4.2 - Vegetation and Other Land Cover

Four habitat types were observed within the BSA: annual grassland, dryland grain crops, deciduous orchard, and urban (Table 4-2; Figure 4-5). Habitats were characterized following the CWHR (Mayer and Laudenslayer 1988). A complete list of plant species observed is presented in Section 5 of this document.

Table 4-2
Habitat Acreages Observed On-Site and within the BSA,
Kamm Avenue Pistachio Processing Project, Fresno County, California

Habitat Type	Acreages	
	BSA	Project
Annual Grassland	68.15	3.27
Deciduous Orchard	3,724.02	2,622.34
Dryland Grain Crops	947.56	464.64
Urban	31.26	1.9

4.2.1 - ANNUAL GRASSLAND

Annual grassland is described by Mayer & Laudenslayer (1988) as open grasslands composed primarily of annual plant species, which also will occur as understory plants in woodland habitats. Habitat structure is dependent largely on weather patterns and livestock grazing. Large quantities of dead plant material may accumulate in summer months. Plant species of this habitat include introduced annual grasses such as brome (*Bromus* sp.) and wild oats (*Avena* sp.), and forbs such as filaree (*Erodium* sp.) and turkey mullein (*Croton setigerus*). Many wildlife species use annual grassland habitat for foraging, but some require special habitat features such as cliffs, ponds, and woodlands for breeding and refuge. Characteristic species of annual grasslands include western fence lizard (*Sceloporus occidentalis*), western rattlesnake (*Crotalus oreganus*), California ground squirrel (*Otospermophilus beecheyi*), coyote (*Canis latrans*), turkey vulture (*Cathartes aura*), burrowing owl, and horned lark (*Eremophila alpestris*).

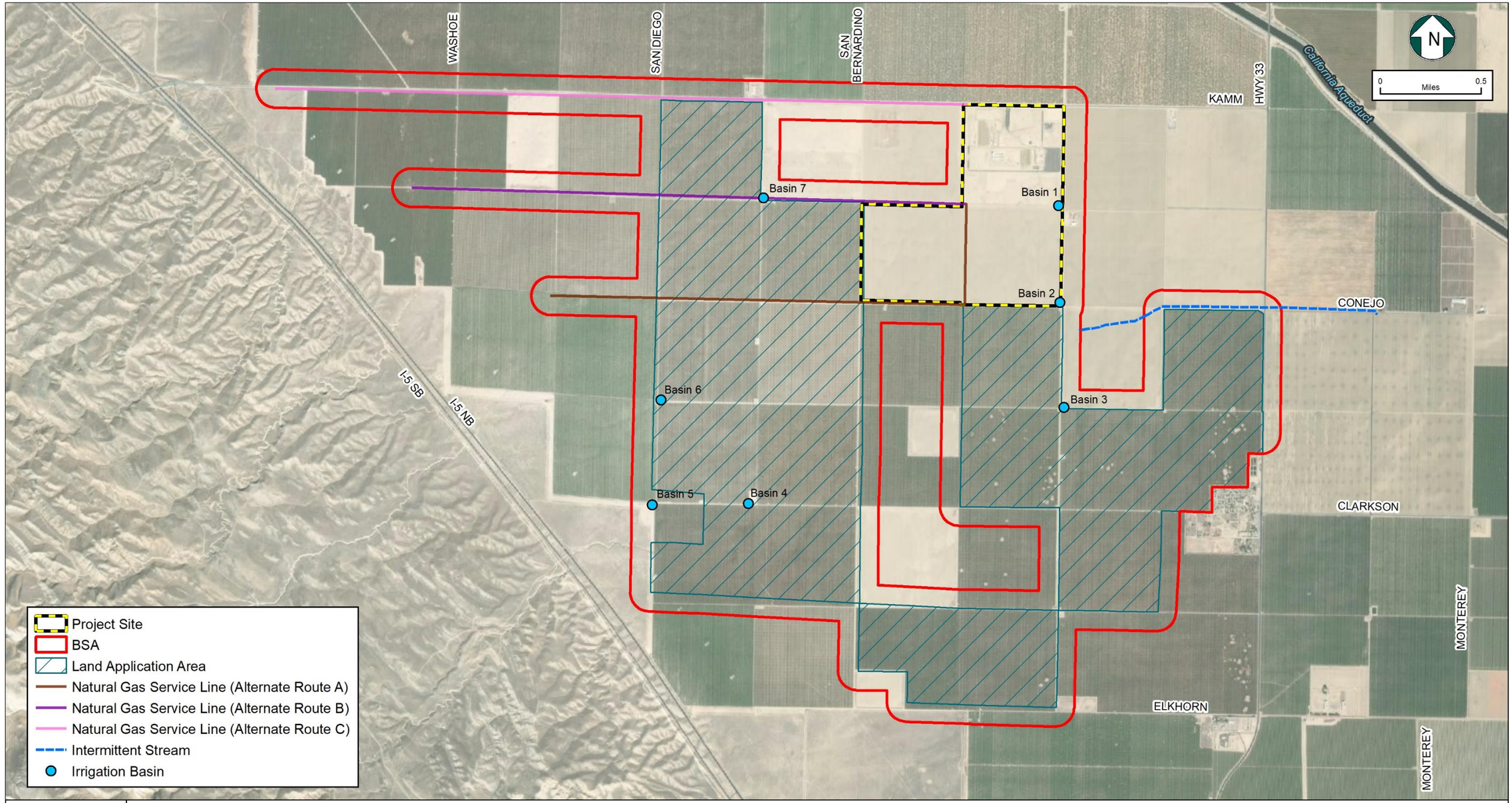

Figure 4-3
Aquatic Resources within the BSA,
Kamm Avenue Processing Plant Project, Fresno County, California

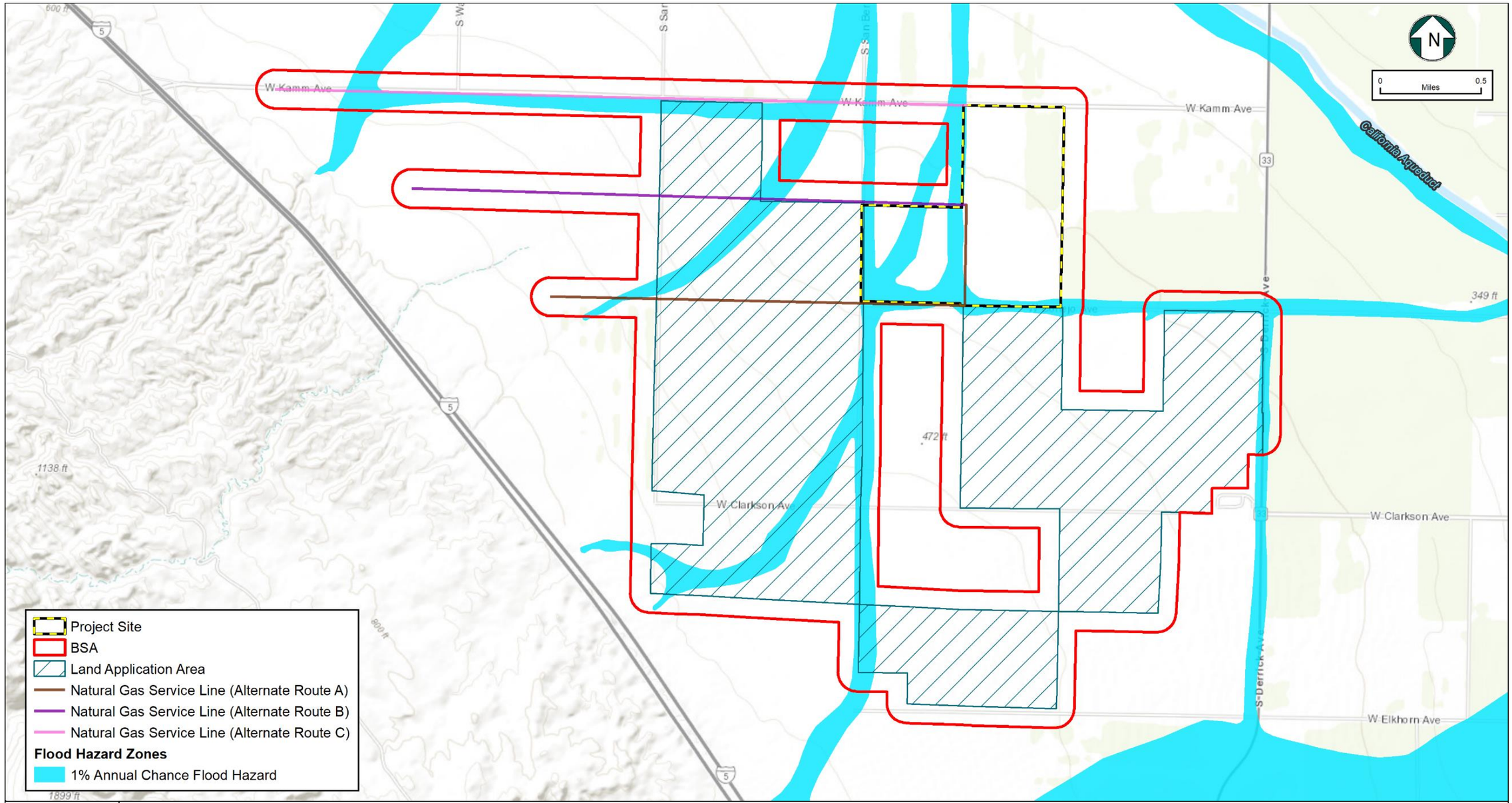

Figure 4-4
FEMA Flood Zone Map,
Kamm Avenue Processing Plant Project, Fresno County, California

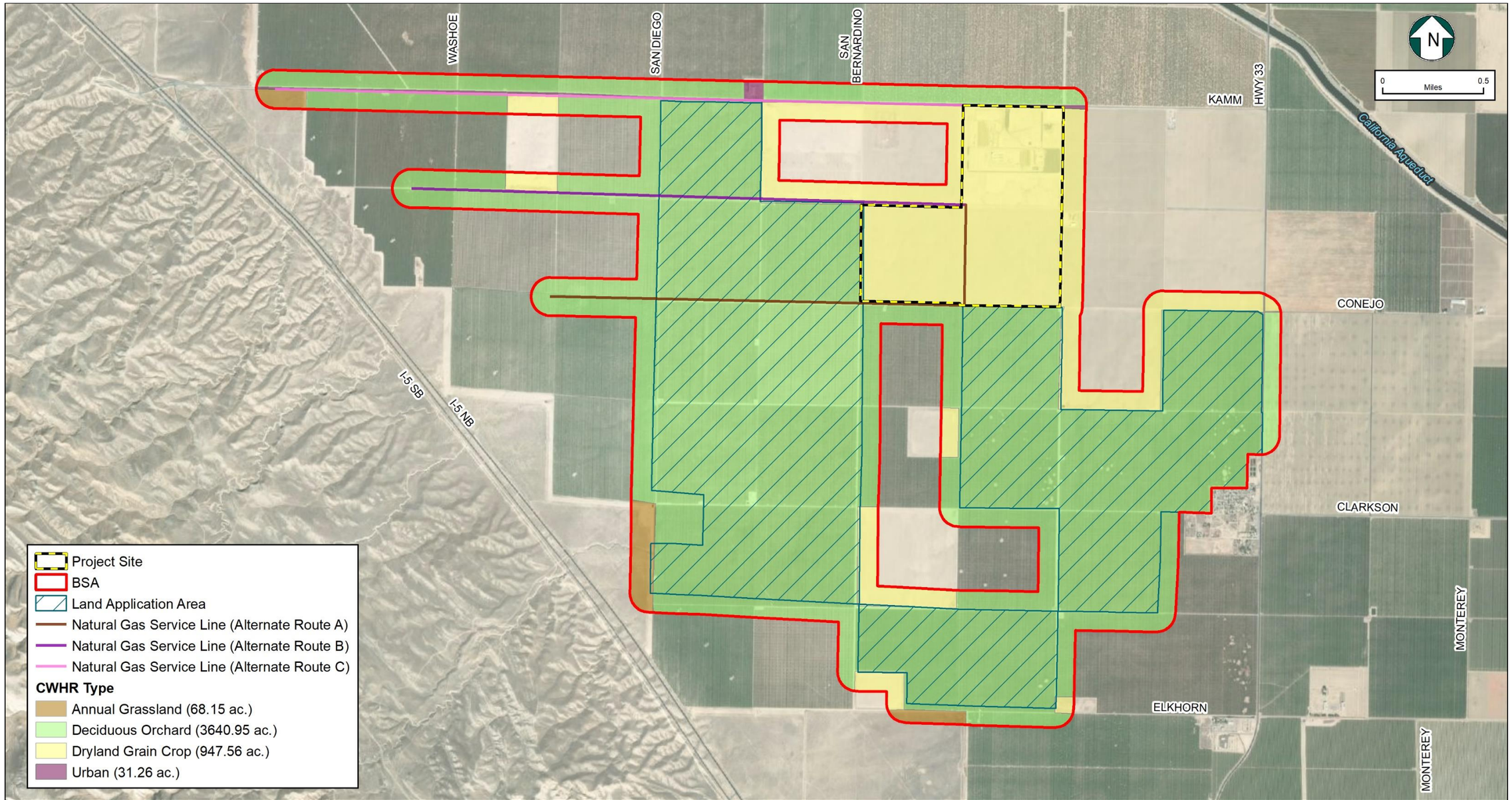

Figure 4-5
Vegetation Communities within the BSA,
Kamm Avenue Processing Plant Project, Fresno County, California

Annual grassland habitat was present to the west and south of the BSA, but grassland habitat within the BSA was present on only 68.15 acres. Within the BSA, these grassland areas were present within the western most portion of Natural Gas Service Line Route C and in areas to the south and southwest of the Land Application Area (see Figure 4-5). This annual grassland was dominated by red brome and foxtail barley (*Hordeum murinum*) with a few isolated allscale saltbush (*Atriplex polycarpa*) shrubs. A complete list of plant species is included in Section-5 of this document.

4.2.2 - DECIDUOUS ORCHARD

Mayer and Laudenslayer (1988) describe deciduous orchards as typically open, single species tree dominated habitats. Depending on the tree type and pruning methods they are usually low, bushy trees with an open understory to facilitate harvest. Deciduous orchards include trees such as almonds, apples, apricots, cherries, figs, nectarines, peaches, pears, pecans, pistachios, plums, pomegranates, prunes, and walnuts.

Trees range in height at maturity for many species from 15 to 30 feet but may be 10 feet or less for some species (pomegranates and some dwarf varieties) or 60 feet or more (pecans and walnuts). Crowns usually touch and are usually in a linear pattern. Spacing between the trunks of trees is uniform depending on desired spread of mature trees. The understory is often managed to prevent understory growth and is composed of bare ground, or is composed of low-growing grasses, legumes, and other herbaceous plants. Wildlife such as deer and rabbit browse on the trees; other wildlife such as squirrels and birds feed on fruit or nuts. Some wildlife (e.g. mourning dove [*Zenaida macroura*] and California quail [*Callipepla californica*]) may use this habitat for cover and nesting.

Deciduous orchard occurs throughout a large portion of the BSA and encompasses approximately 3,724 acres (see Table 4-2, see Figure 4-5). The orchards were mostly pistachio trees and some, particularly in the south, were almond trees.

4.2.3 - Dryland Grain Crops

Mayer and Laudenslayer (1988) describe dryland grain crop habitat as non-irrigated grain and seed crops that includes seed producing grasses, primarily barley, cereal rye, oats, and wheat. These seed and grain crops are annuals. Dryland grain and seed crops do not conform to normal habitat stages. Instead, these crops are regulated by the crop cycle in California. In many areas of the State a dryland crop is grown one year, then the land may be fallowed (not planted) for one or more years. The grain stubble and fallowed land may be grazed by livestock. If fallowed, volunteer native or naturalized herbaceous species grow. Many species of rodents and birds have adapted to croplands. Hawks, owls, and other predators feed on the rodents in these areas. Deer, elk, antelope, and wild pigs may forage in grain fields.

Dryland grain crop habitat within the BSA encompasses approximately 947.56 acres (see Table 4-2) and is present within the Project site including the Processing Plant Site, Water Settling and Cleaning Pond Site, Solid Materials Management Site, and areas intermixed with orchards in the northern and central portion of the Project (see Figure 4-5). Mostly, these

areas were recently disked and without substantial vegetative cover at the time of the site investigations (see description in Section 4.1.3).

4.2.4 - Urban

Mayer and Laudenslayer (1988) describe urban habitat as variable with five vegetative structures defined: tree grove, street strip, shade tree/lawn, lawn, and shrub cover. These structures vary based on the associated urban development. Vegetation commonly associated with urban habitat includes ornamental herbs (grass lawns, weeds, and flowers), shrubs, hedges, and trees, as well as ruderal species.

Urban habitat within the BSA encompasses approximately 31.26 acres (see Figure 4-5 and Table 4-2) and consisted of mostly of farm maintenance and operations facilities, and paved roads such as Kamm Avenue. The most obvious of the facilities is along Kamm Avenue at Riverside Drive (see Figure 4-5), but other smaller and less obvious farm-related facilities are scattered within the orchards.

4.3 - General Plant and Wildlife Observations

The BSA consists of land previously disturbed by disking, mowing, grazing, and other intensive agricultural activities. Areas of non-agricultural vegetation are limited within the BSA and primarily consists of ruderal and non-native plant species including red brome, pigweed amaranth (*Amaranthus albus*), Russian thistle (*Salsola tragus*), and pistachio trees (*Pistacia vera*). Grassland habitats were extremely limited and were present only in the very southern portions of the BSA. Those areas of grassland habitat exhibited signs of past disking. The three proposed natural gas service line routes (Alternative Routes A, B, and C) were mostly surrounded by pistachio or almond orchards but there is a small area within the extreme western end of Alternative Route C that consists of disturbed annual grassland habitat. The pipeline footprint, if built at this location, would be limited to the Fresno County ROW along the south side of Kamm Avenue. This area is highly maintained and heavily disturbed. Annual grassland habitats within the BSA were dominated by non-native grasses such as red brome and foxtail barley with few isolated allscale. A complete list of plant and wildlife species observed is included in Tables 4-3 and 4-4.

The Processing Plant Site was disked in the recent past, but some annual vegetation growth occurred on the site in 2020. Grasses were recently mowed. There were small mammal burrows scattered throughout the site. A limited number of bird species were observed on the Processing Plant Site including the western kingbird (*Tyrannus verticalis*), black phoebe (*Sayornis nigricans*), and American crow (*Corvus brachyrhynchos*). The State endangered Swainson's hawk was observed flying over the Project site on three separate occasions and the loggerhead shrike (*Lanius ludovicianus*), which is a California species of special concern, was observed perching on farming related equipment and supplies on the Project site.

The Water Settling and Cleaning Pond Site and Solid Materials Management Site were disked and mostly devoid of vegetation. The only evidence of wildlife on these two sites were small

mammal burrows that were concentrated along perimeter roads and tracks from a coyote that crossed the disked site.

The Land Application Area consisted of either pistachio or almond orchards with little to no understory vegetation. Minimal wildlife observations occurred within the Land Application Area during the reconnaissance surveys.

Table 4-3
Plant Species Observed Within the Biological Study Area in July 2020, Kamm Avenue Pistachio Processing Project, Fresno County, California

Scientific Name	Common Name	Status	Native or Introduced
Amaranthus albus	pigweed amaranth	none	nonnative
Amsinckia intermedia	common fiddleneck	none	native
Asclepias fascicularis	narrow leaf milkweed	none	native
Astragalus sp.	milk vetch	none	native
Atriplex polycarpa	allscale saltbush	none	native
Avena fatua	wild oat	Cal-IPC moderate	invasive/nonnative
Brassica nigra	black mustard	Cal-IPC moderate	invasive/nonnative
Bromus diandrus	ripgut brome	Cal-IPC moderate	invasive/nonnative
Bromus madritensis ssp. *rubens*	red brome	Cal-IPC high	invasive/nonnative
Capsella bursa-pastoris	shepherd's purse	none	nonnative
Convolvulus arvensis	morning glory	none	native
Croton setiger	turkey mullein	none	native
Cyperus eragrostis	flatsedge	none	native
Erigeron canadensis	Canada horseweed	none	native
Helianthus annuus	sunflower	none	native
Hordeum murinum	foxtail barley	Cal-IPC moderate	invasive/nonnative
Lactuca serriola	prickly lettuce	none	nonnative
Malva parviflora	cheeseweed	none	nonnative
Opuntia basilaris var. *basilaris*	beavertail cactus	none	native
Pistacia vera	domestic pistachio	none	nonnative
Prunus dulcis	domestic almond	none	nonnative
Salsola tragus	Russian thistle	Cal-IPC limited	invasive/nonnative
Senecio vulgaris	common groundsel	none	nonnative
Sisymbrium irio	London rocket	Cal-IPC moderate	invasive/nonnative
Solanum umbelliferum	nightshade	none	native
Tribulus terrestris	puncture vine	Cal-IPC limited	invasive/nonnative

Table 4-4
Wildlife Species and Their Sign Observed within the Biological Study Area in July 2020,
Kamm Avenue Processing Plant Project, Fresno County, California

Scientific Name	Common Name	Status	Native or Introduced	Species Observations			
				Reconnaissance Survey, Nesting Bird and Raptor Surveys	Spotlighting Survey	Baited Track Station Survey	Small Mammal Trapping
Anas discors	blue-winged teal	none	native	X	-	-	-
Anaxyrus boreas halophilus	California toad	none	native	X	-	-	-
Aspidoscelis tigris	whiptail lizard	none	native	X[2]	-	-	-
Aves	Unidentified bird species	N/A	N/A	-	-	X[2]	-
Bubo virginianus	great horned owl	none	native	X[2]	X	-	-
Buteo jamaicensis	red-tailed hawk	none	native	X, X[4]	X	-	-
Buteo swainsoni	Swainson's hawk	ST	native	X	-	-	-
Canis lupus familiaris	domestic dog	none	introduced	-	X	-	-
Canis latrans	coyote	none	native	X[2]	X	X[2]	-
Cathartes aura	turkey vulture	none	native	X	-	-	-
Charadrius vociferus	killdeer	none	native	X	-	-	-
Corvus brachyrhynchos	American crow	none	native	X, X[1]	-	-	-
Corvus corax	common raven	none	native	X, X[1]	-	-	-
Dipodomys sp.	kangaroo rat	-	-	X[2], X[3]	X	X[2]	-
Dipodomys heermanni	Heermann's kangaroo rat	G3G4/S2	native	X[1], X[2], X[3]	-	-	X
Eremophila alpestris	horned lark	G5/S4	native	X	-	-	-
Euphagus cyanocephalus	Brewer's blackbird	none	native	X	-	-	-
Felis catus	domestic cat	none	introduced	X	X	-	-
Formicidae	ant	-	-	-	-	X[2]	
Haemorhous mexicanus	house finch	none	native	X, X[4]	-	-	-
Insecta	insect	-	-	-	-	X[2]	-
Lanius ludovicianus	loggerhead shrike	SSC	native	X	-	-	-
Lepus californicus	black-tailed jackrabbit	none	native	X, X[2]	X	-	-
Lynx rufus	bobcat	none	native	X[2]	X	-	-
Melospiza melodia	song sparrow	none	native	X	-	-	-
Passer domesticus	house sparrow	none	introduced	X, X[4]	-	-	-
Peromyscus sp.	mouse	-	-	X[2]	-	X[2]	
Peromyscus maniculatus	deer mouse	none	native	X[2]	-	X[1]	X
Petrochelidon pyrrhonota	cliff swallow	none	native	X, X[4]	-	-	-
Procyon lotor	raccoon	none	native	-	-	X[2]	-
Pseudacris regilla	Pacific treefrog	none	native	-	X	-	-
Rattus norvegicus	Norwegian rat	none	introduced	X[1]	-	-	-
Sayornis nigricans	black phoebe	none	native	X	-	-	-
Sayornis saya	Say's phoebe	none	native	X	-	-	-
Serpentes	unknown snake	-	-	-	-	X[2]	-
Sturnella neglecta	western meadowlark	none	native	X	-	-	-
Sturnus vulgaris	European starling	none	introduced	X	-	-	-
Sylvilagus audubonii	desert cottontail	none	native	X, X[2]	X	X[2]	-
Thomomys bottae	Botta's pocket gopher	none	native	X[3]	-	-	-

Tyrannus verticalis	western kingbird	none	native	X	-	-	-
Tyto alba	barn owl	none	native	X[2], X[4]	X	-	-
Uta stansburiana	side blotch lizard	none	native	X	-	-	-
Vulpes sp.	unidentified fox	-	-	-	X	-	-
Vulpes macrotis mutica	San Joaquin kit fox	FE/ST	native	X	X	-	-
Zenaida macroura	mourning dove	none	native	X	X	-	-

ST = State threatened
FE = Federally endangered
SSC = State Species of Special Concern
G-rank = Reflects the global condition of the entire species.
S-rank = Reflects the status for the taxon over its state distribution.
2 = Imperiled – At high risk of extinction due to restricted range, few populations or occurrences, steep declines, severe threats, or other factors.
3 = Vulnerable- At moderate risk of extinction due to a fairly restricted range, relatively few populations or occurrences, recent and widespread declines, threats, or other factors.
4 = Apparently secure – At fairly low risk of extinction due to an extensive range and/or many populations or occurrences, but with possible cause for some concern as a result of local recent declines, threats, or other factors.
5 = Secure – At very low risk of extinction due to a very extensive range, abundant populations, or occurrences, and little to no concern from declines or threats.
X = live individual observed
X[1] = animal carcass observed
X[2] = sign observed (i.e. scat, tracks, dig marks, feathers)
X[3] = den or burrow observed
X[4] = nest observed

SECTION 5 - SENSITIVE BIOLOGICAL RESOURCES

Local, State, and federal agencies regulate special-status species and other sensitive biological resources and require an assessment of their presence or potential to be present on-site prior to the approval of a proposed development. This section discusses sensitive biological resources observed on the BSA and evaluates the potential for the BSA to support other sensitive biological resources. Assessments for the potential occurrence of special-status species were based upon known ranges, habitat preferences of the species, species occurrence records from the CNDDB and CNPS, species occurrence records from other sites in the vicinity of the BSA, relevant reports, and the results of surveys conducted at the Project site and associated Project components.

5.1 - Special-Status Species

Table 5-1 presents the list of special-status plant and animal species determined to have a potential to occur within the BSA and identifies if the Project may affect the species and threaten the viability of a population of the species. The complete list of species generated from literature and database searches and that were evaluated for this Project are included in Appendix D. From this search, it was determined that 46 species have the potential to occur within the BSA. Of these 46 species, 39 species are discussed in the subsections below. The six other species were included in the CDFW's Special Animals List, but those species have no special protection and thus were not discussed further in this document.

Table 5-1
Special-Status Species with Potential to Occur within the BSA,
Kamm Avenue Pistachio Processing Project, Fresno County, California

Scientific Name Common Name	Status Fed/State ESA CRPR/CDFW	Potentially Affected by Project? Yes/No	Viability Threat? Yes/No
Plants			
Amsinckia furcate forked fiddleneck	-/- 4.2	Yes	No
Androsace elongata ssp. *acuta* California androsace	-/- 4.2	Yes	No
Atriplex cordulata var. *cordulata* heartscale	-/- 1B.2	Yes	No
Atriplex coronata var. *coronate* crownscale	-/- 4.2	Yes	No
Atriplex coronata var. *vallicola* Lost Hills crownscale	-/- 1B.2	Yes	No
Atriplex depressa brittlescale	-/- 1B.2	Yes	No
Atriplex minuscula lesser saltscale	-/- 1B.1	Yes	No

Scientific Name Common Name	Status Fed/State ESA CRPR/CDFW	Potentially Affected by Project? Yes/No	Viability Threat? Yes/No
Caulanthus californicus California jewelflower	FE/CE 1B.1	Yes	No
Caulanthus lemmonii Lemmon's jewelflower	-/- 1B.2	Yes	No
Chloropyron palmatum palmate-bracted bird's-beak	FE/SE 1B.1	Yes	No
Deinandra halliana Hall's tarplant	-/- 1B.2	Yes	No
Delphinium recurvatum recurved larkspur	-/- 1B.2	Yes	No
Eriastrum hooveri Hoover's eriastrum	-/- 4.2	Yes	No
Eriogonum gossypinum cottony buckwheat	-/- 4.2	Yes	No
Eschscholzia hypecoides San Benito poppy	-/- 4.3	Yes	No
Extriplex joaquinana San Joaquin spearscale	-/- 1B.2	Yes	No
Fritillaria agrestis stinkbells	-/- 4.2	Yes	No
Goodmania luteola golden goodmania	-/- 4.2	Yes	No
Layia munzii Munz's tidy-tips	-/- 1B.2	Yes	No
Madia radiata showy golden madia	-/- 1B.1	Yes	No
Microseris sylvatica sylvan microseris	-/- 4.2	Yes	No
Monolopia congdonii San Joaquin woollythreads	FE/- 1B.2	Yes	No
Navarretia nigelliformis ssp. *radians* shining navarretia	-/- 1B.2	Yes	No
Trichostema ovatum San Joaquin bluecurls	-/- 4.2	Yes	No
Amphibians			
Spea hammondii western spadefoot	-/- SSC	Yes	No
Reptiles			
Arizona elegans occidentalis California glossy snake	-/- SSC	Yes	No
Gambelia sila Blunt-nosed leopard lizard	FE/SE FP	Yes	No
Masticophis flagellum ruddocki San Joaquin coachwhip	-/- SSC	Yes	No

Scientific Name Common Name	Status Fed/State ESA CRPR/CDFW	Potentially Affected by Project? Yes/No	Viability Threat? Yes/No
Phrynosoma blainvillii coast horned lizard	-/- SSC	Yes	No
Birds			
Athene cunicularia burrowing owl	-/- SSC	Yes	No
Buteo swainsoni Swainson's hawk	-/ST -/-	Yes	No
Charadrius montanus mountain plover	-/- SSC	Yes	No
Lanius ludovicianus Loggerhead shrike	-/- SSC	Yes	No
Mammals			
Ammospermophilus nelson San Joaquin antelope squirrel	-/ST -/-	Yes	No
Dipodomys ingens giant kangaroo rat	FE/SE -/-	Yes	No
Dipodomys nitratoides exilis Fresno kangaroo rat	FE/SE -/-	Yes	No
Onychomys torridus tularensis Tulare grasshopper mouse	-/- SSC	Yes	No
Taxidea taxus American badger	-/- SSC	Yes	No
Vulpes macrotis mutica San Joaquin kit fox	FE/ST -/-	Yes	No

CRPR (California Rare Plant Rank):
- 1A Presumed Extinct in California
- 1B Rare, Threatened, or Endangered in California and elsewhere
- 2A Plants presumed extirpated in California, but more common elsewhere
- 2B Plants Rare, Threatened, or Endangered in California, but more common elsewhere

CRPR Threat Code Extension:
- .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)
- 3.1 Native Plant Society List 3 Species-Plants Categorized as Needs More Information; Seriously Endangered in California
- 3.2 Native Plant Society List 3 Species-Plants Categorized as Needs More Information; Fairly Endangered in California.
- 3.3 Native Plant Society List 3 Species-Plants Categorized as Needs More Information; Not Very Endangered in California
- 4.1 Plants of limited distribution (watch list), Seriously Endangered in California; (over 80% of occurrences threatened/high degree and immediacy of threat)
- 4.2 Plants of limited distribution - Watch list, Fairly Endangered in California (20-80% occurrences threatened)
- 4.3 Plants of limited distribution - Watch list, Not Very Endangered in California (<20% of occurrences threatened/low degree and immediacy of threat or no current threats known)

- FE Federally Endangered
- FT Federally Threatened
- FC Federal Candidate Species
- FS Federally Sensitive
- SE State Endangered
- ST State Threatened
- SC State Candidate
- SS State Sensitive
- SSC State Species of Special Concern
- SFP State Fully Protected
- SR State Rare

5.1.1 - SPECIAL-STATUS PLANT SPECIES

The literature and database review identified 48 special-status plant species known or with potential to occur in the vicinity of the Project (see Appendix D). Of those, 24 special status plant species were eliminated from consideration because the project occurs outside of the species known range, outside of the elevation range of the species, or because habitat that could support the species was absent from the BSA. There were 24 special-status plant species determined to have potential to occur within the BSA (see Table 5-1). However, upon evaluating existing site conditions it was determined that none of those species are likely to occur within the BSA, and even more certainly, none of those species would occur within the Project footprint because of the extreme level of disturbance that has occurred. Intensive agricultural operations would effectively eliminate the possibility of these species from the Project footprint, except perhaps in the extreme western edge of Natural Gas Service Line Route C. In that area, the pipeline would be installed along the ROW south of Kamm Avenue where extensive shoulder maintenance would likely preclude these species from occurring. At this location there is a potential that construction activities could encroach into adjacent annual grassland habitat, especially at the point of connection with the existing pipeline.

5.1.2 - SPECIAL-STATUS ANIMAL SPECIES

The literature and database review identified 45 special-status wildlife species known or with potential to occur in the vicinity of the Project (see Appendix D). Of those, 21 were determined to have a potential to occur within the BSA but only 15 of these species (see Table 5-1) are discussed below. The other six species were included in the CDFW's Special Animals List and have no special protection.

Western Spadefoot

SPEA HAMMONDII

Status: State Species of Special Concern

The western spadefoot is a relatively common amphibian found throughout most of the Central Valley and adjacent foothills (Zeiner et al. 1990). The spadefoot is found in grasslands but can also be found in the valley and foothill hardwood woodlands (Zeiner et al. 1990). Shallow temporary pools are optimal habitats for breeding and egg laying. Within grassland habitats this species can be above ground during late winter or late spring when there are periods of rain or high humidity. During the dry season they are rarely above the surface and prefer to remain in burrows.

There was one CNDDB record within 10 miles of the Project. This record (EONDX 114265) was documented approximately 5.6 miles to the northwest of the BSA and documented hundreds of spadefoot tadpoles in a basin located in an agricultural area. Based on site conditions during the on-site surveys, aquatic resources including seven irrigation basins (Basin 1 through 7) that were present within the BSA provide habitat that could potentially support breeding and overwintering of western spadefoot. Hundreds of California toads were observed in irrigation Basin 5 (Figure 5-1), but no western spadefoots were found. There is potential for this species to be present within Basin 1 through 7.

California Glossy Snake

ARIZONA ELEGANS OCCIDENTALIS

Status: State Species of Special Concern

The California glossy snake is common throughout California, especially in desert habitats but also chaparral, sagebrush, valley and foothill hardwood, pine-juniper woodland, and annual grassland. It occurs at elevation from below sea level to 6,000 feet and utilizes small mammal burrows, rock outcrops, and loose soil for cover. It prefers open sandy areas with scattered brush, or rocky areas.

There is one CNDDB record of this species (EONDX 104888) that occurs approximately 4.29 miles west of the BSA. Based on site conditions during the on-site surveys, annual grassland habitat that could support this species occurs to the south and west of the western most portion of Natural Gas Service Line Route C and to the south and southwest of the Land Application Area. This grassland habitat has been disturbed and is regularly managed by grazing. There is no habitat on the Project that would support this species, except along the previously mentioned areas to the south and west of the westernmost portion of Natural Gas Service Line Route C. The California glossy snake was not observed during the field surveys.

Blunt-nosed Leopard Lizard

GAMBELIA SILA

Status: Federally Endangered, State Endangered, State Fully Protected

The blunt-nosed leopard lizard occupies sparsely vegetated alkali and desert scrub habitats in areas of low topographic relief. Typically, they are associated with habitats with low vegetation density in saltbush scrub, alkali sink, non-native grassland, Ephedra scrub, and washes.

There were three CNDDB records within 10 miles of the Project. Two of these records (EONDX 27782 and 27714) were documented in 1960 and 1979 and are overlapping the Project along the proposed natural gas service Routes B and C. There is no specific information provided with these records. Based on site conditions during the on-site surveys, annual grassland habitat that could support this species occurs to the west of the Project. There is habitat that could support this species south and west of Natural Gas Service Line Route C and to the south and southwest of the Land Application Area. This grassland habitat has been disturbed and is regularly managed by grazing. The blunt-nosed leopard lizard was not observed during the field surveys, but no protocol level surveys for this species were conducted. There is not habitat that would support this species on the Project, except the area mentioned above that is adjacent to the western most portion of Natural Gas Service Line Route C.

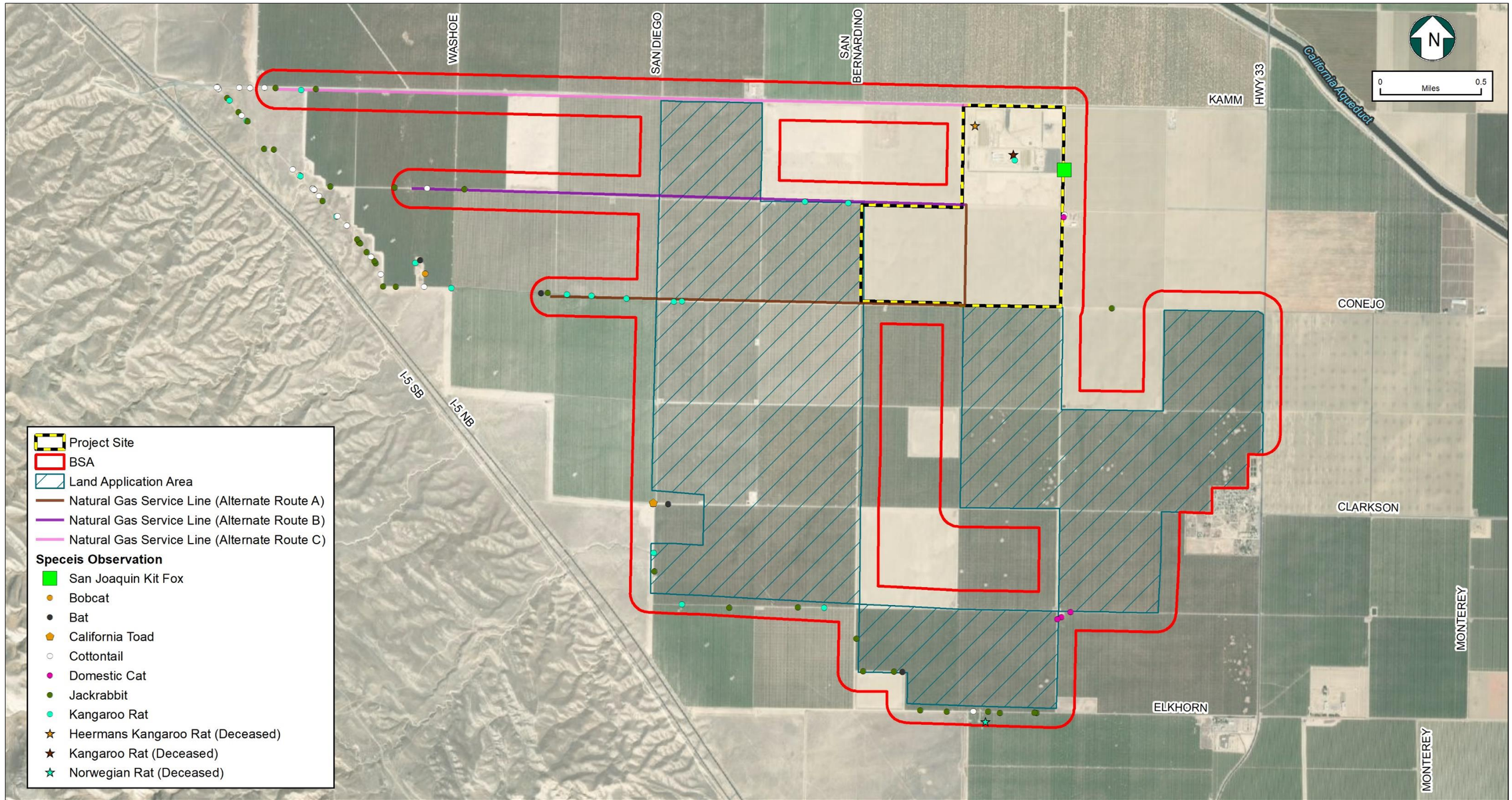

Figure 5-1
Biological Resources: Terrestrial Species Observed within the BSA,
Kamm Avenue Processing Plant Project, Fresno County, California

Coast Horned Lizard

PHRYNOSOMA BLAINVILLII

Status: State Species of Special Concern

The coast horned lizard occupies open areas of sandy soil and low vegetation in valleys, foothills, and semiarid mountains. It is found in grasslands, coniferous forests, woodlands, and chaparral, with open areas and patches of loose soil. It often inhabits lowlands along sandy washes with scattered shrubs and habitat along dirt roads and near ant hills.

There are two CNDDB records of this species within 10 miles of the BSA. The closest (EONDX 34859) is located approximately 3.93 miles to the northwest of the BSA. There is no specific information provided with these records. Based on site conditions during the on-site surveys, annual grassland habitat that could support this species occurs to the west of the Project. There is habitat that could support this species south and west of Natural Gas Service Line Route C and to the south and southwest of the Land Application Area. This grassland habitat has been disturbed and is regularly managed by grazing. The coast horned lizard was not observed during the field surveys. There is no habitat that would support this species on the Project, except the area mentioned above that is adjacent to the western most portion of Natural Gas Service Line Route C.

San Joaquin Coachwhip

MASTICOPHIS FLAGELLUM RUDDOCKI

Status: State Species of Special Concern

The San Joaquin coachwhip occurs in open, dry, treeless areas, including grassland and saltbush scrub and takes refuge in rodent burrows, under shaded vegetation, and under surface objects.

There was one CNDDB record within 10 miles of the Project. This record (EONDX 66159) was of a male adult coachwhip that was documented approximately 4.2 miles to the west of the BSA. Based on site conditions during the on-site surveys, annual grassland habitat that could support this species occurs to the south and west of the western most portion of Natural Gas Service Line Route C and to the south and southwest of the Land Application Area. This grassland habitat has been disturbed and is regularly managed by grazing. There is no habitat on the Project that would support this species, except along the previously mentioned areas to the south and west of the western most portion of Natural Gas Service Line Route C. The San Joaquin coachwhip was not observed during the field surveys.

Western Burrowing Owl

ATHENE CUNICULARIA

Status: State Species of Special Concern

The western burrowing owl is a small ground-dwelling owl that is found throughout western North America. This species occupies a variety of habitat types including grassland, shrub steppe, desert, natural prairie, agricultural areas (including pastures, untilled margins of cropland, and irrigation canals), earthen levees and berms, ruderal, grassy fields, pastures,

coastal uplands, and urban vacant lots as well as the margins of airports, golf courses, and roads. Burrowing owls use earthen burrows, typically relying on other fossorial mammals to construct their burrows (USFWS 1998). In California, they are most often associated with California ground squirrel burrows (Winchell 1994). They use a burrow throughout the year for temperature regulation, offspring rearing, shelter, and escape from predators. While burrows are most often earthen, they have been documented using atypical burrows such as pipes, culvers, and other man-made structures, most often as shelter (Shuford and Gardali 2008). Burrowing owls can have several burrows close to one other that they may use frequently to avoid predators.

Five CNDDB occurrences of western burrowing owl were documented within 10 miles of the Project. The nearest CNDDB record (EONDX 3616) of this species was documented one adult near a roadside approximately 7.3 miles northwest of the BSA. Based on site conditions during the on-site surveys, annual grassland habitat that could support this species occurs to the south and west of the Natural Gas Service Line Route C and in the grassland habitat to the south and southwest of the Land Application Area. Though this grassland habitat has been disturbed and regularly maintained by grazing, it could potentially support nesting and foraging burrowing owls. There were no burrowing owls or diagnostic sign (e.g. pellets, whitewash, feathers, prey remnants, etc.) observed during the time of the field surveys and no burrows or dens that could potentially become inhabited by this species were identified within the BSA. Annual grassland habitat, agricultural fields, and orchards within and surrounding the BSA could also provide potential nesting and foraging habitat. Though no burrowing owls or diagnostic signs of this species were observed, there is some potential for burrowing owls to be present from time to time as transient foragers or even to become established within the Processing Plant Site, pond site, waste management site, as well as other areas within the BSA.

Swainson's Hawk

BUTEO SWAINSONI

Status: State Threatened

Swainson's hawks occur in grassland, desert, and agricultural landscapes in the Central Valley and Antelope Valley of California (Bechard, et al. 2010, Zeiner et al. 1990). Some hawks may be residents, especially in the southern portion of their range, while others may migrate between wintering habitat in Central and South America and breeding habitats in North America. They prefer larger isolated trees or small woodlots for nesting, usually with grassland or dry-land grain fields nearby for foraging. They have been known to nest in large eucalyptus trees along heavily traveled freeway corridors. Swainson's hawks forage in grassland, open scrub, pasture, and dryland grain agricultural habitats, primarily for rodents. Swainson's hawks exhibit a moderate to high nest site fidelity at successful nest sites.

Three CNDDB records of Swainson's hawk occurrences were documented within 10 miles of the Project. The nearest record (EONDX 90996) of this species was approximately 6.9 miles south of the BSA in cottonwood trees along Cantua Creek. There are no potential nesting sites on the Project but there are potential nesting sites within 0.5 mile of the site. No Swainson's hawks were found during a search of those nests. Three Swainson's hawks were observed

overflying the BSA and one was observed south of the BSA within 0.5-mile buffer (Figure 5-2). Because this species is known to utilize the Project area, there is potential for the Swainson's hawk to be present from time to time as transient foragers. It is unlikely this species would nest within the orchards occurring on the BSA.

Mountain Plover

CHARADRIUS MONTANUS

Status: State Species of Special Concern

The Mountain plover inhabits open, arid, sparsely vegetated short-grass plains and fields, plowed fields, rolling hills, and deserts (Knopf and Rupert 1995). In the San Joaquin Valley, valley sink scrub and grasslands are commonly used for overwintering.

Two CNDDB records of mountain plover occurrences were documented within 10 miles of the Project. The nearest record (EONDX 49674) of this species was approximately 9.4 miles northeast of the BSA at an experimental restoration site consisting of fields with short foxtail brome and fallowed and plowed fields. There were approximately 40 overwintering birds at that location. Based on site conditions during the on-site surveys, overwintering habitat consisting of disked fields and annual grassland that could support this species exist within the BSA. The Project site is managed by regular mowing and/or disking and some annual grassland habitat that could support this species occurs within the BSA to the south and southwest of the Land Application Area.

Loggerhead Shrike

LANIUS LUDOVICIANUS

Status: State Species of Special Concern

The loggerhead shrike is associated with open landscapes and is usually observed perching on a fence-line along rural roadways. Nesting habitat is usually in densely foliated shrubs and trees.

No CNDDB records of loggerhead shrike occurrences were documented within 10 miles of the Project. Based on site conditions during the on-site surveys, no nesting habitat that could support this species is present within the BSA. Foraging and perching habitat occurs throughout the BSA. One loggerhead shrike was observed at the Processing Plant Site, which was perched on farming materials (Figure 5-2). This species can occur from time to time as transient and or/forager within any portion of the BSA. There is no nesting habitat available within the BSA.

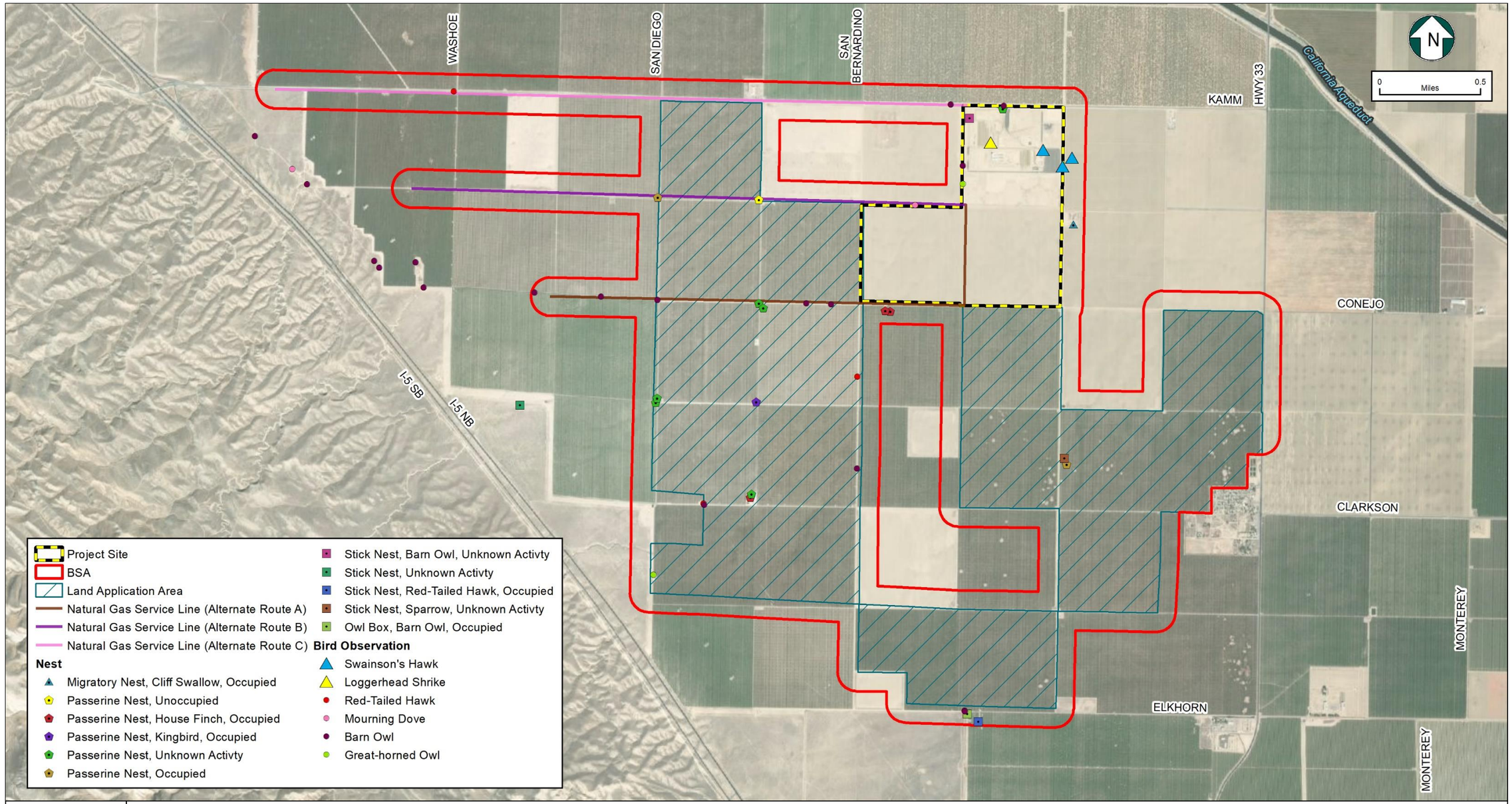

Figure 5-2
Biological Resources: Birds Species and Nests Observed within the BSA,
Kamm Avenue Processing Plant Project, Fresno County, California

San Joaquin Antelope Squirrel

AMMOSPERMOPHILUS NELSON

Status: State Endangered

The San Joaquin antelope squirrel inhabits relatively arid annual grassland and shrubland communities. Habitat of the San Joaquin antelope squirrel consists of grasslands with moderate shrub cover, which includes such species as saltbush, ephedra, bladder pod (*Peritoma arborea*), goldenbush (*Isocoma* sp.), snakeweed (*Gutierrezia* sp.), and others. The squirrels live in small underground familial colonies in sandy, easily excavated soils in grasslands (USFWS 1998).

Eleven CNDDB records of San Joaquin antelope squirrel occurrences were documented within 10 miles of the Project. The nearest record (EONDX) of this species was documented in 1932 approximately 0.3 mile east of the BSA but no specific information is provided for that record. Virtually all lands immediately east of the BSA, aside from a linear strip of habitat along the California Aqueduct, has been converted to agricultural and would no longer support this species. Annual grassland and shrub habitat that could support this species occurs to the south and west of the Natural Gas Service Line Route C and to the south, southwest, and west of the Land Application Area. There were no San Joaquin antelope squirrels observed during the field surveys. There is no habitat within the Project footprint that would support this species.

Giant Kangaroo Rat

DIPODOMYS INGENS

Status: Federally Endangered, State Endangered

The giant kangaroo rat inhabits grasslands and shrub communities on a variety of soil types and on slopes up to about 22 percent at elevations of up to approximately 2,900 feet above sea level. Scattered common and spiny saltbushes (*Atriplex* sp.) or ephedra (*Ephedra* sp.) characterize areas where giant kangaroo rats are associated with shrubs. The most common herbaceous plants occurring within giant kangaroo rat habitat are red brome, annual fescue (*Vulpia myuros*), and red-stemmed filaree (*Erodium cicutarium*) (USFWS 1998). Giant kangaroo rats live in underground precincts (diagnostic burrow systems) that typically consist of one to five separate burrow openings. Typical precincts have three burrows that are independent of one another and are not interconnected. Vegetation surrounding precincts is often clipped short and piled into "haystacks" for drying. Burrow openings are often situated on small rises or hummocks in the ground surface.

Eleven CNDDB records of giant kangaroo rat occurrences were documented within 10 miles of the Project. The nearest record (EONDX 24057) of this species was documented in 1967 approximately 1.9 miles south of the BSA. Numerous small mammal burrows occur at the Processing Plant Site, along the water line that runs along the eastern border of the Processing Plant Site boundary, and in annual grassland habitat in the extreme south and southwest portions of the BSA. High burrow density areas were trapped to determine species presence (see Figure 2-3). Kangaroo rat burrows are also common in the grassland areas to the west of the Project. There was no giant kangaroo rat captured and there was no

diagnostic sign (e.g. burrows, footprints, tail drags, or haystacks) of giant kangaroo rat occurring on the Project (Appendix C). There is no evidence that this species occurs at the Project.

Fresno Kangaroo Rat

DIPODOMYS NITRATOIDES EXILIS

Status: Federally Endangered, State Endangered

The Fresno kangaroo rat occupies grassland and alkali desert scrub communities on the San Joaquin Valley floor in Merced, Kings, Fresno, and Madera counties. It shelters in burrows that are dug by the kangaroo rats. Burrows are usually found in relatively light, sandy soils in raised areas. There are typically two to five burrow entrances that slant gently underground, and one or more holes that open from a vertical shaft. This species was most recently found only in alkali sink communities from 200 to 300 feet in elevation, but there are no known populations existing within its historical geographic range The last record of a Fresno kangaroo rat in Fresno County was in 1992 at the Alkali Sink Ecological Reserve (USFWS 1998).

No CNDDB records of Fresno kangaroo rat occurrences were documented within 10 miles of the Project. Numerous small mammal burrows occur at the Processing Plant Site and along the water line that runs along the eastern boundary of the Processing Plant Site. High burrow density areas were trapped to determine species presence (see Figure 2-3). There was no Fresno kangaroo rat captured during five consecutive nights of trapping (Appendix C) and it is unlikely that this species is present with the Project.

Tulare Grasshopper Mouse

ONYCHOMYS TORRIDUS TULARENSIS

Status: CDFW Species of Special Concern

The Tulare grasshopper mouse inhabits hot, arid grassland and shrubland vegetation communities in the southern San Joaquin Valley and western foothills and valleys of California. These include blue oak woodlands up to 1,476 feet in elevation; upper sonoran subshrub scrub communities; alkali sink and mesquite communities on Valley Floor; and grasslands on sloping margins of the San Joaquin Valley and Carrizo Plain region.

One CNDDB record of the Tulare grasshopper mouse occurs within 10 miles of the Project. This record (EONDX 113698) was of one adult male captured in annual grassland approximately 3.4 miles west of I-5, approximately 4.6 miles west of the BSA, in 2016. Numerous small mammal burrows that could support the Tulare grasshopper mouse occur at the Processing Plant Site and along the water line that runs along the eastern boundary of the Processing Plant Site. High burrow density areas were trapped to determine species presence (see Figure 2-3). Grassland habitat in the extreme south and southwest of the BSA could support this species, as could the grassland habitat to the west and south of the westernmost portion of natural gas service line Alternative Route C. No Tulare grasshopper mouse were captured during five consecutive nights of trapping (Appendix C). It is unlikely that this species occurs within the Project because of extensive past disturbances but it could

occur to the south and west of the extreme western portion of Natural Gas Service Line Route C.

American Badger

TAXIDEA TAXUS

Status: CDFW Species of Special Concern

The American badger is an uncommon permanent resident throughout California, except in high alpine habitats and in the northern North Coast (CDFG 1995). They can typically be found in grasslands, deserts, and drier habitats. Badgers are typically nocturnal and hunt or forage at night while spending daylight hours below ground. Normally, they have a single den entrance that is approximately eight to 12 inches in width, in an elliptical or half-moon shape, similar to their body shape. Dens are usually found in friable soils. American badgers spend most of their time near a den, but they may have multiple dens in an area that they may often frequent. American badgers are known to be able to dig a new den each night. During cooler nights, the entrance to the den may be partially plugged with soil to help regulate temperatures. American badgers primarily feed on small mammals that they capture from digging out the prey's burrows. Such prey may include pocket gophers, mice, chipmunks, and ground squirrels (CDFG 1995). Other prey may include birds, bird eggs, reptiles, invertebrates, and carrion.

No CNDDB records of American badger occurrences were documented within 10 miles of the Project. There was no American badger or American badger diagnostic sign (e.g. den, claw marks, or scat) identified within the BSA. However, there is potential for American badgers to be present from time to time within the BSA as transient foragers or even to establish dens, especially in areas of grassland habitat or in areas that contain high abundances of small rodents. There is habitat that is likely to support this species to the west of the Project, which would increase the potential for this species to visit and forage within the BSA.

San Joaquin Kit Fox

VULPES MACROTIS MUTICA

Status: Federally Endangered and State Threatened

San Joaquin kit foxes are a subspecies of kit fox that is endemic to the Central Valley of California (USFWS 1998, 2010). They are found primarily in the San Joaquin Valley, Carrizo Plain, and Cuyama Valley, as well as other small valleys in the western foothills of the Central Valley. They are only found west of the Sierra Nevada crest. They occupy arid to semi-arid grasslands, open shrublands, savannahs, and grazed lands with loose-textured soils. San Joaquin kit foxes are well-established in some urban areas and are highly adaptable to human-altered landscapes. They generally avoid intensively maintained agricultural land uses. San Joaquin kit foxes use subterranean dens year-round for shelter and pup-rearing. They are nocturnally active but may be visible above ground near their dens during the day, particularly in the spring. The feed primarily on small mammals, but will consume a variety of prey, and will scavenge for human food.

Fifteen CNDDB records of San Joaquin kit fox occurrences were documented within 10 miles of the Project. The nearest record (EONDX 53805) of this species was documented in 1997 approximately 1.3 miles northeast of the BSA along California Aqueduct. This record documented one foraging kit fox adult during spotlighting surveys. Scattered areas suitable to support the San Joaquin kit fox exist near the Project site. Based on site conditions during the on-site surveys, annual grassland habitat that could support this species occurs to the west and south of the extreme western portion of the Natural Gas Service Line Route C and to the south and southwest of the Land Application Area. One San Joaquin kit fox juvenile was observed during the night spotlighting surveys along the eastern boundary of the plant processing site (Figure 5-1) and this species is expected to occur from time to time as transient forager or even to establish dens within the annual grassland of the BSA. The Processing Plant Site contains suitable prey species such as kangaroo rats (*Dipodomys* sp.), deer mice (*Peromyscus* sp.), cottontails (*Sylvilagus* sp.), pocket mice, and other nocturnal rodents that would support San Joaquin kit foxes, and there are substantial denning opportunities on the site.

5.1.3 - OTHER PROTECTED SPECIES

Nesting Birds and Raptors

Habitat within the BSA supports nesting native bird species, which are protected by the federal MBTA and the California Fish and Game Code. The on-site surveys were conducted during the nesting bird season (February 1 to September 15).

A barn owl (*Tyto alba*) nest was present in the duct work of an outbuilding in the northwest corner of the Processing Plant Site (see Figure 5-2). A carcass of a barn owl nestling and an adult barn owl, along with prey remains, whitewash, and owl pellets were below the potential nest location inside the outbuilding. A cliff swallow (*Petrochelidon pyrrhonota*) nesting colony was present in the rafters of an open supply storage structure within the 500-foot buffer east of the Project site (see Figure 5-2). An occupied barn owl nesting box was present on the south side of the BSA where the annual grassland habitat borders the orchards (see Figure 5-2). One potential red-tailed hawk nest was in a cell phone tower within the orchards on the south end of the BSA (see Figure 5-2) where one adult red-tailed hawk was perched below the potential nest. Thirteen additional nests were found within the Land Application Area (see Figure 5-2), mainly in the rafters of storage structures or on electrical equipment. No nests were found on the Water Settling and Cleaning Pond Site, the Solid Materials Management Site or within the southern area of the most western portion of the Natural Gas Service Line Route C. At least half of the nests were occupied at the time of the survey. The other nests were either not occupied or there was no bird activity at the nest location at the time of the survey. No special-status species were nesting within or near the BSA.

Various species of migratory birds will construct nests in a variety of habitats and structures, and more nests may be constructed in trees or shrubs, man-made structures, and directly on the ground as the nesting season progresses. Because the BSA support several types of habitats suitable for nesting birds, it is likely that birds will nest within the BSA. There was

one active barn owl nest discovered in a structure on the Processing Plant Site and there is a potential for ground-nesting birds to be present within the Processing Plant Site, in the Land Application Area, at the Water Settling and Clearing Ponds Site, and on the Solid Materials Management Site, although the latter two areas are routinely disked which would reduce the risk of ground nesting birds being present in those areas.

Bats

Habitat within the BSA provides foraging habitat and limited areas in outbuildings that could support roosting bats. There are structures within the Processing Plant Site that could potentially support rooting bats, but no roosting bats, maternity colonies, or sign of roosting bats (e.g. guano, urine stains, or vocalization) were found to inhabit these structures or roost anywhere within the BSA. The surrounding orchards, annual grassland habitat, and irrigation basins provide foraging habitat for bats and foraging bats were observed during the spotlighting surveys on the west side of the BSA within the Land Application Area.

5.2 - Sensitive Natural Communities

5.2.1 - SENSITIVE PLANT COMMUNITIES

The database and literature review identified five sensitive plant communities, the coastal and valley freshwater marsh, north central coast drainage Sacramento Sucker/Roach River, northern vernal pool, valley needlegrass grassland, and valley sink scrub, but there were no CNDDB records of these communities within 10 miles of the Project (CDFW 2020a). No sensitive plant community occurs within the BSA, primarily because all lands have been regularly disturbed by agricultural use.

5.2.2 - CRITICAL HABITATS

There is no critical habitat present within the BSA or in its immediate vicinity. There are designated critical habitats for several special-status species to north and west of the BSA (Figure 5-3). The closest of these is 14.6 miles to the northeast, which is a critical habitat are for the Fresno kangaroo rat (Figure 5-3).

5.3 - Jurisdictional Aquatic Resources

The NHD identified six intermittent streams encroaching into the BSA but only one of these streams was confirmed during the on-site surveys within the BSA. This stream was to the east of the Project site (see Figure 4-3) but it does not connect to any other waterways. In addition to these features, the NWI identified four Freshwater Ponds (PUBFx, PUSAx, and PUSCx) within the BSA, but none of these features were confirmed during the on-site surveys (see Figure 4-3).

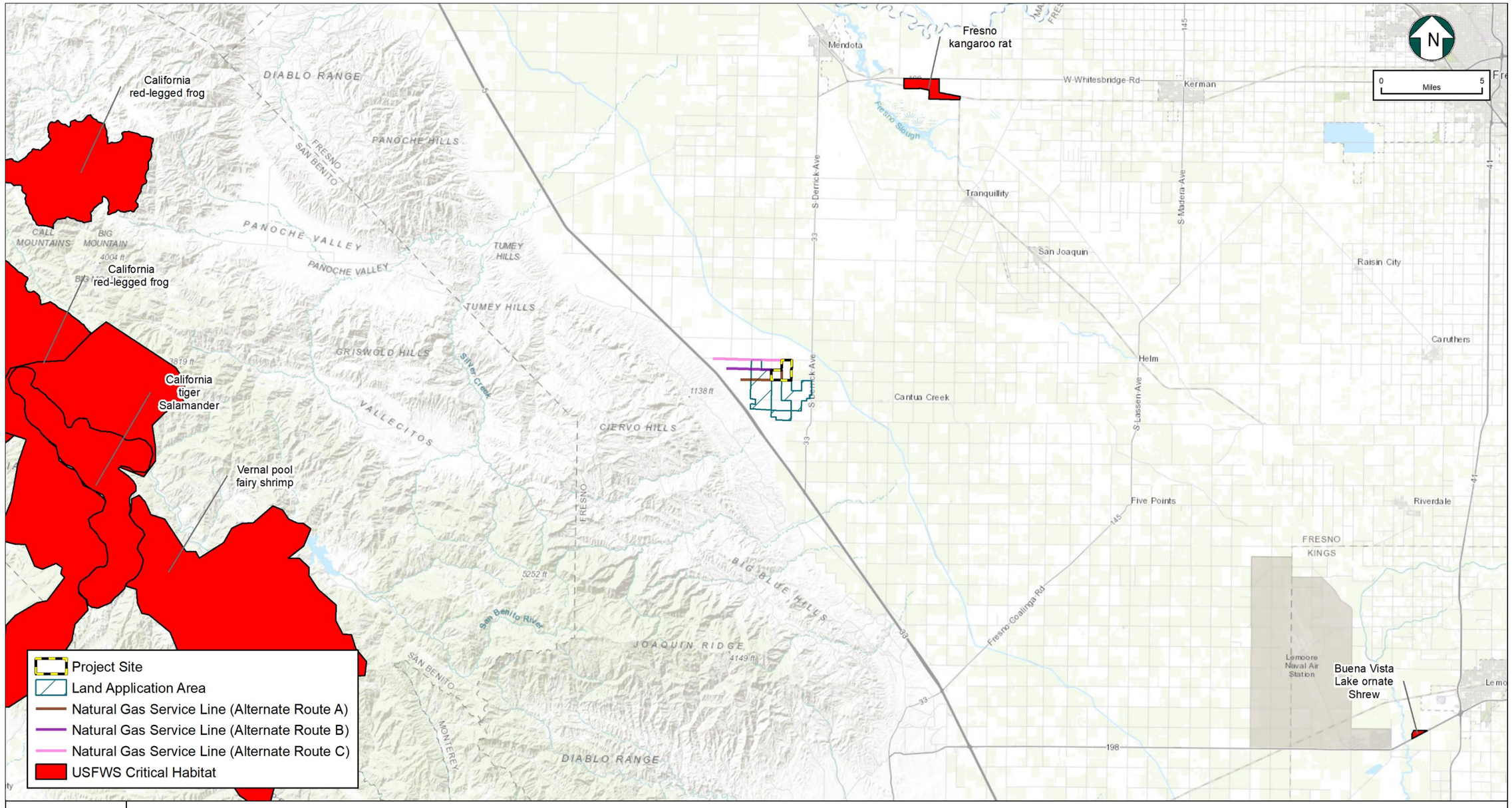

Figure 5-3
Mapped Critical Habitat in the Project Vicinity,
Kamm Avenue Processing Plant Project, Fresno County, California

Several other aquatic features were found within the BSA including seven irrigation basins (Basin 1 through 7) (see Figure 4-3). These basins are present along the Land Application Area and Water Settling and Cleaning Ponds Site, serve as irrigation basins, and are highly maintained. There was water present in five of these irrigation basins during the time of the survey, but no aquatic vegetation was identified. These basins are isolated features with no connection to jurisdictional waterways but may be State Waters.

5.4 - Wildlife Movement

Wildlife movement corridors, also referred to as dispersal corridors or landscape linkages, are generally defined as linear features along which animals can travel from one habitat or resource area to another. Wildlife movement corridors can be large tracts of land that connect regionally important habitats that support wildlife in general, such as stop-over habitat that supports migrating birds or large contiguous natural habitats that support animals with very large home ranges (e.g., coyotes, mule deer [*Odocoileus hemionus californicus*]). They can also be small scale movement corridors such as riparian zones that provide connectivity and cover to support movement at a local scale.

A small area of the BSA is located within an identified wildlife movement corridor linking the BSA to the Western Fresno County wildlife linkage area identified in the *Recovery Plan for Upland Species of the San Joaquin Valley* (USFWS 1998), which is mapped to the north of the Project (Figure 5-4). There are no features on site that would lend themselves specifically to wildlife movement (e.g., riparian corridors). The site is surrounded by active orchards and the area is generally not conducive to wildlife movement.

5.5 - Resources Protected by Local Policies and Ordinances

There are no resources within the BSA that are protected by County policies for natural resources.

5.6 - Habitat Conservation Plans

The Project is located within an area covered by the PG&E San Joaquin Valley Operation and Maintenance Habitat Conservation Plan (HCP). That HCP only applies to maintenance and operations of PG&E facilities.

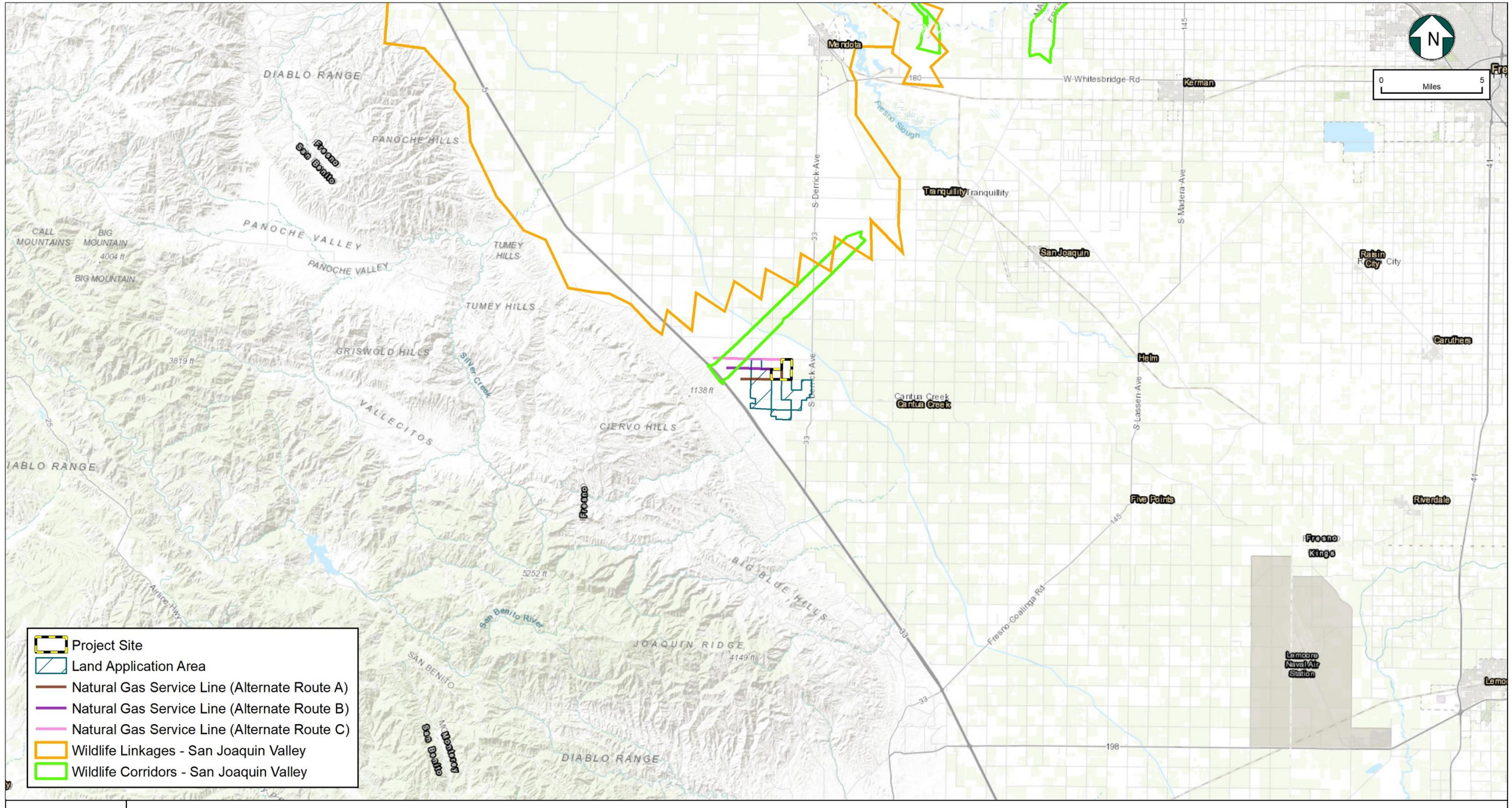

Figure 5-4
Wildlife Linkages and Corridors in the Project Vicinity,
Kamm Avenue Processing Plant Project, Fresno County, California

SECTION 6 - IMPACT ANALYSIS AND RECOMMENDED MITIGATION MEASURES

This section provides an analysis of the potential for special-status biological resources to be impacted by the proposed Project. The analysis was developed using the CEQA Appendix G questions, but also provides sufficient information to support NEPA) documentation. In addition to the standard CEQA analysis topics, we have added another topic that could result in impacts to wildlife, which is an analysis of the quality of irrigation reuse water and the potential effect on wildlife of its reuse within the Land Application Area.

6.1 - Special-Status Species

The proposed project would have a significant effect on biological resources if it would:

a) Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service.

6.1.1 - PROJECT IMPACTS TO SPECIAL-STATUS PLANT SPECIES

Twenty-four special-status plant species have potential to occur within the BSA. These include the San Joaquin woollythreads, palmate-bracted bird's-beak, lesser saltscale, crownscale, heartscale, showy golden madia, Lost Hills crownscale, brittlescale, California jewelflower, Lemmon's jewelflower, Hall's tarplant, recurved larkspur, San Joaquin spearscale, stinkbells, Munz's tidy-tips, shining navarretia, sylvan microseris, forked fiddleneck, California androsace, Hoover's eriastrum, cottony buckwheat, golden goodmania, San Joaquin bluecurls, and San Benito poppy.

There is no evidence that any of these 24 special-status plant species are present within the BSA. Heavily disturbed grassland habitat that could support these species is present within the southern area of the most western portion of Natural Gas Service Line Route C and to the west of it as well as within 500 feet of the orchards in the southwest and west. This habitat has been heavily disturbed by grazing. None of these special-status plant species were observed during the 2020 field survey and are unlikely to occur in the grassland habitat present within the BSA.

Project construction and operational activities are proposed to occur within the Project site which has been maintained by disking and mowing and which provides no habitat that could support any of the special-status plant species. According to the current Project designs, Natural Gas Service Line Route B is the preferred alternative. This route as well as the Natural Gas Service Line Route A are located within the existing and maintained heavily travelled dirt roadways along the Land Application Area and the surrounding orchards. Installation of the pipeline within these routes would not result into impacts to special-status plant species. Annual grassland habitat is present south and west of the most western portion of the Natural Gas Service Line Route C. The footprint of Natural Gas Service Line Route would be in the maintained road should of Kamm Avenue, which does not contain

habitat suitable to support these species. The installation of the pipeline along this route is not the Project's preferred option.

6.1.2 - PROJECT IMPACTS TO SPECIAL-STATUS ANIMAL SPECIES

Fifteen special-status wildlife species have potential to occur within the BSA: western spadefoot, California glossy snake, blunt-nosed leopard lizard, coast horned lizard, San Joaquin coachwhip, western burrowing owl, Swainson's hawk, mountain plover, loggerhead shrike, San Joaquin antelope squirrel, giant kangaroo rat, Fresno kangaroo rat, Tulare grasshopper mouse, American badger, and the San Joaquin kit fox.

Western Spadefoot

There is no evidence that western spadefoot is present within the BSA, but seven irrigation basins (Basins 1 through 7) located within the orchards could support this species during months when water is present. None of these basins would be impacted by the Project development. The Project would have no impacts to these basins, there were no burrows that could be used by the spadefoot as hibernacula found within the dirt roadways near these basins, and no impacts to the western spadefoot are anticipated to occur. No measures are warranted.

Blunt-nosed Leopard Lizard

There is no evidence that blunt-nosed leopard lizard is present within the BSA but degraded annual grassland habitat with some isolated allscale shrubs occurs south and west of the most western portion of the Natural Gas Service Line Route C as well as within the BSA to the south and southwest of the orchards. Though this habitat has been heavily disturbed by grazing, there are some small mammal burrows present, which are a necessary habitat component for the blunt-nosed leopard lizard. Blunt-nosed leopard lizards, if present, would only be present in these areas.

Potential direct impacts would include direct mortality to individuals that could occur through ground disturbance, crushing or destroying burrows occupied by this species, vehicle strikes, habitat loss, and poisoning. Potential indirect impacts would include stress resulting from noise and vibrations from soil disturbance, and increased light. Because the blunt-nosed leopard lizard is State Fully Protected species, avoidance of take is required.

No blunt-nosed leopard lizards would occur on the Processing Plant Site, Water Settling and Cleaning Pond Site, Solid Materials Management Site, Land Application Area, or along the Natural Gas Service Line Routes A or B. No impacts to the blunt-nosed leopard lizard would occur in these areas of the Project. There is a potential for the blunt-nosed leopard lizard to be present in the westernmost section of the Natural Gas Service Line Route C, which is not a preferred route. If this route is selected, mitigation measure BIO-1 should be implemented to avoid impacts to this species.

Coast Horned Lizard

There is no evidence that coast horned lizard is present within the BSA but degraded annual grassland habitat with some isolated allscale shrubs occurs south and west of the most western portion of the Natural Gas Service Line Route C as well as within the BSA to the south and southwest of the orchards. Though this habitat has been heavily disturbed by grazing, there are some small mammal burrows present, which are a necessary habitat component for the blunt-nosed leopard lizard. Coast horned lizards, if present, would only be present in these areas.

Potential direct impacts would include direct mortality to individuals that could occur through ground disturbance, crushing or destroying burrows occupied by this species, vehicle strikes, habitat loss, and poisoning. Potential indirect impacts would include stress resulting from noise and vibrations from soil disturbance, and increased light.

No coast horned lizard would occur on the Processing Plant Site, Water Settling and Cleaning Pond Site, Solid Materials Management Site, Land Application Area or along the Natural Gas Service Routes A or B No impacts to this species would occur in these areas of the Project. There is a potential for the coast horned lizard to be present in the westernmost section of the Natural Gas Service Line Route C, which is not a preferred route. If this route is selected, mitigation measure BIO-1 should be implemented to avoid impacts to this species.

San Joaquin Coachwhip and California Glossy Snake

There is no evidence that San Joaquin coachwhip and California glossy snake is present within the BSA but degraded annual grassland habitat with some isolated allscale shrubs occurs south and west of the most western portion of the Natural Gas Service Line Route C as well as within the BSA to the south and southwest of the orchards. Though this habitat has been heavily disturbed by grazing, there are some small mammal burrows present, which are a necessary habitat component for these species. If San Joaquin coachwhip and California glossy snake are present, it would only be in these areas.

Potential direct impacts would include direct mortality to individuals that could occur through ground disturbance, crushing or destroying burrows occupied by this species, vehicle strikes, habitat loss, and poisoning. Potential indirect impacts would include stress resulting from noise and vibrations from soil disturbance, and increased light.

No San Joaquin coachwhip or San Joaquin glossy snake would occur on the Processing Plant Site, Water Settling and Cleaning Pond Site, Solid Materials Management Site, Land Application Area, Land Application Area, or along the Natural Gas Service Line Routes A or B. No impacts to these species would occur in these areas of the Project. There is a potential for these species to be present in the westernmost section of the Natural Gas Service Line Route C, which is not a preferred route. If this route is selected, bio mitigation measure BIO-2 should be implemented to avoid impacts to this species.

Western Burrowing Owl

There is no evidence that the western burrowing owl is present within the BSA but agricultural fields within and surrounding the BSA and annual grassland habitat along the south and west of Natural Gas Service Line Route C could provide potential nesting and foraging habitat. Because this species is present in the region year-round it is possible that western burrowing owls could become established in these areas or be present from time to time as transient foragers.

Potential direct impacts would include direct mortality to individuals that could occur through ground disturbance, crushing or destroying burrows occupied by this species, vehicle strikes, habitat loss, and poisoning. Potential indirect impacts would include stress resulting from noise and vibrations from soil disturbance, and increased light. Implementation of mitigation measure BIO-3 listed below would reduce any potential impacts to the western burrowing owl to a less than significant level.

Swainson's Hawk

The BSA contains suitable foraging habitat that could support Swainson's hawk. Foraging habitat occurs within annual grassland and disked agricultural fields within and surrounding the BSA. During the on-site surveys, there were three Swainson's hawks observed overflying the BSA (see Figure 5-2).

Because of the presence of Swainson's hawks in the immediate area and existence of limited foraging habitat within and surrounding the BSA, there is potential for Swainson's hawks to nest on and within 0.5 mile of the BSA. There were no Swainson's hawk nests identified in the BSA or within 0.5 mile of the BSA.

If nests become actively used by Swainson's hawks within the BSA, there is a potential for direct and indirect impacts to occur to this species. Direct impacts could consist of mortality as a result of loss of young, fledging, or eggs due to destruction of nest or abandonment of nests if construction activities would occur in close proximity to a nest during the nesting season of this species (February 15 through August 31). Construction-related noise, ground vibration, fugitive dust, habitat loss and modification, introduction and spread of invasive species, or increased human activity which may result in a reduction in prey abundance and/or availability. Noise and vibration could cause physiological and/or loss of fitness in dependent young resulting from interruptions to brooding and/or feeding schedules. The Project could result in the loss of low-quality foraging habitat. The loss of the very small amount of potential foraging habitat would not jeopardize the continued existence of this species and thus, impacts to the foraging habitat of this species would be less than significant. Implementation of mitigation measure BIO-4 listed below would reduce impacts to this species to below significant levels.

Mountain Plover

There is no nesting habitat that could support this species or evidence that mountain plover occurs within the BSA, but disked fields and annual grasslands within the BSA could provide overwintering habitat. Mountain plovers tend to overwinter in flocks ranging from 50 to as high as 1,000 individuals (Knopf and Wunder 2006) and it is unlikely that they would overwinter within the BSA. The Project could result in the loss of low-quality foraging habitat, but there is no evidence that this species forages within the BSA. The loss of the very small amount of potential foraging habitat would not jeopardize the continued existence of this species and thus, impacts to this species would be less than significant. No mitigation measures are warranted.

Loggerhead Shrike

One loggerhead shrike was present at the plant processing site and was perched at farming materials (see Figure 5-2). No nesting habitat occurs within the BSA except for annual grassland habitat with some isolated allscale shrubs occurring to the south and west of the most western portion of the Natural Gas Service Line Route C, as well as within the BSA to the south and southwest of the orchards. Foraging and perching habitat occurs at the Processing Plant Site, Water Settling and Cleaning Pond Site, Solid Materials Management Site, Land Application Area, and loggerhead shrike could occur from time to time as transient foragers.

Potential direct impacts could consist of mortality as a result of loss of young, fledging, or eggs due to destruction of nest or abandonment of nests if construction activities would occur in close proximity to a nest during the nesting season of this species (February 15 through August 31). Construction-related noise, ground vibration, fugitive dust, habitat loss and modification, introduction and spread of invasive species, or increased human activity which may result in a reduction in prey abundance and/or availability. Noise and vibration could cause physiological and/or loss of fitness in dependent young resulting from interruptions to brooding and/or feeding schedules.

There is a potential for the nesting loggerhead shrike to be present in the westernmost section of the Natural Gas Service Line Route C, which is not a preferred route. If this route is selected, bio mitigation measure BIO-6 should be implemented to avoid impacts to this species.

San Joaquin Antelope Squirrel

There is no evidence that San Joaquin antelope squirrel is present within the BSA but degraded annual grassland habitat with some isolated allscale shrubs occurs south and west of the most western portion of the Natural Gas Service Line Route C as well as within the BSA to the south and southwest of the orchards. This habitat has been heavily disturbed by grazing, but some small mammal burrows that could support this species are present.

Direct impacts would include direct mortality to individuals that could occur through ground disturbance, crushing or destroying burrows occupied by this species, vehicle strikes, habitat loss, and poisoning. Potential indirect impacts would include stress resulting from noise and vibrations from soil disturbance, and increased light.

No San Joaquin antelope squirrel would occur on the Processing Plant Site, Water Settling and Cleaning Pond Site, Solid Materials Management Site, Land Application Area, or along the Natural Gas Service Line Routes A or B. No impacts to the San Joaquin antelope squirrel would occur in these areas of the Project. There is a potential for this species to be present in the westernmost section of Natural Gas Service Line Route C, which is not a preferred route. If this route is selected, mitigation measure BIO-5 should be implemented to avoid impacts to this species.

Giant Kangaroo Rat, Fresno Kangaroo Rat, and Tulare Grasshopper Mouse

There is no evidence that the giant kangaroo rat, Fresno kangaroo rat, or Tulare grasshopper mouse are present within the BSA and the giant kangaroo rat and Fresno kangaroo rat are likely absent. The Tulare grasshopper mouse could occur in annual grassland habitat to the south and west of Natural Gas Service Line Route C, and in grassland habitat occurring in the extreme south and southwest of the BSA. The habitat to the south and southwest of the BSA would not be developed by the Project and no impacts would occur to the Tulare grasshopped mouse in those areas. There is a low probability that the Tulare grasshopper mouse would occur within the footprint of the westernmost portion of the Natural Gas Service Line Route C because of the lack of burrows in that area due to routine maintenance of the Kamm Avenue road shoulder. Accordingly, impacts to these species are not likely to occur and no mitigation measures are warranted.

American Badger

There is no evidence that the American badger is present within the BSA but agricultural fields within and surrounding the BSA and annual grassland habitat along the south and west of Natural Gas Service Line Route C could provide potential denning and foraging habitat. Because this species is highly mobile, there is some potential that American badger could become established in these areas or be present from time to time as transient foragers.

Potential impacts to this species could occur if there is an active badger den or transient individual within or near the area of development during the period of construction activities. Potential direct impacts resulting in injury, death, or entrapment in dens and trenches or pipes could occur if an American badger occupies the construction area or travels through. Noise, vibration, and the presence of construction workers could alter normal behaviors if badgers are present, which could affect reproductive success. Implementation of mitigation measure BIO-3 listed below would reduce any potential impacts to the American badger to a less than significant level.

San Joaquin Kit Fox

There was one San Joaquin kit fox juvenile sighted along the eastern boundary of the Processing Plant Site during spotlighting surveys (see Figure 5-1). No other diagnostic signs of San Joaquin kit foxes were seen during site investigations, except within the mixed grassland and saltbush scrub habitat to the west of the Project, and east of I-5. Habitat that could support this species occurs within the BSA includes the grassland habitat in the extreme south and southwest portions of the BSA, and in the grassland habitat to the south and west of the western most portion Natural Gas Service Line Route C. Those portions of the BSA that contain disked lands or mowed vegetation, such as the Processing Plant Site, Water Settling and Cleaning Pond Site, Solid Materials Management Site, and Land Application Area could support the creation of dens by the San Joaquin kit fox. Foraging habitat is present throughout the BSA and surrounding agricultural lands could also support the species. Because this species is highly mobile, there is some potential for the kit foxes to occur from time to time as transient foragers or even to establish a den within the BSA.

Potential impacts to this species could occur if an active San Joaquin kit fox den is established, or transient individual are present within or near areas where active construction is occurring. Potential direct impacts resulting in injury, death, or entrapment in dens and trenches or pipes could occur if a San Joaquin kit fox occupies the construction area or travels through. Construction activities could result in crushing or destroying a den with a kit fox inside. Noise, vibration, and the presence of construction workers could alter normal behaviors if badgers are present, which could affect reproductive success. Implementation of mitigation measure BIO-3 listed below would reduce impacts to San Joaquin kit fox to a less than significant level.

Nesting Birds

A variety of migratory birds and some active and inactive bird nests were identified during the examinations (see Figure 5-2). All areas of the BSA contain orchards, disked or mowed lands, or small areas of annual grassland that provides opportunities for birds to establish nests. Bare ground from disking and mowed areas provide nesting habitat for ground-nesting bird species. Construction activities associated with all project components have a potential to impact nesting birds, if construction takes place during the nesting season (January 15 through September 1).

Ground-disturbing activities and vegetation removal could lead to the destruction of nests. Construction-related vibration, noise, and dust production, and human presence could alter the normal behaviors of nesting birds in the vicinity of the Project and lead to nest failure.

To avoid and minimize impacts to migratory birds including loggerhead shrike, mitigation measure BIO-6 listed below should be implemented during construction to reduce impacts to nesting birds to a level that is less than significant.

Bats

There is no evidence that roosting bats are present within the BSA, but foraging bats were observed within the orchards. Some outbuildings that occur on the Project could provide potential roosting habitat for bats, but examinations of those buildings resulted in no diagnostic signs (guano, urine staining, vocalizations) of bats. However, because bats are highly mobile there is a potential of bats becoming established in structures and other potential roosting sites prior to construction. Construction activities are not likely to impact foraging bats because bats would be foraging at night when construction activities would not be occurring. Implementation of mitigation measure BIO-7 would reduce any impacts to bats to a less than significant level.

Avoidance and Minimization Measures

Implementation of the avoidance and minimization measures listed below would reduce impacts of the Project to special-status wildlife species to level that would be less than significant. The following measures are recommended to avoid and minimize impacts to the western spadefoot, blunt-nosed leopard lizard, San Joaquin coachwhip, western burrowing owl, Swainson's hawk, mountain plover, loggerhead shrike, San Joaquin antelope squirrel, giant kangaroo rat, Fresno kangaroo rat, Tulare grasshopper mouse, American badger, San Joaquin kit fox, nesting migratory birds and raptors, and roosting bats.

BIO-1 Avoidance of Blunt-nosed Leopard Lizard and Coast Horned Lizard
If Natural Gas Service Line Route C is selected, a protocol-level survey for blunt-nosed leopard lizard should be conducted in the western most portion of the route where the route is adjacent to grassland habitat. Surveys should follow the CDFW *Approved Survey Methodology for the Blunt-nosed Leopard Lizard* (CDFW 2019). If blunt-nosed leopard or coast horned lizard is documented during the protocol-level surveys within the area of Project disturbance, species occurrences will be mapped using Geographic Information Systems (GIS) and the designated biologists will conduct on-site monitoring to assure no impacts to this species.

BIO-2 Avoidance of San Joaquin Coachwhip and San Joaquin Glossy Snake
If Natural Gas Service Line Route C is selected, a pre-activity survey of annual grassland habitat within 500 feet of the western most position of the pipeline should be conducted within 14 days of the start of Project activities. The survey should be conducted by a qualified biologist knowledgeable in the identification of this species. Transects should be spaced at no greater than 30-foot intervals to obtain a 100 percent coverage of the development footprint and 500-foot buffer. If no evidence of the San Joaquin coachwhip or California glossy snake is detected, no further action is required. If San Joaquin coachwhip or California glossy snake is documented during the pre-activity survey, the species occurrences will be mapped using GIS and a qualified biologist will conduct on-site monitoring to ensure the species is avoided and there are no impacts to this species.

BIO-3 Avoidance of Western Burrowing Owl, American Badger, and the San Joaquin Kit Fox

The following avoidance and minimization measures should be implemented during all phases of Project construction to reduce the potential for construction activities to impact the burrowing owl, American badger, and the San Joaquin kit fox. This measure is based upon standard avoidance and minimization measures from the *U.S. Fish and Wildlife Service Standardized Recommendations for Protection of the Endangered San Joaquin Kit Fox Prior to or During Ground Disturbance* (USFWS 2011).

- Project construction-related vehicles should observe a daytime speed limit of 20-mph throughout the site in all Project areas, except on County roads and State and federal highways.

- All Project construction activities should occur during daylight hours, but if work must be conducted at night then a night-time construction speed limit of 10-mph should be established.

- Off-road traffic outside of designated Project areas should be prohibited.

- To prevent inadvertent entrapment of kit foxes or other animals during construction of the Project, all excavated, steep-walled holes or trenches more than two feet deep should be covered at the close of each working day by plywood or similar materials. If the trenches cannot be closed, one or more escape ramps constructed of earthen-fill or wooden planks should be installed.

- Before holes or trenches are filled, they should be thoroughly inspected for trapped animals. If at any time a trapped or injured kit fox is discovered, the USFWS and the CDFW should be contacted before proceeding with the work.

- In the case of trapped animals, escape ramps or structures should be installed immediately to allow the animal(s) to escape, or the USFWS and CDFW should be contacted for guidance.

- All construction pipes, culverts, or similar structures with a diameter of four inches or greater that are stored at a construction site for one or more overnight periods should be thoroughly inspected for kit foxes and burrowing owls before the pipe is subsequently buried, capped, or otherwise used or moved in any way. If a kit fox is discovered inside a pipe, that section of pipe should not be moved until the USFWS has been consulted. If necessary, and under the direct supervision of the biologist, the pipe may be moved only once to remove it from the path of construction activity, until the fox has escaped.

- All food-related trash items such as wrappers, cans, bottles, and food scraps should be disposed of in securely closed containers and removed at least once a week from a construction or Project site.

- No pets, such as dogs or cats, should be permitted on the Project site.

- Project-related use of rodenticides and herbicides should be restricted.

- A representative should be appointed by the Project proponent who will be the contact source for any employee or contractor who might inadvertently kill or injure a kit fox or who finds a dead, injured, or entrapped kit fox. The representative should be identified during the employee education program and their name and telephone number should be provided to the USFWS and CDFW.

- Upon completion of the Project, all areas subject to temporary ground disturbances (including storage and staging areas, temporary roads, pipeline corridors, etc.) should be recontoured if necessary, and revegetated to promote restoration of the area to pre-Project conditions. An area subject to "temporary" disturbance means any area that is disturbed during the Project, but after Project completion will not be subject to further disturbance and has the potential to be revegetated.

- Any Project personnel who are responsible for inadvertently killing or injuring one of these species should immediately report the incident to their representative. This representative should contact the CDFW (and USFWS in the case of San Joaquin kit fox) immediately in the case of a dead, injured, or entrapped San Joaquin kit fox, American badger, or western burrowing owl.

- The Sacramento Fish and Wildlife office and CDFW Region 4 office should be notified in writing within three working days of the accidental death or injury to a San Joaquin kit fox during Project related activities. The CDFW should be notified in the case of accidental death to an American badger or western burrowing owl. Notification must include the date, time, and location of the incident or of the finding of a dead or injured animal and any other pertinent information.

- New sightings of San Joaquin kit fox, American badger, or western burrowing owl shall be reported to the CNDDB. A copy of the reporting form and a topographic map clearly marked with the location of where a San Joaquin kit fox was observed should also be provided to the USFWS.

BIO-4 Avoidance of Swainson's Hawk

If Project construction activities must occur during the Swainson's hawk nesting season (February 15 to August 31), pre-activity surveys should be conducted for Swainson's hawk nests in accordance with the *Recommended Timing and Methodology for Swainson's Hawk Nesting Surveys in California's Central Valley* (CDFW 2020). The surveys would be conducted on and within 0.5-mile buffer of the Project. To meet the minimum level of protection for the species, surveys should be conducted during at least two survey periods. If an active Swainson's hawk nest is discovered at any time within 0.5-mile of active construction, a qualified biologist should complete an assessment of the potential for specific construction activities to

impact the nest. The assessment would consider the type of construction activities, the location of construction relative to the nest, the visibility of construction activities from the nest location, and other existing disturbances in the area that are not related to construction activities of this Project. Based on this assessment, the biologist will determine if construction activities can proceed and the level of nest monitoring required. Construction activities should not occur within 500 feet of an active nest but depending upon conditions at the site this distance may be reduced. Full-time monitoring to evaluate the effects of construction activities on nesting Swainson's hawks may be required. The qualified biologist should have the authority to stop work if it is determined that Project construction is disturbing the nest. These buffers may need to increase depending on the sensitivity of the nesting Swainson's hawk to disturbances and at the discretion of the qualified biologist. If the biologist determines that construction cannot occur without risk of take of the species, then a State Incidental Take Permit (ITP) would need to be obtained prior to initiation of work activities.

BIO-5 Avoidance of San Joaquin Antelope Squirrel

If Natural Gas Service Line Route C is selected, a pre-activity survey of the adjacent annual grassland habitat should be conducted within 14 days of the start of Project activities by a qualified biologist knowledgeable in the identification of this species. Transects should be spaced at no greater than 30-foot intervals to obtain a 100 percent coverage of the development footprint and 500-foot buffer. The surveys should be conducted during appropriate time and temperature constraints (April 1 to September 30 and 68 to 86 degrees F), If no evidence of the San Joaquin antelope squirrel is detected, no further action is required. If San Joaquin antelope squirrel is observed during the pre-activity survey, the species occurrences will be mapped using GIS and a qualified biologist will conduct on-site monitoring during construction activities. The biologist should have the authority to temporarily stop activities so that impacts to this species can be avoided.

BIO-6 Pre-activity Surveys for Nesting Migratory Birds and Raptors

If Project construction activities must occur during the nesting season (February 1 to September 15), pre-activity nesting bird surveys should be conducted within seven days prior to the start of construction at any specific construction area. The construction site plus a 250-foot buffer for songbirds and a 500-foot buffer for raptors (other than Swainson's hawk) should be included in the survey. Multiple surveys, conducted at approximately 30-day intervals, are likely to be needed based upon the extended construction period of the Project construction activities and extensive habitat for nesting birds that occurs on the Project. If no active nests are found, no further action is required. However, existing nests may become active and new nests may be built at any time prior to and throughout the nesting season, including when construction activities are in progress. If active nests are found during the survey or at any time during construction of the Project, an avoidance buffer ranging from 50 feet to 500 feet may be required, with the avoidance buffer from any specific nest being determined by a qualified biologist. The avoidance buffer will remain in place

until the biologist has determined that the young are no longer reliant on the adults or the nest. Work may occur within the avoidance buffer under the approval and guidance of the biologist, but full-time monitoring or routine monitoring may be required. The biologist should have the ability to stop construction if nesting adults show any sign of distress.

BIO-7 Avoidance and Minimization Measures for Bats.
A pre-activity survey for bats should be conducted at the plant processing site within 14 days prior to the start of construction activities. If sign of day roosting bats is identified at any of the existing outbuildings during the pre-activity survey, a follow up flyout examination of the potential roost should be conducted at dusk. If rooting bats are found to be present, then acoustical sampling should be conducted to determine species. If day roosting bats are determined to be present, bats would be excluded from the roosting site by installing exclusion devices. Exclusion devices would only be installed at night while bats are away from the roost. If the day roosting bats are identified as special-status species, then an exclusion plan will be prepared and approved by CDFW prior to initiating bat exclusions. If a maternity colony is present, then construction activities will be delayed until the colony has dispersed.

6.2 - Sensitive Natural Communities and Critical Habitat

The proposed project would have a significant effect on biological resources if it would:

b) Have a substantial adverse impact 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 Wildlife or US Fish and Wildlife Service.

The BSA does not support any sensitive natural communities and does not overlap critical habitat. Therefore, the Project would have no impacts to sensitive natural communities and no measures are warranted.

6.3 - Jurisdictional Aquatic Resources

The proposed project would have a significant effect on biological resources if it would:

c) Have a substantial adverse effect on state or federally protected wetlands (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means.

The BSA intersects one intermittent stream to the southeast of the Project site. An approved jurisdictional determination of this intermittent streams has not been completed. This stream is not connected to a Traditional Navigable Water and therefore, does not fall under the jurisdiction of the USACE through Section 404 of the Clean Water Act as "Waters of the U.S." This steam will not be impacted by Project development and an aquatic resource delineation that would be required to determine jurisdiction under Section 401 of the Clean Water Act and Section 1602 of the Fish and Game Code is not warranted.

Seven irrigation basins (Basin 1 through 7) were present within the BSA. These basins were located within the Land Application Area and the Water Settling and Cleaning Ponds Site and all basins except basins 1 and 2 were inundated at the time of the survey. These basins are isolated features that, except for Basin 2, would not be impacted by Project development. Basin 2 is in an area where a settling and cleaning pond would be constructed, but the conversion of this basin would not be a significant Project impact because that basin does not contain wetland features. An aquatic resource delineation to determine jurisdiction under Section 401 of the Clean Water Act and Section 1602 of the Fish and Game Code is not warranted. Impacts to these basins would be a less than significant impact, and no mitigation measures are warranted.

6.4 - Wildlife Movement

The proposed project would have a significant effect on biological resources if it would:

d) Interfere substantially with the movement of any resident or migratory fish or wildlife species or with established resident or migratory wildlife corridors or impede the use of wildlife nursery sites.

The Project site does not intersect any regional or local wildlife movement corridors, nor does it support an important wildlife nursery site. No impacts to wildlife movement or nursery sites would occur.

6.5 - Local Policies and Ordinances

The proposed project would have a significant effect on biological resources if it would:

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

The Project would not conflict with the Fresno County General Plan. There are no impacts with respect to local policies and ordinances and no measures are warranted.

6.6 - Adopted or Approved Plans

The proposed project would have a significant effect on biological resources if it would:

f) Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Conservation Community Plan, or other approved local, regional, or state habitat conservation plan.

The Project is located within an area covered by the PG&E San Joaquin Valley Operation and Maintenance HCP. This HCP applies only to PG&E's activities and does not apply to this Project. No Project impacts related to adopted or approved plans would occur, and no measures are warranted.

6.7 - Irrigation Reuse Water Quality

The proposed project would have a significant effect on biological resources if it would:

g) Have a substantial adverse effect to biological resources and existing pistachio orchards within the Land Application Area where the process wastewater will be used.

This section analyzes potential impacts of wildlife exposed to water with high salt loads and other contaminants that would be anticipated to occur in the settling ponds, in irrigation reuse water, and within areas on existing orchards where solids from the settling ponds would be dispersed. This section provides an evaluation of the potential impacts of water quality on biological and botanical characteristics of the orchard and on wildlife resources that inhabit or may inhabit the area and be exposed to irrigation reuse water.

During the 60-day harvest period from August to October, the facility will use a maximum of 1.8 million gallons per day of surface water. Discharge from the facility will be discharged to series of lined basins to allow dissolved matter to settle. Irrigation reuse water from the ponds will be sent through existing irrigation water distribution facilities within the Land Application Area. Organic material that settles into the basins will be collected and used beneficially as soil amendments, livestock feed or mulch. The irrigation reuse water would be applied on approximately 2,614 acres of existing pistachio orchards. The maximum daily flow of irrigation reuse water is estimated to be 1.8 million gallons per day with a flow for the entire season estimated to be approximately 58.4 million gallons (average of 1 million gallons per processing day). It is estimated that a total of 64.9 million gallons of water will be used during the harvest period, of which, up to 90% (58.4 million gallons) will be land applied.

Approach

The use of irrigation reuse water would potentially pose risks to wildlife in three primary topical areas. First, the application of filtered irrigation reuse water to existing pistachio orchards could affect the botanical and biological characteristics of the existing pistachio trees, and through exposure to those conditions, wildlife could be negatively affected or could "bio-accumulate" toxic substances. Second, the reclaimed solids extracted from basins, stored at the Solid Materials Management Site, and eventually distributed within the pistachio orchards, Land Application Area, could potentially contain substances that would negatively affect wildlife. Third, wildlife could be exposed to toxic conditions that might manifest in the settling ponds and on the Solid Materials Management Site. These three topical areas are discussed below.

EFFECTS OF IRRIGATION REUSE WATER ON THE BIOLOGICAL AND BOTANICAL CHARACTERISTICS OF EXISTING ORCHARDS

The quality of irrigation reuse water must meet water quality standards established by the Central Valley Regional Water Quality Control Board (RWQCB). Those water quality

requirements are site-specific and have not yet been determined for the Kamm Avenue Pistachio Project (KAPP), but there are water quality standards for similar facilities and in similar areas of the State. The most applicable irrigation reuse water quality standards are available for the El Dorado pistachio processing plant near Coalinga, Fresno County. We assume that similar standards will be applied to the KAPP processing facility. The waste discharge requirements (WDR) for the El Dorado processing plant (Order R5-2013-0151) are presented in Table 6-1.

Table 6-1
Irrigation Reuse Water Quality,
Kamm Avenue Pistachio Processing Project, Fresno County, California

Constituent	Units	Minimum	Maximum	Average
pH	s.u.	4.3	9.4	5.1[1]
Electrical Conductivity (EC)	umhos/cm	1,854	7,400	3,800
Total Dissolved Solids (TDS)	mg/L	3,252	6,880	5,200
Biochemical Oxygen Demand (BOD)	mg/L	4,200	9,800	6,700
Total Nitrogen	mg/L	130	330	227
Chloride	mg/L	42	160	113
Sodium	mg/L	35	84	51
Potassium	mg/L	760	1,300	1,024

[1] Average pH values were calculated by converting the values into hydrogen ion concentrations averaging the data and then converting the resulting concentration back to a pH value.

The WDR for the El Dorado processing plant includes specific constituent loading rates for biochemical oxygen demand (BOD), and considers groundwater impacts from nitrogen, salinity, chloride and potassium based on the discharge water with the constituent loads summarized in Table 6-1 on a 600-acre land application area.

The WDR states that with an average BOD concentration of 6,700 mg/L, and a maximum flow rate of 2.5 mgd, instantaneous BOD loading rates could range from about 200 lbs/acre/day to as high as 2,300 lbs/acre/day. The WDR concluded that, given the short processing season, soil lithology, depth to groundwater, and implementation of best management practices, monitoring of the application areas, and resting periods between applications, the discharge would not be expected to cause groundwater degradation due to organic loading. The WDR further requires that the El Dorado achieve a cycle average BOD loading rate of 100 lbs/acre/day. Based on the Project's lower maximum flow rate of 1.8 mgd and much larger Land Application Area, the Project will not exceed the BOD load requirements in the WDR and will not cause significant groundwater impacts related to BOD.

For nitrogen, with an average nitrogen concentration of about 227 mg/L, an annual maximum discharge of 42 million gallons per year, and a 600-acre land application area, the WDR concluded that nitrogen loads would be about 132 lbs/acre/year, less than the nitrogen uptake for pistachios of 200 to 250 lbs/acre/year. The WDR concluded that with proper management of the discharge water, and proper application of additional fertilizers, nitrogen loads of this magnitude would not degrade groundwater for nitrates. Based on the Project's annual flow of 58.4 million gallons per

year, and the much larger Land Application Area, the Project will not exceed the nitrogen loads considered by the Regional Board in the WDR and would not cause significantly impact groundwater.

For salinity, the WDR states that with an average EC and TDS of 3,800 umhos/cm and 5,200 mg/L, respectively, the El Dorado facility water discharge exceeds local groundwater quality. The WDR further states that there are no specific water quality objectives set for EC and TDS and that almost half of the salinity in the pistachio facility discharge water is from organic dissolved solids, which will break down in the soil profile. Much of the remaining portion is from potassium, which is a major plant nutrient that moves slowly through the soil profile and is readily taken up by crops. Given the short processing season, with depth-to-groundwater at greater than 350 feet below ground surface, and percolation of the discharge water through soils of alternating layers of sands and clays, the WDR found that the potential for the irrigation reuse water to reach and significantly impact groundwater was minimal. The Project has similar groundwater depth, sand, clay and other soil conditions, and irrigation reuse water seasonality. Based on these considerations, the anticipated EC and TDS of the irrigation reuse water, Project flow rates, and the much larger Land Application Area, the Project will not be expected to result in significant salinity impacts to groundwater.

For chloride, with an average concentration of 113 mg/L, the WDR concluded that due to generally poor quality groundwater near the El Dorado plant and settling ponds, and dilution of discharge water with higher-quality irrigation water, the facility would avoid significant chloride impacts to groundwater. Groundwater quality in the western San Joaquin Valley is generally poor, including high chloride levels. The irrigation reuse water will also be diluted with higher-quality irrigation water supplies within the Land Application Area. Based on these considerations, the anticipated average chloride concentration of the irrigation reuse water, Project flow rates, and the much larger Land Application Area the Project will not be expected to result in significant chloride impacts to groundwater.

For potassium, the WDR concluded that with an average concentration of about 1,024 mg/L and an annual discharge of 42 million gallons, the El Dorado facility would result in a potassium load of about 600 lbs/acre/year, about three times higher than the general agronomic rate for potassium of about 200 lbs/acre/year for pistachio trees. The WDR further states that potassium readily binds to soil, and crops can and will take up more potassium than required, if available, with no reduction in yield. There are no specific water quality objectives set for potassium other than the overall objectives set for EC and TDS, and the WDR did not include potassium load limits. Based on the anticipated potassium concentration in the irrigation reuse water, an annual flow of 58.4 million gallons, and the much larger Land Application Area, the Project will not exceed the annual potassium load considered by the Regional Board in the WDR and impacts will be less than significant.

Based upon the expected irrigation reuse water characteristics and disposal methods similar to those at a comparable pistachio processing facility, and the expected discharge from the KAPP facility, it is expected that the use of irrigation reuse water will not cause harm to the biological or botanical characteristics of the recipient orchards. The expected potassium loading from the processing facility would approach the agronomic loading rate for pistachio

orchards. The expected loading is half or more of the crop requirement. This would require management of the application of the irrigation reuse water to the orchards to still provide the same production levels prior to this loading. The combination of the irrigation reuse water and fertilizer would not exceed agronomic loading rates.

The application of irrigation reuse water will not adversely affect the existing groundwater quality.

EFFECTS OF THE DISTRIBUTION OF RECOVERED SOLIDS

Solids, consisting principally of hulls, shells, and skins removed during the hulling process will be removed prior to water being discharged to the settling ponds. Other organic constituents will be recovered from the bottom of the settling ponds following the processing season. Organic solids will be collected into waste trucks and removed from the site.

The irrigation reuse water and associated solid organics may contain elevated concentrations of total dissolved solids (TDS) resulting from the fruit and vegetable products or materials used for production. Typically, a percentage of the TDS is organic, which will generally decompose into its component elements and can be utilized by plants and microorganisms in the soil. In contrast, the fixed dissolved solids (FDS), is that portion of the TDS which consists of inorganic constituents, which can accumulate in the soil. Excessive salts may accumulate. Growing and harvesting crops provides a means to remove some of these constituents, particularly calcium, magnesium, potassium, phosphorus, nitrate, and ammonia. It is anticipated that the applied organic solids recovered from the settling ponds would help supplement, but not replace the entirety of fertilizers that would be required by the pistachio crop. It is anticipated that supplemental fertilizers needed would include primarily phosphorus, nitrates, and ammonia. The initial water used in processing would be surface water obtained from the Central Valley Project or other imported water sources. Groundwater, which contains high amounts of salts and heavy metals, and which have a potential of contributing contaminants to the organic solid matrix, would not be used.

The application of these recovered solids is not anticipated to degrade the biological or botanical characteristics of the recipient pistachio orchards, nor would the application of these solids substantially impact soil or groundwater conditions. Unlike the short-term exposure of wildlife to irrigation reuse water, exposure to solid organics would be more long-term. However, the benign nature of these organic solids coupled with the general lack of species richness and abundance present in the pistachio orchards creates a situation that would not be considerably harmful to wildlife.

EFFECTS OF EXPOSURE OF WILDLIFE TO IRRIGATION REUSE WATER WITHIN THE LAND APPLICATION AREA

As a monotypic crop, pistachio orchards are not a haven for wildlife. Intensive management of crops to reduce pests, weed control efforts to improve water availability to the crop, and the use of drip irrigation, all combine to reduce the potential for the orchards to be extensively used by wildlife. Some species, primarily migrating birds, would be expected to

be present as transients or seasonal visitors and some bird species might use the orchards as breeding sites, but not to any extensive degree. Biological surveys of the Land Application Area show that the most common species present in the orchards were mourning dove, barn owl, cottontail, jackrabbit, and Heermann's kangaroo rat. Wide ranging terrestrial species such as the San Joaquin kit fox, American badgers, and coyote could be present as transients. The presence of these species would be dictated by the presence and characteristics of surrounding habitat (or lack thereof).

Most of the species that were documented to be present in the Land Application Area have adapted to live in extremely arid conditions with very little free water and high salinity. These species would not be expected to consume irrigation water to any great degree. The availability of irrigation water tainted with contaminants from pistachio processing would be sporadic, occurring only during the harvest season. Based upon the relative low richness and abundance of wildlife that would be present, the short length of time that irrigation water would be present, the relative low availability (because of application through drip systems) of that water for wildlife use, the minimal change in botanical and biological characteristics of the orchards, and the ability of wildlife to tolerate the anticipated level of irrigation reuse water constituents, impacts to wildlife species would not be substantial.

Effects of Exposure of Wildlife to Water Settling and Cleaning Ponds

The settling ponds would provide an attractant to a multitude of bird species including waterfowl (e.g., ducks, geese, egrets, cormorants, bitterns, herons) and shorebirds (e.g., avocets, stilts, sandpipers). Water sources that are extremely high in salts and laden with heavy metals have been shown to be detrimental to the health of avian species. Evaporation ponds in the Central Valley that are used to collect agricultural drainwater have been shown to cause birth defects and other mortalities in birds that use those ponds as breeding habitat. High levels of selenium in waters at Kesterson National Wildlife Refuge near Los Banos, which was created using agricultural drain water from the San Luis Drain, has been shown to cause embryonic malformation and death, reduced longevity, reduced reproductive success, reduced growth and survival rates, winter stress syndrome, food aversion, anemia and mass wasting, alopecia (loss of feathers) and loss of hair and nails, depressed immune system function, altered enzyme function, skin lesions, respiratory failure, and paralysis. High salt loads at inland lakes such as Mono Lake and Owens Lake in Inyo County and the Salton Sea in Imperial Valley cause birds to invest in osmoregulatory and thermoregulatory physiological responses, thus reducing available energy for other necessary bodily functions.

The KAPP settling ponds will not create these extreme habitat conditions. Contaminated agricultural drain water will not be present in these ponds and the salt content will be relatively low when compared to extreme conditions in Mono Lake, Owens Lake, and the Salton Sea. The levels of salts and heavy metals within the settling ponds are not expected to be extreme enough to create environmental conditions that would be detrimental to waterfowl, shorebirds, or other species of wildlife. The short-term inundation period would result in short-term exposure to the water in the ponds, thereby reducing any potential harmful effects to a negligible level. The short-term exposure of wildlife to inundated settling ponds would not result in substantial effects to wildlife.

Conclusions

Although Waste Discharge Requirements for irrigation reuse water have not yet been established for the KAPP Facility, it is anticipated that those requirements will be similar to other operational pistachio processing plants in the region. Assuming similar standards will be in effect, the levels of salts and other compounds present in the irrigation reuse water, both before and after filtration, would not significantly affect wildlife. The short-term duration of exposure to inundated ponding water, general lack of wildlife on and near the Project site, and the relatively low level of components in irrigation reuse water are factors that contribute to the low effects to wildlife. Standing water in the settling ponds, use of filtered irrigation reuse water as irrigation, and use of reclaimed organic solids distributed on the orchards are not likely to significantly impact wildlife, including special-status species.

SECTION 7 - LIMITATIONS, ASSUMPTIONS, AND USE RELIANCE

This Biological Analysis Report has been performed in accordance with professionally accepted biological investigation practices conducted at this time and in this geographic area. The findings and opinions conveyed in this report are based on findings derived from site reconnaissance, focused biological surveys, jurisdictional areas, and specified historical and literature sources. The biological investigation is limited by the scope of work performed. Reconnaissance biological surveys for certain taxa may not have been performed during a particular blooming period or particular portion of the season when species would be present and when positive identification of plants and wildlife would be possible, and therefore, results cannot necessarily be considered definitive. The biological surveys are limited also by the environmental conditions present at the time of the surveys. In addition, general biological (or protocol) surveys do not guarantee that the organisms are not present and will not be discovered in the future within the site. In particular, mobile animal species could occupy the site on a transient basis or re-establish populations in the future. No other guarantees or warranties, expressed or implied, are provided.

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SECTION 9 - LIST OF PREPARERS

QK Inc.

Primary Authors
- Martina Pernicano, Senior Environmental Scientist
- Curtis Uptain, Principal Environmental Scientist

Contributing Authors
- Julie Hausknecht, Associate Environmental Scientist
- Dylan Ayers, Associate Environmental Scientist
- Sarah Yates, Assistant Environmental Scientist
- Brian Schoener, Senior Engineer

Technical Review
- Curtis Uptain, Principal Environmental Scientist

Graphics
- Dylan Ayers, Associate Environmental Scientist

Production
- Vanessa Williams, Assistant Project Manager

Field Reconnaissance Survey
- Julie Hausknecht, Associate Environmental Scientist
- Sarah Yates, Assistant Environmental Scientist
- Karissa Denney, Associate Environmental Scientist
- Eric Madueno, Associate Environmental Scientist

Small mammal Trapping:
- Curtis Uptain, Principal Environmental Scientist
- Julie Hausknecht, Associate Environmental Scientist
- Sarah Yates, Assistant Environmental Scientist

San Joaquin Kit Fox Surveys:
- Curtis Uptain, Principal Environmental Scientist
- Julie Hausknecht, Associate Environmental Scientist
- Sarah Yates, Assistant Environmental Scientist
- Karissa Denney, Associate Environmental Scientist
- Eric Madueno Associate Environmental Scientist

Nesting Birds and Raptors Survey:
- Julie Hausknecht, Associate Environmental Scientist
- Sarah Yates, Assistant Environmental Scientist

- Karissa Denney, Associate Environmental Scientist
- Eric Madueno, Associate Environmental Scientist

Roosting Bats and Bats Maternity Colonies Survey:

- Karissa Denney, Associate Environmental Scientist

APPENDIX A

REGULATORY SETTING

Regulatory Setting

Federal Laws and Regulations

Federal Endangered Species Act of 1973 (USC, Title 16, Sections 1531 -1543)

The federal Endangered Species Act (FESA) and subsequent amendments provide guidance for the conservation of endangered and threatened species and the ecosystems upon which they depend. The FESA defines species as threatened or endangered and provides regulatory protection for listed species. The FESA provides a program for the conservation and recovery of threatened and endangered species as well as the protection of designated critical habitat that USFWS determines is required for the survival and recovery of listed species.

Section 9 lists actions that are prohibited under the FESA. Although take of a listed species is prohibited, it is allowed when it is incidental to an otherwise legal activity. Section 9 prohibits take of listed species of fish, wildlife, and plants without special exemption. The definition of "harm" includes significant habitat modification or degradation that results in death or injury to listed species by significantly impairing behavioral patterns related to breeding, feeding, or shelter. "Harass" is defined as actions that create the likelihood of injury to listed species by disrupting normal behavioral patterns related to breeding, feeding, and shelter significantly.

Section 7 of the FESA requires federal agencies, in consultation with and assistance from the Secretary of the Interior or the Secretary of Commerce, as appropriate, to ensure that actions they authorize, fund, or carry out are not likely to jeopardize the continued existence of threatened or endangered species or result in the destruction of adverse modification of critical habitat for these species. The USFWS and National Marine Fisheries Service (NMFS) share responsibilities for administering the FESA. Regulations governing interagency cooperation under Section 7 are found in California Code of Regulations (CCR) Title 50, Part 402. If an activity could result in "take" of a listed species as an incident of an otherwise lawful activity, then a biological opinion can be issued with an incidental take statement that exempts the activity from FESA's take prohibitions.

Section 10 provides a means whereby a nonfederal action with the potential to result in take of a listed species can be allowed under an incidental take permit. Application procedures are found at CFR Title 50, Sections 13 and 17 for species under the jurisdiction of USFWS and CFR, Title 50, Sections 217, 220, and 222 for species under the jurisdiction of NMFS. Section 10 would apply to the Project if take of a species (as defined in Section 9) were determined to occur.

Section 4(a)(3) and (b)(2) of the FESA requires the designation of critical habitat to the maximum extent possible and prudent based on the best available scientific data and after considering the economic impacts of any designations. Critical habitat is defined in section 3(5)(A) of the FESA: 1) areas within the geographic range of a species that are occupied by individuals of that species and contain the primary constituent elements (physical and biological features) essential to the conservation of the species, thus warranting special

management consideration or protection; and 2) areas outside of the geographic range of a species at the time of listing but that are considered essential to the conservation of the species.

Migratory Bird Treaty Act (USC, Title 16, Sections 703 - 711)

The MBTA, first enacted in 1918, is a series of treaties that the United State has with Great Britain (on behalf of Canada), Mexico, Japan, and the former Soviet Union that provide for international migratory bird protection. The MBTA authorizes the Secretary of the Interior to regulate the taking of migratory birds. The act provides that it shall be unlawful, except as permitted by regulations, "to pursue, take, or kill any migratory bird, or any part, nest or egg of any such bird" (U.S. Code Title 16, Section 703). The MBTA currently includes several hundred species and includes all native birds.

BALD AND GOLDEN EAGLE PROTECTION ACT OF 1940 (USC, TITLE 16, SECTION *668)*

The Bald and Golden Eagle Protection Act (BGEPA) of 1940 protects bald eagles (*Haliaeetus leucocephalus*) and golden eagle (*Aquila chrysaetos*) by prohibiting the taking, possession, and commerce of these species and established civil penalties for violation of this act. Take of bald and golden eagles includes to "pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest or disturb." To disturb means to agitate or bother a bald or golden eagle to a degree that causes, or is likely to cause, based on the best scientific information available, 1) injury to an eagle, 2) a decrease in its productivity, by substantially interfering with normal breeding, feeding, or sheltering behavior, or 3) nest abandonment, by substantially inferring with normal breeding, feeding, or sheltering behavior. (Federal Register [FR], volume 72, page 31132; 50 CFR 22.3).

Federal Clean Water Act (USC, Title 33, Sections 1521 - 1376)

The Federal Clean Water Act (CWA) provides guidance for the restoration and maintenance of the chemical, physical, and biological integrity of the nation's waters. Section 401 requires that a Project applicant that is pursuing a federal license or permit allowing a discharge to waters of the U.S. to obtain State Certification of Water Quality, thereby ensuring that the discharge will comply with provisions of the CWA. The Regional Water Quality Control Board (RWQCB) administers the certification program in California. Section 402 establishes a permitting system for the discharge of any pollutant (except dredged or fill material) into waters of the U.S. Section 404 establishes a permit program administered by the United States Army Corps of Engineers (USACE) that regulates the discharge of the dredged or fill material into waters of the U.S., including wetlands. The USACE implementing regulations are found in CFR, Title 33, Sections 320 and 330. Guidelines for implementation are referred to as the Section 404(b)(1) Guidelines, which were developed by the United States Environmental Protection Agency (EPA) in conjunction with USACE (40 CFR 230). The guidelines allow the discharge of dredged or fill material into the aquatic system only if there is no practicable alternative that would have less adverse impacts.

Applicable State Laws and Regulations

California Environmental Quality Act (California Public Resources Code, Sections 21000 - 21178, and Title 14 CCR, Section 753, and Chapter 3, Sections *15000 - 15387)*

The California Environmental Quality Act (CEQA) is California's broadest environmental law. CEQA helps guide the issuance of permits and approval of projects. Courts have interpreted CEQA to afford the fullest protection of the environment within the reasonable scope of the statutes. CEQA applies to all discretionary projects proposed to be conducted or approved by a State, County, or City agency, including private projects requiring discretionary government approval.

The purpose of CEQA is to disclose to the public the significant environmental effects of a proposed discretionary project; prevent or minimize damage to the environment through development of project alternatives, mitigation measures, and mitigation monitoring; disclose to the public the agency decision making process to approve discretionary projects; enhance public participation in the environmental review process; and improve interagency coordination.

State CEQA Guidelines Section 15380(b) provides that a species not listed on the federal or State list of protected species nonetheless may be considered rare or endangered for purposed of CEQA if the species can be shown to meet certain specified criteria. These criteria have been modeled after the definition in FESA and the section of the California Fish and Game Code dealing with rare or endangered plants or animals.

California Endangered Species Act (California Fish and Game Code Section 2050 et seq.)

The California Endangered Species Act (CESA) establishes the policy of the State to conserve, protect, restore, and enhance threatened or endangered species and their habitats. The CESA mandates that State agencies should not approve Projects that would jeopardize the continued existence of threatened or endangered species if reasonable and prudent alternatives are available that would avoid jeopardy. For Projects that would result in take of a species listed under the CESA, a project proponent would need to obtain a take permit under Section 2081(b). Alternatively, the CDFW has the option of issuing a Consistency Determination (Section 2080.1) for Projects that would affect a species listed under both the CESA and the FESA, as long as compliance with the FESA would satisfy the "fully mitigate" standard of CESA, and other applicable conditions.

Porter-Cologne Water Quality Control Act

Under Section 401 of the CWA, the RWQCB must certify that actions receiving authorization under Section 404 of the CWA also meet State water quality standards. The RWQCB regulates waters of the State under the authority of the Porter-Cologne Water Quality Control Act (Porter Cologne Act). The RWQCB requires Projects to avoid impacts to wetlands whenever feasible and requires that Projects do not result in a net loss of wetland acreage or a net loss of wetland function and values. The RWQCB typically requires compensatory mitigation for

impacts to wetlands and/or waters of the State. The RWQCB has jurisdiction over waters deemed 'isolated' or not subject to Section 404 jurisdiction under the Solid Waste Agency of Northern Cook County (SWANCC) decision. Dredging, filling, or excavation of isolated waters constitutes a discharge of waste into waters of the State, and such discharges are authorized through an Order of Waste Discharge (or waiver of discharge) from the RWQCB.

Various Sections of the California State and Fish and Game Code

SECTION 460 AND SECTIONS 4000-4003

Chapter 5 of the California Fish and Game Code (FGC) describes regulations concerning the take of furbearing mammals, including defining methods of take, seasons of take, bag and possession limits, and areas of the State where take is allowed. Section 4000-4003 defines furbearing mammals, and the issuance of permits by the Department. Sections 460 and 4000 identifies fisher, marten, river otter, desert kit fox and red fox as furbearing mammals, and Section 460 prohibits take of these species at any time. This section of the California Fish and Game Code (FGC) has historically been interpreted to apply to restriction on furbearer trapping permit but has recently been expanded by CDFW to apply to any forms of take and treated as if these species were listed under CESA.

SECTIONS 1600 THROUGH 1616

Under these sections of the FGC, a Project operator is required to notify CDFW prior to any Project that would divert, obstruct, or change the natural flow, bed, channel, or bank of any river, stream, or lake. Pursuant to the California Code of Regulations, a "stream" is defined as a body of water that flows at least periodically, or intermittently, through a bed or channel having banks and supporting fish or other aquatic life. Based on this definition, a watercourse with surface or subsurface flows that supports of has supported riparian vegetation is a stream and is subject to CDFW jurisdiction. Altered or artificial watercourses valuable to fish and wildlife are subject to CDFW jurisdiction. CDFW also has jurisdiction over dry washes that carry water during storm events. Preliminary notification and Project review generally occur during the environmental process. When an existing fish or wildlife resource may be substantially adversely affected, CDFW is required to propose reasonable Project changes to protect the resource. These modifications are formalized in a Streambed Alteration Agreement.

SECTIONS 3511, 4700, 5050, AND 5515

The protection of fully protected species is described in Sections 3511, 4700, 5050, and 5515 of the FGC. These statues prohibit take or possession of fully protected species. CDFW is unable to authorize incidental take of fully protected species, except as allowed for in an approved Natural Communities Conservation Plan (NCCP), or through direct legislative action.

SECTIONS 1900 THROUGH 1913 - NATIVE PLANT PROTECTION ACT

California's Native Plant Protection Act (NPPA) requires all State agencies to use their authority to carry out programs to conserve endangered and rare native plants. Provision of the NPPA prohibit that taking of listed plants from the wild and require notification of CDFW at least ten days in advance of any change in land use. This allows CDFW to salvage listed plant species that otherwise would be destroyed. A Project proponent is required to conduct botanical inventories and consult with CDFW during Project planning to comply with the provisions of this act and sections of CEQA that apply to rare or endangered plants.

Local and Regional Laws, Regulations, and Policies

Fresno County General Plan

Fresno County's General Plan Open Space and Conservation Element includes goals, policies, and implementation programs for preservation of Natural Resources include wetland and riparian areas, fish and wildlife habitat, and vegetation.

Table A-1
Open Space, and Conservation Element, Natural Resources

D. Wetland and Riparian Areas	
Goal OS-D	To conserve the function and values of wetland communities and related riparian areas throughout Fresno County while allowing compatible uses where appropriate. Protection of these resource functions will positively affect aesthetics, water quality, floodplain management, ecological function, and recreation/tourism.
Policies	
Policy OS-D.1	The County shall support the "no-net-loss" wetlands policies of the US Army Corps of Engineers, the US Fish and Wildlife Service, and the California Department of Fish and Game. Coordination with these agencies at all levels of project review shall continue to ensure that appropriate mitigation measures and the concerns of these agencies are adequately addressed.
Policy OS-D.2	The County shall require new development to fully mitigate wetland loss for function and value in regulated wetlands to achieve "no-net-loss" through any combination of avoidance, minimization, or compensation. The County shall support mitigation banking programs that provide the opportunity to mitigate impacts to rare, threatened, and endangered species and/or the habitat which supports these species in wetland and riparian areas.
Policy OS-D.3	The County shall require development to be designed in such a manner that pollutants and siltation do not significantly degrade the area, value, or function of wetlands. The County shall require new developments to implement the use of Best Management Practices (BMPs) to aid in this effort.

Policy OS-D.4	The County shall require riparian protection zones around natural watercourses and shall recognize that these areas provide highly valuable wildlife habitat. Riparian protection zones shall include the bed and bank of both low- and high-flow channels and associated riparian vegetation, the band of riparian vegetation outside the high-flow channel, and buffers of 100 feet in width as measured from the top of the bank of unvegetated channels and 50 feet in width as measured from the outer edge of the dripline of riparian vegetation.
Policy OS-D.5	The County shall strive to identify and conserve remaining upland habitat areas adjacent to wetland and riparian areas that are critical to the feeding, hibernation, or nesting of wildlife species associated with these wetland and riparian areas.
Policy OS-D.6	The County shall require new private or public developments to preserve and enhance existing native riparian habitat unless public safety concerns require removal of habitat for flood control or other purposes. In cases where new private or public development results in modification or destruction of riparian habitat for purposes of flood control, the developers shall be responsible for creating new riparian habitats within or near the project area. Adjacency to the project area shall be defined as being within the same watershed subbasin as the project site. Compensation shall be at a ratio of three (3) acres of new habitat for everyone (1) acre destroyed.
Policy OS-D.7	The County shall support the management of wetland and riparian plant communities for passive recreation, groundwater recharge, nutrient storage, and wildlife habitats.
Policy OS-D.8	The County should consider the acquisition of wetland, meadows, and riparian habitat areas for parks limited to passive recreational activities as a method of wildlife conservation.
Implementation Programs	
Program OS-D.A	The County shall work toward the acquisition by public agencies or private non-profit conservation organizations of creek corridors, wetlands, and areas rich in wildlife or of a fragile ecological nature as public open space where such areas cannot be effectively preserved through the regulatory process. Such protection may take the form of fee acquisition or protective easements and may be carried out in cooperation with other local, State, and Federal agencies and private entities. Acquisition shall include provisions for maintenance and management in perpetuity. (See Policies OS-D.2 and OSD.8) Responsibility: Planning & Resource Management Department Time Frame: Ongoing
Program OS-D.B	The County shall adopt an ordinance for riparian protection zones identifying allowable activities in riparian protection zones and allowable mitigation techniques. (See Policy OS-D.4)

E. Fish and Wildlife Habitat	
Goal OS-E	To help protect, restore, and enhance habitats in Fresno County that support fish and wildlife species so that populations are maintained at viable levels.
Policies	
Policy OS-E.1	The County shall support efforts to avoid the "net" loss of important wildlife habitat where practicable. In cases where habitat loss cannot be avoided, the County shall impose adequate mitigation for the loss of wildlife habitat that is critical to supporting special-status species and/or other valuable or unique wildlife resources. Mitigation shall be at sufficient ratios to replace the function, and value of the habitat that was removed or degraded. Mitigation may be achieved through any combination of creation, restoration, conservation easements, and/or mitigation banking. Conservation easements should include provisions for maintenance and management in perpetuity. The County shall recommend coordination with the US Fish and Wildlife Service and the California Department of Fish and Game to ensure that appropriate mitigation measures and the concerns of these agencies are adequately addressed. Important habitat and habitat components include nesting, breeding, and foraging areas, important spawning grounds, migratory routes, migratory stopover areas, oak woodlands, vernal pools, wildlife movement corridors, and other unique wildlife habitats (e.g., alkali scrub) critical to protecting and sustaining wildlife populations.
Policy OS-E.2	The County shall require adequate buffer zones between construction activities and significant wildlife resources, including both onsite habitats that are purposely avoided and significant habitats that are adjacent to the project site, in order to avoid the degradation and disruption of critical life cycle activities such as breeding and feeding. The width of the buffer zone should vary depending on the location, species, etc. A final determination shall be made based on informal consultation with the US Fish and Wildlife Service and/or the California Department of Fish and Game.
Policy OS-E.3	The County shall require development in areas known to have particular value for wildlife to be carefully planned and, where possible, located so that the value of the habitat for wildlife is maintained.
Policy OS-E.4	The County shall encourage private landowners to adopt sound wildlife habitat management practices, as recommended by the California Department of Fish and Game officials and the U.S. Fish and Wildlife Service.
Policy OS-E.5	The County shall support preservation of habitats of rare, threatened, endangered, and/or other special-status species including fisheries. The County shall consider developing a formal Habitat Conservation Plan in consultation with Federal and State

	agencies, as well as other resource conservation organizations. Such a plan should provide a mechanism for the acquisition and management of lands that support special-status species.
Policy OS-E.6	The County shall ensure the conservation of large, continuous expanses of native vegetation to provide suitable habitat for maintaining abundant and diverse wildlife populations, as long as this preservation does not threaten the economic well-being of the county
Policy OS-E.7	The County shall continue to closely monitor pesticide use in areas adjacent to habitats of special-status plants and animals.
Policy OS-E.8	The County shall promote effective methods of pest (e.g., ground squirrel) control on croplands bordering sensitive habitat that do not place special status species at risk, such as the San Joaquin kit fox.
Policy OS-E.9	Prior to approval of discretionary development permits, the County shall require, as part of any required environmental review process, a biological resources evaluation of the project site by a qualified biologist. The evaluation shall be based upon field reconnaissance performed at the appropriate time of year to determine the presence or absence of significant resources and/or special-status plants or animals. Such evaluation will consider the potential for significant impact on these resources and will either identify feasible mitigation measures or indicate why mitigation is not feasible.
Policy OS-E.10	The County shall support State and Federal programs to acquire significant fish and wildlife habitat areas for permanent protection and/or passive recreation use.
Policy OS-E.11	The County shall protect significant aquatic habitats against excessive water withdrawals that could endanger special-status fish and wildlife or would interrupt normal migratory patterns.
Policy OS-E.12	The County shall ensure the protection of fish and wildlife habitats from environmentally-degrading irrigation reuse waters originating from mining and construction activities that are adjacent to aquatic habitats.
Policy OS-E.13	The County should protect to the maximum extent practicable wetlands, riparian habitat, and meadows since they are recognized as essential habitats for birds and wildlife.
Policy OS-E.14	The County shall require a minimum 200-foot-wide wildlife corridor along particular stretches of the San Joaquin River and Kings River, whenever possible. The exact locations for the corridors should be determined based on the results of biological evaluations of these watercourses. Exceptions may be necessary where the minimum width is infeasible due to topography or other physical constraints. In these instances, an offsetting expansion on the opposite side of the river should be considered.

Policy OS-E.15	The County should preserve, to the maximum extent practicable, significant wildlife migration routes such as the North Kings Deer Herd migration corridors and fawn production areas.
Policy OS-E.16	Areas that have unusually high value for fish and wildlife propagation should be preserved in a natural state to the maximum possible extent.
Policy OS-E.17	The County should preserve, to the maximum possible extent, areas defined as habitats for rare or endangered animal and plant species in a natural state consistent with State and Federal endangered species laws.
Policy OS-E.18	The County should preserve areas identified as habitats for rare or endangered plant and animal species primarily through the use of open space easements and appropriate zoning that restrict development in these sensitive areas.
Implementation Programs	
Program OS-E.A	The County shall compile inventories of ecologically significant resource areas, including unique natural areas, wetlands, riparian areas, and habitats for special-status plants and animals from existing data sources. The inventories shall be presented when area plans, specific plans, or other project development proposals are considered by the County. The classification system shall be based on the California Wildlife Habitats Relationships (WHR) system and shall identify appropriate buffer zones around the identified resource areas in order to account for periodic, seasonal, or ecological changes. The maps shall be revised on a regular basis to reflect the availability of new information from other agencies, changes in definition, or any other changes. (See Policies OS-E.1, OS-E.2, and OS-E.5) Responsibility: Planning & Resource Management Department Time frame: Ongoing
Program OS-E.B	The County shall maintain current maps that indicate the extent of significant habitat for important fish and game species, as these maps are made available by the California Department of Fish and Game (CDFG). The relative importance of these game species shall be determined by the County, in consultation with CDFG, based on relevant ecological, recreational, and economic considerations. These maps shall be used by the County to evaluate proposed area plans, specific plans, and any other project development proposals to determine the compatibility of development with maintenance and enhancement of important fish and game species. (See Policy OS-E.2) Responsibility: Planning & Resource Management Department Time frame: Ongoing
F. Vegetation	
Goal OS-F	To preserve and protect the valuable vegetation resources of Fresno County

Policies	
Policy OS-F.1	The County shall encourage landowners and developers to preserve the integrity of existing terrain and natural vegetation in visually-sensitive areas such as hillsides and ridges, and along important transportation corridors, consistent with fire hazard and property line clearing requirements.
Policy OS-F.2	The County shall require developers to use native and compatible non-native plant species, especially drought-resistant species, to the extent possible, in fulfilling landscaping requirements imposed as conditions of discretionary permit approval or for project mitigation.
	The County shall support the preservation of significant areas of natural vegetation, including, but not limited to, oak woodlands, riparian areas, and vernal pools.
Policy OS-F.3	The County shall ensure that landmark trees are preserved and protected whenever possible.
Policy OS-F.4	The County shall establish procedures for identifying and preserving rare, threatened, and endangered plant species that may be adversely affected by public or private development projects. As part of this process, the County shall require, as part of the environmental review process, a biological resources evaluation of the project site by a qualified biologist. The evaluation shall be based on field reconnaissance performed at the appropriate time of year to determine the presence or absence of significant plant resources and/or special-status plant species. Such evaluation shall consider the potential for significant impact on these resources and shall either identify feasible mitigation measures or indicate why mitigation is not feasible.
Policy OS-F.5	The County shall require that development on hillsides be limited to maintain valuable natural vegetation, especially forests and open grasslands, and to control erosion.
Policy OS-F.6	The County shall require developers to take into account a site's natural topography with respect to the design and siting of all physical improvements in order to minimize grading.
Policy OS-F.7	The County should encourage landowners to maintain natural vegetation or plant suitable vegetation along fence lines, drainage and irrigation ditches and on unused or marginal land for the benefit of wildlife.
Policy OS-F.8	The County shall support the continued use of prescribed burning to mimic the effects of natural fires to reduce fuel volumes and associated fire hazards to human residents and to enhance the health of biotic communities.
Policy OS-F.9	The County shall require that new developments preserve natural woodlands to the maximum extent possible.
Policy OS-F.10	The County shall promote the preservation and management of oak woodlands by encouraging landowners to follow the Fresno County

	Oak Management Guidelines shown below and to prepare an Oak Management Plan for their property
Implementation Programs	
Program OS-F.A	The County shall prepare and maintain an updated list of State and Federal rare, threatened, and endangered plant species known or suspected to occur in the county. The following other uncommon or special-status species which occur or may occur in the County should also be included on the list: 1) plant species included in the California Native Plant Society's Inventory of Rare and Endangered Vascular Plants of California; and 2) species of special concern as designated by California Department of Fish and Game. In addition to updating the list as new information becomes available, the list should be reviewed and amended at least once every two years. (See Policy OS-F.5) Responsibility: Planning & Resource Management Department Time Frame: FY 00-01; every two years thereafter
Program OS-F.B	The County shall make the Fresno County Oak Management Guidelines and other educational resources available to landowners located in oak woodland habitat. (See Policy OS-F.11) Responsibility: Planning & Resource Management Department Time Frame: Ongoing

Source: (Fresno County, 2000)

Local Ordinances

Fresno County does not have local ordinances regarding the protection of natural resources.

APPENDIX B

REPRESENTATIVE PHOTOGRAPHS

Photograph 1: Aerial view of the Processing Plant Site.
GPS Coordinates: 36.529863, -120.415155, facing southeast.
Photograph taken by Dylan Ayers on August 6, 2020.

Photograph 2: View from the northeast corner of the Processing Plant Site.
GPS Coordinates: 36.530348, -120.407557, facing west.
Photograph taken by Sarah Yates on July 2, 2020.

Photograph 3: View of the Water Settling and Cleaning Pond Site.
GPS Coordinates: 36.519863, -120.417350, facing east.
Photograph taken by Julie Hausknecht on July 3, 2020.

Photograph 4: View of the Solid Materials Management Site.
GPS Coordinates: 36.519863, -120.417350, facing west.
Photograph taken by Julie Hausknecht on July 3, 2020.

Photograph 5: View of the most western portion of Natural Gas Service Line Route A within the Land Application Area. GPS Coordinates: 36.516610, -120.452301, facing west.
Photograph taken by Julie Hausknecht on July 8, 2020.

Photograph 6: View of the most western portion of Natural Gas Service Line Route B within the Land Application Area. GPS Coordinates: 36.524011, -120.470330, facing east.
Photograph taken by Julie Hausknecht on July 7, 2020.

Photograph 7: View of orchards on the most western portion of Natural Gas Service Line Route A.
GPS Coordinates: 36.529940, -120.475130, facing north.
Photograph taken by Julie Hausknecht on July 7, 2020.

Photograph 8: View of the pistachio orchards in the Land Application Area surrounding the BSA.
GPS Coordinates: 36.516610, -120.452301, facing north.
Photograph taken by Julie Hausknecht on July 7, 2020.

Photograph 9: Dry Basin 1 southeast of the Processing Plant Site.
GPS Coordinates: 36.523408, -120.407227, facing northwest.
Photograph taken by Sarah Yates on July 3, 2020.

Photograph 10: Dry Basin 2 on the southeast corner of the Water Settling and Cleaning Ponds Site.
GPS Coordinates: 36.516228, -120.407343, facing northwest.
Photograph taken by Sarah Yates on July 3, 2020.

Photograph 11: Irrigation Basin 3 located within the Land Application Area, approximately 0.5-miles south of the Project site. GPS Coordinates: 36.508871, -120.406775, facing northwest. Photograph taken by Julie Hausknecht on July 7, 2020.

Photograph 12: Irrigation Basin 4 located within the Land Application Area, approximately 1.15 miles southwest of the Project site. GPS Coordinates: 36.501729, -120.434824, facing northeast. Photograph taken by Julie Hausknecht on July 7, 2020.

Photograph 13: Irrigation Basin 5 located adjacent to the Land Application Area, approximately 1.4-miles southwest of the Project site. GPS Coordinates: 36.501575, -120.443212, facing southwest. Photograph taken by Julie Hausknecht on July 7, 2020.

Photograph 14: Irrigation Basin 6 located within the Land Application Area, approximately 1.1 miles southwest of the Project site. GPS Coordinates: 36.509039, -120.442860, facing east. Photograph taken by Julie Hausknecht on July 7, 2020.

Photograph 15: Irrigation Basin 7 located within the Land Application Area, approximately 0.5-miles west of the Project site. GPS Coordinates: 36.523486, -120.433868, facing northeast. Photograph taken by Julie Hausknecht on July 7, 2020.

Photograph 16: Small mammal trapping station #5, east of the Processing Plant Site. GPS Coordinates: 36.528561, -120.407186, facing north. Photograph taken by Julie Hausknecht on July 21, 2020.

Photograph 17: Baited track station #1 on the northeast corner of the BSA, coyote and insect tracks present. GPS Coordinates: 36.487063, -120.420616, facing down.
Photograph taken by Karissa Denney on July 22, 2020.

Photograph 18: Coyote track found near Bait Station #1.
GPS Coordinates: 36.487063, -120.420616, facing down.
Photograph taken by Karissa Denney on July 22, 2020.

Photograph 19: Occupied barn owl box near the Land Application Area, in the southwest corner of the BSA. GPS Coordinates: 36.486805, -120.414999, facing northwest.
Photograph taken by Sarah Yates on July 7, 2020.

Photograph 20: Sparrow nest in the rafters of an open air storage structure in the southeastern Land Application Area. GPS Coordinates: 36.523623, -120.443256, facing east.
Photograph taken by Sarah Yates on July 7, 2020.

APPENDIX C

SMALL MAMMAL TRAPPING RESULTS AND DATASHEETS

SMALL MAMMAL TRAPPING RESULTS

There were no special-status species captured during the trapping effort conducted between July 20 and July 25, 2020. The only two small mammal species captured during the trapping effort were the Heermann's kangaroo rat (*Dipodomys heermanni*) and deer mouse (*Peromyscus maniculatus*) (see summary table below). All kangaroo rat individuals including the juveniles were confirmed to have five toes, and, along with the relatively large body size compared to the body size of the Fresno kangaroo rat, discounted the possibility that these were Fresno kangaroo rats. Similarly, the length of hind feet and relatively small body size compared to the giant kangaroo rat discounted the possibility that these were giant kangaroo rats.

A total of 51 individual small mammals were captured, with 12 recaptures (see summary table below). The deer mouse was captured slightly more often that Herman's kangaroo rats (27 of 51 individuals captured). Adult animals were far more common than juveniles, with 23 of 24 Heermann's kangaroo rats being adults and 24 of 27 deer mice being adults. The male to female sex ratio of Heermann's kangaroo rats was 1:0.6 but the sex ratio of deer mice was nearly equal males to females (1:1.07). Over half of the Hermann's kangaroo rats captured were reproductively active, with nine reproductively active males, three pregnant females, and two lactating females. Of the 27 deer mice that were captured, six were reproductively active males, eight were pregnant females, and five were lactating females (see data sheets below). The overall trap success was approximately 23 percent (63 captures out of 275 traps), but 18.5 percent trap success was achieved when recaptures were excluded.

Summary of Small Mammal Captures, Kamm Avenue Pistachio Processing Project, Fresno County, California

Species	Capture Type	Captures	Male Adult/Juveniles	Female Adult/Juvenile	Escape/ Deceased
Heermann's kangaroo rat (*Dipodomys heermanni*)	New Captures	24	14/1	9/0	None
	Recaptures	8			
	Total captures	32			
deer mouse (*Peromyscus maniculatus*)	New Captures	27	10/3	14/0	None
	Recaptures	4			
	Total captures	31			
	Total Captures	**63**			

Most of the deer mice were captured at Trap Station 2 in the east-central portion of the Processing Plant Site. Captures at that station consisted of 16 deer mice and 3 Heermann's kangaroo rats. Deer mice were less prevalent on the other four trap stations with a total of 21 individuals captured at the other four stations. Heermann's kangaroo rats were most common at trap stations 3 and 4 with 5 and 4 individuals captured, respectively. The area within Trap Station 2 contained a variety of farming related equipment and supplies that provided cover for small mammals while the other four trap stations lacked such cover, except for Trap Station 5, which was placed along an existing water distribution pipeline.

All of the animals captured were of excellent overall health. None of the captured animals exhibited abnormal morphological characteristics or other abnormalities or chronic conditions. All animals were released in good condition and no injuries were caused by the trapping effort.

Trap Location	Fate	Recap_Colors	Species	Sex	Age	Repro	Grams_Bag/Animal	Grams_Bag/No_Animal	Grams_Animal	KRAT_#HindToes	Health	Notes
1-1	5								0			
1-2	5								0			
1-3	1		HKR	F	A	NON			65	5		
1-4	5								0			
1-5	4								0			
1-6	5								0			
1-7	5								0			
1-8	5								0			
1-9	5								0			
1-10	1		HKR	M	A	SCR			73	5		
2-1	5								0			
2-2	1		HKR	M	A	SCR			55	5		
2-3	5								0			
2-4	5								0			
2-5	5								0			
2-6	5								0			
2-7	5								0			
2-8	1		DM	F	A	NON			20			
2-9	5								0			
2-10	4								0			
3-1	5								0			
3-2	5								0			
3-3	5								0			
3-4	5								0			
3-5	5								0			
3-6	5								0			
3-7	5								0			
3-8	5								0			
3-9	5								0			
3-10	5								0			
3-11	5								0			
3-12	5								0			
3-13	5								0			
3-14	5								0			
3-15	5								0			
4-1	5								0			
4-2	5								0			
4-3	1		DM	M	A	SCR			20			
4-4	5								0			
4-5	5								0			
4-6	5								0			

Trap Location	Fate	Recap_Colors	Species	Sex	Age	Repro	Grams_Bag/Animal	Grams_Bag/No_Animal	Grams_Animal	KRAT_#HindToes	Health	Notes
4-7	5								0			
4-8	5								0			
4-9	5								0			
4-10	5								0			
5-1	5								0			
5-2	5								0			
5-3	5								0			
5-4	5								0			
5-5	5								0			
5-6	5								0			
5-7	5								0			
5-8	5								0			
5-9	5								0			
5-10	4								0			

Trap Location	Fate	Recap_Colors	Species	Sex	Age	Repro	Grams_Bag/Animal	Grams_Bag/No_Animal	Grams_Animal	KRAT_#HindToes	Health	Notes
1-1	5								0			
1-2	5								0			
1-3	5								0			
1-4	5								0			
1-5	1		HKR	M	A	SCR			70	5		
1-6	5								0			
1-7	5								0			
1-8	5								0			
1-9	1		DM	F	A	NON			19			
1-10	5								0			
2-1	5								0			
2-2	5								0			
2-3	1		HKR	F	A	PRE	93	8	85	5		
2-4	5								0			
2-5	5								0			
2-6	1		DM	F	A	LAC			26			
2-7	5								0			
2-8	1		DM	F	A	PRE			32			
2-9	5								0			
2-10	1		HKR	M	A	SCR	81	8	73	5		
3-1	5								0			
3-2	4								0			
3-3	1		HKR	M	J	NON	39	8	31	5		
3-4	5								0			
3-5	5								0			
3-6	5								0			
3-7	1		HKR	F	A	LAC	84	8	76	5		
3-8	5								0			
3-9	5								0			
3-10	5								0			
3-11	5								0			
3-12	5								0			
3-13	5								0			
3-14	5								0			
3-15	1		HKR	M	A	SCR	77	8	69	5		
4-1	4								0			
4-2	5								0			
4-3	5								0			
4-4	5								0			
4-5	5								0			
4-6	1		DM	M	A	SCR			21			

Trap Location	Fate	Recap_Colors	Species	Sex	Age	Repro	Grams_Bag/Animal	Grams_Bag/No_Animal	Grams_Animal	KRAT_#HindToes	Health	Notes
4-7	5								0			
4-8	5								0			
4-9	5								0			
4-10	5								0			
5-1	5								0			
5-2	5								0			
5-3	5								0			
5-4	5								0			
5-5	5								0			
5-6	5								0			
5-7	5								0			
5-8	5								0			
5-9	1		DM	F	SA	LAC			14			
5-10	5								0			

Trap Location	Fate	Recap_Colors	Species	Sex	Age	Repro	Grams_Bag/Animal	Grams_Bag/No_Animal	Grams_Animal	KRAT_#HindToes	Health	Notes
1-1	5								0			
1-2	5								0			
1-3	5								0			
1-4	5								0			
1-5	5								0			
1-6	5								0			
1-7	5								0			
1-8	5								0			
1-9	1		DM	F	A	LAC			14			
1-10	5								0			
2-1	5								0			
2-2	5								0			
2-3	5								0			
2-4	2	B	HKR	F	A	PRE			0			
2-5	5								0			
2-6	2	B	DM	F	A	LAC			0			
2-7	5								0			
2-8	1		DM	M	A	SCR			17			
2-9	1		DM	F	A	PRE			21			
2-10	5								0			
3-1	4								0			
3-2	5								0			
3-3	2	B	HKR	M	J	NON			0			
3-4	5								0			
3-5	1		HKR	M	A	SCR			52	5		
3-6	5								0			
3-7	5								0			
3-8	5								0			
3-9	2	B	HKR	F	A	LAC			0			
3-10	5								0			
3-11	5								0			
3-12	5								0			
3-13	5								0			
3-14	5								0			
3-15	2	B	HKR	M	A	SCR			0			
4-1	5								0			
4-2	4								0			
4-3	5								0			
4-4	4								0			
4-5	5								0			
4-6	2	B	DM	M	A	NON			0			

Trap Location	Fate	Recap_Colors	Species	Sex	Age	Repro	Grams_Bag/Animal	Grams_Bag/No_Animal	Grams_Animal	KRAT_#HindToes	Health	Notes
4-7	5								0			
4-8	5								0			
4-9	5								0			
4-10	5								0			
5-1	5								0			
5-2	5								0			
5-3	5								0			
5-4	5								0			
5-5	5								0			
5-6	5								0			
5-7	5								0			
5-8	5								0			
5-9	5								0			
5-10	5								0			

Trap Location	Fate	Recap_Colors	Species	Sex	Age	Repro	Grams_Bag/Animal	Grams_Bag/No_Animal	Grams_Animal	KRAT_#HindToes	Health	Notes
1-1	5								0			
1-2	5								0			
1-3	5								0			
1-4	5								0			
1-5	5								0			
1-6	1		HKR	F	A	NON	72	11	61	5		
1-7	5								0			
1-8	2	B	HKR						0			
1-9	1		DM	M	A	+/-SCR			17			
1-10	4								0			
2-1	5								0			
2-2	1		DM	F	A	PRE			25			
2-3	1		DM	F	A	LAC			19			
2-4	5								0			
2-5	5								0			
2-6	1		DM	M	A	SCR			24			
2-7	5								0			
2-8	1		DM	M	J	NON			8			
2-9	2	B	HKR	M	A	SCR			0			
2-10	1		DM	F	A	PRE			21			
3-1	5								0			
3-2	5								0			
3-3	5								0			
3-4	5								0			
3-5	2	B	HKR	M	A	SCR			0			
3-6	5								0			
3-7	5								0			
3-8	5								0			
3-9	5								0			
3-10	5								0			
3-11	5								0			
3-12	5								0			
3-13	5								0			
3-14	5								0			
3-15	4								0			
4-1	2	B	DM	M	A	+/-SCR			0			
4-2	5								0			
4-3	5								0			
4-4	5								0			
4-5	1		HKR	F	A	LAC			0	5		Escaped
4-6	5								0			

Trap Location	Fate	Recap_Colors	Species	Sex	Age	Repro	Grams_Bag/Animal	Grams_Bag/No_Animal	Grams_Animal	KRAT_#HindToes	Health	Notes
4-7	5								0			
4-8	1		HKR	F	A	PRE	98	11	87	5		
4-9	5								0			
4-10	5								0			
5-1	1		HKR	F	A	NON	81	11	70	5		
5-2	5								0			
5-3	1		HKR	F	A	NON	75	11	64	5		
5-4	5								0			
5-5	5								0			
5-6	4								0			
5-7	5								0			
5-8	5								0			
5-9	4								0			
5-10	1		DM	F	A	PRE	14		14			

Trap Location	Fate	Recap_color	Species	Sex	Age	Repro	Grams_Bag/Animal	Grams_Bag/No_Animal	Grams_Animal	KRAT_#HindToes	Health	Notes
1-1	5								0			
1-2	5								0			
1-3	1		HKR	M	A	SCR			79	5		
1-4	5								0			
1-5	5								0			
1-6	2	G	HKR	F	A	NON			0			
1-7	5								0			
1-8	5								0			
1-9	2	B	DM	F	A	NON			0			
1-10	4								0			
2-1	5								0			
2-2	1		DM	F	A	PRE			23			
2-3	1		DM	M	A	NON			16			
2-4	5								0			
2-5	1		DM	F	A	PRE			21			
2-6	2	G	DM	M	A	SCR			0			
2-7	5								0			
2-8	1		DM	M	J	NON			8		Double capture-see below	
2-8	1		DM	F	J	NON			8			
2-9	5								0			
2-10	1		DM	F	A	PRE			19			
3-1	5								0			
3-2	1		DM	M	A	SCR			19			
3-3	5								0			
3-4	5								0			
3-5	5								0			
3-6	5								0			
3-7	5								0			
3-8	5								0			
3-9	5								0			
3-10	5								0			
3-11	5								0			
3-12	5								0			
3-13	5								0			
3-14	5								0			
3-15	2	B	HKR	M	A	SCR			0			
4-1	5								0			
4-2	5								0			
4-3	5								0			
4-4	1		HKR	F	A	PRE			76	5		
4-5	2	G	HKR	F	A	LAC			0			

Trap Location	Fate	Recap_color	Species	Sex	Age	Repro	Grams_Bag/Animal	Grams_Bag/No_Animal	Grams_Animal	KRAT_#HindToes	Health	Notes
4-6	1		DM	M	A	SCR			21			
4-7	1		DM	F	A	NON			12			
4-8	4								0			
4-9	5								0			
4-10	5								0			
5-1	5								0			
5-2	2	G	HKR	F	A	NON			0			
5-3	5								0			
5-4	5								0			
5-5	5								0			
5-6	5								0			
5-7	5								0			
5-8	5								0			
5-9	4								0			
5-10	5								0			

APPENDIX D

SPECIAL-STATUS SPECIES DATABASE SEARCH RESULTS

Special-Status Species in the Regional Vicinity of the Project Site
Kamm Avenue Processing Plant, Fresno County, California

Scientific Name	Common Name	Status	General Habitat Description	Potential to Occur (Present/Yes/No)	Rationale
SENSITIVE NATURAL COMMUNITIES					
Coastal and Valley Freshwater Marsh	Coastal and Valley Freshwater Marsh	G3/ S2.1	Freshwater emergent wetlands characterized by erect, rooted herbaceous hydrophytes; composed of moist soil plant species including sedges, rushes, saltgrass (in more alkali sites) and on wetter sites cattail and bulrush.	**No**	This community is absent from the BSA. There are no CNDDB records of this community within 10 miles of the BSA. This community was not observed during the 2020 field survey and is not expected to occur within the BSA.
North Central Coast Drainage Sacramento Sucker/Roach River	North Central Coast Drainage Sacramento Sucker/Roach River	GNR/ SNR	This is a community located on the San Benito River, below the Hernandez Reservoir in San Benito County from Hernandez Reservoir outlet downstream to about one mile below HWY 25. Native fish assemblage includes California roach, Sacramento sucker, speckled dace, and hitch and the community is an extensive one-mile-long cattail marsh north of the town of San Benito.	**No**	This community is absent from the BSA. There are no CNDDB records of this community within 10 miles of the BSA. This community was not observed during the 2020 field survey and is not expected to occur within the BSA.
Northern Vernal Pool	Northern Vernal Pool	G2/ S2	undefined	**No**	This community is absent from the BSA. There are no CNDDB records of this community within 10 miles of the BSA. This community was not observed during the 2020 field survey and is not expected to occur within the BSA.
Valley Needlegrass Grassland	Valley Needlegrass Grassland	G3/ S3.1	This community consists of is a mid-height (2 feet) grassland dominated by *Nassella pulchra*, a perennial, tussock-forming grass. Native and introduced annuals occur between the bunchgrasses, and this community is usually found on fine-textured soils, moist or even waterlogged in winter, but very dry in summer.	**No**	This community is absent from the BSA. There are no CNDDB records of this community within 10 miles of the BSA. This community was not observed during the 2020 field survey and is not expected to occur within the BSA.
Valley Sink Scrub	Valley Sink Scrub	G1/S1.1	Heavy, saline and/or alkaline clays of lakebeds or playas with *Allenrolfea*, salt grass, *Lasthenia*, etc.	**No**	This community is absent from the BSA. There are no CNDDB records of this community within 10 miles of the BSA. This community was not observed during the 2020 field survey and is not expected to occur within the BSA.
SPECIAL-STATUS PLANTS					
Acanthomintha lanceolata	Santa Clara thorn-mint	-/- 4.2	Annual herb; blooms March to June; occurs in woodland, chaparral, talus, rocky slopes, outcrops, occasionally serpentine; occurs at elevations less than 1,200 meters.	**No**	The BSA does not contain woodland, chaparral, talus, or serpentine habitats to support this species. There are no CNDDB records of this species within 10 miles of the BSA. This species was not observed during the 2020 field survey and is not expected to occur within the BSA.
Acanthomintha obovata ssp. *obovata*	San Benito thorn-mint	-/- 1B.3	Annual herb; blooms April to July; occurs in heavy clay, alkaline, and serpentinite in chaparral, cismontane woodland, and Valley and foothills grassland; ranges in elevation from 1,295 to 4,920; threatened by grazing.	**No**	The BSA is outside of this species elevation range. There are no CNDDB records of this species within 10 miles of the BSA. This species was not observed during the 2020 field survey and is not expected to occur within the BSA.
Allium howellii var. *sanbenitense*	San Benito onion	-/- 1B.3	Perennial bulbiferous herb; blooms between April and May; occurs in clay and on steep slopes in chaparral and Valley and foothill grassland; ranges in elevation from 1,280 to 4,475 feet; threatened by grazing and development.	**No**	The BSA is outside of this species elevation range. There are no CNDDB records of this species within 10 miles of the BSA. This species was not observed during the 2020 field survey and is not expected to occur within the BSA.

Scientific Name	Common Name	Status	General Habitat Description	Potential to Occur (Present/Yes/No)	Rationale
Androsace elongata ssp. *acuta*	California androsace	-/- 4.2	Annual herb; flowers between March and June; occurs in chaparral, cismontane woodland, coastal scrub, meadows and seeps, pinyon and juniper woodland, and Valley and foothills grassland; ranges in elevation 492 to 4,281 feet; threatened by grazing, trampling, non-native plants, alteration of fire regimes, and recreational activities. Potentially threatened by wind energy development.	**Yes**	Annual grassland habitat with few isolated allscale shrubs occurs within the southern area of the most western portion of the Natural Gas Service Line Route C and to the west of it as well as within 500 feet of the orchards in the southwest and west. This grassland habitat has been heavily disturbed and regularly maintained by mowing and/or grazing. There are no CNDDB records of this species within 10 miles of the BSA. This species was not observed during the 2020 field survey and is unlikely to occur within the annual grassland habitat within the BSA
Atriplex cordulata var. *cordulata*	heartscale	-/- 1B.2	Annual herb; blooms April to October; occurs in saline and alkaline soils, chenopod scrub, meadows and seeps, and Valley foothill grassland habitats; endemic to California; ranges in elevation from sea level to 1,837 feet; threatened by competition from non-native plants; possibly threated by trampling	**Yes**	Annual grassland habitat with few isolated allscale shrubs occurs within the southern area of the most western portion of the Natural Gas Service Line Route C and to the west of it as well as within 500 feet of the orchards in the southwest and west. This grassland habitat has been heavily disturbed and regularly maintained by mowing and/or grazing. There are no CNDDB records of this species within 10 miles of the BSA. This species was not observed during the 2020 field survey and is unlikely to occur within the annual grassland habitat within the BSA
Atriplex coronata var. *vallicola*	Lost Hills crownscale	-/- 1B.2	Annual herb; blooms April to September; occurs in dry beds of alkaline pools in chenopod scrub, Valley and foothill grassland, and vernal pools; also found on exposed slopes rich in gypsum; elevation approximately 165 to 2,085 feet; documented on the valley floors and lower foothills of the western Central Valley from San Benito to Kern and San Luis Obispo counties; threatened by grazing, vehicles, and development.	**Yes**	Annual grassland habitat with few isolated allscale shrubs occurs within the southern area of the most western portion of the Natural Gas Service Line Route C and to the west of it as well as within 500 feet of the orchards in the southwest and west. This grassland habitat has been heavily disturbed and regularly maintained by mowing and/or grazing. The closest (EONDX 58910) is located approximately 1.70 miles to the west of the BSA. This species was not observed during the 2020 field survey and is unlikely to occur within the annual grassland habitat within the BSA
Atriplex coronata var. *coronata*	crownscale	-/- 4.2	Annual herb; blooms March to October; occurs in fine, alkaline soils and clay soils in chenopod scrub, valley and foothill grassland, and vernal pools; elevation approximately from sea level to 650 feet.	**Yes**	Annual grassland habitat with few isolated allscale shrubs occurs within the southern area of the most western portion of the Natural Gas Service Line Route C and to the west of it as well as within 500 feet of the orchards in the southwest and west. This grassland habitat has been heavily disturbed and regularly maintained by mowing and/or grazing. There are no CNDDB records of this species within 10 miles of the BSA. This species was not observed during the 2020 field survey and is unlikely to occur within the annual grassland habitat within the BSA
Atriplex depressa	brittlescale	-/- 1B.2	Annual herb; blooms April to October; occurs on alkaline and clay soils in chenopod scrub, meadows and seeps, playas, vernal pools, and Valley and foothill grassland; elevation approximately sea level to 1,050 feet; threatened by development, grazing, and trampling.	**Yes**	Annual grassland habitat with few isolated allscale shrubs occurs within the southern area of the most western portion of the Natural Gas Service Line Route C and to the west of it as well as within 500 feet of the orchards in the southwest and west. This grassland habitat has been heavily disturbed and regularly maintained by mowing and/or grazing. There are no CNDDB records of this species within 10 miles of the BSA. This species was not observed during the 2020 field survey and is unlikely to occur within the annual grassland habitat within the BSA

Scientific Name	Common Name	Status	General Habitat Description	Potential to Occur (Present/Yes/No)	Rationale
Benitoa occidentalis	western lessingia	-/- 4.3	Annual herb; blooms June to November; occurs in grassland, foothill woodland, vertic clay, and occasionally serpentine in cismontane woodland, chaparral, coastal scrub, valley and foothill grassland; elevation approximately 1,150 to 3,600 feet.	**No**	The BSA is outside of this species elevation range and soils at the Project are not suitable to support this species. There are no CNDDB records of this species within 10 miles of the BSA. This species was not observed during the 2020 field survey and is not expected to occur within the BSA.
Calystegia collina ssp. *venusta*	South Coast Range morning-glory	-/- 4.3	Perennial herb (rhizomatous); blooms April to June; occurs in open grassy or rocky places or in open oak/pine woodland, and often in serpentine in chaparral, cismontane woodland, valley and foothill grassland; elevation approximately 1,395 to 4,888 feet. Can be relatively abundant and tolerant of disturbance.	**No**	The BSA is outside of this species elevation range. There are no CNDDB records of this species within 10 miles of the BSA. This species was not observed during the 2020 field survey and is not expected to occur within the BSA.
Camissonia benitensis	San Benito evening-primrose	FT/- 1B.1	Annual herb; blooms April to June; occurs in Chaparral, cismontane woodland, valley and foothill grassland and is strictly endemic to serpentine soil; endemic to California; ranges in elevation from 1,920 to 4,096 feet; known only from the New Idria area; seriously threatened by vehicles.	**No**	The BSA is outside of this species elevation range. There are no CNDDB records of this species within 10 miles of the BSA. This species was not observed during the 2020 field survey and is not expected to occur within the BSA.
Campanula exigua	chaparral harebell	-/- 1B.2	Annual herb; blooms May to June; occurs in rocky sites, usually on serpentine in chaparral; elevation approximately 295 to 4,511 feet; possibly threatened by mining and vehicles.	**No**	This plant occurs in rocky habitat on serpentine in chaparral, conditions that do not occur within the BSA. There are no CNDDB records of this species within 10 miles of the BSA. This species was not observed during the 2020 field survey and is not expected to occur within the BSA.
Caulanthus californicus	California jewelflower	FE/CE 1B.1	Annual herb; blooms February to May; occurs in slightly alkaline sandy soils in chenopod scrub, valley and foothill grassland, and pinyon and juniper woodland; elevation approximately 200 to 3,280 feet; found in San Joaquin Valley, Carrizo Plain, and Cuyama Valley from Fresno County south to Santa Barbara County; many occurrences presumed extirpated; threatened by development, grazing, and competition from non-native plants.	**Yes**	Annual grassland habitat with some isolated allscale shrubs occurs within the southern area of the most western portion of the Natural Gas Service Line Route C and to the west of it, as well as within 500 feet of the orchards in the southwest and west. This grassland habitat has been heavily disturbed and regularly maintained by mowing and/or grazing. There are no CNDDB records of this species within 10 miles of the BSA. This species was not observed during the 2020 field survey and it is unlikely to occur within the annual grassland habitat within the BSA.
Caulanthus lemmonii	Lemmon's jewelflower	-/- 1B.2	Annual herb; blooms February through May; occurs in pinyon and juniper woodland and Valley and foothill grassland; elevation approximately 260 to 1,580 feet; documented in lower foothills and mountains in the Coast Ranges on the west side of the Central Valley from Alameda and San Joaquin counties to Ventura County; threatened by development, grazing, and vehicles.	**Yes**	Annual grassland habitat with some isolated allscale shrubs occurs within the southern area of the most western portion of the Natural Gas Service Line Route C and to the west of it, as well as within 500 feet of the orchards in the southwest and west. This grassland habitat has been heavily disturbed and regularly maintained by mowing and/or grazing. There are no CNDDB records of this species within 10 miles of the BSA. This species was not observed during the 2020 field survey and it is unlikely to occur within the annual grassland habitat within the BSA
Clarkia breweri	Brewer's clarkia	-/- 4.2	Annual herb; blooms May to June; occurs in chaparral, cismontane woodland, and coastal scrub; often found on serpentine; elevation from 705 to 3,658 feet; threatened by cattle grazing, and potentially by reservoir construction.	**No**	The BSA is outside of this species elevation range and there is no chaparral, cismontane woodland, coastal scrub, or serpentine habitat within the BSA. There are no CNDDB records of this species within 10 miles of the BSA. This species was not observed during the 2020 field survey and it is not expected to occur within the BSA.

Scientific Name	Common Name	Status	General Habitat Description	Potential to Occur (Present/Yes/No)	Rationale
Deinandra halliana	Hall's tarplant	-/- 1B.2	Annual herb; blooms April, sometimes as early as March, to May; occurs in clay and sometimes alkaline soils in chenopod scrub, cismontane woodland, and Valley and foothill grassland; elevation from 260 to 950 feet; threatened by grazing and non-native plants; appears only in unusually wet years.	**Yes**	Annual grassland habitat with few isolated allscale shrubs occurs within the southern area of the most western portion of the Natural Gas Service Line Route C and to the west of it, as well as within 500 feet of the orchards in the southwest and west. This grassland habitat has been heavily disturbed and regularly maintained by mowing and/or grazing. There are two CNDDB records of this species within 10 miles of the BSA. The closest (EONDX 108637) is located approximately 3.04 miles to the southwest of the BSA. This species was not observed during the 2020 field survey and is unlikely to occur within the annual grassland habitat within the BSA
Delphinium recurvatum	recurved larkspur	-/- 1B.2	Perennial herb; blooms March to June; occurs in alkaline conditions in chenopod scrub, cismontane woodland, and Valley and foothill grassland; elevation approximately 10 to 2,591 feet; endemic to California; occurs throughout Central Valley and Coast Ranges from Butte County south; few occurrences in Antelope Valley; threatened by agriculture and competition from non-native plants.	**Yes**	Annual grassland habitat with some isolated allscale shrubs occurs within the southern area of the most western portion of the Natural Gas Service Line Route C and to the west of it, as well as within 500 feet of the orchards in the southwest and west. This grassland habitat has been heavily disturbed and regularly maintained by mowing and/or grazing. There is one CNDDB record of this species (EONDX 117098) that occurs approximately 5.93 miles southwest of the BSA. This species was not observed during the 2020 field survey and it is unlikely to occur within the annual grassland habitat within the BSA
Eriastrum hooveri	Hoover's eriastrum	-/- 4.2	Annual herb; blooms from March, sometimes as early as February, to July; occurs in chenopod scrub, pinyon/juniper woodland, and Valley and foothill grassland; ranges in elevation from 164 to 3,001 feet; threatened by agriculture, grazing, urbanization, energy development, and vehicles.	**Yes**	Annual grassland habitat with some isolated allscale shrubs occurs within the southern area of the most western portion of the Natural Gas Service Line Route C and to the west of it, as well as within 500 feet of the orchards in the southwest and west. This grassland habitat has been heavily disturbed and regularly maintained by mowing and/or grazing. There are no CNDDB records of this species within 10 miles of the BSA. This species was not observed during the 2020 field survey and it is unlikely to occur within the annual grassland habitat within the BSA
Eriogonum gossypinum	cottony buckwheat	-/- 4.2	Annual herb; flowers between March and September; occurs in clay in chenopod scrub and Valley and foothill grassland; ranges in elevation from 328 to 1,804 feet; threatened by development and possibly by vehicles.	**Yes**	Annual grassland habitat with some isolated allscale shrubs occurs within the southern area of the most western portion of the Natural Gas Service Line Route C and to the west of it as well as within 500 feet of the orchards in the southwest and west. This grassland habitat has been heavily disturbed and regularly maintained by mowing and/or grazing. There are no CNDDB records of this species within 10 miles of the BSA. This species would have been identifiable at the time of the survey, but it was not observed during the 2020 field survey and it is unlikely to occur within the annual grassland habitat within the BSA
Eriogonum vestitum	Idria buckwheat	-/- 4.3	Annual herb; blooms between April and August; occurs in Valley and foothill grassland; ranges in elevation from 770 to 2,952 feet.	**No**	The BSA is outside of this species elevation range. There are no CNDDB records of this species within 10 miles of the BSA. This species was not observed during the 2020 field survey and it is not expected to occur within the BSA.

Scientific Name	Common Name	Status	General Habitat Description	Potential to Occur (Present/Yes/No)	Rationale
Eschscholzia hypecoides	San Benito poppy	-/- 4.3	Annual herb; blooms from March to June; occurs in serpentinite clay in chaparral, cismontane woodland, and Valley and foothill grassland; ranges in elevation between 656 to 4,921 feet.	**Yes**	Annual grassland habitat with some isolated allscale shrubs occurs within the southern area of the most western portion of the Natural Gas Service Line Route C and to the west of it, as well as within 500 feet of the orchards in the southwest and west. This grassland habitat has been heavily disturbed and regularly maintained by mowing and/or grazing. There are no CNDDB records of this species within 10 miles of the BSA. This species was not observed during the 2020 field survey and it is unlikely to occur within the annual grassland habitat within the BSA
Extriplex joaquinana	San Joaquin spearscale	-/- 1B.2	Annual herb; blooms from April to October; occurs in alkaline substrates in chenopod scrub, meadows and seeps, playas, and Valley and foothill grassland; ranges in elevation from 3 to 2,739 feet; threatened by grazing, agriculture, development, and non-native plants.	**Yes**	Annual grassland habitat with some isolated allscale shrubs occurs within the southern area of the most western portion of the Natural Gas Service Line Route C and to the west of it, as well as within 500 feet of the orchards in the southwest and west. This grassland habitat has been heavily disturbed and regularly maintained by mowing and/or grazing. There are no CNDDB records of this species within 10 miles of the BSA. This species was not observed during the 2020 field survey and it is unlikely to occur within the annual grassland habitat within the BSA
Fritillaria agrestis	stinkbells	-/- 4.2	Perennial bulbiferous herb; blooms March to June; occurs on clay and sometimes serpentinite soils in chaparral, cismontane woodland, pinyon and juniper woodland, and valley and foothill grassland; elevation approximately 30 to 5,100 feet; threatened by development, grazing, vehicles, and possibly non-native plants; most populations small; scattered occurrences throughout coast ranges and Sierra Nevada foothills.	**Yes**	Annual grassland habitat with some isolated allscale shrubs occurs within the southern area of the most western portion of the Natural Gas Service Line Route C and to the west of it, as well as within 500 feet of the orchards in the southwest and west. This grassland habitat has been heavily disturbed and regularly maintained by mowing and/or grazing. There are no CNDDB records of this species within 10 miles of the BSA. This species was not observed during the 2020 field survey and it is unlikely to occur within the annual grassland habitat within the BSA
Fritillaria viridea	San Benito fritillary	-/- 1B.2	Perennial bulbiferous herb; blooms between March and May; occurs in serpentinite slopes and sometimes in streambanks, rocky areas, and roadsides in chaparral and cismontane woodland; ranges in elevation from 656 to 5,003 feet; threatened by vehicles and expansion of mining.	**No**	No serpentinite slopes, streambanks, rocky areas, and roadsides in chaparral and cismontane woodland are present within the BSA. There are no CNDDB records of this species within 10 miles of the BSA. This species was not observed during the 2020 field survey and it is not expected to occur within the BSA.
Goodmania luteola	golden goodmania	-/- 4.2	Annual herb; blooms April to August; typically found on alkaline or clay soils and meadows and seeps within Mojavean desert scrub and Valley and foothill grassland; elevation ranges from 65 to 7,220 feet.	**Yes**	Annual grassland habitat with few isolated allscale shrubs occurs within the southern area of the most western portion of the Natural Gas Service Line Route C and to the west of it as well as within 500 feet of the orchards in the southwest and west. This grassland habitat has been heavily disturbed and regularly maintained by mowing and/or grazing. There are no CNDDB records of this species within 10 miles of the BSA. This species was not observed during the 2020 field survey and is unlikely to occur within the annual grassland habitat within the BSA
Lasthenia chrysantha	alkali-sink goldfields	-/- 1B.1	Annual herb; blooms February to June; occurs in alkaline, vernal pool, and wet saline flat habitat; elevation up to 328 feet.	**No**	No vernal pool or wet saline flat habitat occurs on the BSA. There are no CNDDB records of this species within 10 miles of the BSA. This species was not observed during the 2020 field survey and it is not expected to occur within the BSA.

Scientific Name	Common Name	Status	General Habitat Description	Potential to Occur (Present/Yes/No)	Rationale
Layia discoidea	rayless layia	-/- 1B.1	Annual herb; blooms in May; occurs in serpentinite, talus, and alluvial terraces. In chaparral, cismontane woodland, and lower montane coniferous forest; ranges in elevation between 2,608 to 5,200 feet; threatened by vehicles, and possibly by alteration of fire regimes.	**No**	The BSA is outside of this species elevation range and habitat conditions that would support this species are absent within the BSA. There are no CNDDB records of this species within 10 miles of the BSA. This species was not observed during the 2020 field survey and it is not expected to occur within the BSA.
Layia heterotricha	pale-yellow layia	-/- 1B.1	Annual herb; blooms March to June; occurs on alkaline or clay soils in cismontane woodland, coastal scrub, pinyon and juniper woodland, and Valley and foothill grassland; elevation approximately 984 to 5,595 feet; found in western mountains and foothills from Fresno and San Benito counties south to Ventura and possibly Los Angeles Counties; also in Tehachapi Mountains; threatened by agriculture, vehicles, and competition from non-native plants.	**No**	The BSA is outside of this species elevation range and soil conditions that would support this species are absent from the BSA. There are two CNDDB records of this species within 10 miles of the BSA. The closest (EONDX 22348) is located approximately 5.81 miles to the southwest of the BSA. This species was not observed during the 2020 field survey and it is not expected to occur within the BSA.
Layia munzii	Munz's tidy-tips	-/- 1B.2	Annual herb; blooms March to April; occurs in chenopod scrub and Valley and foothill grassland; endemic to California; ranges in elevation from 492 to 2,297 feet; threatened by non-native plants.	**Yes**	Annual grassland habitat with some isolated allscale shrubs occurs within the southern area of the most western portion of the Natural Gas Service Line Route C and to the west of it, as well as within 500 feet of the orchards in the southwest and west. This grassland habitat has been heavily disturbed and regularly maintained by mowing and/or grazing. There is one CNDDB record of this species (EONDX 3129) that occurs approximately 7.14 miles north of the BSA. This species was not observed during the 2020 field survey and it is unlikely to occur within the annual grassland habitat within the BSA
Lepidium jaredii ssp. *album*	Panoche peppergrass	-/- 1B.2	Annual Herb; blooms between February and June; occurs in Valley and foothill grassland (on steep slopes in clay and sometimes alkaline substrates); ranges in elevation from 606 to 2,444 feet; potentially threatened by wind energy development and possibly threated by grazing and vehicles.	**No**	No steep slopes or soil conditions suitable to support this species are present within the BSA. There are six CNDDB records of this species within 10 miles of the BSA. The closest (EONDX 67489) is located approximately 4.87 miles to the southwest of the BSA. This species was not observed during the 2020 field survey and it is not expected to occur within the BSA
Madia radiata	showy golden madia	-/- 1B.1	Annual herb; blooms March to May; occurs in cismontane woodland and Valley and foothill grassland; elevation approximately 80 to 3,985 feet; documented in mountains and foothills along the west side of the Central Valley from Contra Costa County south to Santa Barbara County; threatened by grazing and competition from non-native plants.	**Yes**	Annual grassland habitat with some isolated allscale shrubs occurs within the southern area of the most western portion of the Natural Gas Service Line Route C and to the west of it, as well as within 500 feet of the orchards in the southwest and west. This grassland habitat has been heavily disturbed and regularly maintained by mowing and/or grazing. There are five CNDDB records of this species within 10 miles of the BSA. The closest (EONDX 2985) overlaps the BSA in the orchards in the south. This species was not observed during the 2020 field survey and is unlikely to occur within the annual grassland habitat within the BSA and it would not be present on the Project site.

Scientific Name	Common Name	Status	General Habitat Description	Potential to Occur (Present/Yes/No)	Rationale
Microseris sylvatica	sylvan microseris	-/- 4.2	Perennial herb; blooms March to June; occurs in chaparral, cismontane woodland, Great Basin scrub, pinyon and juniper woodland, and valley and foothill grassland; elevation approximately 150 to 4,920 feet; threatened by wind energy development, grazing, agriculture, vehicles, and recreational activities. Possibly threatened by non-native plants.	**Yes**	Annual grassland habitat with some isolated allscale shrubs occurs within the southern area of the most western portion of the Natural Gas Service Line Route C and to the west of it, as well as within 500 feet of the orchards in the southwest and west. This grassland habitat has been heavily disturbed and regularly maintained by mowing and/or grazing. There are no CNDDB records of this species within 10 miles of the BSA. This species was not observed during the 2020 field survey and it is unlikely to occur within the annual grassland habitat within the BSA
Monardella antonina ssp. *benitensis*	San Benito monardella	-/- 4.3	Perennial rhizomatous herb; blooms June to July; occurs in chaparral, cismontane woodland, lower montane coniferous forest, valley and foothill grassland, and in serpentine barrens; elevation approximately 1,640 to 5,150 feet;	**No**	The BSA is outside of this species elevation range. There are no CNDDB records of this species within 10 miles of the BSA. This species was not observed during the 2020 field survey and it is not expected to occur within the BSA.
Monolopia congdonii	San Joaquin woollythreads	FE/- 1B.2	Annual herb; blooms February to May; occurs on chenopod scrub, and on sandy soils in Valley and foothill grassland; elevational range from 60 to 800 feet; known populations in Carrizo Plain Natural Area, Lost Hills, Kettleman Hills, Jacalitos Hills, Panoche Hills, and Cuyama Valley; threatened by agricultural conversion, energy development, urbanization, grazing, trampling, and off-road activities.	**Yes**	Annual grassland habitat with some isolated allscale shrubs occurs within the southern area of the most western portion of the Natural Gas Service Line Route C and to the west of it, as well as within 500 feet of the orchards in the southwest and west. This grassland habitat has been heavily disturbed and regularly maintained by mowing and/or grazing. There are six CNDDB records of this species within 10 miles of the BSA. The closest (EONDX 3108) overlaps the BSA in the northeast within 500 feet of the orchards and the processing plant. The area near and within the BSA where this species was reported has been converted to agricultural production. This species was not observed during the 2020 field survey and it is unlikely to occur within the annual grassland habitat within the BSA because of the high levels of disturbance.
Navarretia nigelliformis ssp. *radians*	shining navarretia	-/- 1B.2	Annual herb; blooms between April and July; sometimes occurs in clay in cismontane woodland, Valley and foothill grassland, and vernal pools; ranges in elevation from 213 to 3,280 feet; threatened by development and possibly by grazing and competition from non-native plants	**Yes**	Annual grassland habitat with some isolated allscale shrubs occurs within the southern area of the most western portion of the Natural Gas Service Line Route C and to the west of it, as well as within 500 feet of the orchards in the southwest and west. This grassland habitat has been heavily disturbed and regularly maintained by mowing and/or grazing. There are no CNDDB records of this species within 10 miles of the BSA. This species was not observed during the 2020 field survey and it is unlikely to occur within the annual grassland habitat within the BSA
Navarretia panochensis	Panoche navarretia	-/- 1B.3	Annual herb; presently known from a few locations in the Panoche Hills and Panoche Valley of the San Joaquin Desert in Fresno and San Benito Counties from 1,312 to 2,132 feet. On the valley floor, it occurs on surficial sediments of alluvial deposits of sand, clay, and pebbles of sandstone, shale, and serpentinite of Holocene in origin.	**No**	The BSA is outside of this species elevation range. There are five CNDDB records within 10 miles of the BSA. The closest (EONDX 117944) occurs approximately 7.32 miles southwest of the BSA. This species was not observed during the 2020 field survey and it is not expected to occur within the BSA.
Navarretia prostrata	prostrate vernal pool navarretia	-/- 1B.1	Annual herb; blooms April to July; occurs in vernal pools in coastal scrub, meadows and seeps, valley and foothill grassland on alkaline soils; ranges in elevation from sea level to 3,970 feet.	**No**	Coastal scrub, meadows and seeps, and vernal pool habitat are not present within the BSA. There are no CNDDB records of this species within 10 miles of the BSA. This species was not observed during the 2020 field survey and it is not expected to occur within the BSA.

Scientific Name	Common Name	Status	General Habitat Description	Potential to Occur (Present/Yes/No)	Rationale
Senecio aphanactis	chaparral ragwort	-/- 2B.2	Perennial herb endemic to California; blooms May to July; occurs on rocky slopes in coastal bluff scrub and chaparral; ranges in elevation from 1,310 to 4,920 feet.	**No**	The BSA is outside of this species elevation range. There are four CNDDB records of this species within 10 miles of the BSA. The closest CNDDB record of this species occurs approximately 2.79 miles northwest of the BSA. This species was not observed during the 2020 field survey and it is not expected to occur within the BSA.
Solidago guiradonis	Guirado's goldenrod	-/- 4.3	Perennial rhizomatous herb; occurs in cismontane woodland, and valley and foothill grasslands near serpentine streams or seeps in asbestos-laden soils; serpentine; elevation approximately 1,970 to 4,495 feet.	**No**	The BSA is outside of this species elevation range, and soil and mesic conditions that would support this species are absent from the BSA. There are no CNDDB records of this species within 10 miles of the BSA. This species was not observed during the 2020 field survey and it is not expected to occur within the BSA.
Trichostema ovatum	San Joaquin bluecurls	-/- 4.2	Annual herb; blooms from July to October; occurs in chenopod scrub and Valley and foothill grassland; ranges in elevation from 213 to 1,050 feet; possibly threatened by recreational activities.	**Yes**	Annual grassland habitat with some isolated allscale shrubs occurs within the southern area of the most western portion of the Natural Gas Service Line Route C and to the west of it, as well as within 500 feet of the orchards in the southwest and west. This grassland habitat has been heavily disturbed and regularly maintained by mowing and/or grazing. There are no CNDDB records of this species within 10 miles of the BSA. This species would have been identifiable at the time of the surveys, but it was not observed during the 2020 field survey and is unlikely to occur within the annual grassland habitat within the BSA
Trichostema rubisepalum	Hernandez bluecurls	-/- 4.3	Annual herb; blooms from June to August; occurs in broad-leafed upland forest, chaparral, cismontane woodland, lower montane woodland, vernal pools; occurs in volcanic or serpentine substrates; elevation from approximately 985 to 4,700 feet.	**No**	The BSA is outside of this species elevation range and soil conditions suitable to support this species are absent from the BSA. There are no CNDDB records of this species within 10 miles of the BSA. This species was not observed during the 2020 field survey and it is not expected to occur within the BSA.
INVERTEBRATES					
Aegialia concinna	Ciervo aegilian scarab beetle	-/- G1/S1	Little is known about the specific life history and habitat of the Ciervo aegialian scarab beetle, but it is associated with Delta and inland dune systems, and sandy substrates. Threatened by fragmentation, degradation of dunes by agricultural development, flood control, water management, and off-road vehicle use.	**No**	No dune systems, and sandy substrates are present within the BSA. There are three CNDDB records of this species within 10 miles of the BSA. The closest (EONDX 22632) occurs approximately 2.06 miles west of the BSA. This species was not observed during the 2020 field survey and is not expected to occur within the BSA.
Branchinecta longiantenna	longhorn fairy shrimp	FE/-	This fairy shrimp species occurs in and is endemic to the eastern margin of the central coast mountains. It is found seasonally in astatic grassland vernal pools and inhabits small, clear-water depressions in sandstone and clear-to-turbid clay/grass-bottomed pools in shallow swales.	**No**	No vernal pools, swales, or clear water depressions are present within the BSA. There are two CNDDB records of this species within 10 miles of the BSA. The closest (EONDX 95762) occurs approximately 6.85 miles northeast of the BSA. This species was not observed during the 2020 field survey and it is not expected to occur within the BSA.
Branchinecta lynchi	vernal pool fairy shrimp	FT/-	This fairy shrimp species occurs in a variety of vernal pool habitats from small, clear sandstone rock pools to large, turbid, alkaline, grassland valley floor pools.	**No**	No vernal pools or grassland valley pools are present within the BSA. There are no CNDDB records of this species within 10 miles of the BSA. This species was not observed during the 2020 field survey and it is not expected to occur within the BSA.

Scientific Name	Common Name	Status	General Habitat Description	Potential to Occur (Present/Yes/No)	Rationale
Linderiella occidentalis	California linderiella	-/- G2G3/ S2S3	This fairy shrimp species occurs in a variety of 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.	**No**	No seasonally ponded habitat types including vernal pools, swales, ephemeral drainages, stock ponds, reservoirs, ditches, backhoe pits, and ruts are present within the BSA. There are no CNDDB records of this species within 10 miles of the BSA. This species was not observed during the 2020 field survey and it is not expected to occur within the BSA.
Metapogon hurdi	Hurd's metapogon robberfly	-/- G1G2/S1S2	This species has only been found in sandy habitat in Antioch, Contra Costa County, and Fresno County. There is no published information on the life history or behavior of this species, but robberflies eat other insects and larvae usually develop in soil or rotting wood.	**No**	No sandy habitat that would support this species is present within the BSA. There is one CNDDB record of this species within 10 miles of the BSA (EONDX 88103) and is located approximately 1.49 miles to the west of the BSA. This species was not observed during the 2020 field survey and it is not expected to occur within the BSA.
Protodufourea wasbaueri	Wasbauer's protodufourea bee	-/- G1/S1	This species has been found in chaparral and desert scrub; nests in the ground; specialized pollinator that collects pollen on *Emmenanthe* sp., a plant that blooms in profusion after fires, then declines.	**No**	No chaparral or desert scrub occurs within the BSA. No *Emmenanthe* sp. were observed onsite to provide foraging for this species. There are no CNDDB records of this species within 10 miles of the BSA. This species was not observed during the 2020 field survey and it is not expected to occur within the BSA.
FISH					
Hypomesus transpacificus	Delta smelt	FE/CT	This species occurs in the Sacramento and San Joaquin estuaries of the San Francisco Bay. Occurs primarily in main water bodies and sloughs of the Delta and Suisun Bay. Not directly associated with small stream systems.	**No**	The BSA is outside of this species range. There are no CNDDB records of this species within 10 miles of the BSA. This species was not observed during the 2020 field survey and it is not expected to occur within the BSA.
AMPHIBIANS					
Ambystoma californiense	California tiger salamander	FT/CT	This species occurs in natural ephemeral pools or ponds that mimic them, and that remain inundated for 12 weeks or more. It requires nearby upland habitat containing small mammal burrows or crevices that provide refugia.	**No**	No ephemeral pools or natural ponds ephemeral pools or ponds are present within the BSA. There are no CNDDB records of this species within 10 miles of the BSA. This species was not observed during the 2020 field survey and it is not expected to occur within the BSA.
Rana boylii	foothill yellow-legged frog	-/CE CSC	This species occurs in quiet pools of small streams, ponds and marshes, preferably with dense shrubby vegetation such as cattails and willows near deep water pools.	**No**	No quiet pools of small streams, ponds and marshes are present within the BSA. There are no CNDDB records of this species within 10 miles of the BSA. This species was not observed during the 2020 field survey and it is not expected to occur within the BSA.
Spea hammondii	western spadefoot	-/- CSC	This species occurs primarily in grassland habitats but can also be found in valley-foothill hardwood woodlands. Grasslands with shallow temporary pools are optimal habitats for breeding and egg laying.	**Yes**	Aquatic resources consisting of irrigation basins (Basin 1 through 7) that could support this species are present within the BSA. There is one CNDDB record of this species (EONDX 114265) that occurs approximately 2.40 miles northwest of the BSA. This species was not observed during the 2020 field survey but aquatic habitat that could support this species occurs at Basin 1 through 7. None of these basins would be impacted by the Project.

Scientific Name	Common Name	Status	General Habitat Description	Potential to Occur (Present/Yes/No)	Rationale
REPTILES					
Anniella pulchra	northern California legless lizard	-/- CSC	Secretive fossorial lizard found in many habitats, especially valley and foothill grassland, chaparral, coastal scrub, and coastal dune, most commonly associated with sandy or loose organic soils with leaf litter; elevation from near sea level to 6,000 feet; may hibernate in inland areas with colder winter temperatures; primarily associated with foothill and mountains from Ventura County north to San Joaquin and Contra Costa counties, and in the western Sierra Nevada foothills in Fresno and Tulare counties.	**No**	No sandy or loose organic soils with leaf litter is present within the BSA. There are two CNDDB records of this species within 10 miles of the BSA. The closest (EONDX 107056) is located approximately 4.97 miles to the southwest of the BSA. This species was not observed during the 2020 field survey and it is not expected to occur within the BSA.
Arizona elegans occidentalis	California glossy snake	-/- CSC	Common throughout California, especially in desert habitats but also chaparral, sagebrush, valley and foothill hardwood, pine-juniper woodland, and annual grassland; elevation from below sea level to 6,000 feet; nocturnal; utilize small mammal burrows, rock outcrops, and loose soil for cover; prefer open sandy areas with scattered brush, or rocky areas; ranges from eastern part of San Francisco Bay Area south to northwestern Baja California, but absent from coast; may also be in Tehachapi Mountains and Santa Monica Mountains.	**Yes**	No sandy areas with scattered brush or rocky areas are present within the BSA. There is one CNDDB record of this species (EONDX 104888) that occurs approximately 4.29 miles west of the BSA. This species was not observed during the 2020 field survey but annual grassland habitat occurring within limited areas of the BSA could support this species.
Emys marmorata	western pond turtle	-/- CSC	This species occurs in ponds and small lakes with abundant vegetation; also found in marshes, slow moving streams, reservoirs, and brackish water. Require basking sites.	**No**	No ponds, lakes, marshes, reservoirs, or streams are present within the BSA. There is one CNDDB record of this species (EONDX 516) that occurs approximately 5.59 miles southwest of the BSA. This species was not observed during the 2020 field survey and it is not expected to occur within the BSA.
Gambelia sila	blunt-nosed leopard lizard	FE/CE FP	This species occurs in sparsely vegetated alkali and desert scrub habitats, in areas of low topographic relief. It seeks cover in mammal burrows, under shrubs, or structures such as fence posts.	**Yes**	Annual grassland habitat with some isolated allscale shrubs occurs within the southern area of the most western portion of the Natural Gas Service Line Route C and to the west of it, as well as within 500 feet of the orchards in the southwest and west. This grassland habitat has been heavily disturbed and regularly maintained by mowing and/or grazing. There are two CNDDB records of this species that overlap the BSA (EONDX 27782, and 27714). These records occur within 500 feet of the Processing Plant Site and within 500 feet of the proposed Natural Gas Service Line Route C. Habitat on and near the Processing Plant site has been converted to agricultural use and would no longer support this species. This species was not observed during the 2020 but the limited annual grassland habitat that occurs within the BSA could support this species.

Scientific Name	Common Name	Status	General Habitat Description	Potential to Occur (Present/Yes/No)	Rationale
Masticophis flagellum ruddocki	San Joaquin coachwhip	-/- CSC	Occurs in open, dry, treeless areas with little or no cover; found in valley grassland and saltbush scrub habitats; avoids areas that are densely vegetated; found from the Sacramento Valley in Colusa County southward to the Grapevine in Kern County and westward to the inner South Coast Ranges; threatened by habitat loss and fragmentation, conversion of large suitable habitats to agricultural use in the San Joaquin Valley and urban development in the inner Coast Ranges.	**Yes**	Annual grassland habitat with some isolated allscale shrubs occurs within the southern area of the most western portion of the Natural Gas Service Line Route C and to the west of it, as well as within 500 feet of the orchards in the southwest and west. This grassland habitat has been heavily disturbed and regularly maintained by mowing and/or grazing. The closest CNDDB record of this species is located 0.35 miles to the west of the BSA. This species was not observed during the 2020 but annual grassland habitat that occurs within the BSA could support this species.
Thamnophis gigas	giant gartersnake	FT/CT	This species primarily occurs in permanent or semi-permanent marshes and sloughs, drainage canals, and irrigation ditches, particularly around rice fields. It prefers to reside in sloughs that are flooded in summer and dry in winter. It can occasionally be found in slow-moving creeks. It prefers locations with vegetation close to the water for basking.	**No**	No marshes and sloughs, drainage canals, and irrigation ditches are present within the BSA. There is one CNDDB record of this species (EONDX 46373) that occurs approximately 6.17 miles northeast of the BSA. This species was not observed during the 2020 field survey and is not expected to occur within the BSA.
Thamnophis hammondii	two-striped gartersnake	-/- G4/S3S4	This species is generally found near water sources including pools, creeks, cattle tanks, and others, often in rocky areas. Associated vegetation: oak woodland, willow, coastal sage scrub, scrub oak, sparse pine, chaparral, and brushland. Ranges continuously from near Salinas in Monterey County south along the coast mostly west of the south Coast Ranges, to southern California where it ranges east through the Transverse Ranges, and south through the coastal area and the Peninsular Ranges into northern Baja California. Occurs in some perennial desert slope streams north of the Transverse Ranges and east of the Peninsular Ranges, and into the Mohave Desert in Victorville.	**No**	No pools, creeks, cattle tanks surrounded by rocky areas are present within the BSA. There are no CNDDB records of this species within 10 miles of the BSA. This species was not observed during the 2020 field survey and is not expected to occur within the BSA.
BIRDS					
Agelaius tricolor	tricolored blackbird	-/CT	This species occurs near fresh water, and prefer emergent wetland vegetation with tall, dense cattails or tules, but is also found in thickets of willow, blackberry, wild rose, and tall herbs. It has been found to nest and forage in grassland and agricultural fields (pastures, dairies, rice fields). A highly social nester, it occurs in large colonies.	**No**	No fresh water and emergent wetland vegetation with tall, dense cattails or tules are present within the BSA. There is one CNDDB record of this species (EONDX 98870) that occurs approximately 8.85 miles to the southeast of the BSA. This species was not observed during the 2020 field survey and is not expected to occur within the BSA.
Asio flammeus	short-eared owl	-/- CSC	Winters in Central Valley, western Sierra Nevada foothills, and along coastline, less often in southern California; breeding range includes northern California along the coast of Del Norte and Humboldt counties, San Francisco Bay Delta, northeastern Modoc plateau, eastern Sierra from Lake Tahoe south to Inyo County, and the San Joaquin Valley; nests on ground in depression concealed in vegetation; suitable nesting habitat may include salt- and freshwater marshes, irrigated alfalfa or grain fields, and ungrazed grasslands and old pastures; prefers open treeless habitats with perches.	**No**	Suitable salt/freshwater marsh, irrigated alfalfa or grain fields, or ungrazed grasslands and old pastures which are suitable for nesting do not occur within the BSA. Grassland habitat occurs within the BSA, but this habitat is routinely grazed and disked grassland habitat providing poor nesting habitat. There are two CNDDB records of this species within 10 miles of the BSA. The closest (EONDX 49800) is located approximately 1.07 miles to the northwest of the BSA. This species was not observed during the 2020 field survey and it is not expected to occur within the BSA.

Scientific Name	Common Name	Status	General Habitat Description	Potential to Occur (Present/Yes/No)	Rationale
Athene cunicularia	burrowing owl	-/- CSC	This species occurs in open annual or perennial grasslands, deserts and scrublands characterized by low-growing vegetation.	**Yes**	Annual grassland habitat with some isolated allscale shrubs occurs within the southern area of the most western portion of the Natural Gas Service Line Route C and to the west of it, as well as within 500 feet of the orchards in the southwest and west. This grassland habitat has been heavily disturbed and regularly maintained by mowing and/or grazing. There are five CNDDB records of this species within 10 miles of the BSA. The closest (EONDX 3616) is located approximately 3.32 miles to the northeast of the BSA. This species was not observed during the 2020 field survey but because it is present in the region year-round, it is possible that western burrowing owls could become established within the BSA or be present from time to time as transient foragers.
Charadrius montanus	mountain plover	-/- CSC	Does not breed in California; winter resident from September-March; occurs in grasslands, open sagebrush, and plowed fields throughout central and southern California, except desert regions; feeds on large insects, especially grasshoppers.	**Yes**	Agricultural fields are present within 500 feet of the Processing Plant Site and Water Settling and Cleaning Pond Site, within 500 feet of the orchards in the southwest and west, and within 500 feet west of the proposed natural gas service line routes. There are two CNDDB records of this species within 10 miles of the BSA. The closest (EONDX 53590) is located approximately 8.63 miles to the northeast of the BSA. This species was not observed during the 2020 field survey but habitat that could support winter visitors of this species occurs within the BSA.
Coccyzus americanus occidentalis	western yellow-billed cuckoo	FT/CE	Nests in open riparian woodlands along broad lower flood bottoms of larger river systems; prefers willows, often mixed with cottonwood, with understory of blackberry, nettles or wild grape; nest most often placed in willows with cottonwoods used extensively for foraging; also occasionally nests in orchards adjacent to river bottoms; migratory.	**No**	Riparian woodland habitat is not present within the BSA. There are no CNDDB records of this species within 10 miles of the BSA. This species was not observed during the 2020 field survey and it is not expected to occur within the BSA.
Empidonax traillii extimus	southwestern willow flycatcher	FT/CT	Occurs in broad, open river valleys or large mountain meadows with lush growth of shrubby willows; prefers to nest within shrubs and brushes, often near the outer edge; primarily feed on insects including bees, wasps, ants, beetles, and moths but will also consume blackberries, raspberries, currants, and dogwood berries; threats include loss and modification of riparian habitat and nest parasitism by the brown-headed cowbird.	**No**	No riparian habitat that could support this species is present within the BSA. There are no CNDDB records of this species within 10 miles of the BSA. This species was not observed during the 2020 field survey and it is not expected to occur within the BSA.
Eremophila alpestris actia	California horned lark	-/- G5/S4	Horned larks are common in large agricultural fields, open areas, and Valley grasslands.	**Yes**	Annual grassland and open fields are present within and surrounding the BSA. There is one CNDDB record of this species (EONDX 12997) that occurs approximately 0.92 miles northwest of the BSA. A horned lark was observed during the 2020 field survey within the disked fields south of the Processing Plant Site; however, it was not identified to species. There is habitat within the BSA that could support this species and there is potential for it to occur as a forager within the BSA

Scientific Name	Common Name	Status	General Habitat Description	Potential to Occur (Present/Yes/No)	Rationale
Falco columbarius	merlin	-/- G5/ S3S4	Does not breed in California; winter resident from September to May; occurs in open grasslands, savannahs, woodlands, coastlines, lakes, wetlands, and early successional stage habitats; occurs in most of western half of state below 3,900 feet; prefers dense tree stands close to bodies of water for cover; rare in Mojave Desert; feeds primarily on small birds; threats likely include reduction of bird prey species due to pesticides.	**Yes**	No dense tree stands adjacent to bodies of water providing nesting habitat are present within the BSA. Foraging habitat consisting of annual grassland habitat with some isolated allscale shrubs occurs within the southern area of the most western portion of the Natural Gas Service Line Route C and to the west of it, as well as within 500 feet of the orchards in the southwest and west. Disked/mowed field is present within the project site. There are no CNDDB records of this species within 10 miles of the BSA. This species was not observed during the 2020 field survey but foraging habitat that could support this species occurs within the BSA.
Gymnogyps californianus	California Condor	FE/CE	Documented in southern and northern California, northern Baja California, Oregon, southern British Columbia, Arizona, Utah, and Nevada where the three states come together; rare visitor to the San Joaquin Valley; found at elevation ranges from sea level to 9,000 feet; main characteristics sought for a nest site are: 1) partially sheltered from the weather and 2) located on a cliff, steep slope, or tall tree; nest are located between 2,000 to 6,500 feet in elevation; threatened by lead poisoning, microtrash ingestion, collisions, electrocution by powerlines, drownings, and predation; more recent threats have been from shootings.	**No**	Nesting habitat consisting of cliff, steep slope, or tall tree located between 2,000 to 6,500 feet in elevation are absent from the BSA. There are no CNDDB records of this species within 10 miles of the BSA. This species was not observed during the 2020 field survey and it is not expected to occur within the BSA.
Lanius ludovicianus	loggerhead shrike	-/- CSC	This species forages in open landscapes characterized by well-spaced, often spiny, shrubs and low trees, interspersed with short grasses, forbs, and bare ground. While hunting they use perches such as telephone and barbed wire and tall shrubs or trees, and often use sharp objects such as barbed wire and thorns on which to impale prey items; found throughout North America, extending up into Canada during the breeding season and as far south as Central America during the winter; northern populations are migratory; Southern California populations are resident. Nests are placed within dense vegetation, often thorny, at variable heights above the ground, usually between 1 and 2 meters.	**Present**	Limited nesting habit consisting of some isolated allscale shrubs that could support this species present is within the degraded annual grassland habitat within the most western portion the Natural Gas Service Line Route C. Foraging and perching habitat occurs through the BSA and loggerhead shrike could occur from time to time as transient and or/forager throughout the BSA. There are no CNDDB records of this species within 10 miles of the BSA. This species was observed during the 2020 field survey within the Processing Plant Site, but no nesting habitat is present. It could nest within the limited grassland/shrubland areas within the BSA and it could forage within the BSA.
Plegadis chihi	white-faced ibis	-/- G5/S3S4	This species requires dense thickets for nesting interspersed with areas of shallow water for foraging.	**Yes**	No nesting habitat consisting of dense thickets or foraging habitat with shallow water are present within the BSA. However, open agricultural fields within the BSA are suitable to support flocks of this species, although they usually forage in flooded or moist field. There are no CNDDB records of this species within 10 miles of the BSA. This species was not observed during the 2020 field survey, but it could occur as a transient forager.
Vireo bellii pusillus	least Bell's vireo	FE/CE G5/S2	Inhabits low, dense riparian growth along waterways or along dry parts of intermittent streams. Typically associated with willow, cottonwood, baccharis, wild blackberry, or mesquite (in desert localities).	**No**	No riparian habitat that could support this species is present within the BSA. There are no CNDDB records of this species within 10 miles of the BSA. This species was not observed during the 2020 field survey and it is not expected to occur within the BSA.

Scientific Name	Common Name	Status	General Habitat Description	Potential to Occur (Present/Yes/No)	Rationale
MAMMALS					
Ammospermophilus nelsoni	San Joaquin antelope squirrel	-/CT	San Joaquin antelope squirrel inhabits the western San Joaquin Valley and Carrizo area from 200 to 1,200 feet in elevation in dry, sparsely vegetated loam soils. It digs burrows or uses kangaroo rat burrows. It generally requires widely scattered shrubs, forbs and grasses in broken terrain with gullies and washes but can be found in grassland habitats.	**Yes**	Annual grassland habitat with some isolated allscale saltbush shrubs that could support this species is present within the southern area of the most western portion of the Natural Gas Service Line Route C and to the west of it, as well as within 500 feet of the orchards in the southwest and west. Though this habitat has been routinely disturbed, this habitat could support the San Joaquin antelope squirrel. There were eleven CNDDB records of this species within 10 miles of the BSA. The closest (EONDX 65254) overlaps the BSA but the area where this record occurs has been converted to agriculture and would no longer support this species. This species was not observed during the 2020 field survey but limited areas of annual grassland habitat that occurs within the BSA could support this species.
Dipodomys nitratoides exilis	Fresno kangaroo rat	FE/CE -/-	This species historically occurred in alkali sink and open grassland habitats on the valley floor in Fresno County and portions of Tulare, Kings, and Madera counties. The last confirmed specimen was captured in 1992 and it may be extinct.	**Yes**	Annual grassland habitat and fallowed farm fields that could support this species occurs within 500 feet of the Processing Plant Site and Water Settling and Cleaning Pond Site, within 500 feet of the orchards in the southwest and west, and within 500 feet south and west of Natural Gas Service Line Route C. There are no CNDDB records of this species within 10 miles of the BSA. This species was not captured during the 2020 small mammal trapping effort and it is not expected to occur within the BSA.
Dipodomys venustus elephantinus	big-eared kangaroo rat	-/- G4/ S2	Occurs in chaparral-covered slopes of the southern part of the Gabilan Range, in the vicinity of Pinnacles National Park; forages under shrubs & in the open; burrows for cover and for nesting.	**No**	The BSA does not occur within the Gabilan Range and is over 40 miles east of Pinnacles. There are no CNDDB records of this species within 10 miles of the BSA. This species was not captured during the 2020 small mammal trapping effort and it is not expected to occur within the BSA.
Eumops perotis californicus	western mastiff bat	-/- CSC	Occurs in open, semi-arid to arid habitats throughout southeastern San Joaquin Valley and Coast Ranges from Monterey County southward; also in urban areas; feeds on insects captured in flight; roosts in cliff faces, high buildings, trees, and tunnels; nursery roosts most often in tight rock crevices or crevices in buildings; maternity season begins in March with young flying on their own by September.	**No**	High buildings and structures that could provide roosting habitat for this species are not present within the BSA. There are no CNDDB records of this species within 10 miles of the BSA. This species was not observed during the 2020 field survey but foraging habitat that could support this species occurs within the BSA.
Lasiurus blossevillii	western red bat	-/- G5/ S3	Locally common in areas from Shasta County to Mexican border, west of the Sierra Nevada/Cascade crests; migrates between summer and winter ranges; roosts in forests and woodlands from sea level up through mixed conifer forests; not in deserts; feeds on insects over grasslands, shrublands, open woodlands and forests, and croplands; roosts primarily in trees on edge habitats near streams, fields, or urban areas, less often in shrubs; requires water; maternity season from late May through early July; usually does not roost with other bats; rabies is common in this species.	**No**	Roosting habitat consisting of trees associated with riparian areas are not present within the BSA. There are no CNDDB records of this species within 10 miles of the BSA. This species was not observed during the 2020 field survey and it is not expected to occur within the BSA.

Scientific Name	Common Name	Status	General Habitat Description	Potential to Occur (Present/Yes/No)	Rationale
Lasiurus cinereus	hoary bat	-/- G5/ S4	This species occurs in deciduous and coniferous forests and woodlands, including areas altered by humans. Roost sites usually occur in tree foliage with dense foliage above and open flying room below, often at the edge of a clearing and commonly in hedgerow trees. Sometimes it roosts in rock crevices, but rarely in caves. When hibernating, it has been found on tree trunks, in a tree cavity, in a squirrel's nest, and in a clump of Spanish-moss.	**No**	Roosting habitat consisting of trees associated with riparian areas are not present within the BSA. There are no CNDDB records of this species within 10 miles of the BSA. This species was not observed during the 2020 field survey and it is not expected to occur within the BSA.
Myotis yumanensis	Yuma myotis	-/- G5/ S4	This species occurs near reservoirs and roosts in buildings, trees, mines, caves, bridges, and rock crevices. Maternity colonies are active between May and July.	**Yes**	Buildings and structures that could provide roosting habitat for this species are present within the BSA. There are no CNDDB records of this species within 10 miles of the BSA. This species was not observed during the 2020 field survey but roosting and foraging habitat that could support this species occurs within the BSA.
Perognathus inornatus	San Joaquin Pocket Mouse	-/- G2G3/ S2S3	Occurs in dry, open grasslands or scrublands on fine-textured soils in the Central (mostly west side) and Salinas valleys; elevation from 1,100 to 2,000 feet; feeds primarily on seeds; digs burrows for cover and breeding; nocturnal.	**Present**	Grassland habitat that could support this species occurs within 500 feet of the orchards in the southwest and west, and within 500 feet south and west of Natural Gas Service Line Route C There are three CNDDB records of this species within 10 miles of the BSA. The closest (EONDX 113695) is located approximately 0.35 mile to the west of the BSA. This species was identified as occurring in grassland habitat to the west of the BSA.
Taxidea taxus	American badger	-/- CSC	This species occurs in drier open stages of most shrub, forest, and herbaceous habitats, with friable soils. It needs sufficient food and open, uncultivated ground. It preys on burrowing rodents and digs burrows.	**Yes**	Annual grassland habitat with some isolated allscale shrubs occurs to the west of the BSA. That area likely supports the American badger and there is a strong possibility that it is a transient forager within the BSA. There are no CNDDB records of this species within 10 miles of the BSA. This species was not documented during the 2020 field survey efforts but could occur as a transient and/or forager or even to establish den within the suitable habitat of the BSA.
Vulpes macrotis mutica	San Joaquin kit fox	FE/CT	This species occurs in annual grasslands or grassy open stages with scattered shrubby vegetation. Need loose-textured sandy soils for burrowing, and suitable prey base.	**Present**	Annual grassland habitat with some isolated allscale shrubs occurs to the west of the BSA. That habitat is likely to support the San Joaquin kit fox. There are twelve CNDDB records of this species within 10 miles of the BSA. The closest (EONDX 53805) is located approximately 0.59 mile to the northeast of the BSA. This species was observed during spotlighting surveys for this Project. The sighting was within 500 feet of the BSA southeast of the Processing Plant Site. This species could occur as a transient forager or it even could establish dens within the BSA.

APPENDIX E

CALIFORNIA NATIVE SPECIES FIELD FORM

CNDDB Online Field Survey Form Report

California Natural Diversity Database
Department of Fish and Wildlife
1416 9th Street, Suite 1266
Sacramento, CA 95814
Fax: 916.324.0475
cnddb@wildlife.ca.gov
www.dfg.ca.gov/biogeodata/cnddb/

This data has been reported to the CNDDB, but may not have been evaluated by the CNDDB staff

Source code YAT20F0001
Quad code 3612054
Occ. no.
EO index no.
Map index no.

Scientific name: *Vulpes macrotis mutica*

Common name: San Joaquin kit fox

Date of field work (mm-dd-yyyy): 07-23-2020

Comment about field work date(s): San Joaquin kit fox spotlighting survey.

OBSERVER INFORMATION

Observer: Sarah J. Yates

Affiliation: QK

Address: 38614 Bon Veu Circle , Oakhurst, CA 93644

Email: Sarah.Yates@qkinc.com

Phone: (559) 760-2242

Other observers: Curtis Uptain, Julie Hausknecht

DETERMINATION

Keyed in:

Compared w/ specimen at:

Compared w/ image in:

By another person: Curtis Uptain; Julie Hausknecht

Other:

Identification explanation: San Joaquin kit fox pup observed at the edge of an existing road south of Kamm Avenue along a disked field within approximately 50 feet of spotlighting driving route. Full view of kit fox obtained upon approach. Fox then observed hunting in disked field.

Identification confidence: Very confident

Species found: Yes **If not found, why not?**

Level of survey effort:

Total number of individuals: 1

Collection? **Collection number:**

Museum/Herbarium:

ANIMAL INFORMATION

How was the detection made? Seen

Number detected in each age class:

adults	juveniles	larvae	egg mass	unknown
	1			

Age class comment: San Joaquin kit fox pup observed hunting.

Site use description: Hunting for small mammals.

What was the observed behavior? Observed along roadside. Stopped to look at spotlighting vehicle and then resumed hunting in the disked field to the east of the road first seen.

Describe any evidence of reproduction:

SITE INFORMATION

Habitat description: San Joaquin kit fox pup observed foraging in a recently disked agricultural field.

Slope: 0 Land owner/manager:

Aspect:

Site condition + population viability: Good

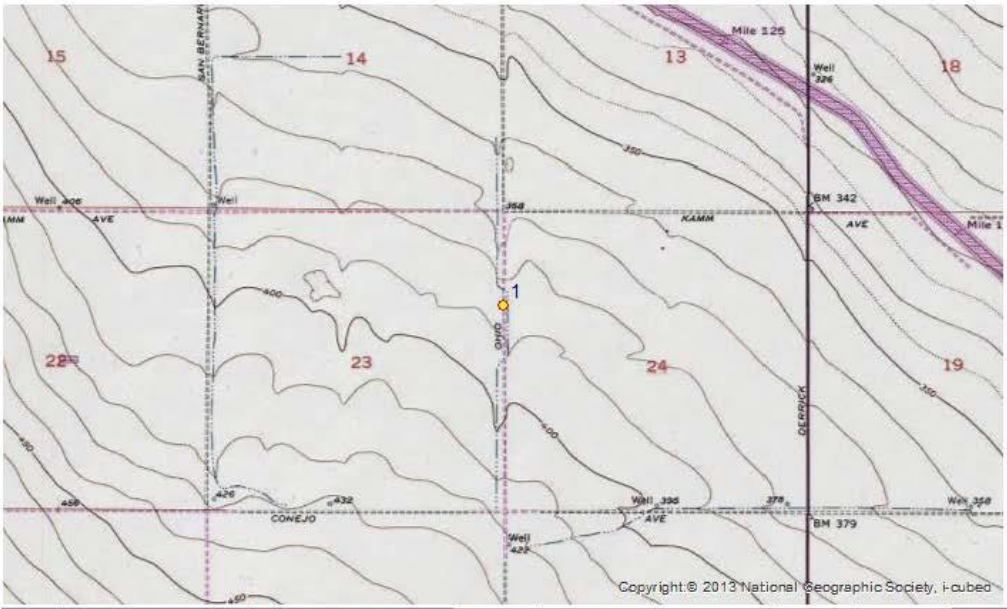
Immediate & surrounding land use: Agriculture: orchard, disked fields.

Visible disturbances: Dirt agricultural roads with high agricultural activity, paved road along Kamm Ave., disked fields.

Threats: Agricultural activity.

General comments: Agricultural field San Joaquin kit fox observed in disked field surrounded by agricultural fields and infrastructure. Observed approximately 3.95 miles directly east of natural atriplex scrub and grassland habitat with sloped hills ideal for denning.

MAP INFORMATION



ID	County	24K Quadrangle	Elev. (ft)	Latitude NAD83	Longitude NAD83	UTME NAD83	UTMN NAD83	UTM Zone
	Fresno	Levis	388	36.52600	-120.40717	732147	4045420	10
	Public Land Survey	**Feature Comment**						
1	M T16S R14E 24							

The mapped feature is accurate within: 5 m

Source of mapped feature: ArcGIS Collector app

Mapping notes: Location of siting recorded with an iPad with Collector data collection app installed. GPS accuracy approx. 16 feet.

Location/directions comments: San Joaquin kit fox pup observed south of W Kamm Ave., west of CA-33, east of S San Bernardino Ave. and north of W Conejo Ave. along an ag road running adjacent to a disked field.

Attachment(s):

Appendix C

Cultural Resources Report

A Cultural Resources Survey of 475.76 Acres
038-300-17S, 038-300-30S and 038-300-14S

Prepared For:
Kamm Avenue Pistachio Processing LLC (KAPP)

Prepared by Robert Pennell, Tribal Cultural Resources Director,
Roger LaJeunesse P.hD.
Cristina Gonzales, Assistant Director/Museum Registrar
Sara Lane Barnett, Cultural Resources Assistant
Venessa Jimenez, Cultural Resources Assistant
Ngoc Thuy Kirby, GIS Specialist
Table Mountain Rancheria, October 2020
Topographic Quadrangle: Levi Calif., 7.5' (2018)

(**Keywords**: *Fresno County, Pitkachi, Table Mountain, bedrock milling, Three Rocks, Cantua Creek)*

(Cover photo: Looking west over the KAPP property to the Ciervo Hills)

Table of Contents

List of Figures ii

Management Summary 1

1.0 Introduction 1

2.0 Background 2

3.0 Regulatory Context 3

4.0 Setting 4

4.1 Natural Environment 4

4.2 Ethnography and Ethnohistory 5

5.0 Record Search 8

6.0 Field Methods 8

7.0 Geoarcheological Context 10

8.0 Evaluations and Recommendations 12

References Cited 15

Appendix A Record Search CONFIDENTIAL

List of Figures

Figure 1 Project Location, Fresno County

Figure 2 Surveyed Area, Aerial Map

Figure 3 Fresno County Assessors Map

Figure 4 USGS Levi Topographical Map, 1923

Figure 5 GLO Map 16S 14E, 1855

Figure 6 El Camino A Los Angeles

Figure 7 Soils Map

Figure 8 Surface Site Potential

Figure 9 Buried Site Potential

Figure 10 Potential Natural Gas Service Alignments

1.0 INTRODUCTION

On March 19th 2019 and August 27th 2020, the Table Mountain Cultural Resources Department conducted a cultural resources inventory on 475.76 acres; which included a Cultural Resources Survey of 315.76 Acres on March 19, 2019, APN 038-300-17S and 038-300-30S, and on August 27th 2020, 160 acres on APN 038-300-14S, properties owned by Kamm Avenue Pistachio Processing, LLC (KAPP).

The 475.76 acre combined study area is located south of Kamm Ave and one-mile west of Highway 33 near the unincorporated community of Three Rocks, California in Fresno County. **(Figure 1,2)** The proposed development is located on the United States Geologic Survey (USGS) Levi (2018) 7.5' topographic quadrangle map. The study area falls within the east half of Section 23 in Township 16 South, Range 14 East of the Mount Diablo Meridian **(Figure 4,5)**.

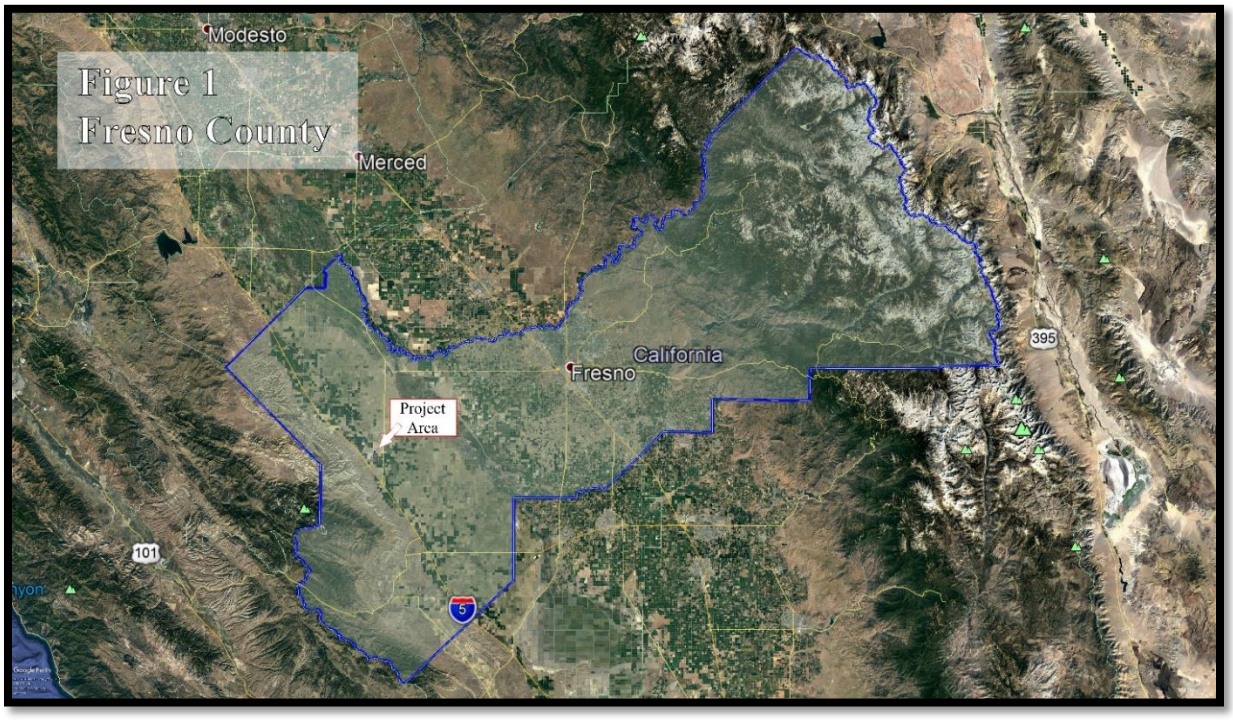


Figure 1

The results of this effort are included in a cultural resources report for the 475.76 acre construction of a Pistachio Processing Facility. In order to complete this process, an inventory of cultural resources is required, pursuant to AB-52 of the California Environmental Quality Act.

2.0 Background

KAPP, is preparing to develop land south of Kamm Avenue and 1-mile west of Highway 33 near the community of Three Rocks, California for the purpose of developing a Pistachio Processing Facility. This report presents the results of the cultural resources investigation of 315.75 acres on parcels 038-300-17S and 038-300-30S that will see the construction of the Pistachio Processing Facility and 160 contiguous acres on parcel 038-300-14S (**Figure** 3) owned by KAPP, for the purpose of spreading and temporary storage of green waste (leaves, sticks and twigs).

Figure 2

This archaeological survey by Table Mountain Rancheria was conducted on March 19th 2019 and August 27th 2020. Project personnel included professional archaeological staff from the Table

Mountain Rancheria Cultural Resources Department of Friant, California; Robert Pennell, Roger LaJeunesse Ph.D, Cristina Gonzales and Sara Barnett.

A description of the natural and cultural setting of the study area is presented below, as well as a discussion of the survey methods employed, and a finding of no effect.

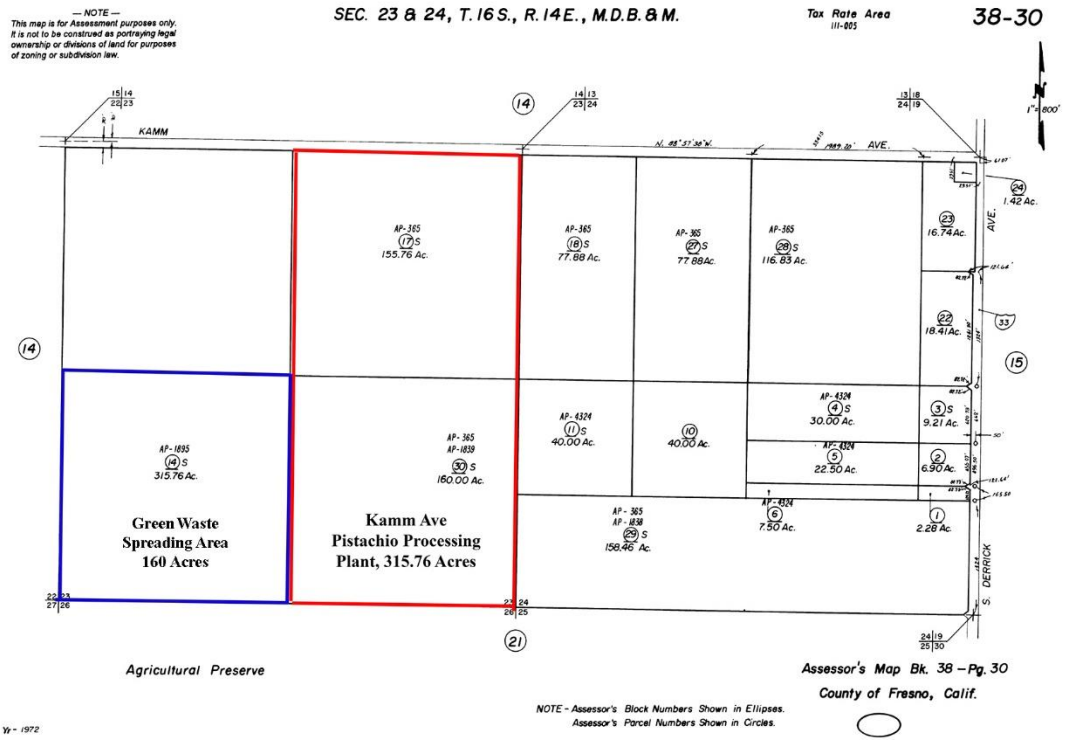


Figure 3

3.0 REGULATORY CONTEXT

"CEQA, or the California Environmental Quality Act, is a statute that requires state and local agencies to identify the significant environmental impacts of their actions and to avoid or mitigate those impacts, if feasible. CEQA applies to certain activities of state and local public agencies. A public agency must comply with CEQA when it undertakes an activity defined by CEQA as a "project." A project is an activity undertaken by a public agency or a private activity which must receive some discretionary approval (meaning that the agency has the authority to deny the requested permit or approval) from a government agency which may cause either a direct physical

change in the environment or a reasonably foreseeable indirect change in the environment. Most proposals for physical development in California are subject to the provisions of CEQA, as are many governmental decisions which do not immediately result in physical development (such as adoption of a general or community plan). Every development project which requires a discretionary governmental approval will require at least some environmental review pursuant to CEQA, unless an exemption applies."(Public Resources Code 21000–21189 Gatto, 2014)

4.0 SETTING

The study area is located at south of Kamm Ave and one-mile west of Highway 33 near Three Rocks, California within the San Joaquin Valley. Currently, the subject property has been disc plowed and was formerly used as agricultural land. The study area is bounded on the north by Kamm Avenue and on the south by West Conejo Ave. Elevation above sea level ranges from 410ft to 435ft. Surrounding areas include orchards and ranches **(Figure 4,).**

Figure 4

4.1 Natural Environment

The study area is situated in the San Joaquin Valley, 2.67 mile east of the foot slopes of the Ciervo Hills. The immediate study area has been heavily disturbed and was formerly used for agriculture. Prior to its current development, the project area would have been typical arid California Prairie, dominated by sparse perennial bunch grasses such as Purple Needle Grass, *Nassella pulchra*, and during years of optimum precipitation, annual forbes such as California Poppy. The study area is located approximately 2.4 miles north of Hondo Creek, 7 miles north of Cantua Creek and 14 miles south of Panoche Creek, the only reliable water sources in the area. Given its distance from any water source, Native American occupation of the immediate study area is highly unlikely within the discernable past (Latta, 1936) (**Figure 5**).

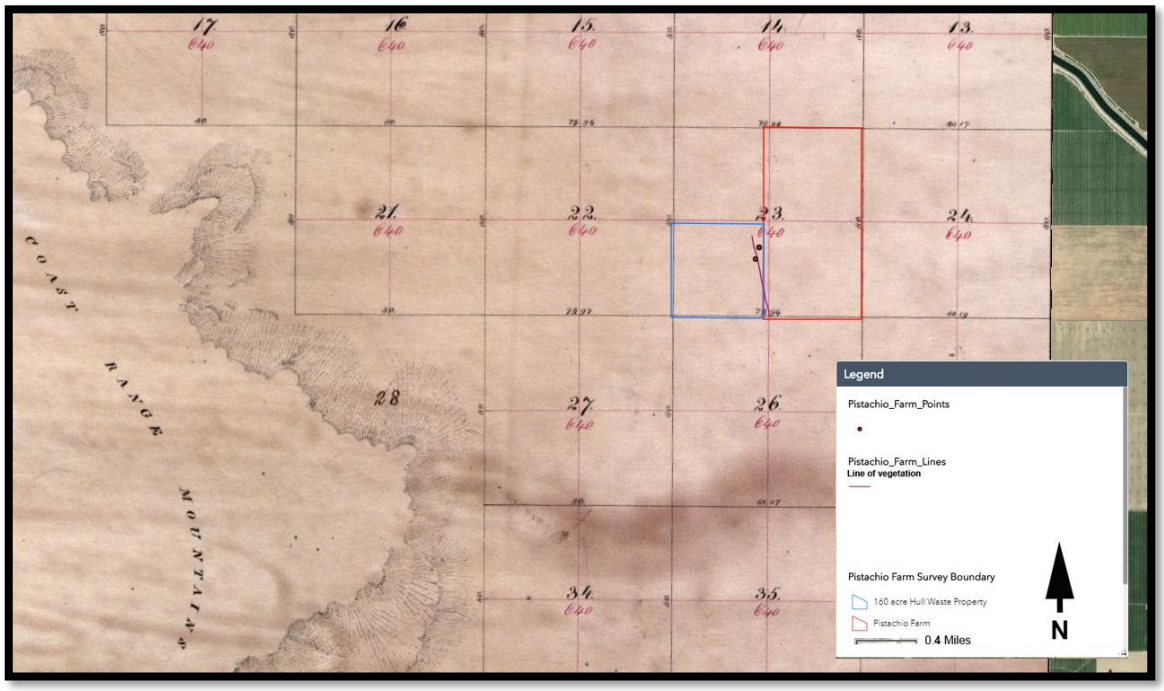


Figure 5, General Land Office, 1855, 16S 14E

4.2 Ethnography and Ethnohistory

The indigenous people of the San Joaquin Valley and its bordering foothills of the Sierra and Diablo Ranges are speakers of Yokutsan languages from the Penutian language family. The

word yokuts or *yokotch* translates as people in most of the Yokutsan dialects and has been attached to the many groups that speak this language as a Tribal appellation by early anthropologists working in the region. The majority of Yokuts lived along rivers, seasonal streams and permanent springs on the more well-watered eastern side of the San Joaquin Valley, around the shores of historic Tulare Lake and along the braids of the San Joaquin River as it flowed north from the big bend of the river near what is now Mendota. Valley lands between water courses usually lacked resources necessary for settlements. Lieutenant George H. Derby, US Topographical Engineers, noted during his reconnaissance survey of the San Joaquin (Tulare) Valley in April and May of 1850 that "The Tulare valley, from the mouth of the Mariposa to the Tejon pass at its head, is about one hundred and twenty mile in extent, and varies from eight to one hundred miles in width. With the exception of a strip of fertile land upon the rivers emptying into the (Tulare) lake from the east, it is little better than a desert. The soil is generally dry, decomposed and incapable of cultivation, and the vegetation, consisting of Artemisias [sic] and wild sage, is extremely sparse."(California Historical Society Quarterly, 1932). The study area does not fall within any immediate known Tribal areas but is closest to the Village sites of the *Pitkachi* about 18 miles to the N/NE (Latta, 1977) (National Archives, 1928; Merriam, 1967; Heizer, 1972). The *Pitkachi,* a Tribe of the San Joaquin River Yokuts group of the Foothill Yokuts division, occupied the area south of the San Joaquin in between Mendota and Herndon in present day Fresno. (Kroeber, 1925: Plate 47; Wallace 1978b). Known ethnographic villages located in this area include *Kohuou*, near Herndon, *Weshiu* on a slough west of *Kohuou,* and *Gewachiu* NE of Mendota. The *Pitkachi* were said to be named after a salt or alkali that was "evil-smelling" (Kroeber, 1925).

Yokuts occupants of the San Joaquin Valley and adjoining Sierran foothills were hunters and gatherers who depended upon the seasonal vegetal and faunal resources. Similar to their

neighboring Tribes, the *Pitkachi* lived in permanently established villages during most of the year, usually between the months of October and May (Gayton, 1930:365). The rest of the year, they would travel across their territory, tracking seasonally available plants as well as game and fish. Their principal villages were located along permanent springs, sloughs, and streams, while temporary camps were scattered throughout their area along seasonal drainages. Pounding rocks, the most visible vestige of Native American occupation, are located on rock boulders and bedrock outcrops above seasonal or permanent water courses, but are rarely found on the valley floor. River cobble mortars or wooden mortars on fallen tree logs were more commonly used in this area. The abundance of resources in the valley supported a socially complex lifestyle, with the high population numbers normally associated with agricultural peoples (Baumhoff, 1963).

Numerous accounts (Gayton, 1930, 1948; Kroeber, 1925; Latta, 1977; McCarthy, 1995; Spier, 1978; and Wallace, 1978a), of Valley Yokuts life ways offer details of pre-European land use in the San Joaquin Valley.

To the West of the subject property, lay El Camino Viejo A Los Angeles, (El Camino Viejo, the "Old Road"). This caretta (ox cart) road is one of the oldest trails in present day California, parts of which are still travelled on today. El Camino Viejo started from San Pedro Bay, passed Los Angeles, Mission San Fernando, Cuddy Valley and entered the San Joaquin Valley at San Emidio Creek in Kern County. The road skirted the valley along the Coastal Ranges ending at San Francisco Bay near present day Oakland. The trail came as close as 1.12 miles SW of the SW corner of the subject property between the old watering holes on Arroyo Hondo to the south and Arroyo de Panoche Grande to the NW. El Camino Viejo was used as early as the late 1700s and became a prominent trail by the 1820s. **(Figure 6)**

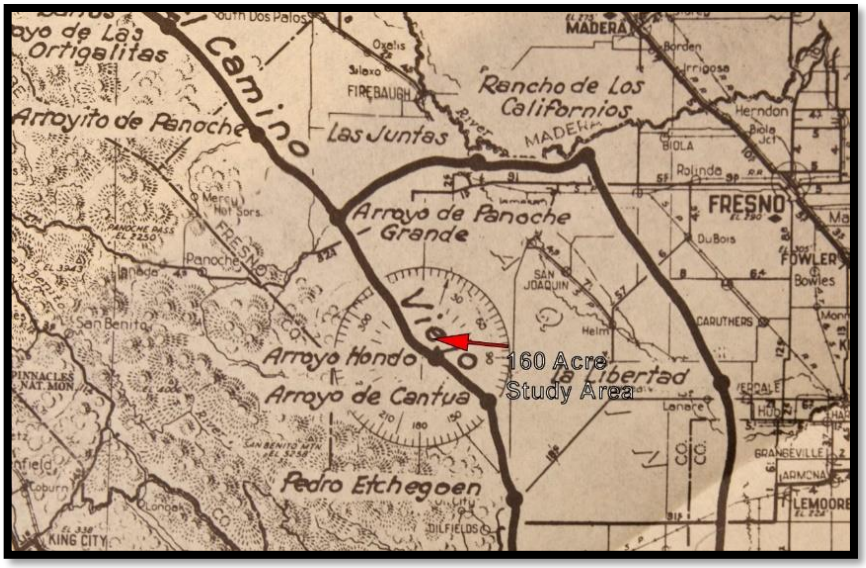


Figure 6

5.0 Record Search

In April 2019 Table Mountain Cultural Resources Department sent a record search request to the Southern San Joaquin Valley Information Center. The record search indicated no archaeological resources had been previously identified on the subject property or within ½ mile radius. **(Appendix A).**

6.0 Field Methods

Field investigators included Robert Pennell, Roger LaJeunesse, Cristina Gonzales and Sara Barnett, Department of Cultural Resources, Table Mountain Rancheria, Friant, CA. The goal of the survey was to identify any historic properties or resources including, (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 California Register of Historical Resources. (B) Included in a local register of historical resources

as defined in subdivision (k) of Section 5020.1, or an historical resource listed in, or determined to be eligible for listing in, the California Register of Historical Resources.

On March 19th 2019 and August 27th 2020, an extensive on-foot investigation of the study area was undertaken, **(Figure 5).** We walked north to south transects spaced 20 meters apart. In the course of the investigation no historic or cultural resources were identified. Due to recent disc plowing prior to the August 27th 2020 survey, 100% of the surface area was visible.

Our on-site procedure involved identifying and recording all features that were visible on the surface using a Trimble GeoXH GeoExplorer 6000 series GPS unit with an accuracy of +/- 10cm. One potential isolated artifact was identified, no historic resources or properties eligible for the National Register of Historic Places were found.

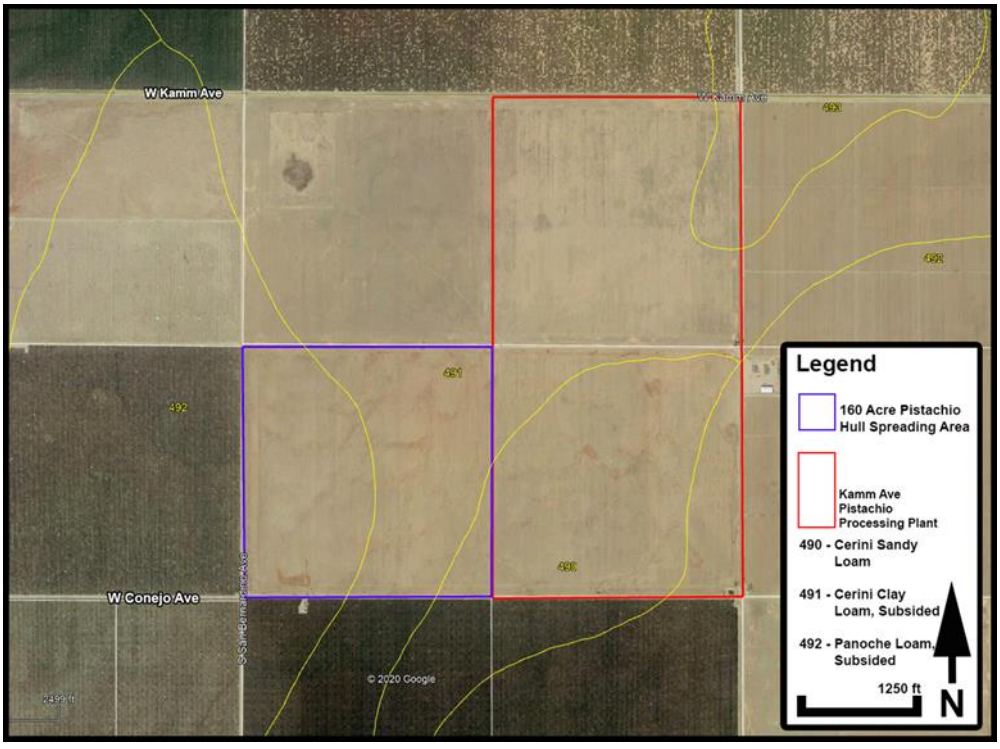


Figure 7

7.0 GEOARCHEOLOGICAL CONTEXT

On March 19, 2019 and August 27, 2020, Table Mountain Rancheria Cultural Resources staff undertook an extensive on-foot investigation of the study area. Cultural Resources staff used both on-site and in- office methods to complete our geoarchaeology review. Our on-site procedure involved examining surface soils composition throughout the study area. In-office procedures involved identifying soils utilizing the UC Davis California Soil Resource lab. Soils identified within the study area are as follows; Cerini Sandy Loam, subsided (490), Cerini Clay Loam, subsided (491), Panoche Loam (492) and Panoche Clay Loam, subsided (493). These alluvium soils, derived from the calcareous sedimentary rocks of the Diablo Range, are commonly found in the dry footslopes of the western edge of the San Joaquin Valley north of the Tulare Lake Basin (**Figure 7**).

Additionally, Cultural Resources staff reviewed A Refined Geoarchaeological Model and Sensitivity Assessment of Prehistoric Site Potential for Caltrans District Six in Part of South Central California, (2019, Meyer et al) specifically, sections related to the APE and surrounding area to gain an understanding of the potential for buried cultural deposits within the APE. The assessment for potential buried cultural deposits was determined to be necessary as the project proponent proposes to trench within the parcels 038-300-17S and 038-300-30S at as yet undetermined locations to a maximum depth of 54" for natural gas service alignments, **(Figure 10)**, with the preferred alignment being HP Gas Route Option B. The study area for the Pistachio Processing Plant, including parcels 038-300-17S and 038-300-30S and the green waste storage parcel, 038-300-14S, was evaluated by Caltrans

and Far Western and Associates in 2019 as being low sensitivity for both surface and buried cultural deposits **(Figures 8 and 9)**. Additionally, the evaluation for low sensitivity for surface and buried cultural deposits applies to the all properties surrounding the 475.75 acre study area within a minimum 1.36 miles radius. However, the western extents of HP Gas Route Option A and Option B skirt the northeastern and southeastern edges of the Arroyo Ciervo flood plain where it exits the Coast Range foothills onto the valley floor, traversing areas indicated as potentially medium and high sensitivity for buried and surface cultural deposits **(Figure 10).** Arroyo Ciervo is a seasonal runoff stream that likely never produced any lasting standing water. It is located midway between two moderate to well-watered streams Arroyo Hondo to the south and Arroyo de Panoche Grande to the north along the historic El Camino Viejo. In his 1936 publication, El Camino Viejo A Los Angeles, Frank Latta noted that; "Arroyo Hondo is a large gulch, but carries no water except during heavy rainstorms. The soil through which the stream cuts is so loose that running water is extremely muddy. For this reason it is unlikely that it was ever used as a watering place.

About fifteen miles from Arroyo Hondo was Arroyo de Panoche Grande (Big Sugar Loaf). This arroyo has probably always carried more running water during the summer months than any other of the west side creeks. During the fall of 1931 it was the only one which flowed through to the plains." Latta documented all of the streams along the west side of the valley that produced even a moderate amount of seasonal standing water that could support travelers but failed to mention Arroyo Ciervo, likely due to unreliable water flow except during unusually heavy runoff.

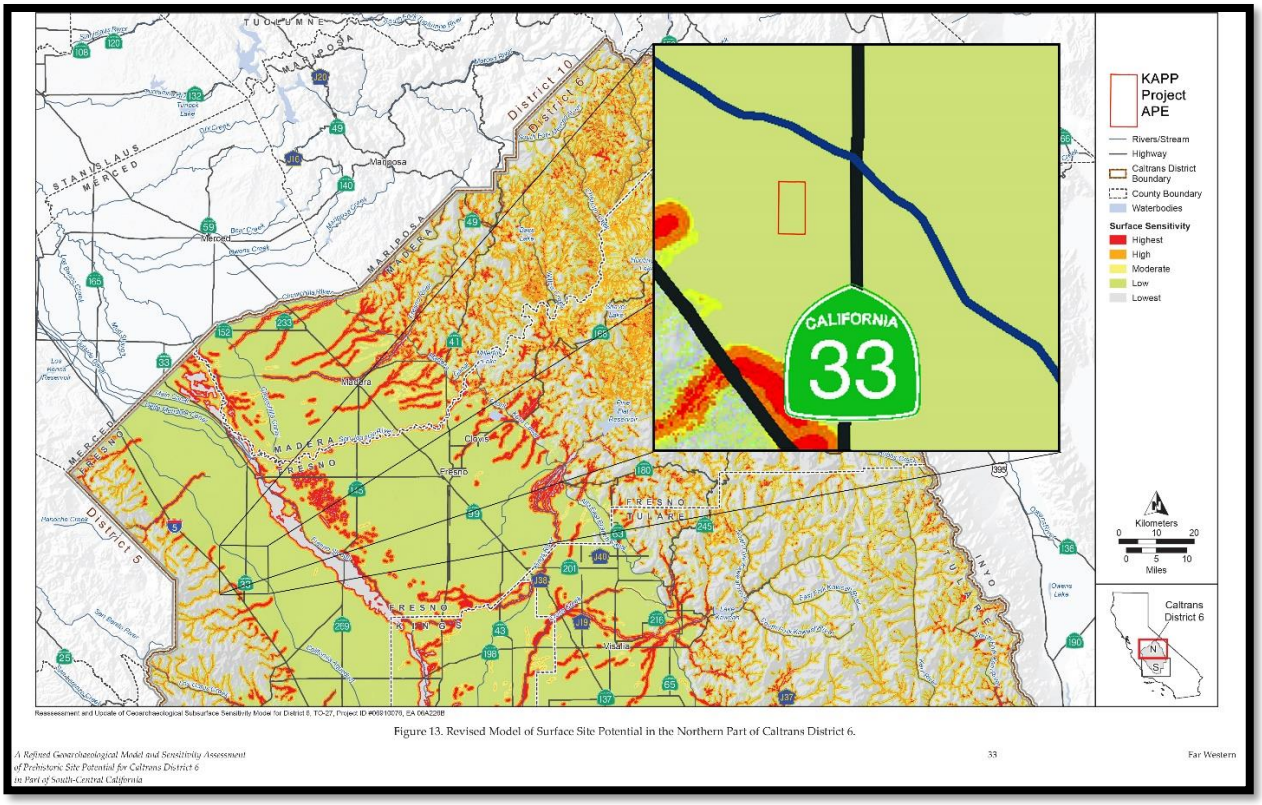


Figure 8

8.0 Evaluations and Recommendations

No historic or tribal cultural resources were found during the survey on the subject property. Any signs of cultural resources may have possibly filtered out due to many years of ground disturbances by farming. There is a remote possibility that cultural artifacts or human remains may be inadvertently discovered during significant ground disturbing activities, although that is unlikely due to distance of the subject property from any viable water source. Contractors and construction workers should be notified of the possibility of cultural findings during construction. If there is a finding, work surrounding that area should be

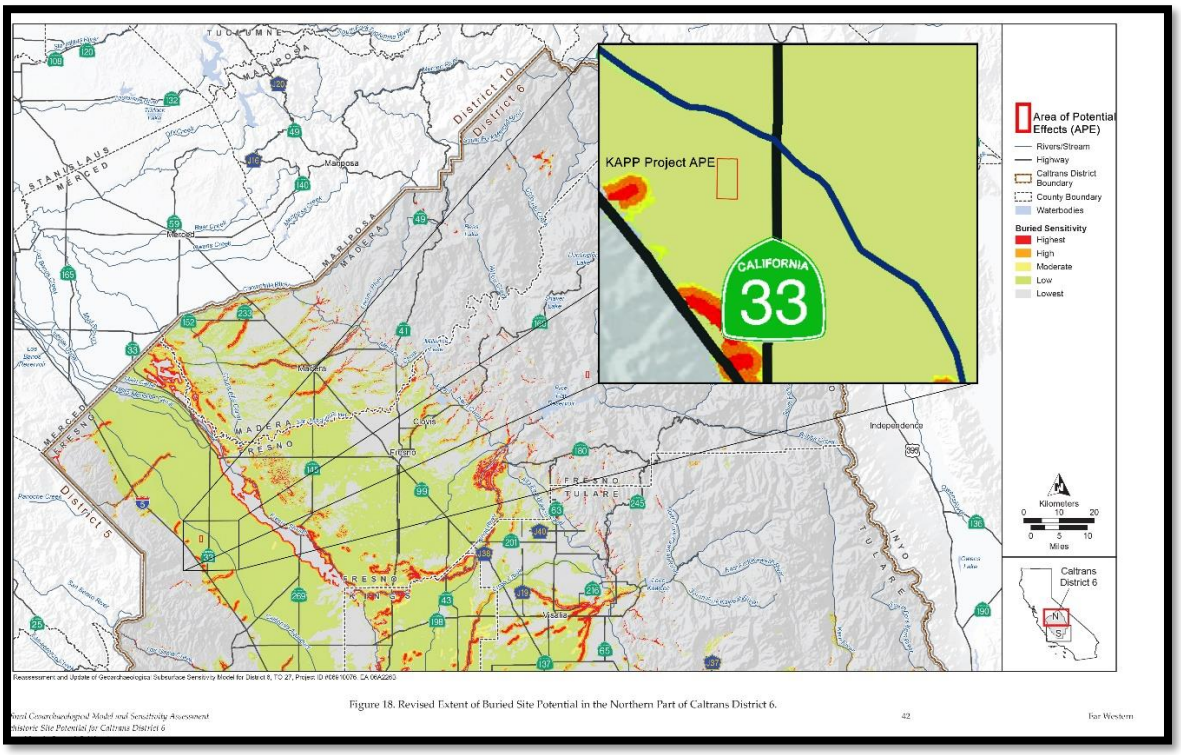
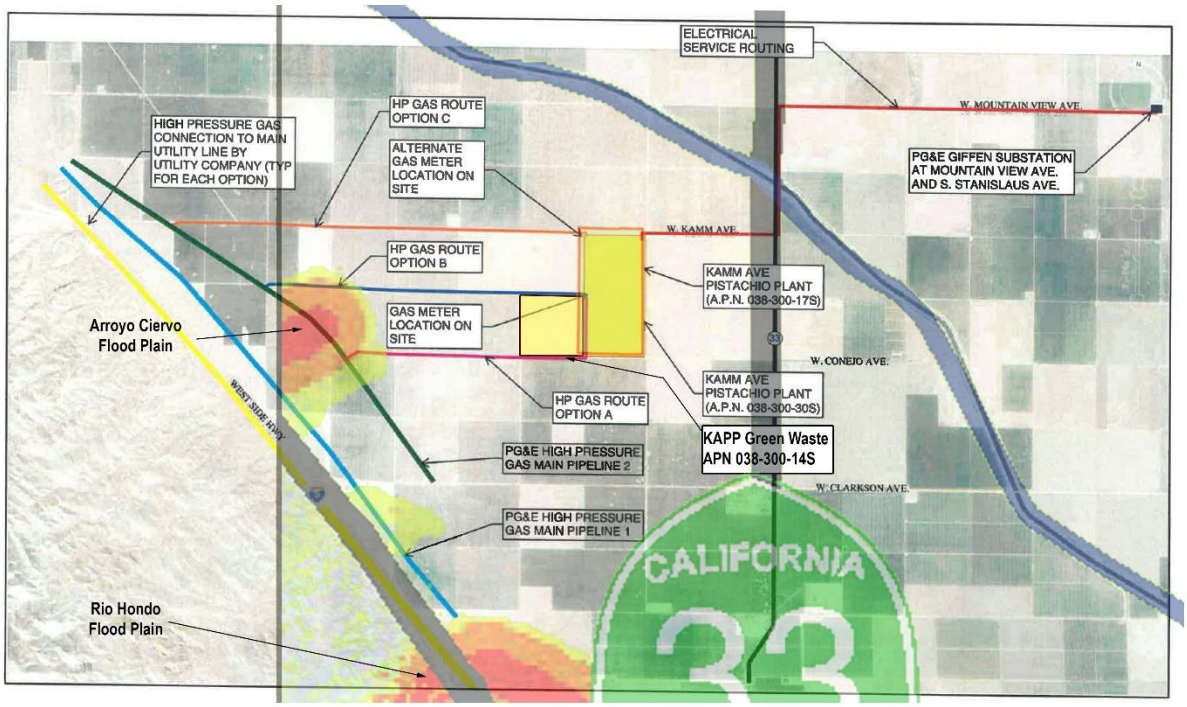


Figure 9

stopped until a qualified archaeologist has been able to evaluate the finding. If human remains are found, the Fresno County Coroner must be notified immediately. The coroner has 24 hours to contact the Native American Heritage Commission if the remains are deemed Native American. The Most Likely Descendent (MLD) then has 24 hours to suggest proper treatment for the remains per the NAHC. Additionally, due to the findings by Caltrans of potential sensitivity for surface and/or buried cultural deposits within the flood plain of Arroyo Ciervo, any ground disturbance associated with trenching for HP Gas Route Option A and Option B within the southern half of Section 23 in Township 16S, Range 14E of the Mount Diablo Meridian would require the presence of a qualified archaeological monitor in the view of this office.

Figure 2-5
Potential Natural Gas Service Alignments from Existing Distribution Line to the Site and Existing Electrical Substation and Transmission Line to the Site



COUNTY OF FRESNO | Crawford & Bowen Planning, Inc. 12

Figure 10

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Appendix A

California Historical Resources Information System

Fresno
Kern
Kings
Madera
Tulare

Southern San Joaquin Valley Information Center
California State University, Bakersfield
Mail Stop: 72 DOB
9001 Stockdale Highway
Bakersfield, California 93311-1022
(661) 654-2289
E-mail: ssjvic@csub.edu
Website: www.csub.edu/ssjvic

4/29/2019

Robert Pennell
Table Mountain Cultural Resources
23736 Sky Harbour Road
P.O. Box 410
Friant, CA 93626

Re: Granville Homes
Records Search File No.: 19-152

The Southern San Joaquin Valley Information Center received your record search request for the project area referenced above, located on the Levis USGS 7.5' quad. The following reflects the results of the records search for the project area and the 1.0 mile radius:

As indicated on the data request form, the locations of archaeological resources and reports are provided in the following format: ☒ custom GIS maps ☐ shapefiles

Archaeological resources within project area:	None
Archaeological resources within 1.0 mile radius:	None
Reports within project area:	None
Reports within 1.0 mile radius:	FR-00229, 02740

Resource Database Printout (list):	☐ enclosed	☐ not requested	☒ nothing listed
Resource Database Printout (details):	☐ enclosed	☐ not requested	☒ nothing listed
Resource Digital Database Records:	☐ enclosed	☐ not requested	☒ nothing listed
Report Database Printout (list):	☒ enclosed	☐ not requested	☐ nothing listed
Report Database Printout (details):	☒ enclosed	☐ not requested	☐ nothing listed
Report Digital Database Records:	☒ enclosed	☐ not requested	☐ nothing listed
Resource Record Copies:	☐ enclosed	☐ not requested	☒ nothing listed
Report Copies:	☒ enclosed	☐ not requested	☐ nothing listed
OHP Historic Properties Directory:	☐ enclosed	☐ not requested	☒ nothing listed
Archaeological Determinations of Eligibility:	☐ enclosed	☐ not requested	☒ nothing listed
CA Inventory of Historic Resources (1976):	☐ enclosed	☐ not requested	☒ nothing listed

Caltrans Bridge Survey: Not available at SSJVIC; please see http://www.dot.ca.gov/hq/structur/strmaint/historic.htm

Ethnographic Information: Not available at SSJVIC

Historical Literature: Not available at SSJVIC

Historical Maps: Not available at SSJVIC; please see http://historicalmaps.arcgis.com/usgs/

Local Inventories: Not available at SSJVIC

GLO and/or Rancho Plat Maps: Not available at SSJVIC; please see http://www.glorecords.blm.gov/search/default.aspx#searchTabIndex=0&searchByTypeIndex=1 and/or http://www.oac.cdlib.org/view?docId=hb8489p15p;developer=local;style=oac4;doc.view=items

Shipwreck Inventory: Not available at SSJVIC; please see http://www.slc.ca.gov/Info/Shipwrecks.html

Soil Survey Maps: Not available at SSJVIC; please see http://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx

Please forward a copy of any resulting reports from this project to the office as soon as possible. Due to the sensitive nature of archaeological site location data, we ask that you do not include resource location maps and resource location descriptions in your report if the report is for public distribution. If you have any questions regarding the results presented herein, please contact the office at the phone number listed above.

The provision of CHRIS Data via this records search response does not in any way constitute public disclosure of records otherwise exempt from disclosure under the California Public Records Act or any other law, including, but not limited to, records related to archeological site information maintained by or on behalf of, or in the possession of, the State of California, Department of Parks and Recreation, State Historic Preservation Officer, Office of Historic Preservation, or the State Historical Resources Commission.

Due to processing delays and other factors, not all of the historical resource reports and resource records that have been submitted to the Office of Historic Preservation are available via this records search. Additional information may be available through the federal, state, and local agencies that produced or paid for historical resource management work in the search area. Additionally, Native American tribes have historical resource information not in the CHRIS Inventory, and you should contact the California Native American Heritage Commission for information on local/regional tribal contacts.

Should you require any additional information for the above referenced project, reference the record search number listed above when making inquiries. Invoices for Information Center services will be sent under separate cover from the California State University, Bakersfield Accounting Office.

Thank you for using the California Historical Resources Information System (CHRIS).

Sincerely,

Celeste M. Thomson
Coordinator

Appendix D

Energy Analysis

Mitchell Air Quality Consulting

Energy Analysis Report
Kamm Avenue Pistachio Processing Plant
Cantua Creek, County of Fresno, California

Prepared for:
Kamm Avenue Pistachio Processing, LLC
1396 W. Herndon Avenue
Fresno, CA 93711
559.440.8308
Contact: Jeff Roberts

Prepared by:
Mitchell Air Quality Consulting
1164 E. Decatur Avenue
Fresno, CA 93720
559.246.3732
Contact: Dave Mitchell, Senior Air Quality Scientist

December 23, 2020

SECTION 1: ENERGY

1.1—Project Description

The 315.8-acre project site is located at 34411 West Kamm Avenue, Cantua Creek, CA 93608. The Assessor's Parcel Numbers are 038-300-17S and 038-300-30S. Approximately 135 acres will be disturbed during construction activities.

Construction of this plant will enable the applicant to hull, dry, process, store, and package pistachios. The project is expected to process up to 60 million pounds of pistachios per year. Currently, the applicant's pistachios are taken to another processing plant over 21 miles away. This allows the project to provide energy savings from transportation compared with existing conditions. The project is expected to be constructed in a single phase. The project includes the following structures and equipment:

- One 130,000-square-foot processing/packing building with a 10,000-square-foot canopy and a truck dock
- One 15,000-square-foot cold storage building
- One 1,200-square-foot motor control center building
- One 1,200-square-foot air compressor building
- One 12,156-square-foot administration office building
- One 8,818-square-foot breakroom/supervisor office building
- One 1,000-square-foot main scale house/guard shack and truck scale
- One 200-square-foot scale house and truck scale
- Forty-nine 48-foot-diameter x 65-foot-tall storage silos
- One 21,600-square-foot huller canopy
- Thirteen 27-million-British-thermal-unit-per-hour (MMBtu/hr) natural gas-fired column dryers
- One 6,570-square-foot shop building with a 2,920-square-foot canopy
- Four sand and media water filters
- One 353,000-gallon water storage tank
- One 324-square-foot fire pump house
- One 972-square-foot storage warehouse
- One 225-square-foot domestic water treatment plant control room
- Three domestic water treatment filters
- One 70,000-gallon domestic water storage tank

- Three precleaning equipment installations
- One huller pit
- Three excavated and cement lined hauling pits for raw pistachios
- One 50,000-square-foot fenced fumigation operations area
- One 400-square-foot fenced chemical storage area
- Water supply connections and metering equipment
- Two underground, 18-inch-diameter pipelines from hulling canopy to water settling and cleaning ponds
- Two lined, 450-square-foot process water settling and cleaning ponds (100 acre-feet)
- Two processed water separators/pumps
- Paved or improved primary access and secondary roads, truck turnaround areas, and employee parking facilities
- Black chain link security fence around 80-acre main plant area.
- Natural gas connections and metering equipment with PG&E system
- Electrical power connections and metering equipment with PG&E distribution system on north side of Kamm Avenue

The project includes a total of 177,665 square feet of occupied industrial and office space. The proposed plant will also include processing equipment, on-site roadways, parking lots, signage, and landscaping in front of the main processing building. There will be 6-foot black chain link fencing along the entire perimeter of the plant with several gates on the northern and southern borders, and one on the eastern border.

The project's peak operations will occur during the harvest season, which normally starts in September and ends in October for about 6 weeks. Employment is estimated at 60 people year-round and an additional 60 people during harvest periods with two shifts per day. Truck trips during peak periods are estimated at 342 trips per day (one trip incoming and one trip outgoing). Most of the trucks are used during the harvest season to bring raw pistachios to the plant for processing. Additional trucks are used for shipping finished products to market and deliveries of materials to the site by package delivery services. Details regarding employee and truck trip generation are included in Appendix A of this report.

The project includes thirteen 27 MMBtu natural gas-fueled dryers that are used during the 6-week harvest season. The project also includes a warmer and a roaster used to further process the pistachios that are fueled by natural gas.

During the first year of operation, the PG&E natural gas pipeline connection to the project will not be complete. As an interim source of natural gas, liquefied natural gas (LNG) will be trucked to the project site during the six-week harvest season.

1.2—Summary of Analysis Results

The following is a summary of the analysis results. As shown below, the project would result in less than significant impacts for all air quality and GHG impact criteria analyzed.

Impact ENERGY-1: The project would not result in a potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources during project construction or operation. **Less than significant impact.**

Impact ENERGY-2: The project would not conflict with or obstruct a state or local plan for renewable energy or energy efficiency. **Less than significant impact.**

1.3—Standard Conditions and Mitigation Measures Applied to the Project

No mitigation measures beyond compliance with regulations is required to ensure that project energy impacts would less than significant.

SECTION 2: MODELING PARAMETERS AND ASSUMPTIONS

2.1—Model Selection and Guidance

The primary source of energy use data for the analysis is the California Emissions Estimator Model (CalEEMod) version 2016.3.2 that was used for the air quality and greenhouse gas analysis for the project. CalEEMod provides vehicle miles traveled (VMT) generated during project operations in the model output. CalEEMod also provides the amount of electricity and natural gas used by project buildings. The CalEEMod construction component provides hours of use per each type of construction equipment. Fuel use per horsepower-hour was obtained from South Coast Air Quality Management District (SCAQMD) factors. The California Air Resources Board (ARB) EMFAC model was used to obtain average fuel economy for the vehicle types used by the project. Stationary source fuel consumption is based on applicant estimates for the equipment that will be installed onsite and annual usage rates based Environmental Protection Agency (EPA) and San Joaquin Valley Air Pollution Control District (SJVAPCD) factors.

2.1.1 - Stationary Equipment

The project includes 13 natural gas column dryers that are rated at 27 million British thermal units (MMBtu) per hour; thus, the project is expected to use 290.79 million cubic feet (CF) of natural gas per year for this purpose. The dryers are used to dry the pistachios during processing. The project also includes a natural gas warmer and a roaster to further process the pistachios for packaging. The warmer will have a capacity of 1.2 MMBtu per hour, and the roaster will have a capacity of 4.3 MMBtu per hour. The warmer and roaster would consume approximately 26.20 million CF of natural gas per year. The project will include a 175 hp emergency diesel generator. The generator was assumed to operate up to 100 hours per year for maintenance and testing.

2.1.2 - Offroad Equipment

The project will use the following off-road equipment:

- Propane forklifts: four used during harvest and one during the remainder of the year. Emission factors for propane are from EPA AP-42, section 1.5.
- Yard trucks: eight used during the harvest season and one during the remainder of the year. The yard trucks were modeled with EMFAC 2017 as T7 Tractors with speed of 5 to 15 miles per hour.
- Golf carts: One zero emission electric golf cart will be used.
- Electric forklifts: All forklifts used inside the processing building will be zero emission electric models.

2.1.3 - Water and Wastewater

The project will use surface water from the San Luis Canal for process water. The project will construct and operate on-site water treatment facilities to produce water that meets domestic use standards for periodic process equipment, bin, and silo washing and employee consumption. GHG emissions are emitted from the use of electricity to pump water to the project. The project will use septic systems for domestic wastewater and storage basins for process water that do not use electricity. Some pumping may be needed to transport water from the basins to area pistachio farms that will reuse 80 to 90 percent of the wastewater.

2.2—CEQA Guidelines

CEQA requires that EIRs include a discussion of the potential energy impacts of proposed projects, with particular emphasis on avoiding or reducing inefficient, wasteful and unnecessary consumption of energy. Appendix F of the CEQA Guidelines applies to the direct and indirect impact analysis, as well as the cumulative impact analysis.

2.3—Impact Analysis

2.3.1 - Energy

Impact ENERGY-1: The project would not result in a potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources during project construction or operation.

Impact Analysis

Threshold of Significance

Appendix F does not prescribe a threshold for the determination of significance. Rather, Appendix F focuses on reducing and minimizing inefficient, wasteful, and unnecessary consumption of energy. Therefore, for the purposes of this EIR, a significant impact to energy would result if the project would:

1. Result in the wasteful and inefficient use of nonrenewable resources during its construction.

2. Result in the wasteful and inefficient use of nonrenewable resources during long-term operation.
3. Be inconsistent with Adopted Plans and Policies.

Construction Energy Consumption

Project construction is assumed to be completed in 2021. Construction activities would consume energy through the operation of heavy off-road equipment, trucks, and worker traffic. Construction equipment fuel consumption for each of was based on equipment lists generated using CalEEMod default values. The fuel consumption of off-road equipment calculated in this analysis is based on an SCAQMD estimated fuel consumption rate of 0.05 gallon per horsepower-hour and the horsepower, usage hours, and load factors from CalEEMod model runs prepared for the project's air quality analysis.

Based on the anticipated construction schedule and hours of use, construction equipment would result in the consumption of approximately 117,150 gallons of diesel fuel over the entire construction period.

Worker, vendor, and haul trips would result in approximately 451,856 VMT over the entire construction period. A countywide average fuel consumption of 26.6 miles per gallon (mpg) for employee vehicles, 11.4 mpg for vendor trucks, and 7.2 mpg for haul trucks were obtained from EMFAC 2017. The results indicate that construction trips would consume approximately 22,783 gallons of motor vehicle fuel.

Although the proposed project would result in the consumption of an estimated 117,150 gallons of diesel and 22,783 gallons of motor vehicle fuels during construction, the project is expected to achieve energy efficiencies typical for ag industrial and food processing projects in California. Construction equipment fleet turnover and increasingly stringent state and federal regulations on engine efficiency, combined with local, state, and federal regulations limiting engine idling times and require recycling of construction debris, would further reduce the amount of transportation fuel demand during project construction. Considering these reductions in transportation fuel use, the proposed project would not result in the wasteful and inefficient use of energy resources during construction and impacts would be less than significant. Detailed modeling results are provided in Appendix A. Construction energy use is summarized in Table 1.

Table 1: Construction Energy Consumption

Activity	Variable	Consumption Rate	Consumption Amount
Construction Equipment Diesel Fuel Use	hp-hr of equipment use per project Hours of Use	0.05 gal/hp-hr 18,060 hours	117,150 gallons (diesel)
Construction Employee VMT	VMT/Project	VMT = 352,296 mpg = 26.6	13,243 gallons (all fuels)
Construction Vendor Truck VMT	VMT/Project	VMT = 84,000 mpg = 11.4	7,379 gallons (all fuels)

Activity	Variable	Consumption Rate	Consumption Amount
Construction Haul Trucks VMT	VMT/Project	VMT = 15,560 mpg = 7.2	2,161 gallons (diesel)
LNG Haul Trucks Year 1 VMT	VMT/Project	VMT =12,768 mpg = 7.2	1,767 gallons (diesel)
Notes: mpg = miles per gallon VMT = vehicle miles traveled hp-hr = horsepower per hour Source of data for construction and VMT: CalEEMod 2016.3.2 Source of Fresno County mpg for 2021: EMFAC 2017. Modeling results are provided in Appendix A.			

Operation Energy Consumption

Long-term energy consumption associated with the project includes electricity and natural gas consumption by buildings, electricity required for water supply, treatment, distribution, and wastewater treatment, fuels for motor vehicle travel, and stationary natural gas equipment used to process the pistachios.

Electricity and Natural Gas Consumption

During operations the proposed project buildings would consume natural gas for space heating, and water heating associated with the land uses on the project site. The natural gas consumption from buildings was estimated using the CalEEMod default values. The results of the analysis indicate that the project buildings would consume approximately 3,707,900 thousand British thermal units (kBtu) per year of natural gas per year during operation. The stationary equipment used for drying and heating the pistachios during processing were estimated to consume 316.99 million cubic feet (MMCF) of natural gas per year.

In addition to the consumption of natural gas, the proposed project would use electricity for lighting, air conditioning, and other uses associated with the project. Electricity use during operations is based on estimates obtained for a similar facility provided by the project energy consultant. The project would use approximately 2,987,000 kilowatt-hours (kWh) of electricity per year. The electricity used by the project is expected to be provided by increasing amounts of renewable energy sources as PG&E increases its renewable energy portfolio to meet the State 60 percent mandate by 2030.

As described above, the proposed project would result in a long-term increase in demand for electricity from PG&E. However, the project would be designed to meet the most recent Title 24 standards. Title 24 specifically establishes energy efficiency standards for residential and non-residential buildings constructed in the State of California in order to reduce energy demand and consumption. Title 24 is updated periodically to incorporate and consider new energy efficiency technologies and methodologies. Therefore, impacts from the wasteful or inefficient use of electricity or natural gas during operation of the project would be less than significant.

Water Treatment, Conveyance, and Distribution

Water used for indoor and outdoor purposes requires electricity for water treatment, conveyance, and distribution. The project's water demand was included in the project description. The amount

used for process water and domestic water was provided. The project will use surface water that will be treated onsite. Approximately 65.4 million gallons (Mgal) per year is expected to be used as process water, and 2.75 Mgal per year is expected to be used for domestic purposes. Approximately 315,000 gallons per year of the domestic water will be used by employees. This amount of water consumption would result in the use of approximately 368,000 kWh of electricity per year for treatment, conveyance, distribution, and wastewater treatment.

Although the proposed project would result in electricity use from the treatment, conveyance, and distribution of water to the project site, the project would also require all water fixtures to be compliant with the latest version of the California Green Building Standards Code and the MWELO, which would reduce the amount of water used by the project and require compliance with regulations relating to drought conditions. In addition, the project will recover and provide for irrigation reuse of approximately 80 to 90 percent of the water supplied to the facility, or from 167 to 188 acre-feet per year. Irrigation water from Plant operations will be supplied to pistachio growers in the region. Therefore, the project would not result in the wasteful or inefficient use of electricity for water treatment, conveyance, and distribution and impacts would be less than significant.

Wastewater Service

The project will treat employee generated wastewater using onsite septic systems which require no energy to operate. Process waste water will be stored in onsite ponds for later use for irrigating crops. Water would require pumping for distribution which would result in the consumption of electricity. The analysis used CalEEMod energy intensity factors for wastewater treatment as a conservative assumption. Energy used for treating project wastewater will increasingly be generated by renewable energy sources to comply with RPS standards that apply to the energy utility serving the project area.

Therefore, the project would not result in the wasteful or inefficient use of electricity for wastewater treatment, and impacts would be less than significant.

Fuel Consumption

During operation, vehicle trips would be generated by the project. The project was modeled with CalEEMod using project specific trip generation rates based on the facility's seasonal operations. The results show that the vehicle trips generated would result in approximately 1,970,718 VMT per year from all vehicle types. Based on a countywide average fuel consumption from EMFAC 2017 for all vehicle classifications for 2021, the proposed project would result in the consumption of an estimated 143,353 gallons per year of gasoline and diesel transportation fuel. During the first year of operation, the PG&E natural gas pipeline connection to the project will not be complete. As an interim source of natural gas, liquefied natural gas (LNG) will be trucked to the project site during the six-week harvest season. The LNG haul trucks are estimated to consume 1,767 gallons during the first year of operation.

Various federal and state regulations including the Low Carbon Fuel Standard, Pavley Clean Car Standards, and Low Emission Vehicle Program would serve to reduce the project's transportation fuel consumption progressively into the future. Therefore, the project would avoid the wasteful and inefficient use of transportation fuel during operations and impacts would be less than significant. In addition, the project will serve a large pistachio growing area and will provide processing facilities

that require shorter travel distances from the farms than under current conditions and would reduce regional transportation related VMT and energy use.

State and federal regulatory requirements addressing fuel efficiency are expected to increase fuel efficiency over time as older, less fuel-efficient vehicles are retired. The efficiency standards and light/heavy vehicle efficiency/hybridization programs, contribute to increased fuel efficiency and therefore would reduce vehicle fuel energy consumption rates over time. While the project would increase the consumption of gasoline and diesel proportionately with projected population and economic growth, the increase would be accommodated within the projected growth as part of the energy projections for the state and the region and would not require the construction of new regional energy production facilities. Therefore, energy impacts related to fuel consumption/efficiency during project operations would be less than significant.

Impact Summary

As described above, the project would result in less than significant impacts on the wasteful, inefficient, or unnecessary use of energy due to compliance with County development standards and regulations that apply to the project such as Title 24 Building Energy Efficiency Standards and the California Green Building Standards Code that apply to industrial buildings. Furthermore, various federal and state regulations including the Low Carbon Fuel Standard, Pavley Clean Car Standards, and Low Emission Vehicle Program would serve to reduce the transportation fuel demand by the project. In addition,

With the adherence to the increasingly stringent building and vehicle efficiency standards, the proposed project would not contribute to a cumulative impact to the wasteful or inefficient use of energy. As such, the project would not result in a significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources, during project construction or operation. A summary of the project's estimated operational energy consumption is provided in Table 2.

Table 2: Operational Energy Consumption

Activity	Variable	Consumption Rate	Consumption Amount
Electricity	Energy use at a similar project for electricity and CalEEMod for natural gas	kWh/sf/year	2,987 MWh/year
Natural Gas - Building		kBtu/sf/year	3,707,900 kBtu/year
Natural Gas – Stationary Equipment	Estimate from project energy consultant	Dryers 13 27 MMbtu/hr for 42 days	290.79 Mcf/year
		Warmer 1.2 MMBtu/hr Roaster 4.35 MMBtu/hr	26.196 Mcf/year
Water Supply, Treatment, and Conveyance and Wastewater Treatment	Water Use (Mgal)	68.12 Mgal/yr	368,000 kWh/year
Transportation	VMT/year mpg all Fuels	VMT/year = 1,970,718 miles mpg = 13.7 (all classes)	143,353 gallons/year Transportation Fuels
Transportation – LNG Fuel	VMT/year	VMT/year = 12,725 mi.	1,767 gallons Diesel (year

Activity	Variable	Consumption Rate	Consumption Amount
Hauling in Year 1	mpg - diesel	mpg = 7.2 (HHDT)	1 only)
Yard Trucks	VMT/year mpg – diesel	VMT/year = 3,265 mi. mpg = 7.2	3,618 gallons/year Diesel
Propane Fork Lifts	Hours/year Hours/gallon	Hours/year = 3,760 Hours/Gal. = 3.57	13,423 gallons/year
Tractor	Hour/year Engine horsepower	Gal./HP-Hour = 0.05 Hours/Year = 2,016	4,618 gallons/year Diesel
Emergency Diesel Generator	Engine horsepower Hours of Operation	9.7 gallons/hr 100 hours/year	970 gallons/year Diesel
Notes: MPG = miles per gallon Mcf = million cubic feet VMT = vehicle miles traveled kW = kilowatts kWh = kilowatt-hours MWh = megawatt-hours MMBTU = million British thermal units Source of data for energy use: Project Energy Consultant. VMT: CalEEMod 2016.3.2. Source of Fresno County MPG for 2021: EMFAC 2017. Modeling results are provided in Appendix A.			

Level of Significance Before Mitigation

Less than significant impact.

Mitigation Measures

No mitigation measures are required.

Level of Significance After Mitigation

Less than significant impact.

2.3.2 - Renewable Energy or Energy Efficiency Plans

Impact ENERGY-2: The project would not conflict with or obstruct a state or local plan for renewable energy or energy efficiency.

Impact Analysis

The County of Fresno has not adopted a local plan that promotes renewable energy and energy efficiency. Therefore, the analysis assesses the project's impact on State of California energy plans.

The project was reviewed for consistency with several State of California energy plans and energy related plans. The ARB 2008 Scoping Plan required by AB 32 (ARB 2008) and the ARB 2017 Scoping Plan (ARB 2017) provide the State's strategy for achieving legislated GHG reduction targets. Although the primary purpose of the Scoping Plans is to reduce GHG emissions, the strategies to achieve the GHG reduction targets rely on the use of increasing amounts of renewable fuels under the LCFS and RPS, and energy efficiency with updates to Title 24 and the CalGreen Code. The project will comply with these regulations and would not conflict with or obstruct the ARB Scoping Plans.

The 2019 California Energy Efficiency Action Plan addresses issues pertaining to energy efficiency in California's buildings, industrial, and agricultural sectors. The 2019 California Energy Efficiency Action Plan (2019 EE Action Plan) is the state's roadmap for an energy-efficient and low-carbon future for

buildings. Energy efficiency is a key piece of California's efforts to lessen the impacts of climate change, reduce the economic burden of energy consumption on low-income populations, and complement sustainability efforts in the state. The California Energy Commission's (CEC) 2019 EE Action Plan charts the progress toward doubling energy efficiency savings in buildings, industry, and agriculture; achieving increased energy efficiency in existing buildings; and reducing greenhouse gas emissions (GHGs) from buildings. Through robust, sustainable marketplaces, California can achieve its energy and climate goals and deliver benefits to California residents (CEC 2019). The EE Action Plan will be implemented through State programs and regulations.

Buildings constructed to implement the project will meet the latest efficiency standards. The project will be subject to 2019 Title 24 Building Energy Efficiency Standards (CEC 2018). Vehicles and equipment will meet the latest fuel efficiency standards and use fuels subject to the LCFS. The project will be installing the latest most efficient pistachio processing equipment that will contribute to meeting the State's energy efficiency goals. The project will serve a large pistachio growing area and will provide processing facilities that require shorter travel distances from the farms than under current conditions and would reduce transportation related energy use.

The project is consistent with applicable plans and policies and would not result in wasteful or inefficient use of nonrenewable energy sources; therefore, impacts would be less than significant.

Level of Significance Before Mitigation

Less than significant impact

Mitigation Measures

No mitigation measures are required

Level of Significance After Mitigation

Less than significant impact

SECTION 3: REFERENCES

The following references were used in the preparation of this analysis and are referenced in the text and/or were used to provide the author with background information necessary for the preparation of thresholds and content.

CalEEMod. California Emissions Estimator Model. Version 2016.3.2 Website: http://caleemod.com/. Accessed September 9, 2020.

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Appendix A: Modeling Assumptions and Results

Energy Analysis - Kamm Avenue Pistachio Plant

Construction

Fuel Use	**Gallons**	**Hours**
Const Equipment	117,150	18,060

Construction VMT Fuel Use from CalEEMod

	Days/Phase	**Worker Trips/day**	**Worker Trips/Phase**	**Vendor Trips/day**	**Vendor Trips/Phase**	**Hauling Trips/day**	**Hauling Trips/Phase**	**Worker Trip Length**	**Vendor Trip Length**	**Hauling Trip Length**
Site Preparation	10	18	180	0	0	0	0	16.8	6.6	20
Grading	30	20	600	0	0	0	0			
Building Construction	100	200	20000	50	5000	778	778			
Paving	5	8	40	0	0	0	0			
Architecture	15	10	150	0	0	0	0			
Totals		**256**	**20970**	**50**	**5000**	**778**	**778**			
								Total		
VMT/Year			352,296		84,000		15,560	**451,856**		

Total VMT	**Worker**		**Vendor**	**Total**
Construction	352,296		84,000	451,856
Total	**352,296**		**84,000**	**451,856**

Vender Truck MPG	11.38	
Vender Fuel Use (gal)	7,379	All Fuels
Worker Vehicles MPG	26.6	
Worker Fuel Use (gal)	13,242.7	All Fuels
Haul Trucks MPG	7.2	
Haul Truck Fuel Use (gal)	2,161.1	Diesel
Total	22,782.7	

Operational VMT	**VMT/Year**	**Class**	**MPG**	**Fuel Use/Year**	
Employee and Visitor	1,254,477	Pass Veh	26.60	47,156	
Maintenance Trucks	64,672	LHDT	11.38	5,681	
Haul Trucks	651,569	HHD	7.20	90,516	
	1,970,718			143,353	13.7

	VMT/Year	**Class**	**MPG**	**Fuel Use/Year**	
Yard Trucks (Diesel)	3,265	HHD	7.20	453.58	
LNG Haul Truck	12,725	HHD	7.20	1,767	Year 1 Only

	Hours/Year	**Load Factor**	**HP**	**HP-Hours/year**	**Gallons/HP-HR**	**Fuel Use/Year**
Tractors (Diesel)	2,016	0.37	97	72,354	0.05	3,618

	Hours/Year	**Hours/Gallon**	**Gallons/Year**
Forklifts (Propane)	3,760	3.57	13,423

Toyota Forklift Fuel Consumption and Efficiency

Electricity Usage

	kWh/yr
Project Electricity Use	2,987,000

Source: Project Energy Consultant Estimate

	CO2 (lbs/MWh)	**CH4 (lbs/MWh)**	**N2O (lbs/MWh)**	**MTCO2e**
PG&E Emission Factors	**290**	0.025	0.005	
Emissions (lbs/year	**866,230.00**	**74.68**	**14.94**	
Emissions (tons/year	**433.12**	**0.04**	**0.01**	
Emission MTCO2e	**392.92**	**0.03**	**0.01**	**392.96**
Convert Tons to MT	**0.9072**			
		BAU	54.60%	866.14

	kBTU/year	
Natural Gas from Buildings		
Bulding Energy Use	**3,707,900**	From CalEEMod

Water Usage

	Mgal/yr	Intensity Factor Supply (kWhr/Mgal)	Intensity Factor Treat (kWhr/Mgal)	Intensity Factor Distribute (kWhr/Mgal)	Intensity Factor WW Treatment (kWhr/Mgal)	Total Intensity (kWhr/Mgal)	Electricity Usage kWh/Yr.
Process Water	65.40	2,117	111	1,272	1,911	5,411	353,857
Domestic Water	2.41	2,117	111	1,272	1,911	5,411	13,041
Domestic Water Employee	0.315	2,117	111	1,272	0	3,500	1,103
Total	**68.12**						**368,000**

Domestic Water	2.125
Proc Equip Wash	0.168
Bin Wash	0.117
Subtotal	**2.410**
Employee	0.315
Total Domestic	**2.725**

Water consumption from Project Description. Employee wastewater to septic system.
Process water sent to storage ponds for irrigation. All water used is surface water from WWD

Stationary Equipment

	Equipment Specs	Natural Gas Usage (MMCF/Year)
Natural Gas Dryers	13 27 MMBtu/Hr.	290.79
Nut Warmers/Roasters		26.196
Total		**316.986**

		Gallons/Hour	Hours/Year	Fuel Use/Year
Emergency Diesel Gen	175 HP	9.7	100	970

Kamm Avenue Pistachio

Project Construction Schedule

PhaseNumber	PhaseName	PhaseType	PhaseStartDate	PhaseEndDate	NumDays\	NumDays
1	Site Preparation	Site Preparation	2021/01/01	2021/01/14	5	10
2	Grading	Grading	2021/01/15	2021/02/25	5	30
3	Building Constructio	Building Constructi	2021/02/26	2021/07/15	5	100
4	Paving	Paving	2021/07/16	2021/07/22	5	5
5	Architectural Coatin	Architectural Coati	2021/07/23	2021/08/12	5	15

Construction Equipment List

Phase Name	Offroad Equipment	No. of Equip.	Usage Hours/da	Work Days Used	Hours/Pha	Horsepow	Load Fact	Fuel Use (gal)
Site Preparation	Rubber Tired Dozers	6	8	10	480	247	0.4	5,928
Site Preparation	Tractors/Loaders/Ba	8	8	10	640	97	0.37	3,104
Grading	Excavators	4	8	30	960	158	0.38	7,584
Grading	Graders	2	8	30	480	187	0.41	4,488
Grading	Rubber Tired Dozers	2	8	30	480	247	0.4	5,928
Grading	Scrapers	4	8	30	960	367	0.48	17,616
Grading	Tractors/Loaders/Ba	4	8	30	960	97	0.37	4,656
Building Construction	Cranes	2	7	100	1400	231	0.29	16,170
Building Construction	Forklifts	6	8	100	4800	89	0.2	21,360
Building Construction	Generator Sets	2	8	100	1600	84	0.74	6,720
Building Construction	Tractors/Loaders/Ba	6	7	100	4200	97	0.37	20,370
Building Construction	Welders	1	8	100	800	46	0.45	1,840
Paving	Pavers	1	8	5	40	130	0.42	260
Paving	Paving Equipment	1	8	5	40	132	0.36	264
Paving	Rollers	1	8	5	40	80	0.38	160
Architectural Coating	Air Compressors	2	6	15	180	78	0.48	702
								117,150
Fuel Use Factor (SCAQMD	0.05	gal/bhp-hr			**18060**			

EMFAC2017 (v1.0.2) Emissions Inventory

Region Type: County
Region: FRESNO
Calendar Year: 2025
Season: Annual
Vehicle Classification: EMFAC2011 Categories
Units: miles/day for VMT, trips/day for Trips, tons/day for Emissions, 1000 gallons/day for Fuel Consumption. Note 'day' in the unit is operation day.

Region	Calendar Year	Vehicle Category	Model Year	Speed	Fuel	Population	VMT	Trips	Fuel Consumption
FRESNO	2021	All Other Buses	Aggregated	Aggregated	DSL	163	9,552	1,372	1.07
FRESNO	2021	LDA	Aggregated	Aggregated	GAS	360,187	13,826,269	1,691,919	450.58
FRESNO	2021	LDA	Aggregated	Aggregated	DSL	2,735	113,420	13,041	2.24
FRESNO	2021	LDA	Aggregated	Aggregated	ELEC	5,772	228,950	28,804	0.00
FRESNO	2021	LDT1	Aggregated	Aggregated	GAS	39,100	1,354,857	175,755	52.13
FRESNO	2021	LDT1	Aggregated	Aggregated	DSL	30	419	94	0.02
FRESNO	2021	LDT1	Aggregated	Aggregated	ELEC	130	5,483	660	0.00
FRESNO	2021	LDT2	Aggregated	Aggregated	GAS	129,640	4,712,300	596,970	198.00
FRESNO	2021	LDT2	Aggregated	Aggregated	DSL	548	23,833	2,687	0.64
FRESNO	2021	LDT2	Aggregated	Aggregated	ELEC	713	23,801	3,620	0.00
FRESNO	2021	LHD1	Aggregated	Aggregated	GAS	10,625	355,805	158,292	42.96
FRESNO	2021	LHD1	Aggregated	Aggregated	DSL	10,657	371,709	134,049	21.02
FRESNO	2021	LHD2	Aggregated	Aggregated	GAS	1,825	59,953	27,197	8.32
FRESNO	2021	LHD2	Aggregated	Aggregated	DSL	3,629	128,355	45,643	8.14
FRESNO	2021	MCY	Aggregated	Aggregated	GAS	18,423	148,923	36,847	3.94
FRESNO	2021	MDV	Aggregated	Aggregated	GAS	124,849	4,140,988	564,004	215.18
FRESNO	2021	MDV	Aggregated	Aggregated	DSL	2,106	86,519	10,154	3.20
FRESNO	2021	MDV	Aggregated	Aggregated	ELEC	312	10,760	1,602	0.00
FRESNO	2021	MH	Aggregated	Aggregated	GAS	1,760	15,221	176	3.21
FRESNO	2021	MH	Aggregated	Aggregated	DSL	723	6,310	72	0.65
FRESNO	2021	Motor Coach	Aggregated	Aggregated	DSL	60	7,771	873	1.24
FRESNO	2021	OBUS	Aggregated	Aggregated	GAS	344	17,738	6,881	3.81
FRESNO	2021	PTO	Aggregated	Aggregated	DSL	0	14,761	0	3.01
FRESNO	2021	SBUS	Aggregated	Aggregated	GAS	87	4,895	348	0.53

FRESNO	2021	SBUS	Aggregated	Aggregated	DSL	1,107	34,722	12,770	4.37
FRESNO	2021	T6 Ag	Aggregated	Aggregated	DSL	71	987	311	0.11
FRESNO	2021	T6 CAIRP heavy	Aggregated	Aggregated	DSL	149	29,407	2,182	2.67
FRESNO	2021	T6 CAIRP small	Aggregated	Aggregated	DSL	78	4,096	1,142	0.39
FRESNO	2021	T6 instate construct	Aggregated	Aggregated	DSL	517	35,208	2,339	4.38
FRESNO	2021	T6 instate construct	Aggregated	Aggregated	DSL	2,198	113,732	9,937	14.06
FRESNO	2021	T6 instate heavy	Aggregated	Aggregated	DSL	1,869	241,522	21,566	24.86
FRESNO	2021	T6 instate small	Aggregated	Aggregated	DSL	4,091	205,725	47,215	21.86
FRESNO	2021	T6 OOS heavy	Aggregated	Aggregated	DSL	85	16,841	1,241	1.53
FRESNO	2021	T6 OOS small	Aggregated	Aggregated	DSL	46	2,383	670	0.23
FRESNO	2021	T6 Public	Aggregated	Aggregated	DSL	522	7,851	1,582	1.13
FRESNO	2021	T6 utility	Aggregated	Aggregated	DSL	110	1,853	1,266	0.21
FRESNO	2021	T6TS	Aggregated	Aggregated	GAS	926	51,880	18,530	10.96
FRESNO	2021	T7 Ag	Aggregated	Aggregated	DSL	54	831	238	0.15
FRESNO	2021	T7 CAIRP	Aggregated	Aggregated	DSL	2,654	471,356	38,752	70.77
FRESNO	2021	T7 CAIRP constructi	Aggregated	Aggregated	DSL	140	25,290	633	4.40
FRESNO	2021	T7 NNOOS	Aggregated	Aggregated	DSL	2,864	574,611	41,821	83.05
FRESNO	2021	T7 NOOS	Aggregated	Aggregated	DSL	1,042	185,194	15,216	28.46
FRESNO	2021	T7 other port	Aggregated	Aggregated	DSL	54	8,643	410	1.58
FRESNO	2021	T7 POAK	Aggregated	Aggregated	DSL	285	32,756	2,165	6.26
FRESNO	2021	T7 POLA	Aggregated	Aggregated	DSL	266	33,510	2,022	6.44
FRESNO	2021	T7 Public	Aggregated	Aggregated	DSL	771	15,576	2,337	2.85
FRESNO	2021	T7 Single	Aggregated	Aggregated	DSL	1,038	74,341	11,975	12.03
FRESNO	2021	T7 single constructi	Aggregated	Aggregated	DSL	892	62,740	4,034	11.81
FRESNO	2021	T7 SWCV	Aggregated	Aggregated	DSL	431	17,588	1,681	7.25
FRESNO	2021	T7 SWCV	Aggregated	Aggregated	NG	64	2,604	249	1.14
FRESNO	2021	T7 tractor	Aggregated	Aggregated	DSL	5,015	685,160	63,685	95.18
FRESNO	2021	T7 tractor construct	Aggregated	Aggregated	DSL	745	51,755	3,369	9.81
FRESNO	2021	T7 utility	Aggregated	Aggregated	DSL	36	722	409	0.12
FRESNO	2021	T7IS	Aggregated	Aggregated	GAS	4	473	72	0.12
FRESNO	2021	UBUS	Aggregated	Aggregated	GAS	78	6,764	314	1.52
FRESNO	2021	UBUS	Aggregated	Aggregated	DSL	20	2,068	80	0.27
FRESNO	2021	UBUS	Aggregated	Aggregated	NG	120	13,413	478	3.09

							28,680,193		1,453
									1,452,933
Overall Fuel Economy All Fuels						MPG	19.74		
LHDT Truck Only Fleet Average Fuel Economy									
FRESNO	2021	LHD1	Aggregated	Aggregated	GAS	10,625	355,805	158,292	42.96
FRESNO	2021	LHD1	Aggregated	Aggregated	DSL	10,657	371,709	134,049	21.02
FRESNO	2021	LHD2	Aggregated	Aggregated	GAS	1,825	59,953	27,197	8
FRESNO	2021	LHD2	Aggregated	Aggregated	DSL	3,629	128,355	45,643	8
							915,822		80.45
						MPG	11.4		80,450
FRESNO	2021	T7 tractor	Aggregated	Aggregated	DSL	5,015	685,160	63,685	95.18
Truck Fleet Fuel Efficiency						MPG	7.20		95,183
Passenger Car and Light Truck Fleet Efficiency									
FRESNO	2021	LDA	Aggregated	Aggregated	GAS	360,187	13,826,269	1,691,919	450.58
FRESNO	2021	LDA	Aggregated	Aggregated	DSL	2,735	113,420	13,041	2.24
FRESNO	2021	LDA	Aggregated	Aggregated	ELEC	5,772	228,950	28,804	0.00
FRESNO	2021	LDT1	Aggregated	Aggregated	GAS	39,100	1,354,857	175,755	52.13
FRESNO	2021	LDT1	Aggregated	Aggregated	DSL	30	419	94	0.02
FRESNO	2021	LDT1	Aggregated	Aggregated	ELEC	130	5,483	660	0.00
FRESNO	2021	LDT2	Aggregated	Aggregated	GAS	129,640	4,712,300	596,970	198.00
FRESNO	2021	LDT2	Aggregated	Aggregated	DSL	548	23,833	2,687	0.64
FRESNO	2021	LDT2	Aggregated	Aggregated	ELEC	713	23,801	3,620	0.00
FRESNO	2021	MDV	Aggregated	Aggregated	GAS	124,849	4,140,988	564,004	215.18
FRESNO	2021	MDV	Aggregated	Aggregated	DSL	2,106	86,519	10,154	3.20
FRESNO	2021	MDV	Aggregated	Aggregated	ELEC	312	10,760	1,602	0.00
							24,527,598		921.99
									921,987
Passenger Car and Light Truck Fleet Efficiency						MPG	26.60		

Appendix E

Geotechnical Report

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FINAL GEOTECHNICAL FEASIBILITY REPORT
KAMM AVENUE PISTACHIO PROCESSING
APNS 038-300-017S AND 038-300-030S
FRESNO COUNTY, CALIFORNIA 93608

for

Morris General Contracting, Inc.
14451 West Whitesbridge Avenue
Kerman, California 93630

June 1, 2020

Project No. 19G-0194-0

RMA GeoScience
Every Project Matters | www.rmacompanies.com

Table of Contents

1.00 Introduction 1
- 1.01 Planned Development 1
- 1.02 Site Location and Description 1
- 1.03 Purpose 2
- 1.04 Scope of the Investigation 2
- 1.05 Investigation Methods and Limitation 2

2.00 Findings 2
- 2.01 Geologic Setting 2
- 2.02 Faults 5
- 2.03 Earth Materials 5
- 2.04 Expansive Soil 5
- 2.05 Surface and Groundwater Conditions 6

3.00 Conclusions and Preliminary Recommendations 6
- 3.01 General 6
- 3.02 Seismic Design Parameters 6
- 3.03 Liquefaction and Secondary Earthquake Hazards 7
- 3.04 Preliminary Earthwork Recommendations 8
- 3.05 Lateral Soil Resistance 9
- 3.06 Preliminary Foundation Recommendations 9
- 3.07 Cement Type and Corrosion Potential 10
- 3.08 Additional Recommendations 11

4.0 Closure 11

FIGURES

Figure 1 Site Location Map
Figure 2 Boring Location Map

APPENDICES

Appendix A Field Investigation
Appendix B Laboratory Tests
Appendix C References

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1.00 Introduction

1.01 Planned Development

Based on our review of provided information, including the most recent Site Plan prepared by Gerald Mele & Associates, it is our understanding that the project will consist of constructing a new pistachio processing plant with various buildings, storage tanks, equipment, and associated structures. Anticipated appurtenant improvements include underground utilities, concrete flatwork, asphalt concrete roads and driveways, and some landscaping.

1.02 Site Location and Description

The KAPP is located approximately 1 mile west of the intersection of South Derrick Avenue and West Kamm Avenue within the western part of Fresno County (see Figure 1). The location of the planned development relative to streets and roads is shown on Figure 2.

At the time of our field exploration on April 4, 2019, there was a light growth of drying seasonal grasses and weeds that had been recently cut (see photo below). According to Google Earth, the existing ground surface elevation varies from approximately 362 feet to approximately 393 feet, with a slight slope to the northeast. Aerial photos indicate the site has been used as agriculture land since at least 1994.

Photo taken on April 4, 2019, from B-1 looking northwest.

1.03 Purpose

A geotechnical feasibility study has been completed for the planned new Kamm Avenue Pistachio Processing project located northwest of Three Rocks in western Fresno County, California. The purpose of the investigation was to generally summarize geotechnical and geologic conditions at the site, to assess their potential impact on the proposed improvements, and to develop preliminary geotechnical engineering design parameters.

1.04 Scope of the Investigation

The general scope of this study included the following:

- Review of published and unpublished geologic, seismic, groundwater and geotechnical literature.
- Examination of aerial maps.
- Sampling, logging, and backfilling of two exploratory borings to a maximum depth of approximately 31 feet below ground surface (bgs). The boring locations were selected by Dan Jauregui at Tri City Engineering, Inc and marked by Cris Robles of C. H. Robles & Associates.
- Laboratory testing of representative soil samples.
- Geotechnical evaluation of the compiled data.
- Preparation of this report presenting our findings, general conclusions and preliminary recommendations.

Our scope of work did not include site assessment for the potential of hazardous materials.

1.05 Investigation Methods and Limitation

Our geotechnical feasibility investigation consisted of office research, field exploration, laboratory testing, review of the compiled data, and preparation of this report. It has been performed in a manner consistent with generally accepted engineering and geologic principles and practices, and has incorporated applicable requirements of the 2016 California Building Code. Definitions of technical terms and symbols used in this report include those of the ASTM International, the California Building Code, and commonly used geologic nomenclature.

Supporting technical data are presented in the attached appendices. Appendix A presents a description of the methods and equipment used in performing the field exploration, as well as logs of our subsurface exploration. Appendix B presents a description of our laboratory testing and the test results, and references are presented in Appendix C.

2.00 Findings

2.01 Geologic Setting

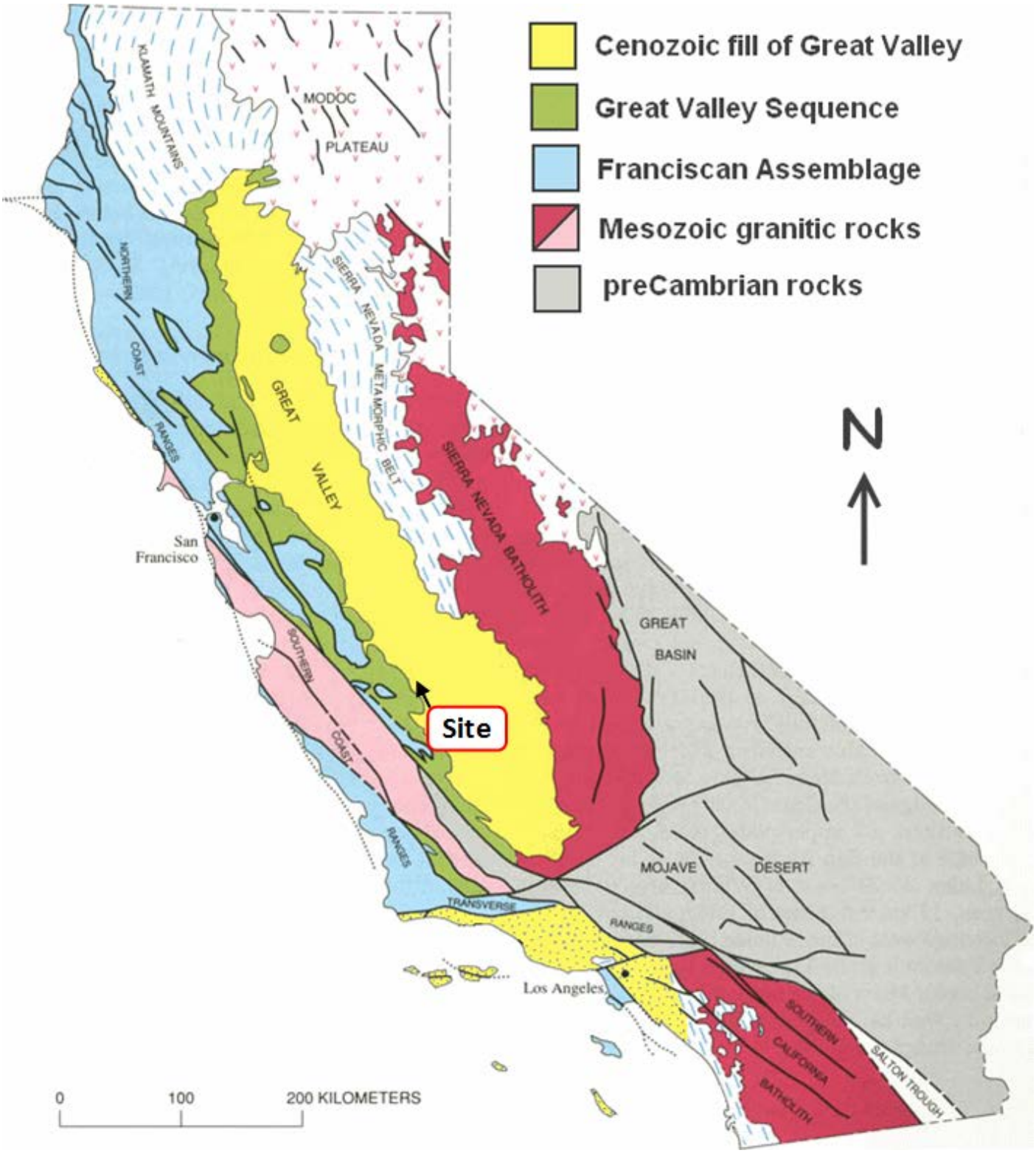
The subject site is located in the central part of the San Joaquin Valley, which comprises the southern half of the Great Valley geomorphic province. The valley is a westward-tilting trough which forms a broad alluvial fan, approximately 200 miles long and 50 to 70 miles wide, where the eastern flank is broad and gently inclined, as

opposed to the western flank which is relatively narrow (Bartow, 1991; Page, 1968). The Central Valley consists of the Great Valley Sequence, overlain by Cenozoic alluvium. Underlying the Great Valley Sequence are the Franciscan Assemblage to the west and the Sierra Nevada batholith to the east (Bailey, Irwin, and Jones, 1964).

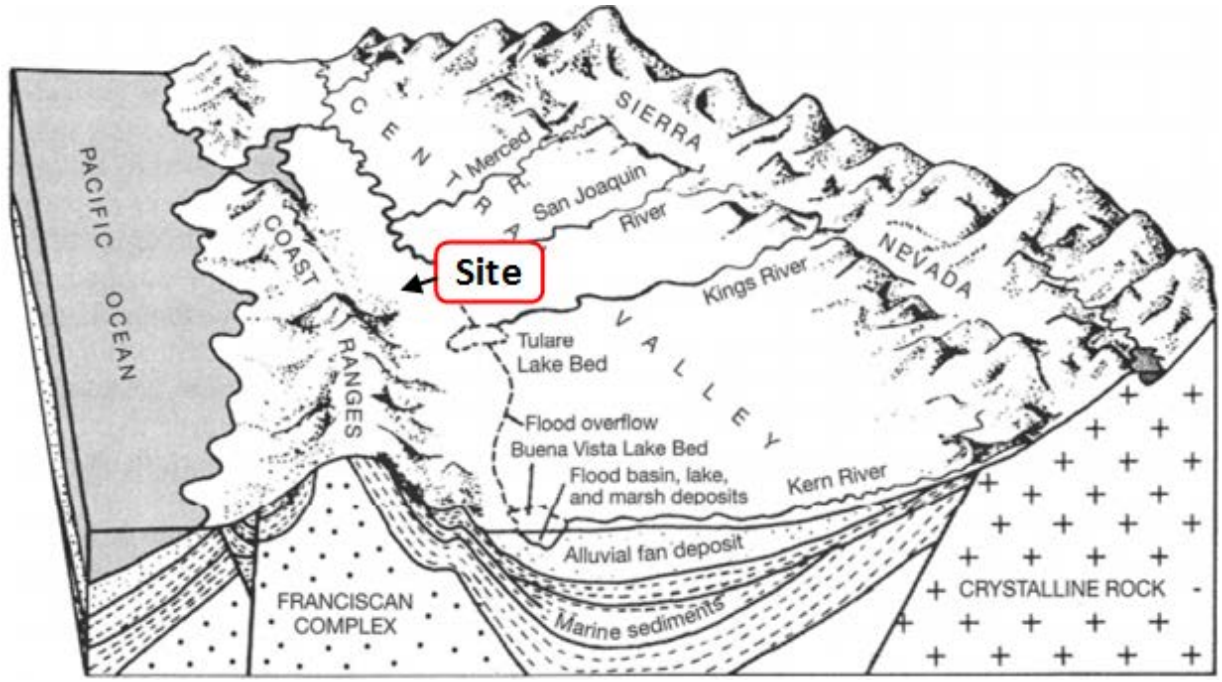
The Franciscan Assemblage, made up of deformed and high pressure and low temperature metamorphosed mafic and ultramafic rocks, was formed around the Late Jurassic through the Miocene (160 to about 20 million years ago) by the offscraping of rocks from a subducting plate dipping to the east (Wakabayashi, 1992; Wakabayashi, 2010).

The Sierra Nevada started to form during the Early Jurassic (around 200 million years ago) when the Farallon Plate began subducting under the North American Plate. This subduction resulted in several orogenies, or mountain building events, that created the granitic Sierra Nevada Batholith deep below the surface. During the Miocene (around 10 million years ago), vertical movement along the Sierra Nevada Frontal Fault Zone (part of the Eastern California Shear Zone) began to uplift the Sierra Nevada. This uplift and erosion exposed the batholiths to the surface. From the Pleistocene (commonly known as the last Ice Age) to the present, glaciers have been carving out many parts of the Sierras. The current uplift of the Sierra Nevada is 1 - 2mm per year (Hammond, et al. 2012).

The Great Valley Sequence is a 40,000 foot sequence of marine shale, sandstone, and conglomerate beds, deposited in a deep marine environment during the Late Jurassic through the Cretaceous (150 – 65 million years ago). Overlying the Great Valley Sequence is several thousand feet of Cenozoic alluvium, deposited by: streams and rivers draining from the mountains and creating alluvial fans; by lakes that covered parts of the valley floor from time to time; flooding; and marsh environments (Page, 1986). In some places, it is thousands of feet thick, and more than half of this thickness is composed of fine grained fluvial and lacustrine deposits. Holocene deposition consists mainly of episodic deposition of alluvial sediments (Bartow, 1991; Page, 1986). The project site is situated on Quaternary fan deposits and older marine sediments that are several thousand feet deep.



Geologic map showing the locations of Cenozoic alluvium/fill (yellow) overlying the Great Valley Sequence (green), the Franciscan Assemblage (blue), and the Sierra Nevada Batholith (red). Modified from: Irwin (1990).



Geologic block diagram of California. From: Harden (2004). Not to scale.

2.02 Faults

The subject site is not located within the boundaries of an Earthquake Fault Zone for fault rupture hazard as defined by the Alquist-Priolo Earthquake Fault Zoning Act and no faults are known to pass through the property. The nearest active earthquake fault zones (evidence of displacement within the past 11,700 years) are the Nunez Fault , the Ortigalita Fault Zone, and the San Andreas Fault Zone located approximately 20 miles south, 30 miles south, and 31 miles southwest, respectively, of the project site.

2.03 Earth Materials

The soils encountered in the test borings consisted primarily of sandy clay and clayey sand with occasional layers or zones of silty sand, poorly graded sand, and sandy silt. The consistency of the soils was predominantly medium dense for sandy soils and medium stiff to hard for the silty and clayey soils. At Boring B-2, there were loose zones from 8 to 13.5 feet and 18 to 22 feet. As indicated above, the soils encountered in the test borings are related to alluvial deposits that are estimated to be several thousand feet deep in the vicinity of the project site.

The approximate locations of the borings that were drilled for this project are presented on Figure 2. Logs of our exploratory borings are presented in Appendix A, which provide more detailed information of the soils that were encountered to the depths explored at the project site.

2.04 Expansive Soil

Our field exploration and laboratory testing program indicated that the near surface soils have a medium expansion potential (Plasticity Index of 22). Results of our laboratory tests are presented in Appendix B.

2.05 Surface and Groundwater Conditions

No areas of ponding or standing water were present at the time of our study. Further, no springs or areas of natural seepage were observed at the project site. In addition, no groundwater was encountered in the test borings within the maximum depth explored of 31 feet.

According to groundwater data that is available at the California Department of Water Resource website, recent groundwater data indicates the depth to ground water is approximately 450 feet in the project area. Historical data derived from wells (State Well Numbers 16S14E26A001M, 16S14E14F001M, and 16S14E15Q001M) located approximately 0.82 miles to the southeast, 0.84 miles to the northwest, and 1.26 miles northwest, respectively, indicate the depth to ground water on average was approximately 509 feet deep throughout the 1960's and then rose to a depth of approximately 290 feet during the 1990's. Over the subsequent years, the data indicates that the groundwater elevation has declined approximately 160 feet.

3.00 Conclusions and Preliminary Recommendations

3.01 General

Based on preliminary data and information contained in this report, our understanding of the project, and our geotechnical engineering experience, it is our professional judgment that the proposed improvements are geologically and geotechnically feasible. However, the soils within the upper 5 feet at the subject site consist of sandy clay that has a medium expansion potential. In addition, the relative densities of the near-surface soils are generally low and somewhat variable. Therefore, it will be important to perform some over-excavation, moisture conditioning, and re-compaction in the areas where improvements are planned. The onsite soils also contain a high concentration of soluble sulfates and they should be considered extremely corrosive with respect to buried metallic pipe. Specific geotechnical recommendations are presented below that can be used by other members of the design team to prepare the project plans and specifications for the planned improvements.

3.02 Seismic Design Parameters

Seismic design parameters have been developed in accordance with Section 1613 of the 2016 California Building Code (CBC) using the online U.S. Geological Survey Seismic Design Maps Calculator (ASCE 7-10 Standard) and a site location based on latitude and longitude. The calculator generates probabilistic and deterministic maximum considered earthquake spectral parameters represented by a 5-percent damped acceleration response spectrum having a 2-percent probability of exceedance in 50 years. The deterministic response accelerations are calculated as 150 percent of the largest median 5-percent damped spectral response acceleration computed on active faults within a region, where the deterministic values govern. The calculator does not, however, produce separate probabilistic and deterministic results. The parameters generated for both pipeline alignments are presented below:

2016 California Building Code (CBC) Seismic Parameters

Parameter	Value
Site Location	Latitude = 36.5269 degrees Longitude = -120.4121 degrees
Site Class	Site Class = D Soil Profile Name = Stiff Soil
Mapped Spectral Accelerations	S_s (0.2- second period) = 1.735g S_1 (1-second period) = 0.571g
Site Coefficients (Site Class D)	F_a = 1.000 F_v = 1.500
Maximum Considered Earthquake Spectral Accelerations (Site Class D)	S_{MS} (0.2- second period) = 1.735g S_{M1} (1-second period) = 0.857g
Design Earthquake Spectral Accelerations (Site Class D)	S_{DS} (0.2- second period) = 1.156g S_{D1} (1-second period) = 0.571g

The above table shows that the mapped spectral response acceleration parameter for a 1-second period (S_1) is less than 0.75g and the spectral response acceleration parameters are S_{DS} = 1.156g and S_{D1} = 0.571g. Therefore, the Seismic Design Category has been determined from Tables 1613.3.5(1) and 1613.3.5(2) is D for all Occupancy Categories (CBC Section 1613.5.6). Consequently, as required for Seismic Design Categories C through F by CBC Section 1803.5.11, slope instability, liquefaction, total and differential settlement, and surface displacement by faulting or seismically lateral spreading or lateral flow have been evaluated. Based on our subsurface exploration and our knowledge of the geologic setting, there is no significant risk of ground rupture, liquefaction, lateral spreading, or seismic settlement to occur at the subject site during a design-level seismic event.

Peak earthquake ground acceleration adjusted for site class effects (PGA_M) has been determined in accordance with ASCE 7-10 Section 11.8.3 as follows: $PGA_M = F_{PGA} \times PGA = 1.000 \times 0.653 = 0.653g$.

3.03 Liquefaction and Secondary Earthquake Hazards

Potential secondary seismic hazards that can affect land development projects include liquefaction, tsunamis, seiches, and seismically induced settlement.

Liquefaction

Liquefaction is a phenomenon where earthquake-induced ground vibrations increase the pore pressure in saturated, granular soils until it is equal to the confining, overburden pressure. When this occurs, the soil can completely lose its shear strength and enter a liquefied state. The possibility of liquefaction is dependent upon grain size, relative density, confining pressure, saturation of the soils, and intensity and duration of ground shaking. In order for liquefaction to occur, three criteria must be met: “low density”, coarse-grained (sandy) soils, a groundwater depth of less than about 50 feet, and a potential for seismic shaking from nearby large-magnitude earthquake. Since the depth to groundwater at the project site is 450 feet bgs, in our opinion there is a negligible risk of liquefaction occurring at the project site during a design level seismic event.

Tsunamis and Seiches

Tsunamis are sea waves that are generated in response to large-magnitude earthquakes. When these waves reach shorelines, they sometimes produce coastal flooding. Seiches are the oscillation of large bodies of standing water, such as lakes, that can occur in response to ground shaking. Tsunamis and seiches do not pose hazards due to the inland location of the site and lack of nearby bodies of standing water.

Seismically Induced Settlement

Seismically induced settlement occurs most frequently in areas underlain by loose, granular sediments. Damage as a result of seismically induced settlement is most dramatic when differential settlement occurs in areas with large variations in the thickness of underlying sediments. Settlement caused by ground shaking is often non-uniformly distributed, which can result in differential settlement. Taking into account the soil profile within the upper 31 feet, that the PGA_M is 0.653g, and the nearest active fault is approximately 20 miles from the project site, there is a moderate risk of seismic settlement occurring at the project site during a design seismic event.

Seismically Induced Flooding

The site is not located within a low-lying area that would be inundated during the failure of an up gradient water reservoir or dam. Consequently, seismically induced flooding at the site is very unlikely.

3.04 Preliminary Earthwork Recommendations

This section provides preliminary recommendations for site preparation and fill placement related to the project site plan. It should be noted that all references to maximum dry density, optimum moisture content, and relative compaction are based on ASTM D 1557 laboratory test procedures.

In areas where construction is planned, all vegetation, organic rich soils (soils containing more than 2 percent organics by weight), trash, and debris, should be cleared from the grading area, removed, and properly disposed of. Subsequently, over-excavation and replacing with engineered compacted fill should be anticipated to support new building structures and new equipment.

Over-excavation should extend at least 5 feet horizontally outside of the building footprint and/or perimeter foundations. The subgrade must be over-excavated to a depth that will extend below the stripped subgrade surface or below the bottom of the foundation. The upper 2 feet of compacted soils underneath concrete slab-on-grade should consist of non-expansive soils with a plasticity index of less than 10. As an alternative to replacing expansive soils with import non-expansive soils, lime treatment of on-site soils may be performed to mitigate potential expansive soils movement after completion of construction. Another alternative is post-tensioned slab.

Within the area of new roadways and other surface improvements, the subgrade must be over-excavated at least 12 inches below the stripped surface or the finished subgrade surface, whichever is lower.

The stripped and/or over-excavated ground surface in all areas determined to be satisfactory for the support of fills must be scarified to a minimum depth of 8 inches. Scarification should continue until the soils are broken down and free from lumps or clods and until the scarified zone is uniform. The scarified zone should be uniformly moisture

conditioned to at least 3 percent over optimum and compacted to at least 90 percent relative compaction.

Removed and/or over-excavated soils free of organics and other deleterious material may be used as engineered fill. Fill material should be placed in nearly horizontal layers, uniformly moisture conditioned to required moisture content, and then compacted in layers that do not exceed approximately 6 inches in thickness. Thicker lifts may be placed if testing indicates the compaction procedures are such that the required compaction is being achieved and the geotechnical consultant approves their use. Each layer shall be spread evenly and shall be thoroughly mixed during the spreading to insure uniformity of material in each layer. Engineered fill derived from the clayey soils at the project site must be moisture-conditioned to at least 3 percent over optimum and compacted to achieve a relative compaction of at least 90 percent except for the upper 8 inches of clayey subgrade within areas subject to vehicular traffic, which must be compacted to a relative compaction of at least 92 percent. Engineered fill consisting of non-expansive imported soils should be uniformly moisture conditioned to at least optimum and compacted to at least 90 percent relative compaction, except for the upper 8 inches of subgrade in areas with vehicular traffic must be compacted to at least 95 percent relative compaction.

The above recommendations are based on the assumption that soils encountered during field exploration are representative of soils throughout the site. However, there can be unforeseen and unanticipated variations in soils between points of subsurface exploration. Hence, over-excavation depths must be verified, and adjusted if necessary, at the time of grading. In addition, any contaminated or expansive soils within three (3) feet of the finished subgrade surface must be removed and properly disposed of outside the area the planned improvements.

3.05 Lateral Soil Resistance

Lateral loads may be resisted by soil friction and the passive resistance of the soil. The following parameters are recommended for preliminary design.

- Allowable Passive Earth Pressure = 200 pcf (equivalent fluid weight, includes a factor of safety = 2.0)
- Allowable Coefficient of Friction (soil to footing) = 0.25 (includes a factor of safety = 1.5)
- Retaining structures should be designed to resist a lateral active earth pressure of 25 pcf (equivalent fluid weight) for a level, non-expansive backfill with drainage provided.

The active earth pressure provided above is only applicable if the retained earth is allowed to strain sufficiently to achieve the active state. The required minimum horizontal strain to achieve the active state is approximately 0.0025H. Retaining structures should be designed to resist an at-rest lateral earth pressure of 55 pcf (equivalent fluid weight) if this horizontal strain cannot be achieved.

3.06 Preliminary Foundation Recommendations

Isolated spread footings and/or continuous wall footings are recommended to support the planned buildings, provided the settlement is within tolerable for structural design. For the purposed of this report, foundation loads are not known and therefore settlements will be estimated in the design specific geotechnical report. Deep foundations should be used when settlements are excessive and/or structural design warrants deep

foundation.

Shallow foundations should be embedded at least 12 inches below the lowest adjacent grade. The foundations must be constructed on firm native soils or engineered fill as recommended in Section 3.04 of this report. Continuous and isolated spread footings with a minimum width of 12 and 24 inches, respectively, may be designed using an allowable bearing capacity of 2,000 pounds per square foot (psf), up to maximum dimensions of 8 feet by 8 feet. This allowable bearing capacity represents an allowable net increase in soil pressure over existing soil pressure and may be increased by one-third for short-term wind or seismic loads. The maximum expected settlement of footings designed with the recommended allowable bearing capacity and maximum foundation dimensions is expected to be less than 1 inch. Differential settlements should be considered during design level study. Since the encountered near-surface soils have a medium expansion potential, the reinforcement of building foundations should be based on structural considerations. However, it is recommended that continuous footings be reinforced with at least two #4 rebars, one located near the top, and one located near the bottom, of the footing.

It will be very important for all footing excavations to be observed by the geotechnical engineer to verify that they have been excavated into the recommended bearing material. Where zones of relatively loose or disturbed soils are present at the bottom of foundation recommendations, these soils should be properly compacted to provide a uniform bearing surface that meets the approval of the geotechnical engineer (refer to Section 3.04).

3.07 Cement Type and Corrosion Potential

The results of tests performed on two samples of soil obtained from the project site indicate a soluble sulfate content in the range of 4,230 to 4,640 mg/kg (0.423 to 0.464 percent by weight). Thus, below-grade concrete at the subject site may have a severe exposure to water-soluble sulfate in the soil. Our recommendations for concrete exposed to soils containing various concentrations of soluble sulfate are presented in the table below.

Recommendations for Concrete Exposed to Soils Containing Soluble Sulfate

Sulfate Exposure	Water Soluble Sulfate (SO_4) in Soil (% by Weight)	Sulfate (SO_4) in Water (ppm)	Cement Type (ASTM C150)	Maximum Water-Cement Ratio (by Weight)	Minimum Compressive Strength (psi)
Negligible	0.00 - 0.10	0-150	--	--	2,500
Moderate	0.10 - 0.20	150-1,500	II	0.50	4,000
Severe	0.20 - 2.00	1,500-10,000	V	0.45	4,500
Very Severe	Over 2.00	Over 10,000	V plus pozzolan or slag	0.45	4,500

Use of alternate combinations of cementitious materials may be permitted if the combinations meet design recommendations contained in American Concrete Institute guideline ACI 318-11.

Our testing also indicates that there is a low to moderate soluble chloride content (21.0 to 83.7 mg/kg) in the onsite soils; therefore, the special protection of reinforcing steel due to soil conditions should be evaluated by the design engineer.

The soils were also tested for soil reactivity (pH) and minimum electrical resistivity (ohm-cm). The test results indicate that the on-site soils have a pH in the range of 7.51 to 7.70 and exhibit a minimum electrical resistivity in the range of 600 to 1,040 ohm-cm. A neutral or non-corrosive soil has a pH value ranging from approximately 6 to 8.5. Generally, soils that could be considered moderately corrosive to ferrous metals have minimum resistivity values of about 3,000 ohm-cm to 10,000 ohm-cm. Soils with minimum resistivity values less than 3,000 ohm-cm can be considered corrosive and soils with minimum resistivity values less than 1,000 ohm-cm can be considered extremely corrosive. In any case, buried metal conduits should have a protective coating in accordance with the manufacturer's specifications. A corrosion specialist should be consulted if more detailed recommendations are required.

3.08 Additional Recommendations

Bases upon our findings and assuming the project proceeds into the next phase of development, additional geotechnical studies will be necessary. The studies will include:

- A design-level geotechnical investigation.
- A review of final construction plans and specifications, including grading plans, foundations plans, and calculations for conformance with our recommendations.

We will be please to provide an estimate for these additional services once final plans are available.

4.0 Closure

The findings, conclusions and recommendations in this report were prepared in accordance with generally accepted engineering and geologic principles and practices. No other warranty, either expressed or implied, is made. This report has been prepared for Morris General Contracting, Inc. to be used for the design and construction of the improvements described above. Anyone using this report for any other purpose must draw their own conclusions regarding required construction procedures and subsurface conditions.

The geotechnical and geologic consultant should be retained during the earthwork and foundation phases of construction to monitor compliance with the design concepts and recommendations and to provide additional recommendations as needed. Should subsurface conditions be encountered during construction that are different from those described in this report, this office should be notified immediately so that our recommendations may be re-evaluated.

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FIGURES

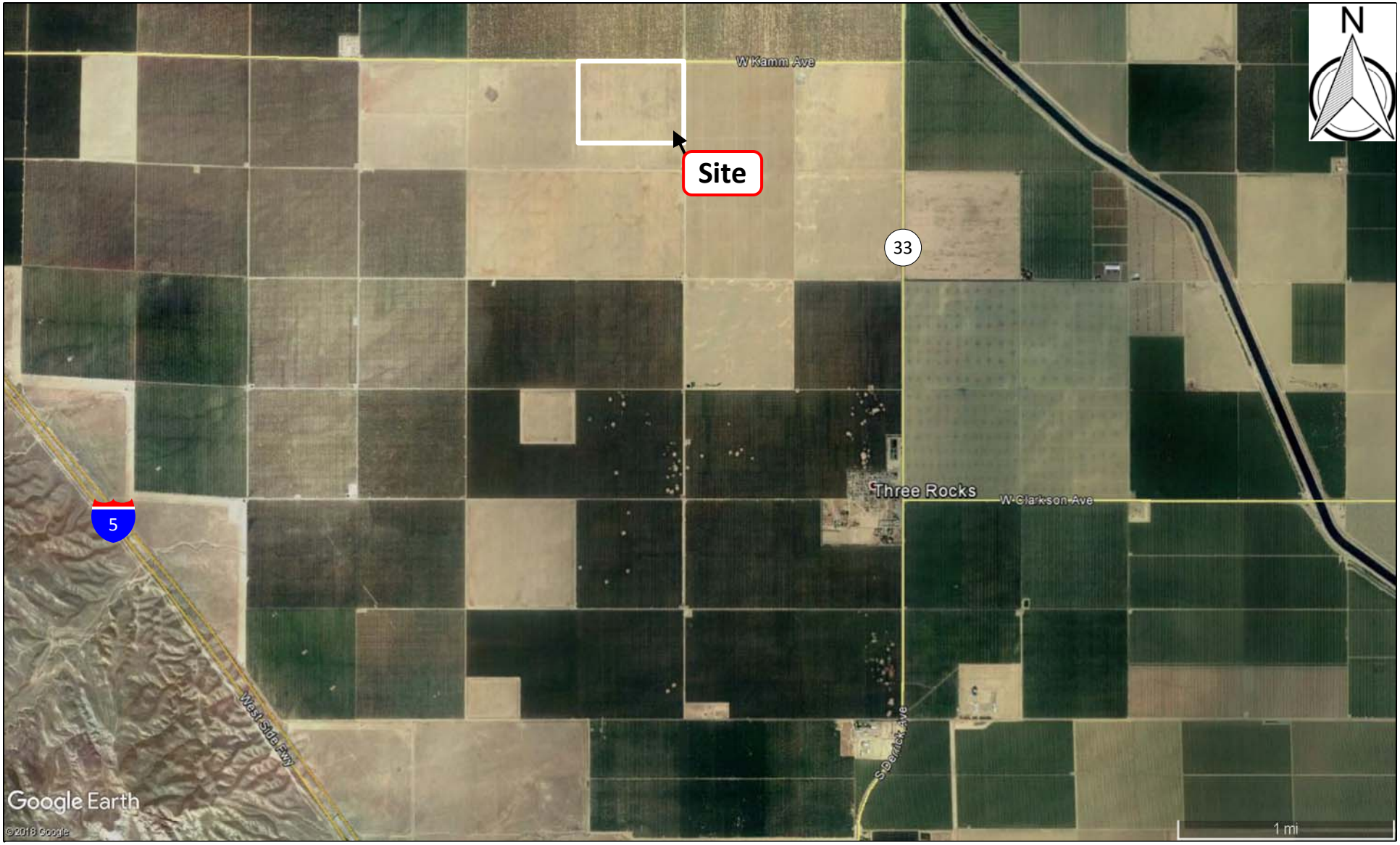

FIGURE 1

SITE VICINITY MAP

Scale: 1" ≈ 3,350'

Kamm Avenue Pistachio Processing
APNs 038-300-017S and 038-300-030S
Fresno County, California 93608
Project #19G-0194-0

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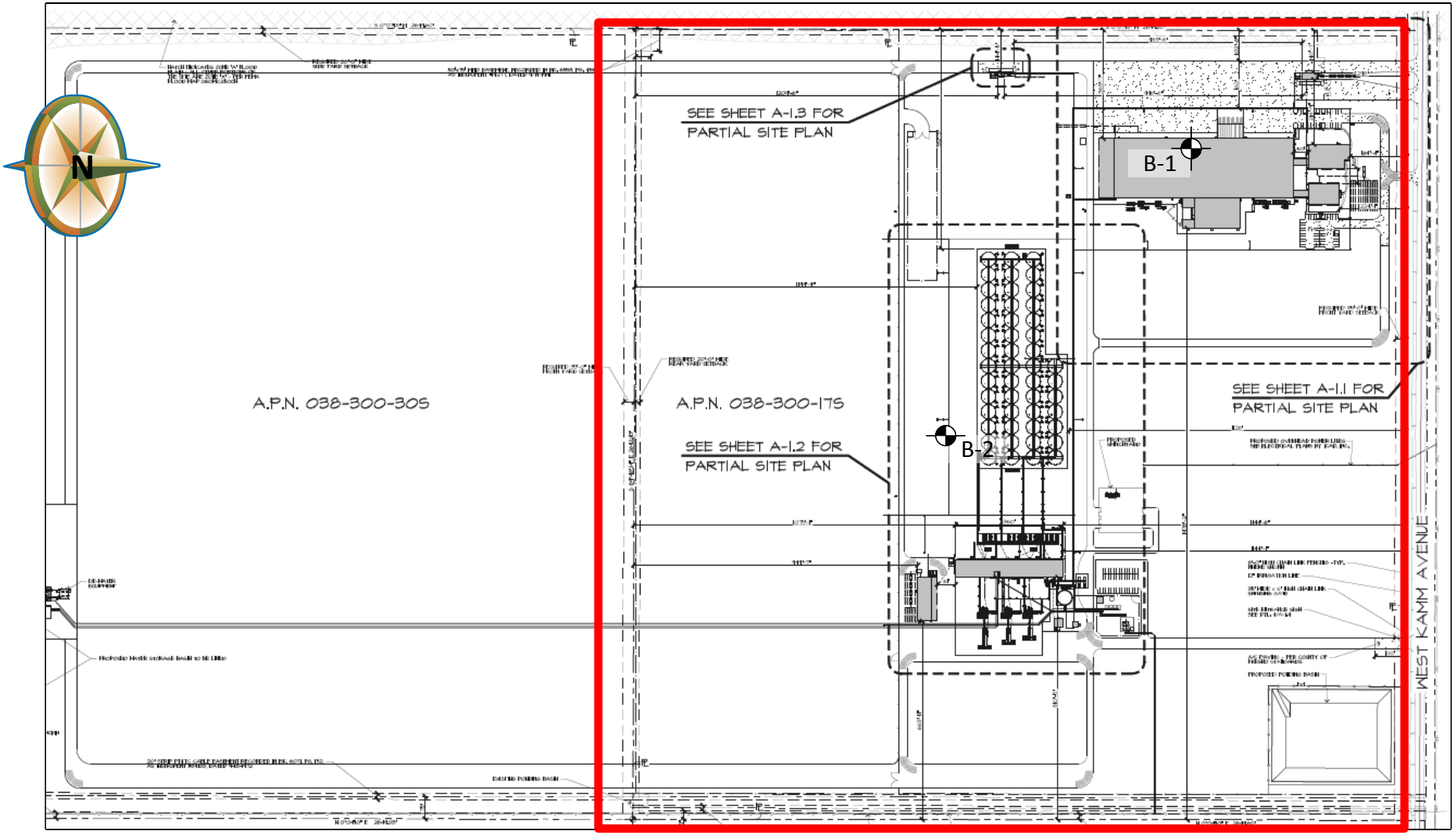

Reference: Site Plan prepared by Gerald Mele & Associates, Inc., 6/20/2020

Scale: 1" ≈ 490'

FIGURE 2

BORING LOCATION MAP

Kamm Avenue Pistachio Processing
APNs 038-300-017S and 038-300-030S
Fresno County, California 93608
Project #19G-0194-0

B-2 Approximate Boring Location

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APPENDIX A

FIELD INVESTIGATION

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APPENDIX A

FIELD INVESTIGATION

A-1.01 Number of Borings

Our subsurface investigation consisted of excavating two borings to a maximum depth of 31 feet below existing grade on April 4, 2019 with a CME 75 drill rig equipped with 7-inch diameter hollow stem auger and a 140-pound auto-hammer.

A-1.02 Location of Borings

A Boring Location Map showing the approximate locations of the test borings is presented as Figure 2. GPS coordinates indicated on the logs are based on information provided by Theodolite Version 7.0 run on an iPhone X with iOS Version 12.1.4.

A-1.03 Boring Logging

Logs of the borings were prepared by one of our staff and are attached in this appendix. The logs contain factual information and interpretation of subsurface conditions between samples. The strata indicated on these logs represent the approximate boundary between earth units and the transition may be gradual. The logs show subsurface conditions at the dates and locations indicated, and may not be representative of subsurface conditions at other locations and times.

Identification of the soils encountered during the subsurface exploration was made using the field identification procedure of the Unified Soils Classification System (ASTM D2488). A legend defining the terms used in describing the relative compaction, consistency or firmness of the soil is included in this appendix. Bag or tube samples of the major earth units were obtained for laboratory inspection and testing.

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I. SOIL STRENGTH/DENSITY

BASED ON STANDARD PENETRATION TESTS

Compactness of sand		Consistency of clay	
Penetration Resistance N (blows/Ft)	Compactness	Penetration Resistance N (blows/ft)	Consistency
0-4	Very Loose	<2	Very Soft
4-10	Loose	2-4	Soft
10-30	Medium Dense	4-8	Medium Stiff
30-50	Dense	8-15	Stiff
>50	Very Dense	15-30	Very Stiff
		>30	Hard

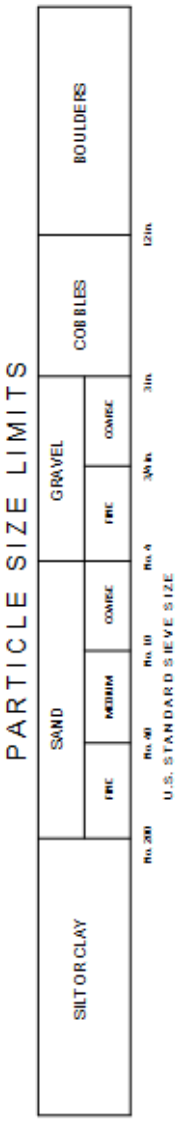
N = Number of blows of 140 lb. weight falling 30 in. to drive 2-in OD sampler 1 ft.

BASED ON RELATIVE COMPACTION

Compactness of sand		Consistency of clay	
% Compaction	Compactness	% Compaction	Consistency
<75	Loose	<80	Soft
75-83	Medium Dense	80-85	Medium Stiff
83-90	Dense	85-90	Stiff
>90	Very Dense	>90	Very Stiff

II. SOIL MOISTURE

Moisture of sands		Moisture of clays	
% Moisture	Description	% Moisture	Description
<5%	Dry	<12%	Dry
5-12%	Moist	12-20%	Moist
>12%	Very Moist	>20%	Very Moist, wet



MAJOR DIVISIONS			GROUP SYMBOLS	TYPICAL NAMES
COARSE GRAINED SOILS (More than 50% of material is LARGER than No. 200 sieve size)	GRAVELS (More than 50% of coarse fraction is LARGER than the No. 4 sieve size)	CLEAN GRAVELS (Little or no fines)	GW	Well graded gravel, gravel-sand mixtures, little or no fines.
			GP	Poorly graded gravel or gravel-sand mixtures, little or no fines.
		GRAVELS WITH FINES (Appreciable amt. of fines)	GM	Silty gravels, gravel-sand-silt mixtures.
			GC	Clayey gravels, gravel-sand-clay mixtures.
	SANDS (More than 50% of coarse fraction is SMALLER than the No. 4 sieve size)	CLEAN SANDS (Little or no fines)	SW	Well graded sands, gravelly sands, little or no fines.
			SP	Poorly graded sands or gravelly sands, little or no fines.
		SANDS WITH FINES (Appreciable amount of fines)	SM	Silty sands, sand-silt mixtures.
			SC	Clayey sands, sand-clay mixtures.
FINE GRAINED SOILS (More than 50% of material is SMALLER than No. 200 sieve size)	SILTS AND CLAYS (Liquid limit LESS than 50)		ML	Inorganic silts and very fine sands, rock flour silty or clayey fine sands or clayey silts with slight plasticity
			CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays.
			OL	Organic silts and organic silty clays of low plasticity.
	SILTS AND CLAYS (Liquid limit GREATER than 50)		MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts.
			CH	Inorganic clays of high plasticity, fat clays.
			OH	Organic clays of medium to high plasticity, organic silts.
HIGHLY ORGANIC SOILS			Pt	Peat and other highly organic soils.

BOUNDARY CLASSIFICATIONS: Soils possessing characteristics of two groups are designated by combinations of group symbols.

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GEOTECHNICAL CONSULTANTS

Exploratory Boring Log

Boring No. B-1
Sheet 1 of 1

Date Drilled:	April 4th, 2019	Drilling Equipment:	CME 75, Hollow Stem Auger
Logged By:	MJS	Borehole Diameter:	7"
Location:	See Boring Location Map	Drive Weights:	140 lbs. (Autohammer)
Geographic Position:	36.529267°, -120.414654°	Drop Height:	30"

Depth (ft)	Samples: Sample Type	Samples: Blows (blows/ft)	Samples: Bulk Sample	Moisture Content (%)	Dry Density (pcf)	USCS	Graphic Symbol	Material Description
0	R	12	▨	12.1	75.9	SC		**ALLUVIUM:** yellow brown, fine to medium CLAYEY SAND, dry, medium dense, with caliche
5	R	11		5.6	103.8	SP		Light yellow brown, fine SAND, dry, medium dense
						SM		Yellow brown, fine to medium SILTY SAND with CLAY, moist, medium dense, with caliche
10	S	5						. . .with minor/varying CLAY, loose
15	R	11		13.5	100.8	SC		Yellow brown, fine to medium CLAYEY SAND, moist, medium dense, with caliche
20	S	5						. . .loose . . .difficult drilling below 22 feet
25	R	56		19.1	111.0	CL		Yellow brown, fine to medium SANDY CLAY, moist, hard, with caliche . . .very difficult drilling below 26 feet
30	S	12						. . .stiff
35								Notes: 1. Boring terminated at 31' 2. No Groundwater Encountered 3. Boring backfilled with soil cuttings

The log contains factual information and interpretation of the subsurface conditions between the samples. The stratum indicated on this log represent the approximate boundary between earth units and the transition may be gradual. The log show subsurface conditions at the date and location indicated, and may not be representative of subsurface conditions at other locations and times.

***Note**

All blow counts associated with Modified California Sample are uncorrected. The sampler dimensions are as follows:
ID = 2.5" OD = 3"

Sample Types:
S - SPT Sample
▨ - Bulk Sample
T - Modified California Tube Sample
R - Modified California Ring Sample

Symbols:
▽ - Groundwater
◣ - End of Boring

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GEOTECHNICAL CONSULTANTS

Exploratory Boring Log

Boring No. B-2
Sheet 1 of 1

Date Drilled:	April 4th, 2019	Drilling Equipment:	CME 75, Hollow Stem Auger
Logged By:	MJS	Borehole Diameter:	7"
Location:	See Boring Location Map	Drive Weights:	140 lbs. (Autohammer)
Geographic Position:	36.526988°, -120.411472°	Drop Height:	30"

Depth (ft)	Samples: Sample Type	Samples: Blows (blows/ft)	Samples: Bulk Sample	Moisture Content (%)	Dry Density (pcf)	USCS	Graphic Symbol	Material Description
								This log contains factual information and interpretation of the subsurface conditions between the samples. The stratum indicated on this log represent the approximate boundary between earth units and the transition may be gradual. The log show subsurface conditions at the date and location indicated, and may not be representative of subsurface conditions at other locations and times.
	R	13	▨	9.2	96.7	SC		**ALLUVIUM:** yellow brown, fine to medium CLAYEY SAND, dry, medium dense, with caliche
5	S	6				CL		Yellow brown, fine to medium SANDY CLAY, moist, medium stiff, with caliche
10	R	15		8.9	103.2	SM		Yellow brown, fine to medium SILTY SAND with CLAY and interlayers of SANDY CLAY, moist, medium dense, with caliche
15	S	11				CL		Brown, fine SILTY CLAY, moist, stiff, with caliche . . .difficult drilling below 17 feet
20	R	15		22.6	101.0			. . .with minor SAND, very stiff
25	S	4						. . .little to no SAND, medium stiff
30	S	11				ML		. . .stiff Gray brown, fine to SANDY SILT with CLAY, moist, stiff, with caliche
35								Notes: 1. Boring terminated at 31' 2. No Groundwater Encountered 3. Boring backfilled with soil cuttings

***Note**
All blow counts associated with Modified California Sample are uncorrected. The sampler dimensions are as follows:
ID = 2.5" OD = 3"

Sample Types:
S - SPT Sample
▨ - Bulk Sample
T - Modified California Tube Sample
R - Modified California Ring Sample

Symbols:
▽ - Groundwater
◣ - End of Boring

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APPENDIX B

LABORATORY TESTS

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APPENDIX B

B-1.00 LABORATORY TESTS

B-1.01 Moisture Determination

The moisture content of tube and/or ring samples obtained from the test borings was determined in accordance with ASTM D2216, the standard method for determining the water content of soil using a drying oven. The mass of material remaining after oven drying is used as the mass of the solid particles. The results of these tests are provided on the boring logs in Appendix A.

B-1.02 Density of Tube Samples

The densities of tube and/or ring samples, which were obtained using a split-barrel sampler, were determined in accordance with ASTM D2937. The results of these tests are provided on the boring logs in Appendix A.

B-1.03 Soluble Sulfates and Chlorides

Tests were performed in accordance with California Test Methods 417 and 422 on two near-surface soil samples obtained during the field exploration. These tests were performed by Dellavalle Laboratory, Inc. located in Fresno, California. The test results are provided below in Table B1.

B-1.04 Soil Reactivity (pH) and Minimum Electrical Resistivity

Two near-surface soil samples were tested for soil reactivity (pH) and minimum electrical resistivity using California Test Method 643 (see Table B1). The pH measurement determines the degree of acidity or alkalinity in the soils. The minimum electrical resistivity is used as an indicator of how corrosive the soil is relative to buried metallic items.

TABLE B1: Summary of Corrosivity Tests

Sample Location	Soluble Sulfates (mg/kg)	Soluble Chlorides (mg/kg)	pH	Minimum Resistivity (ohm-cm)
B-1 @ 1’ – 3’	4640.0	83.7	7.51	600
B-2 @ 1’ – 3’	4230.0	21.0	7.70	1,040

B-1.05 Percent Passing #200 Sieve

Two soil samples were tested in accordance with ASTM D1140 to determine the percent passing the #200 sieve (see Table B2). This represents the amount of silt and clay that is present in the soil.

TABLE B2: PERCENT PASSING #200 SIEVE TEST RESULTS

Sample Location	Dry Weight Before Wash (grams)	Dry Weight After Wash (grams)	Percent Passing #200 Sieve
B-1 @ 9.5' – 11'	265.6	156.3	41
B-2 @ 1' – 3'	274.6	180.4	34

B-1.06 Atterberg Limits

The liquid limit, plastic limit, and the plasticity index of two near-surface soil samples were determined using the standard test methods of ASTM D4318 (See Figures B1 and B2).

B-1.07 Direct Shear

One 3-point direct shear tests were performed on representative near-surface samples of soil using the standard test method of ASTM D3080 (consolidated and drained). Shear tests were performed on a direct shear machine of the strain-controlled type by Moore Twining Associates, Inc. To simulate possible adverse field conditions, the samples were saturated prior to shearing. Three soil specimens were sheared at varying normal loads for each test and the results plotted to establish the angle of the internal friction and cohesion of the tested samples. The results of these tests are shown on Figure B3.

B-1.08 One-Dimensional Consolidation Properties

The magnitude and rate of consolidation of soils obtained from test borings, when it is restrained laterally and drained axially while subjected to incrementally applied controlled-stress loading, was determined using the standard test methods of ASTM D2435.The results of these tests are shown on Figure B4.

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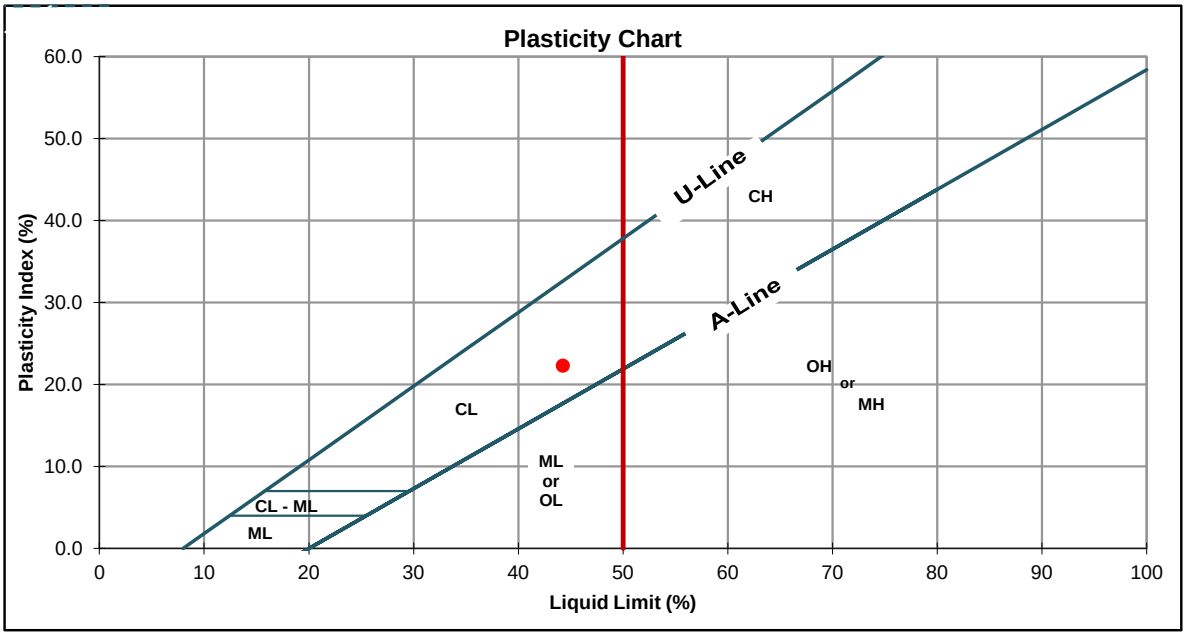
Figure B1
Laboratory Test Form | ASTM D4318
Plasticity Index (PI) of Soils

Project Number:	19G-0194-0/02	Lab ID:	19-002034
Project Name:	Kamm Avenue Pistachio Processing	Date Tested:	4/11/2019
Sampled By:	Megan S.	Tested By:	Bryce M.
Sample Date:	4/4/2019		
Sample Location:	B-1 @ 1' - 3'		
Sample Description:	Sandy CLAY, fine to medium grained, yellow brown		

Plasticity Index Results

Average Liquid Limit:	44
Average Plastic Limit :	22
Plasticity Index:	22



Liquid Limit Data

	Trial 1	Trial 2	Trial 3
Wet Weight (gm.)	36.97	36.39	36.74
Dry Weight (gm.)	34.37	33.99	34.14
Tare Weight (gm.)	28.36	28.48	28.29
Number of Blows	35	28	21
Liquid Limit	43.3	43.6	44.4
Corrected Liquid Limit	45.1	44.2	43.5

Plastic Limit Data

	Trial 1	Trial 2
Wet Weight (gm.)	33.93	40.12
Dry Weight (gm.)	32.91	39.01
Tare Weight (gm.)	28.29	33.92
Moisture Content (%)	22.1	21.8

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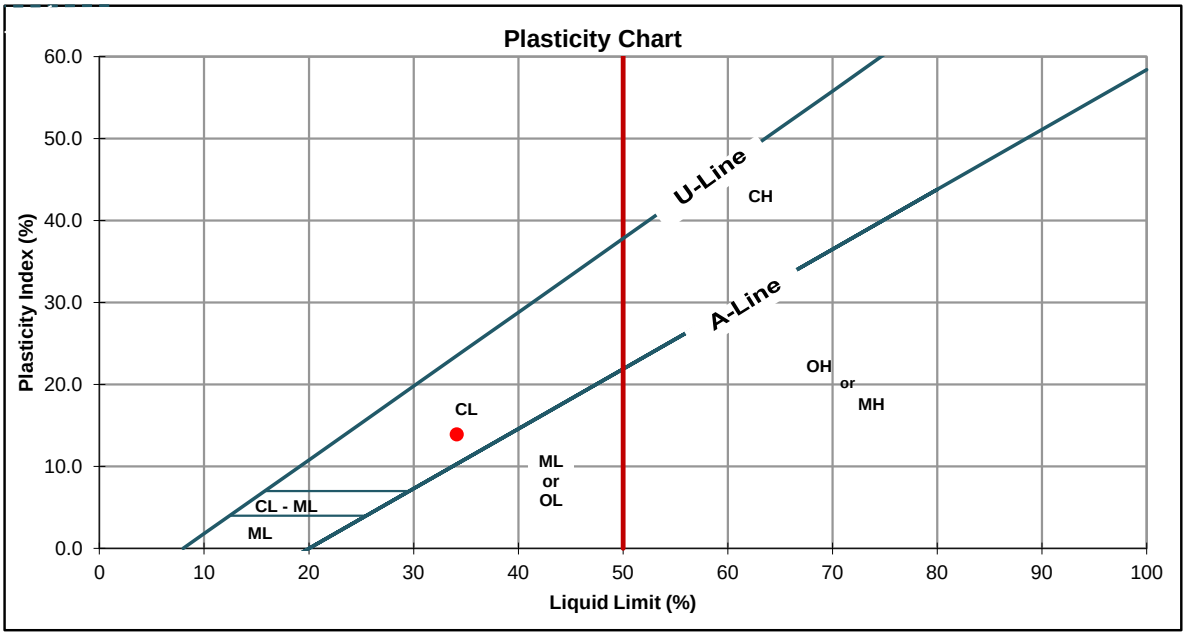
Figure B2
Laboratory Test Form | ASTM D4318
Plasticity Index (PI) of Soils

Project Number:	19G-0194-0/02	Lab ID:	19-002032
Project Name:	Kamm Avenue Pistachio Processing	Date Tested:	4/11/2019
Sampled By:	Megan S.	Tested By:	Bryce M.
Sample Date:	4/4/2019		
Sample Location:	B-2 @ 4.5' - 6'		
Sample Description:	Sandy CLAY, fine to medium grained, yellow brown		

Plasticity Index Results

Average Liquid Limit:	34
Average Plastic Limit :	20
Plasticity Index:	14



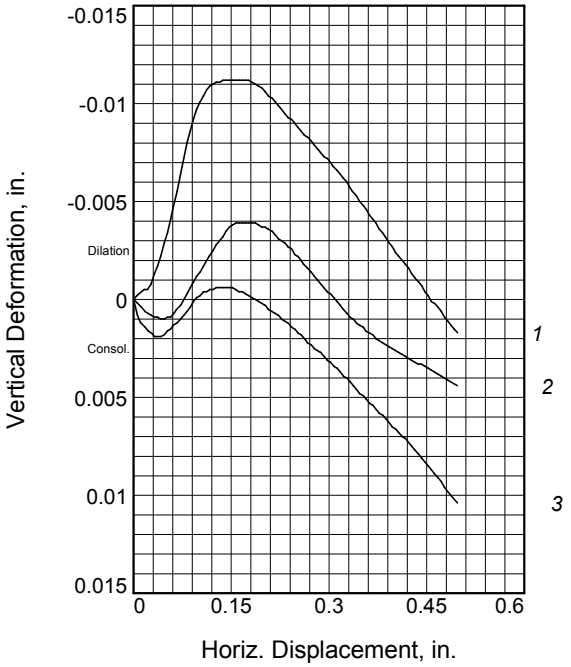
Liquid Limit Data

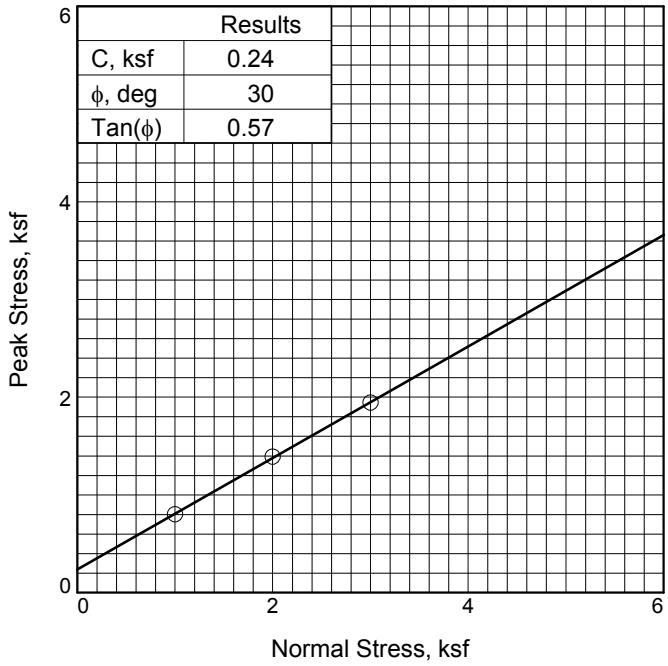
	Trial 1	Trial 2	Trial 3
Wet Weight (gm.)	36.91	36.08	41.48
Dry Weight (gm.)	34.81	34.17	39.52
Tare Weight (gm.)	28.45	28.51	33.85
Number of Blows	31	27	24
Liquid Limit	33.0	33.7	34.6
Corrected Liquid Limit	33.9	34.1	34.4

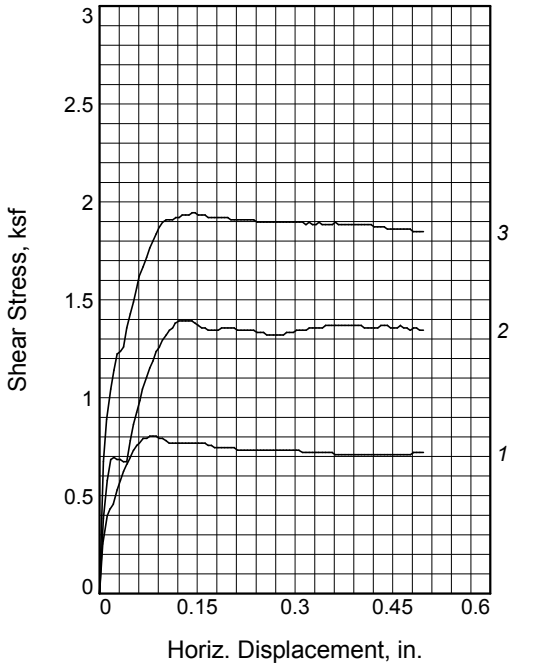
Plastic Limit Data

	Trial 1	Trial 2
Wet Weight (gm.)	39.10	39.24
Dry Weight (gm.)	38.18	38.30
Tare Weight (gm.)	33.56	33.71
Moisture Content (%)	19.9	20.5

Figure B3







Sample No.		1	2	3
Initial	Water Content, %	5.4	5.6	5.3
	Dry Density, pcf	103.9	104.8	103.2
	Saturation, %	24.3	25.8	23.4
	Void Ratio	0.5927	0.5788	0.6029
	Diameter, in.	2.42	2.42	2.42
	Height, in.	1.00	1.00	1.00
At Test	Water Content, %	20.6	19.9	20.8
	Dry Density, pcf	105.5	106.6	105.2
	Saturation, %	96.3	95.7	96.2
	Void Ratio	0.5678	0.5513	0.5723
	Diameter, in.	2.42	2.42	2.42
	Height, in.	0.98	0.98	0.98
Normal Stress, ksf		1.00	2.00	3.00
Peak Stress, ksf		0.80	1.39	1.94
Displacement, in.		0.08	0.12	0.14
Ultimate Stress, ksf				
Displacement, in.				
Strain at peak, %		3.2	5.0	5.9

Sample Type: Rings
Description: SM

Specific Gravity= 2.65
Remarks:

Figure B3

Client: RMA GeoScience

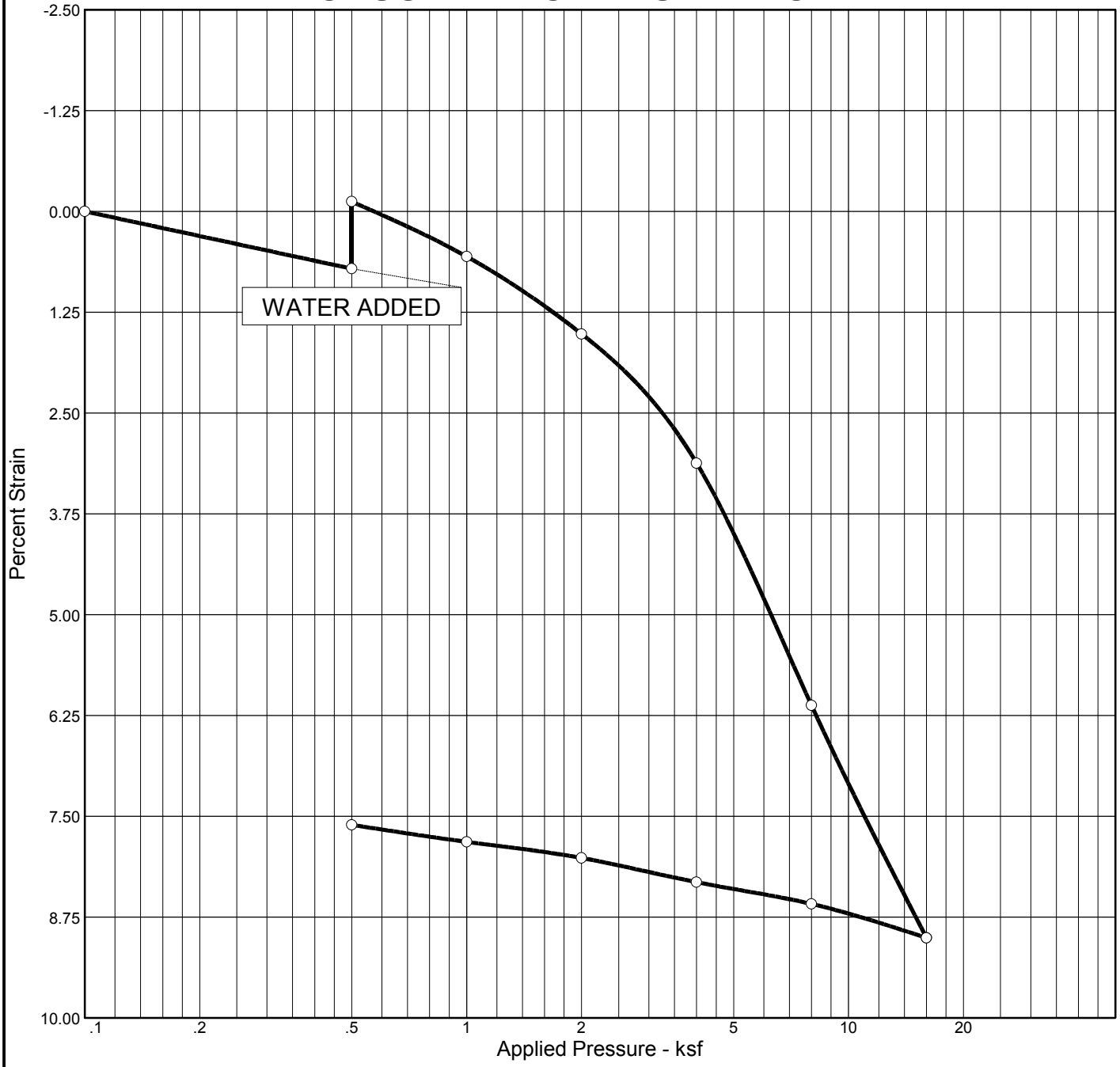
Project: Kamm Avenue Pistachio Processing

Source of Sample: Fresno County, CA
Sample Number: B-1 **Depth:** 5.5'
Proj. No.: 19G-0194-0 **Date Sampled:** 4/4/19

DIRECT SHEAR TEST REPORT
Moore Twining Associates, Inc.
Fresno, CA

Figure B4

CONSOLIDATION TEST REPORT



Natural		Dry Dens. (pcf)	LL	PI	Sp. Gr.	Overburden (ksf)	P_c (ksf)	C_c	C_s	Swell Press. (ksf)	Swell %	e_o
Sat.	Moist.											
39.5 %	9.1 %	102.9			2.65		3.41	0.15	0.01	1.13	0.8	0.608

MATERIAL DESCRIPTION	USCS	AASHTO
SILTY SAND with CLAY, fine to medium grained, yellow brown	SM	

Project No. 19G-0194-0 **Client:** RMA GeoScience

Project: Kamm Avenue

Source: Fresno County, CA **Sample No.:** B-2 **Elev./Depth:** 10.5'

Moore Twining Associates, Inc.

Fresno, CA

Remarks:

Figure B4

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APPENDIX C

REFERENCES

REFERENCES

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June 1, 2020 Project No. 19G-0194-1

Mr. Tony Morris
Morris General Contracting, Inc.
14451 West Whitesbridge Avenue
Kerman, California 93630

Subject: Final Geotechnical Investigation Report
Kamm Avenue Pistachio Processing
APNs 038-300-017S and 038-300-030S
Fresno County, California 93608

Dear Mr. Morris:

At your authorization, we have performed a geotechnical investigation for the subject project. This work was performed in accordance with Section 1803 of the 2016 California Building Code. The results of our geotechnical investigation are presented in the accompanying report, which includes a description of site conditions and potential geotechnical hazards, results of our field exploration and laboratory testing, conclusions, and recommendations. A Geotechnical Feasibility Report dated May 10, 2019, was submitted prior to this geotechnical investigation.

We appreciate this opportunity to be of continued service to you. If you have any questions regarding this report, please do not hesitate to contact us at your convenience.

Respectfully submitted,

RMA GeoScience, Inc.

Megan J. Stewart

Megan J. Stewart, GIT
Staff Geologist

Josue Montes, PE|GE
Principal Geotechnical Engineer

Distribution: Addressee (4 Originals and one pdf copy to tony@morrisgeneralinc.com)
Mr. Dan Jauregui, Tri City Engineering, Inc. (one pdf copy to danj@tricityengineering.com)

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FINAL GEOTECHNICAL INVESTIGATION REPORT
KAMM AVENUE PISTACHIO PROCESSING
APNS 038-300-017S AND 038-300-030S
FRESNO COUNTY, CALIFORNIA 93608

for

Morris General Contracting, Inc.
14451 West Whitesbridge Avenue
Kerman, California 93630

June 1, 2020

Project No. 19G-0194-1

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Table of Contents

1.00 Introduction 1
- 1.01 Planned Development 1
- 1.02 Site Location and Description 1
- 1.03 Purpose 2
- 1.04 Scope of the Investigation 2
- 1.05 Investigation Methods and Limitation 3

2.00 Findings 3
- 2.01 Geologic Setting 3
- 2.02 Faults 5
- 2.03 Earth Materials 5
- 2.04 Expansive Soil 6
- 2.05 Surface and Groundwater Conditions 6

3.00 Conclusions and Recommendations 6
- 3.01 General 6
- 3.02 Seismic Design Parameters 7
- 3.03 Liquefaction and Secondary Earthquake Hazards 8
- 3.04 Earthwork Recommendations 8
- 3.05 Rippability and Rock Disposal 10
- 3.06 Earthwork Shrinkage 10
- 3.07 Imported Fill Material 10
- 3.08 Temporary Slopes and Shoring 11
- 3.09 Utility Trench Backfill 11
- 3.10 Lateral Soil Pressures 12
- 3.11 Foundations 12
- 3.12 Pole Type Foundations 14
- 3.13 Interior Slabs on Grade 14
- 3.14 Miscellaneous Concrete Flatwork 15
- 3.15 Footing Excavations and Concrete Subgrade 16
- 3.16 Drainage and Moisture Proofing 16
- 3.17 Cement Type and Corrosion Potential 17
- 3.18 Pavement Sections 17
- 3.19 Plan Review 18
- 3.20 Geotechnical Observation and Testing During Grading 18

4.0 Closure 19

FIGURES
- Figure 1 Site Location Map
- Figure 2 Boring Location Map

APPENDICES

Appendix A	Field Investigation
Appendix B	Laboratory Tests
Appendix C	References

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1.00 Introduction

1.01 Planned Development

Based on our review of provided information, it is our understanding that the project will consist of constructing a new pistachio processing plant facility. The plant will include various buildings, storage tanks, equipment, huller building, and associated structures typical in a processing plant. The main building will have a plan area of approximately 200 feet by 650 feet, 30-foot bay spacing, with concrete slab-on-grade and a depressed loading dock area approximately 50 inches lower than finished grade. The main building will be metal-framed with loads supported on column footings and without continuous wall loads. Anticipated appurtenant improvements include underground utilities, overhead piping, concrete flatwork, asphalt concrete roads and driveways, and some landscaping.

The main buildings will be constructed on cut and fill. Cut and fill take off prepared by the grading contractor indicated mostly fill of up to approximately 5 feet in the north end of the main buildings and cut of up to approximately 1.5 feet in the south end of the building. Planned column foundations are up to 14.5 feet by 14.5 feet with maximum DL+LL 126 kips, and maximum upward of 61 kips. The future tanks area will be on cut almost entirely, with cut depths of up to approximately 5.5 feet. The tanks will be supported on ringwall foundations with 3.4 klf loading, and 1000 psf in on the tank floor. The huller building will be on fill and cut, of up to approximately 2 feet and approximately 4 feet, respectively.

The project includes the design, installation, and use of a an on-site septic wastewater treatment system. The system will be built and operated in accordance with applicable County and other applicable building code requirements.

1.02 Site Location and Description

The Kamm Avenue Pistachio Processing (KAPP) is located approximately 1 mile west of the intersection of South Derrick Avenue and West Kamm Avenue within the western part of Fresno County (see Figure 1). The location of the planned development relative to streets and roads is shown on Figure 2.

At the time of our field exploration on May 10, 2019, the site had been recently disked (see photo below). According to Google Earth, the existing ground surface elevation varies from approximately 362 feet to approximately 393 feet, with a slight slope to the northeast. Aerial photos indicate the site has been used as agriculture land since at least 1994.

Photo taken on May 29, 2019, from B-4 looking southeast.

1.03 Purpose

A geotechnical investigation has been completed for the planned new KAPP project located northwest of Three Rocks in western Fresno County, California. The purpose of the investigation was to summarize geotechnical and geologic conditions at the site, to assess their potential impact on the proposed development, and to develop geotechnical engineering design parameters.

1.04 Scope of the Investigation

The general scope of this study included the following:

- Review of published and unpublished geologic, seismic, groundwater and geotechnical literature.
- Examination of aerial photographic and topographic maps
- Contacting of Underground Service Alert to locate onsite utility lines.
- Logging, sampling, and backfilling of eleven (11) exploratory borings drilled with a CME-75 drill rig.
- Laboratory testing of selected representative soil samples.
- Geotechnical evaluation of the compiled data.
- Preparation of this report presenting our findings, conclusions and preliminary recommendations.

Our scope of work did not include site assessment for the potential of hazardous materials.

1.05 Investigation Methods and Limitation

Our geotechnical investigation consisted of office research, field exploration, laboratory testing, review of the compiled data, and preparation of this report. This investigation has been performed in a manner consistent with generally accepted engineering and geologic principles and practices, and has incorporated applicable requirements of the 2016 California Building Code. Definitions of technical terms and symbols used in this report include those of the ASTM International, the California Building Code, and commonly used geotechnical and geologic nomenclature. Our geotechnical investigation was performed

Supporting technical data are presented in the attached appendices. Appendix A presents a description of the methods and equipment used in performing the field exploration, as well as logs of our subsurface exploration. Appendix B presents a description of our laboratory testing and the test results, and references are presented in Appendix C.

2.00 Findings

2.01 Geologic Setting

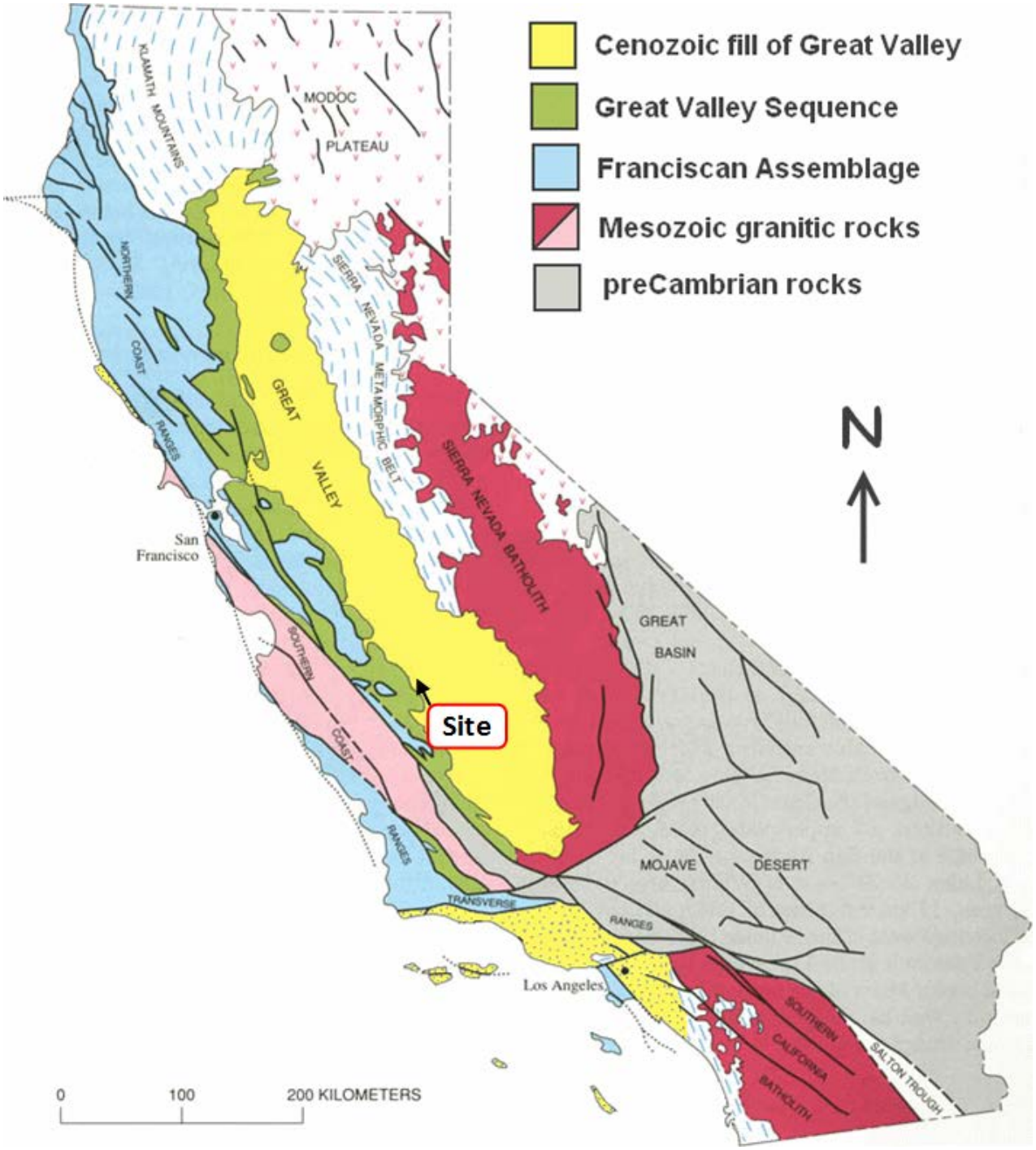
The subject site is located in the central part of the San Joaquin Valley, which comprises the southern half of the Great Valley geomorphic province. The valley is a westward-tilting trough which forms a broad alluvial fan, approximately 200 miles long and 50 to 70 miles wide, where the eastern flank is broad and gently inclined, as opposed to the western flank which is relatively narrow (Bartow, 1991; Page, 1968). The Central Valley consists of the Great Valley Sequence, overlain by Cenozoic alluvium. Underlying the Great Valley Sequence are the Franciscan Assemblage to the west and the Sierra Nevada batholith to the east (Bailey, Irwin, and Jones, 1964).

The Franciscan Assemblage, made up of deformed and high pressure and low temperature metamorphosed mafic and ultramafic rocks, was formed around the Late Jurassic through the Miocene (160 to about 20 million years ago) by the offscraping of rocks from a subducting plate dipping to the east (Wakabayashi, 1992; Wakabayashi, 2010).

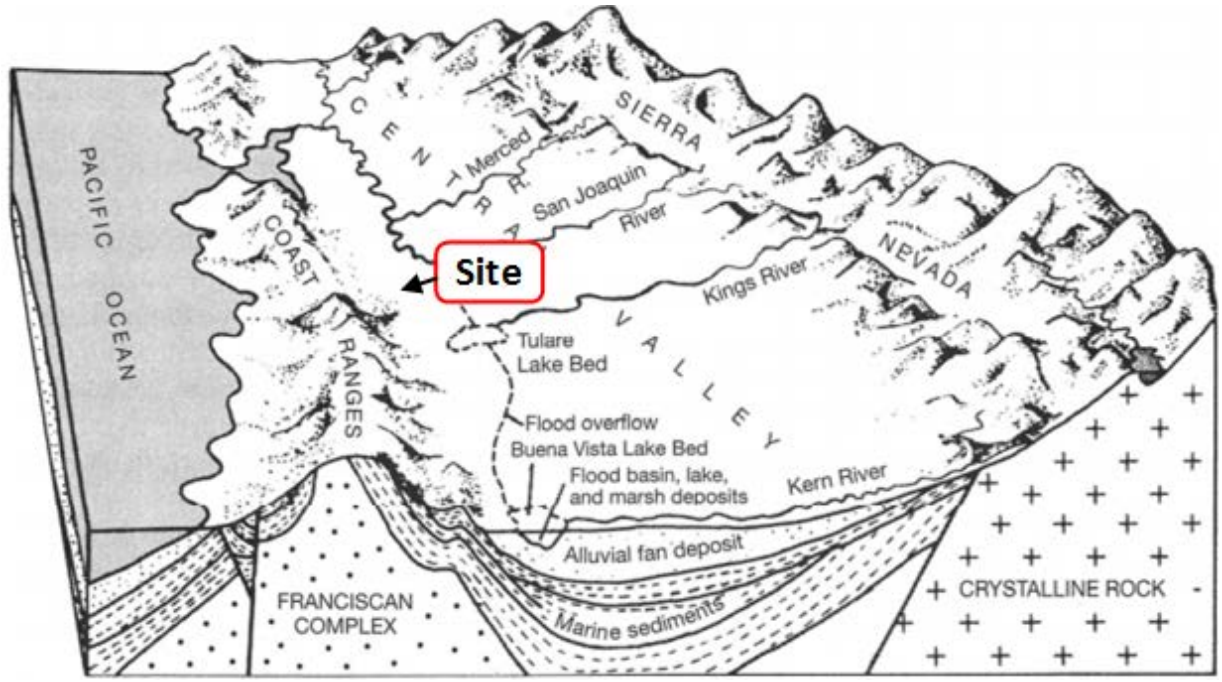
The Sierra Nevada started to form during the Early Jurassic (around 200 million years ago) when the Farallon Plate began subducting under the North American Plate. This subduction resulted in several orogenies, or mountain building events, that created the granitic Sierra Nevada Batholith deep below the surface. During the Miocene (around 10 million years ago), vertical movement along the Sierra Nevada Frontal Fault Zone (part of the Eastern California Shear Zone) began to uplift the Sierra Nevada. This uplift and erosion exposed the batholiths to the surface. From the Pleistocene (commonly known as the last Ice Age) to the present, glaciers have been carving out many parts of the Sierras. The current uplift of the Sierra Nevada is 1 - 2mm per year (Hammond, et al. 2012).

The Great Valley Sequence is a 40,000 foot sequence of marine shale, sandstone, and conglomerate beds, deposited in a deep marine environment during the Late Jurassic through the Cretaceous (150 – 65 million years ago). Overlying the Great Valley Sequence is several thousand feet of Cenozoic alluvium, deposited by: streams

and rivers draining from the mountains and creating alluvial fans; by lakes that covered parts of the valley floor from time to time; flooding; and marsh environments (Page, 1986). In some places, it is thousands of feet thick, and more than half of this thickness is composed of fine grained fluvial and lacustrine deposits. Holocene deposition consists mainly of episodic deposition of alluvial sediments (Bartow, 1991; Page, 1986). The project site is situated on Quaternary fan deposits and older marine sediments that are several thousand feet deep.



Geologic map showing the locations of Cenozoic alluvium/fill (yellow) overlying the Great Valley Sequence (green), the Franciscan Assemblage (blue), and the Sierra Nevada Batholith (red). Modified from: Irwin (1990).



Geologic block diagram of California. From: Harden (2004). Not to scale.

2.02 Faults

The subject site is not located within the boundaries of an Earthquake Fault Zone for fault rupture hazard as defined by the Alquist-Priolo Earthquake Fault Zoning Act and no faults are known to pass through the property. The nearest active earthquake fault zones (evidence of displacement within the past 11,700 years) are the Nunez Fault , the Ortigalita Fault Zone, and the San Andreas Fault Zone located approximately 20 miles south, 30 miles south, and 31 miles southwest, respectively, of the project site.

2.03 Earth Materials

The soils encountered in the test borings consisted primarily of sandy clay and clayey sand with occasional layers or zones of silty sand, poorly graded sand, and sandy silt. The consistency of the soils was predominantly medium dense for sandy soils and medium stiff to hard for the silty and clayey soils. At Borings B-3, B-7, and B-11, there were zones with low blow count encountered from 8 to 13 feet, while in Boring B-1 there was a low blow count zone between 3 and 5 feet. As indicated above, the soils encountered in the test borings are related to alluvial deposits that are estimated to be several thousand feet deep in the vicinity of the project site.

The approximate locations of the borings that were drilled for this project are presented on Figure 2. Logs of our exploratory borings are presented in Appendix A, which provide more detailed information of the soils that were encountered to the depths explored at the project site.

2.04 Expansive Soil

Our field exploration and laboratory testing program indicated that the near surface soils have a medium expansion potential (Lab results from selected samples - Expansion Index of 52 and Plasticity Index in the range of 14 to 19). Results of our laboratory tests are presented in Appendix B.

Due to the expansive characteristic of the encountered upper soils, the concrete slab should be constructed with the upper 12 inches of the underlying soils as one of the following: non-expansive imported soils (EI ≤ 20), or lime treated on-site native clayey soils, or on-site native soils moisture conditioned and compacted as recommended in Earthwork Recommendations, in order of least to increasing potential of cracking due expansive soils effect on the concrete slab.

2.05 Surface and Groundwater Conditions

No areas of ponding or standing water were present at the time of our study. Further, no springs or areas of natural seepage were observed at the project site. In addition, no groundwater was encountered in the test borings within the maximum depth explored of approximately 41 feet below grade.

According to groundwater data that is available at the California Department of Water Resource website, recent groundwater data indicates the depth to ground water is approximately 450 feet in the project area. Historical data derived from wells (State Well Numbers 16S14E26A001M, 16S14E14F001M, and 16S14E15Q001M) located approximately 0.82 miles to the southeast, 0.84 miles to the northwest, and 1.26 miles northwest, respectively, indicate the depth to ground water on average was approximately 509 feet deep throughout the 1960's and then rose to a depth of approximately 290 feet during the 1990's. Over the subsequent years, available data indicates that the groundwater elevation has declined approximately 160 feet.

3.00 Conclusions and Recommendations

3.01 General

Based on specific data and information contained in this report, our understanding of the project, and our geotechnical engineering experience, it is our professional judgment that the proposed construction is geologically and geotechnically feasible. The soils upper soils encountered during our investigation consisted of clayey sand/sandy clay that has a medium expansion potential. In addition, the densities of the near-surface soils are generally somewhat variable. Therefore, it will be important to perform some over-excavation, moisture conditioning, and re-compaction in the areas where improvements are planned. The onsite soils test specimen also contained soluble sulfates that require Type V cement, and resistivity test results indicated extremely corrosive with respect to buried metallic pipe. Specific geotechnical recommendations are presented below that can be used by other members of the design team to prepare the project plans and specifications for the planned improvements. Due to the expansive characteristic of the encountered upper soils, the concrete slab should be constructed with the upper 12 inches of the underlying soils as one of the following: non-expansive imported soils (EI ≤ 20), or lime treated on-site native clayey soils, or on-site native soils moisture conditioned and compacted as recommended in Earthwork Recommendations, in order of least to increasing

potential of cracking due expansive soils effect on the concrete slab.

Also, based on our experience, and available project site information, it is our opinion design and installation of a septic tank and wastewater treatment system are feasible, provided the system will be built and operated in accordance with applicable County and other applicable building code requirements.

3.02 Seismic Design Parameters

Seismic design parameters have been developed in accordance with Section 1613 of the 2016 California Building Code (CBC) using the online U.S. Geological Survey Seismic Design Maps Calculator (ASCE 7-10 Standard) and a site location based on latitude and longitude. The calculator generates probabilistic and deterministic maximum considered earthquake spectral parameters represented by a 5-percent damped acceleration response spectrum having a 2-percent probability of exceedance in 50 years. The deterministic response accelerations are calculated as 150 percent of the largest median 5-percent damped spectral response acceleration computed on active faults within a region, where the deterministic values govern. The calculator does not, however, produce separate probabilistic and deterministic results. The parameters generated for both pipeline alignments are presented below:

2016 California Building Code (CBC) Seismic Parameters

Parameter	Value
Site Location	Latitude = 36.5269 degrees Longitude = -120.4121 degrees
Site Class	Site Class = D Soil Profile Name = Stiff Soil
Mapped Spectral Accelerations	S_s (0.2- second period) = 1.735g S_1 (1-second period) = 0.571g
Site Coefficients (Site Class D)	F_a = 1.000 F_v = 1.500
Maximum Considered Earthquake Spectral Accelerations (Site Class D)	S_{MS} (0.2- second period) = 1.735g S_{M1} (1-second period) = 0.857g
Design Earthquake Spectral Accelerations (Site Class D)	S_{DS} (0.2- second period) = 1.156g S_{D1} (1-second period) = 0.571g

The above table shows that the mapped spectral response acceleration parameter for a 1-second period (S_1) is less than 0.75g and the spectral response acceleration parameters are S_{DS} = 1.156g and S_{D1} = 0.571g. Therefore, the Seismic Design Category has been determined from Tables 1613.3.5(1) and 1613.3.5(2) is D for all Occupancy Categories (CBC Section 1613.5.6). Consequently, as required for Seismic Design Categories C through F by CBC Section 1803.5.11, slope instability, liquefaction, total and differential settlement, and surface displacement by faulting or seismically lateral spreading or lateral flow have been evaluated. Based on our subsurface exploration and our knowledge of the geologic setting, there is no significant risk of ground rupture, liquefaction, lateral spreading, or seismic settlement to occur at the subject site during a design-level seismic event.

Peak earthquake ground acceleration adjusted for site class effects (PGA_M) has been determined in accordance with ASCE 7-10 Section 11.8.3 as follows: $PGA_M = F_{PGA} \times PGA = 1.000 \times 0.653 = 0.653g$.

3.03 Liquefaction and Secondary Earthquake Hazards

Potential secondary seismic hazards that can affect land development projects include liquefaction, tsunamis, seiches, and seismically induced settlement.

Liquefaction

Liquefaction is a phenomenon where earthquake-induced ground vibrations increase the pore pressure in saturated, granular soils until it is equal to the confining, overburden pressure. When this occurs, the soil can completely lose its shear strength and enter a liquefied state. The possibility of liquefaction is dependent upon grain size, relative density, confining pressure, saturation of the soils, and intensity and duration of ground shaking. In order for liquefaction to occur, three criteria must be met: "low density", coarse-grained (sandy) soils, a groundwater depth of less than about 50 feet, and a potential for seismic shaking from nearby large-magnitude earthquake. Since the depth to groundwater at the project site is 450 feet bgs, in our opinion there is a negligible risk of liquefaction occurring at the project site during a design level seismic event.

Tsunamis and Seiches

Tsunamis are sea waves that are generated in response to large-magnitude earthquakes. When these waves reach shorelines, they sometimes produce coastal flooding. Seiches are the oscillation of large bodies of standing water, such as lakes, that can occur in response to ground shaking. Tsunamis and seiches do not pose hazards due to the inland location of the site and lack of nearby bodies of standing water.

Seismically Induced Settlement

Seismically induced settlement occurs most frequently in areas underlain by loose, granular sediments. Damage as a result of seismically induced settlement is most dramatic when differential settlement occurs in areas with large variations in the thickness of underlying sediments. Settlement caused by ground shaking is often non-uniformly distributed, which can result in differential settlement. Taking into account the soil profile within the upper 31 feet, that the PGA_M is 0.653g, and the nearest active fault is approximately 20 miles from the project site, there is a moderate risk of seismic settlement occurring at the project site during a design seismic event.

Seismically Induced Flooding

The site is not located within a low-lying area that would be inundated during the failure of an up gradient water reservoir or dam. Consequently, seismically induced flooding at the site is very unlikely.

3.04 Earthwork Recommendations

All earthwork construction should be performed in accordance with Appendix J of the 2016 California Building Code and all applicable governmental agency requirements. In the event of conflicts between this report and Appendix J, this report shall govern. It should be noted that all references to maximum dry density, optimum

moisture content, and relative compaction are based on ASTM D 1557 laboratory test procedures.

All vegetation, organic rich soils (soils containing more than 2 percent organics by weight), trash, and debris, should be cleared from the grading area and removed from the site. It is anticipated that the upper three to four inches of soil will need to be stripped in order to remove the organic rich materials from the building pad and paved areas of the site. Prior to performing the over-excavation recommended below, the stripped surface should be observed and approved by the Project Geotechnical Engineer. After the removal of deleterious materials and the stripping of organic-rich soils, the following site preparation must be done within the area of the planned construction:

- Within the area of the planned building improvements plus at least 5 feet horizontally beyond the perimeter of these improvements, the subgrade must be over-excavated to elevations at least 12 inches below the design bottom of footings. The excavated on-site soils may be used to backfill as engineered compacted fill. Prior to backfilling, the excavated soils should be moisture conditioned to about 3% over optimum, and compacted to 90 percent of laboratory maximum density.
- Outside of "building pad" areas indicated above, and within the areas of planned asphalt pavement or concrete flatwork, the subgrade must be scarified at least 8 inches below the stripped surface or below the finished subgrade surface, whichever is lower, moisture conditioned to about 3% over optimum, and compacted to 90 percent of laboratory maximum density. In cut areas, the bottom should be scarified 8 inches, moisture conditioned and compacted to 90 percent.
- The upper 12 inches of subgrade soils below the concrete slab-on-grade should consist of: (1) non-expansive imported soils (EI ≤ 20), or, (2) lime treated on-site native clayey soils with up to 5 percent quicklime, or, (3) on-site native soils moisture conditioned and compacted as recommended in this section. Replacing the clayey soils with non-expansive soils represents a subgrade support with the least potential of future vertical movement of the upper 12 inches of soils due to expansion.

Due to the slight grade elevations in the construction area, the fill thickness may be benched but no more than 2 feet in bench height. Following the over-excavation and/or cut indicated above, a designated representative for the Project Geotechnical Engineer must review the exposed ground surface prior to scarification and determine if any additional over-excavation is required.

The over-excavated ground surface in all areas determined to be satisfactory for the support of fills must be scarified to a minimum depth of 8 inches. Scarification should continue until the soils are broken down and free from lumps or clods and until the scarified zone is uniform. The scarified zone should be uniformly moisture conditioned to about 3% over optimum and compacted to at least 90 percent of the maximum dry density.

Removed and/or over-excavated soils free of organics and other deleterious material may be used as engineered fill. Fill material from excavated soils should be placed in nearly horizontal layers, uniformly moisture conditioned to about 3% over optimum moisture content, and then compacted in layers that do not exceed approximately 6 inches in thickness. Thicker lifts may be placed if testing indicates the compaction procedures are such that the required compaction is being achieved and the geotechnical consultant approves their use. Each layer shall be spread evenly and shall be thoroughly mixed during the spreading to insure uniformity of material in each layer. Engineered fill must be compacted to achieve a relative compaction of at least 90 percent, except for the upper 8 inches of subgrade below asphalt or concrete pavement sections subject to vehicular traffic, which must be compacted to at least 95 percent. A representative from RMA GeoScience must

observe the placement of all fill material and perform tests to verify that the compaction of the fill material meets these requirements.

The above recommendations are based on the assumption that soils encountered during field exploration are representative of soils throughout the site. However, there can be unforeseen and unanticipated variations in soils between points of subsurface exploration. Hence, over-excavation depths must be verified, and adjusted if necessary, at the time of grading. In addition, any contaminated soils within three (3) feet of the finished subgrade surface, must be removed and properly disposed of outside the area of the planned improvements.

3.05 Rippability and Rock Disposal

Our exploratory borings were advanced without difficulty and no oversize materials were encountered in our subsurface investigation. Accordingly, we expect that all earth materials will be rippable with conventional grading equipment and oversized materials are not expected.

3.06 Earthwork Shrinkage

Shrinkage is the decrease in volume of soil upon removal and recompaction, or scarifying and recompacting, expressed as a percentage of the original in-place volume. Based on our observations of the existing field conditions and lab testing data, a shrinkage factor in the range of approximately 10 to 15 percent is considered applicable for this project.

The degree to which fill soils are compacted and variations in the insitu density of existing soils will influence earth volume changes. Consequently, some adjustments in grades near the completion of grading could be required to balance the earthwork.

3.07 Imported Fill Material

The onsite stockpile of soil and any imported fill materials that will be placed within building, pavement, or concrete flatwork areas must be non-hazardous and meet the following criteria:

Maximum Particle Size:	3 inches
Percent Passing 3/4 inch Sieve:	90% - 100%
Percent Passing #4 Sieve:	65% - 100%
Percent Passing #200 Sieve:	20% - 60%
Maximum Expansion Index:	20
Organic Content:	<2 % by weight
Minimum R-value (in paved areas):	45

Soluble Sulfates < 1,000 mg/kg

Soluble Chlorides < 200 mg/kg

Minimum Soil Resistivity > 5,000 ohm-cm (unless other requirement established by the Design Engineer)

pH in the range of 6.0 to 8.5

3.08 Temporary Slopes and Shoring

Our geotechnical investigation indicates that excavations less than 5 feet in depth may generally be constructed with vertical sidewalls without shoring or shielding. Temporary excavations in existing alluvial soils that are deeper than 5 feet may be safely made at an inclination of 1:1 or flatter. If vertical sidewalls are required in excavations greater than 5 feet in depth, the use of cantilevered or braced shoring is recommended. The following geotechnical parameters can be used to design a shoring system:

Moist Unit Weight of Soils:	115 pcf
Angle of Internal Friction (ø):	23°
Cohesion:	120 psf

Unless vehicles, equipment, materials, etc., are kept a minimum distance equal to the height of the excavation away from the edge of the excavation, a surcharge load equal to a uniform lateral pressure of 70 psf should be assumed to act on the shoring in addition to the earth pressure calculated using the above geotechnical parameters.

Vehicles, equipment, materials, etc. should be set back a minimum distance of 10 feet from the top edge of sloped or vertical excavations. Surface waters should be diverted away from temporary excavations and prevented from draining over the top of the excavation and down the slope face. During periods of heavy rain, the slope face should be protected with sandbags to prevent drainage over the edge of the slope, and a plastic liner placed on the slope face to prevent erosion of the slope face.

Periodic observations of the excavations should be made by the geotechnical consultant to verify that the soil conditions have not varied from those anticipated and to monitor the overall condition of the temporary excavations over time. If at any time during construction conditions are encountered which differ from those anticipated, the geotechnical consultant should be contacted and allowed to analyze the field conditions prior to commencing work within the excavation.

Cal/OSHA construction safety orders should be observed during all underground work.

3.09 Utility Trench Backfill

The onsite soils will not be suitable for use as pipe bedding for buried utilities. All pipes should be bedded in sand or other suitable material as specified by the Project Civil Engineer. We recommend the bedding material have a Sand Equivalent (SE) of at least 30 and have less than 8 percent, by weight, passing the #200 Sieve. The geotechnical consultant should review and approve proposed bedding materials prior to use. Bedding materials should be compacted to at least 90% relative compaction (ASTM D1557) by mechanical methods.

The on-site soils are expected to be suitable as trench backfill provided they are screened of organic matter and other deleterious material. Trench backfill must be compacted consistent with the recommendations given above for engineered fill (see Section 3.04). Trench backfill should be compacted using mechanical methods; no jetting of backfill should be allowed. A minimum trench width of 24 inches or 18 inches plus the diameter of the

utility line, whichever is greater, should be provided to permit uniform compaction on both sides of utility line and allow for a technician to perform in-place density tests using a nuclear gauge. If narrower trenches are desired, a sand-cement slurry should be used to backfill the trenches to within 8 inches of the top of trench. The sand-cement slurry should contain at least 2 sacks of cement per yard of mix and have a 4- to 6-inch slump. In addition, slurry should be consolidated using a suitable vibratory or mechanical method.

All utility trench backfill within street right of ways, utility easements, under or adjacent to sidewalks, driveways, or building pads should be observed and tested by the geotechnical consultant to verify proper compaction. Trenches excavated adjacent to foundations should not extend within the footing influence zone defined as the area within a line projected at a 1:1 drawn from the bottom edge of the footing. Trenches crossing perpendicular to foundations should be excavated and backfilled prior to the construction of the foundations. The excavations should be backfilled in the presence of the geotechnical engineer and tested to verify adequate compaction beneath the proposed footing. Where utility crossings are located within 12 inches of bottoms of footings, conduits should be wrapped with polystyrene foam or other suitable material with a minimum thickness of one inch. Conduits extending through footings shall be "sleeved" as determined by the Project Structural Engineer.

3.10 Lateral Soil Pressures

Lateral loads may be resisted by soil friction and the passive resistance of the soil. The following parameters are recommended for preliminary design.

- Allowable Passive Earth Pressure = 200 pcf (equivalent fluid weight, includes a factor of safety = 2.0)
- Allowable Coefficient of Friction (soil to footing) = 0.25 (includes a factor of safety = 1.5)
- Retaining structures should be designed to resist a lateral active earth pressure of 40 pcf (equivalent fluid weight) for a level, non-expansive backfill with drainage provided.

The active earth pressure provided above is only applicable if the retained earth is allowed to strain sufficiently to achieve the active state. The required minimum horizontal strain to achieve the active state is approximately 0.0025H. Retaining structures should be designed to resist an at-rest lateral earth pressure of 60 pcf (equivalent fluid weight) if this horizontal strain cannot be achieved.

3.11 Foundations

Conventional Foundations: Isolated spread footings and/or continuous wall footings are recommended to support the proposed construction. Building foundations should be embedded at least 12 inches below the lowest adjacent grade. The foundations must be constructed on firm native soils or engineered fill as recommended in Section 3.04 of this report. Continuous and isolated spread footings with a minimum width of 12 and 24 inches, respectively, may be designed using an allowable bearing capacity of 2,000 pounds per square foot (psf). This allowable bearing capacity represents an allowable net increase in soil pressure over existing soil pressure and may be increased by one-third for short-term wind or seismic loads. The maximum expected settlement of footings designed with the recommended allowable bearing capacity is expected to be less than ¾ inch with a maximum differential settlement of ½ inch between similarly sized and loaded footings or less than

½ inch over a distance of 40 feet for continuous footings. Since the near-surface soils have a low to medium expansion potential, the reinforcement of building foundations should be based on structural considerations. However, it is recommended that continuous footings be reinforced with at least two #4 rebars, one located near the top, and one located near the bottom, of the footing.

It will be very important for all footing excavations to be observed by the geotechnical engineer to verify that they have been excavated into the recommended bearing material. Where zones of relatively loose or disturbed soils are present at the bottom of foundation recommendations, these soils should be properly compacted to provide a uniform bearing surface that meets the approval of the geotechnical engineer (refer to Section 3.04).

Tank Foundations: It is understood a ring wall footing and a center support with an isolated spread footing will be used to support the proposed storage tank. These footings must be embedded at least 24 inches below the lowest adjacent grade and must be constructed on bearing soils as recommended in Section 3.04 of this report. The footings must have a minimum width of 24 inches and may be designed using an allowable bearing capacity of 1,500 pounds per square foot (psf). This allowable bearing capacity is applicable when the storage tank is empty and represents an allowable net increase in soil pressure over existing soil pressure and may be increased by one-third for short-term wind or seismic loads. An allowable bearing pressure of 2,500 psf may be considered applicable when the storage tank is full. It is recommended that the ring wall footing be reinforced with at least two #4 rebars at both the top and bottom of the footing.

When empty, the estimated total settlement of the storage tank is expected to be less than 3/4 inch with a differential settlement of less than 1/2 inch over a distance of 40 feet. However, once filled, the total settlement is estimated to vary from approximately 2 inches at the center of the tank to approximately 1.5 inches at the edge of the tank. In addition, the maximum differential settlement on opposite sides of the tank should be less than one inch. The estimated differential settlement is well within normal design standards (δ/L does not exceed 0.008) for steel storage tanks with a flexible base. Since the project site is underlain by predominantly clayey soils, the settlement is expected to occur gradually over a 6 to 9 month period.

If the new storage tank will be supported on a reinforced concrete mat foundation, it must be constructed on compacted subgrade as recommended in Section 3.04 of this report. A mat foundation should be embedded at least 12 inches below the lowest adjacent grade and may be designed using a modulus of subgrade reaction (k) of 125 psi/in and an allowable bearing pressure of 1,500 psf. The allowable bearing pressure represents an allowable net increase in soil pressure over existing soil pressure and may be increased by one-third for short-term wind or seismic loads. For settlement purposes, it is anticipated that the applied bearing pressure (dead plus live loads, not including wind or seismic) of mat foundations will be approximately 2,500 psf, in which case the total settlement should be less than 4 inches and the differential settlement should not exceed one inch between the center and edge of the storage tank. Although the Project Design Engineer should specify the minimum slab thickness and required reinforcement for the mat foundation, the mat foundation must be reinforced with at least #4 rebar spaced no more than 12 inches on-center in each direction.

It will be very important for all footing excavations to be observed by the geotechnical engineer to verify that they have been excavated into the recommended bearing material. Where zones of relatively loose or disturbed soils are present at the bottom of foundation recommendations, these soils should be properly compacted to provide a uniform bearing surface that meets the approval of the geotechnical engineer (refer to Section 3.04).

3.12 Pole Type Foundations

It is anticipated that light poles, signs, or canopies may be supported on pole-type foundations, drilled piers, or cast-in-drilled-hole (CIDH) piles. This type of foundation should be designed in accordance with Section 1807.3 of the 2016 CBC. However, it is recommended that an allowable lateral soil bearing pressure of 200 psf per foot of embedment be used to develop parameters S1 and S3 rather than one of the values given in Table 1806.2. This value includes a factor of safety of 2 and may be increased as indicated in Section 1806.3.4. In unpaved landscape areas, the upper 12 inches of soil should be ignored when calculating the minimum depth of embedment.

An allowable end bearing pressure of 3,000 psf (includes a factor of safety of 3.0) and an allowable average skin friction of 300 psf (includes a factor of safety of 2.0) may be used to support vertical loads applied to pier foundations that are 2 feet or less diameter and embedded at least 5 feet. The end bearing should be ignored if the drilled pier excavation is not properly cleaned out prior to installing the reinforcing steel and placing concrete. The uplift capacity of drilled piers can be calculated using an allowable skin friction of 150 psf plus the weight of the pier. In unpaved landscape areas, the skin friction within the upper 12 inches of embedded length should be ignored. The total settlement of pier foundations designed in accordance with these recommendations should not exceed one-half inch.

Prior to placing reinforcing steel or concrete, loose or disturbed soils should be removed from drilled pier excavations. A representative of the Geotechnical Engineer should observe the drilling and clean-out associated with the construction of pier foundations in order to assess whether the actual bearing conditions are compatible with the conditions anticipated during the preparation of this report. Test borings indicate that relatively clean sands may be encountered at depths of between 6 and 12 feet below the existing ground surface. Therefore, the contractor should be prepared to take measures to prevent caving or significant sloughing of CIDH sidewalls (such as installing a temporary casing) that extend more than 6 feet deep. In any case, reinforcing steel and concrete should be installed in an expeditious manner after each drilled hole is cleaned out. The contractor must take responsibility for staging the installation of CIDH piles so that significant amounts of sloughing or caving do not occur prior to installing the reinforcing steel and concrete.

3.13 Interior Slabs on Grade

The upper 12 inches of subgrade soils below the concrete slab should consist of one of the following: non-expansive imported soils (EI ≤ 20), or lime treated clayey soils, or on-site native soils moisture conditioned and compacted as recommended in this section. Replacing the clayey soils with non-expansive soils represents a subgrade support with least potential of vertical movement of soils due to expansion, which can contribute to concrete distress.

Concrete floors with a minimum thickness of 4 inches are recommended for interior slabs on grade. Existing on-site soils within 5 feet of the ground surface are considered to have a low to medium expansion potential for design purposes. In order to reduce the potential for excessive cracks as a result of differential movement, consideration should be given to reinforcing concrete slab-on-grade floors with at least #3 bars spaced 24 inches on-center in both directions. Reinforcement consisting of welded or woven wire mesh should not be used, due to the difficulty of keeping it centered in the slab during the construction process. If heavy concentrated or moving loads are anticipated, slabs should be designed using a modulus of subgrade reaction (k) of 100 pci.

concrete mix, reinforcement of slabs, and the location of construction and control joints should be specified by the Design Engineer. A concrete or 3-sack slurry curtain embedded 18 inches below finished subgrade should be constructed for the purpose of mitigation of water migrating to underneath slab-on-grade.

A moisture vapor retarder/barrier is recommended beneath all slabs-on-grade that will be covered by moisture-sensitive flooring materials such as vinyl, linoleum, wood, carpet, rubber, rubber-backed carpet, tile, impermeable floor coatings, adhesives, or where moisture-sensitive equipment, products, or environments will exist. We recommend that design and construction of the moisture vapor retarder/barrier conform to Section 1805 of the 2016 California Building Code and pertinent sections of American Concrete Institute (ACI) guidance documents 302.1R-04, 302.2R-06 and 360R-10.

The moisture vapor retarder/barrier should consist of a minimum 10 mils thick polyethylene with a maximum perm rating of 0.3 in accordance with ASTM E 1745. The vapor barrier should be placed directly on a smooth compacted subgrade surface consistent with the recommendations provided in Section 3.02 of this report. Seams in the moisture vapor retarder/barrier should be overlapped no less than 6 inches or in accordance with the manufacturer's recommendations. Joints and penetrations should be sealed with the manufacturer's recommended adhesives, pressure-sensitive tape, or both. The contractor must avoid damaging or puncturing the moisture vapor retarder/barrier and repair any punctures with additional polyethylene properly lapped and sealed.

The moisture vapor retarder/barrier may be placed directly beneath the floor slab with no intermediate granular fill layer. This method of construction will provide improved curing of the slab bottom and will eliminate potential problems caused by water being trapped in a granular fill layer. However, concrete slabs poured directly on a moisture vapor retarder/barrier can experience shrinkage cracking and curling due to differential rates of curing through the thickness of the slab. Therefore, for concrete placed directly on the moisture vapor retarder/barrier, we recommend a maximum water to cement ratio of 0.45 and the use of water-reducing admixtures to increase workability and decrease bleeding.

Alternatively, the slabs may be constructed over 2 inches of sand that is placed on the moisture vapor retarder/barrier in accordance with ACI 302.1R-04. Granular fill should consist of clean, fine-graded materials with 100% passing the No. 4 sieve, 10% to 30% passing the No. 100 sieve, and less than 5% passing the No. 200 sieve. The granular layer should be moist but not saturated and uniformly compacted by making at least one pass with a vibratory base compactor or some other mechanical method that is approved by the Project Geotechnical Engineer. The granular fill layer should not be left exposed to rain or other sources of water such as wet-grinding, power washing, pipe leaks or other processes, and should be damp but not saturated at the time of concrete placement. Granular fill layers that become saturated should be removed and replaced prior to concrete placement.

3.14 Miscellaneous Concrete Flatwork

Miscellaneous concrete flatwork and walkways may be designed with a minimum thickness of 4 inches. Large slabs should be reinforced with a minimum of #3 rebar spaced 24 inches on center in both directions placed at mid-height in the slab. Control joints should be constructed to create squares or rectangles with a maximum spacing of 12 feet. The Project Civil Engineer should provide design details and specifications for all exterior

concrete flatwork including the concrete mix design, reinforcement, and the location of construction and control joints. We recommend walkways be separated from foundations with a thick expansion joint filler.

The subgrade soils beneath all miscellaneous concrete flatwork should be moisture conditioned and compacted as recommended in Section 3.04 of this report. The geotechnical engineer should monitor the moisture conditioning and compaction of the subgrade soils and perform testing to verify that the proper moisture content and compaction has been obtained. Prior to the placement of concrete, the moisture content of the upper 6 inches of subgrade should be at least optimum.

3.15 Footing Excavations and Concrete Subgrade

All footing excavations and bottom excavations should be observed by the geotechnical consultant to verify that they have been excavated into the recommended bearing material. The foundation excavations should be observed prior to the placement of forms, reinforcement steel, or concrete. These excavations should be evenly trimmed and level. Prior to concrete placement, any loose or soft soils should be removed. Excavated soils should not be placed on slab or footing areas unless properly compacted.

Prior to the placement of the moisture barrier and sand, the subgrade soils underlying the slab should be observed by the geotechnical consultant to verify that all under-slab utility trenches have been properly backfilled and compacted, that no loose or soft soils are present, and that the slab subgrade has been properly moisture conditioned and compacted as recommended in Section 3.04 of this report.

Footings may experience an overall loss in bearing capacity or an increased potential to settle where located in close proximity to existing or future utility trenches. Furthermore, stresses imposed by the footings on the utility lines may cause cracking, collapse and/or a loss of serviceability. To reduce this risk, footings should extend below a 1:1 plane projected upward from the closest bottom of the trench.

The upper 6 inches of subgrade underlying slabs-on-grade and walkways should have a moisture content at least optimum (see Section 3.04) prior to the placement of concrete or moisture barriers. The geotechnical consultant should perform insitu moisture tests to verify that the appropriate moisture content has been achieved within 72 hours prior to the placement of concrete or moisture barriers.

3.16 Drainage and Moisture Proofing

Surface drainage should be directed away from the proposed improvements into suitable drainage devices (see Section 1804.4 of the 2016 CBC). Neither excess irrigation nor rainwater should be allowed to collect or pond against building foundations or within low-lying or level areas of the property within 10 feet of buildings. Concrete apron adjacent to exterior wall footings should be included in design in order to keep migration of surface water into the building subgrade. Surface waters should be diverted away from the tops of slopes and prevented from draining over the top of slopes and down the slope face.

Walls and portions thereof that retain soil and enclose interior spaces and floors below grade should be waterproofed and damp-proofed in accordance with Section 1805 of the 2016 CBC.

Retaining structures should be drained to prevent the accumulation of subsurface water behind the walls. Backdrains should be installed behind all retaining walls exceeding 3 feet in height. All backdrains should be

outlet to suitable drainage devices. Retaining walls less than 3 feet in height should be provided with backdrains or weep holes. Damp-proofing and/or waterproofing should also be provided on all retaining walls that enclose interior spaces and floors below grade.

3.17 Cement Type and Corrosion Potential

The results of tests performed on two samples of soil obtained from the project site indicate a soluble sulfate content in the range of 4,260 to 5,040 mg/kg (0.426 to 0.504 percent by weight). Thus, below-grade concrete at the subject site may have a severe exposure to water-soluble sulfate in the soil. Our recommendations for concrete exposed to soils containing various concentrations of soluble sulfate are presented in the table below.

Recommendations for Concrete Exposed to Soils Containing Soluble Sulfate

Sulfate Exposure	Water Soluble Sulfate (SO_4) in Soil (% by Weight)	Sulfate (SO_4) in Water (ppm)	Cement Type (ASTM C150)	Maximum Water-Cement Ratio (by Weight)	Minimum Compressive Strength (psi)
Negligible	0.00 - 0.10	0-150	--	--	2,500
Moderate	0.10 - 0.20	150-1,500	II	0.50	4,000
Severe	0.20 - 2.00	1,500-10,000	V	0.45	4,500
Very Severe	Over 2.00	Over 10,000	V plus pozzolan or slag	0.45	4,500

Use of alternate combinations of cementitious materials may be permitted if the combinations meet design recommendations contained in American Concrete Institute guideline ACI 318-11.

Our testing also indicates that there is a low soluble chloride content (5.0 to 19.0 mg/kg) in the onsite soils; therefore, the special protection of reinforcing steel due to soil conditions should be evaluated by the design engineer.

The soils were also tested for soil reactivity (pH) and minimum electrical resistivity (ohm-cm). The test results indicate that the on-site soils have a pH in the range of 6.62 to 6.84 and exhibit a minimum electrical resistivity in the range of 690 to 700 ohm-cm. A neutral or non-corrosive soil has a pH value ranging from approximately 6 to 8.5. Generally, soils that could be considered moderately corrosive to ferrous metals have minimum resistivity values of about 3,000 ohm-cm to 10,000 ohm-cm. Soils with minimum resistivity values less than 3,000 ohm-cm can be considered corrosive and soils with minimum resistivity values less than 1,000 ohm-cm can be considered extremely corrosive. In any case, buried metal conduits should have a protective coating in accordance with the manufacturer's specifications. A corrosion specialist should be consulted if more detailed recommendations are required.

3.18 Pavement Sections

Current plans indicate that site improvements will include constructing new asphalt concrete (AC) driveways and

parking areas. It is anticipated that a Traffic Index (TI) in the range of 5.5 to 8 should be applicable for the planned parking areas and driveways. Based on the laboratory testing that has been performed for this project (see Figure B9 and B10 in Appendix B), a subgrade R-value of 15 is recommended for design purposes and has been used to develop the pavement sections given below. The asphalt concrete (AC) structural section recommendations given herein were developed using the procedures outlined in Chapter 630 of the California Highway Design Manual. The design procedure is based on the principle that the pavement structural section must be of adequate thickness to distribute the load from the design TI to the subgrade soils in such a manner that the stresses from the applied loads do not exceed the strength of the soil (R-value). Recommended minimum structural sections are given below:

Design TI	Recommended Minimum Pavement Section
≤5.5	3.0" AC over 9.5" Class 2 AB
6.0	3.0" AC over 11.5" Class 2 AB
6.5	3.5" AC over 12.0" Class 2 AB
7.0	4.0" AC over 13.0" Class 2 AB
8.0	4.5" AC over 15.5" Class 2 AB

Prior to paving, the subgrade should be prepared in accordance with Section 3.04 of this report. At a minimum, the upper 8 inches of subgrade soils should be compacted to a minimum of 95% relative compaction. All aggregate base (AB) courses should be moisture conditioned to within 2% of optimum moisture content and compacted to a minimum of 95% relative compaction. The AC mix design(s) and installation requirements should be specified by the Project Civil Engineer.

Recommended minimum structural sections if the upper 12 inches of subgrade is lime treated, are given below:

Design TI	Recommended Minimum Pavement Section
≤5.5	3.0" AC over 3.0" Class 2 AB
6.0	3.0" AC over 4.0" Class 2 AB
6.5	3.5" AC over 4.5" Class 2 AB
7.0	4.0" AC over 4.5" Class 2 AB
8.0	4.5" AC over 6.0" Class 2 AB

3.19 Plan Review

Once formal grading and foundation plans are prepared for the subject project, this office should review the plans from a geotechnical viewpoint, comment on changes from the plan used during preparation of this report and revise the recommendations of this report where necessary.

3.20 Geotechnical Observation and Testing During Grading

The geotechnical engineer should be contacted to provide observation and testing during the following stages of grading:

- During the clearing and grubbing of the site.
- During the demolition of any existing structures, buried utilities or other existing improvements.
- During excavation and over-excavation of existing subgrade.
- During all phases of grading including ground preparation and filling operations.
- When any unusual conditions are encountered during grading.

A grading and compaction report summarizing conditions encountered during grading and the in-place density testing that was performed should be submitted upon completion of the earthwork construction.

After the completion of grading, the geotechnical engineer should be contacted to provide additional observation and testing during the following construction activities:

- During trenching and backfilling operations of buried improvements and utilities to verify proper backfill and compaction of the utility trenches.
- After excavation and prior to placement of reinforcing steel or concrete within footing excavations to verify that footings are properly founded in competent materials.
- During fine or precise grading involving the placement of any fills underlying driveways, sidewalks, walkways, or other miscellaneous concrete flatwork to verify proper placement, mixing and compaction of fills.
- When any unusual ground or soil conditions are encountered during construction.

4.0 Closure

The findings, conclusions and recommendations in this report were prepared in accordance with generally accepted engineering and geologic principles and practices. No other warranty, either express or implied, is made. This report has been prepared for Morris General Contracting, Inc. to be used for the design and construction of the improvements described above. Anyone using this report for any other purpose must draw their own conclusions regarding required construction procedures and subsurface conditions.

The geotechnical and geologic consultant should be retained during the earthwork and foundation phases of construction to monitor compliance with the design concepts and recommendations and to provide additional recommendations as needed. Should subsurface conditions be encountered during construction that are different from those described in this report, this office should be notified immediately so that our recommendations may be re-evaluated.

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FIGURES

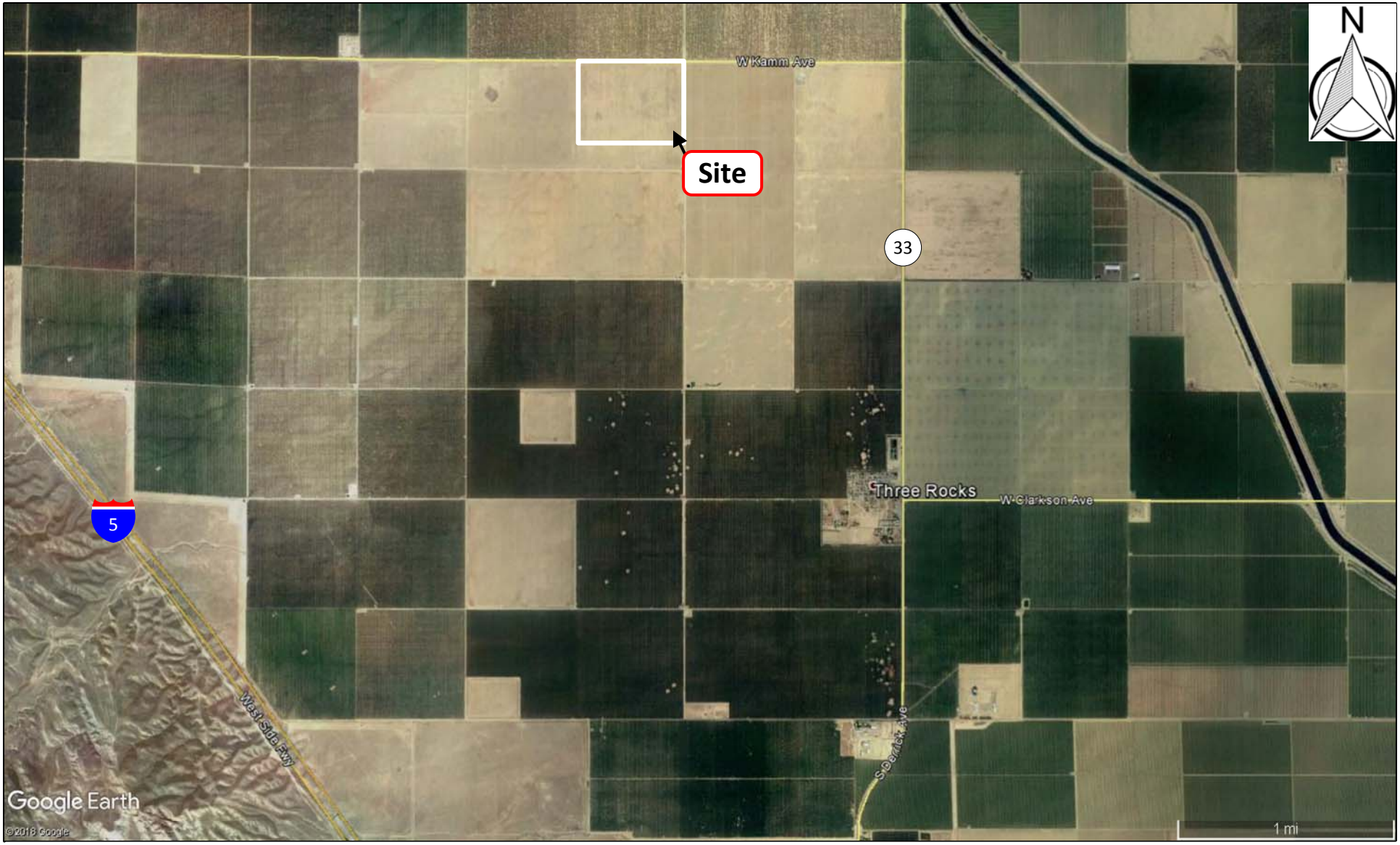

FIGURE 1

Scale: 1" ≈ 3,350'

SITE VICINITY MAP

Kamm Avenue Pistachio Processing
APNs 038-300-017S and 038-300-030S
Fresno County, California 93608
Project #19G-0194-1

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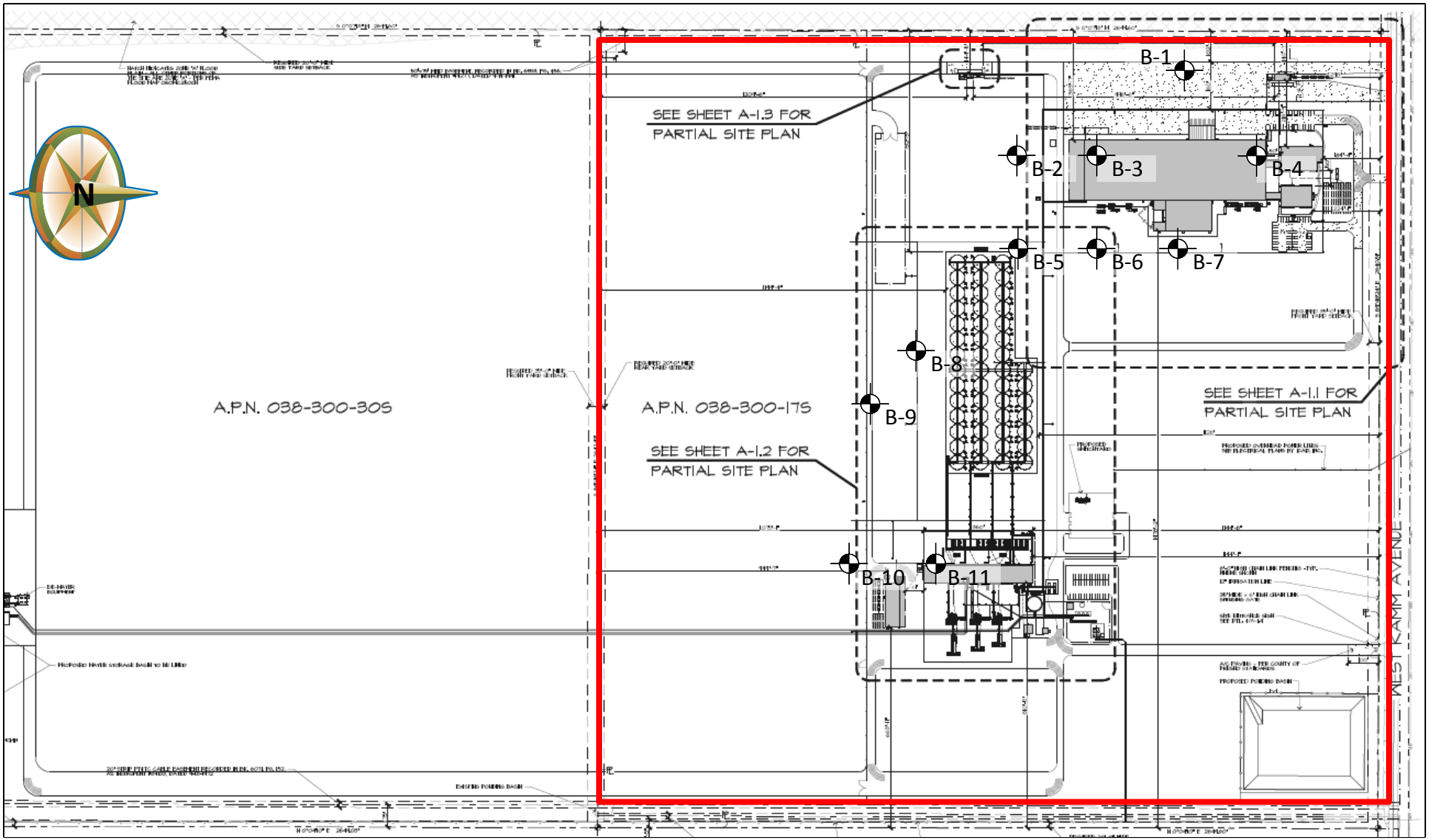

Reference: Site Plan prepared by Gerald Mele & Associates, Inc., 6/20/2020

Scale: 1" ≈ 490'

FIGURE 2

BORING LOCATION MAP

KAPP
APNs 038-300-017S and 038-300-030S
Fresno County, California 93608
Project #19G-0194-1

B-2 Approximate Boring Location

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APPENDIX A

FIELD INVESTIGATION

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APPENDIX A

FIELD INVESTIGATION

A-1.01 Number of Borings

Our subsurface investigation consisted of excavating 11 borings to a maximum depth of 41 feet below existing grade on May 29, 2019 with a CME 75 drill rig equipped with 7-inch diameter hollow stem auger and a 140-pound auto-hammer.

A-1.02 Location of Borings

A Boring Location Map showing the approximate locations of the test borings is presented as Figure 2. GPS coordinates indicated on the logs are based on information provided by Theodolite Version 7.0 run on an iPhone X with iOS Version 12.3.

A-1.03 Boring Logging

Logs of the borings were prepared by one of our staff and are attached in this appendix. The logs contain factual information and interpretation of subsurface conditions between samples. The strata indicated on these logs represent the approximate boundary between earth units and the transition may be gradual. The logs show subsurface conditions at the dates and locations indicated, and may not be representative of subsurface conditions at other locations and times.

Identification of the soils encountered during the subsurface exploration was made using the field identification procedure of the Unified Soils Classification System (ASTM D2488). A legend defining the terms used in describing the relative compaction, consistency or firmness of the soil is included in this appendix. Bag or tube samples of the major earth units were obtained for laboratory inspection and testing.

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I. SOIL STRENGTH/DENSITY

BASED ON STANDARD PENETRATION TESTS

Compactness of sand		Consistency of clay	
Penetration Resistance N (blows/Ft)	Compactness	Penetration Resistance N (blows/ft)	Consistency
0-4	Very Loose	<2	Very Soft
4-10	Loose	2-4	Soft
10-30	Medium Dense	4-8	Medium Stiff
30-50	Dense	8-15	Stiff
>50	Very Dense	15-30	Very Stiff
		>30	Hard

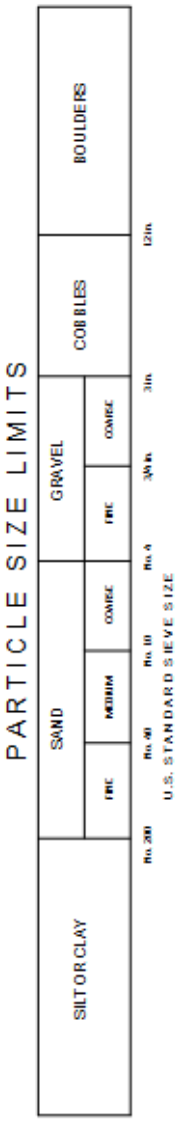
N = Number of blows of 140 lb. weight falling 30 in. to drive 2-in OD sampler 1 ft.

BASED ON RELATIVE COMPACTION

Compactness of sand		Consistency of clay	
% Compaction	Compactness	% Compaction	Consistency
<75	Loose	<80	Soft
75-83	Medium Dense	80-85	Medium Stiff
83-90	Dense	85-90	Stiff
>90	Very Dense	>90	Very Stiff

II. SOIL MOISTURE

Moisture of sands		Moisture of clays	
% Moisture	Description	% Moisture	Description
<5%	Dry	<12%	Dry
5-12%	Moist	12-20%	Moist
>12%	Very Moist	>20%	Very Moist, wet



MAJOR DIVISIONS			GROUP SYMBOLS	TYPICAL NAMES
COARSE GRAINED SOILS (More than 50% of material is LARGER than No. 200 sieve size)	GRAVELS (More than 50% of coarse fraction is LARGER than the No. 4 sieve size)	CLEAN GRAVELS (Little or no fines)	GW	Well graded gravel, gravel-sand mixtures, little or no fines.
			GP	Poorly graded gravel or gravel-sand mixtures, little or no fines.
		GRAVELS WITH FINES (Appreciable amt. of fines)	GM	Silty gravels, gravel-sand-silt mixtures.
			GC	Clayey gravels, gravel-sand-clay mixtures.
	SANDS (More than 50% of coarse fraction is SMALLER than the No. 4 sieve size)	CLEAN SANDS (Little or no fines)	SW	Well graded sands, gravelly sands, little or no fines.
			SP	Poorly graded sands or gravelly sands, little or no fines.
		SANDS WITH FINES (Appreciable amount of fines)	SM	Silty sands, sand-silt mixtures.
			SC	Clayey sands, sand-clay mixtures.
FINE GRAINED SOILS (More than 50% of material is SMALLER than No. 200 sieve size)	SILTS AND CLAYS (Liquid limit LESS than 50)		ML	Inorganic silts and very fine sands, rock flour silty or clayey fine sands or clayey silts with slight plasticity
			CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays.
			OL	Organic silts and organic silty clays of low plasticity.
	SILTS AND CLAYS (Liquid limit GREATER than 50)		MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts.
			CH	Inorganic clays of high plasticity, fat clays.
			OH	Organic clays of medium to high plasticity, organic silts.
HIGHLY ORGANIC SOILS			Pt	Peat and other highly organic soils.

BOUNDARY CLASSIFICATIONS: Soils possessing characteristics of two groups are designated by combinations of group symbols.

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Exploratory Boring Log

Boring No. B-1

Date Drilled:	May 29th, 2019	Drilling Equipment:	CME 75, Hollow Stem Auger
Logged By:	MJS	Borehole Diameter:	7"
Location:	See Boring Location Map	Drive Weights:	140 lbs. (Autohammer)
Geographic Position:	36.528602°, -120.415732°	Drop Height:	30"

Depth (ft)	Samples: Sample Type	Samples: Blows (blows/ft)	Samples: Bulk Sample	Moisture Content (%)	Dry Density (pcf)	USCS	Graphic Symbol	Material Description
0	R	14		8.4	90.1	SC		**ALLUVIUM:** yellow brown, fine to medium CLAYEY SAND, moist, medium dense
5	S	5						. . .loose, with caliche
10								Notes: 1. Boring terminated at 6' 2. No Groundwater Encountered 3. Boring backfilled with soil cuttings
15								
20								
25								
30								
35								

This log contains factual information and interpretation of the subsurface conditions between the samples. The stratum indicated on this log represent the approximate boundary between earth units and the transition may be gradual. The log show subsurface conditions at the date and location indicated, and may not be representative of subsurface conditions at other locations and times.

***Note**

All blow counts associated with Modified California Sample are uncorrected. The sampler dimensions are as follows:
ID = 2.5" OD = 3"

Sample Types:
- S - SPT Sample
- Bulk Sample
- T - Modified California Tube Sample
- R - Modified California Ring Sample

Symbols:
- Groundwater
- End of Boring

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GEOTECHNICAL CONSULTANTS

Exploratory Boring Log

Boring No. B-2

Sheet 1 of 1

Date Drilled:	May 29th, 2019	Drilling Equipment:	CME 75, Hollow Stem Auger
Logged By:	MJS	Borehole Diameter:	7"
Location:	See Boring Location Map	Drive Weights:	140 lbs. (Autohammer)
Geographic Position:	36.527036°, -120.414509°	Drop Height:	30"

Depth (ft)	Sample Type	Blows (blows/ft)	Bulk Sample	Moisture Content (%)	Dry Density (pcf)	USCS	Graphic Symbol	Material Description
	R	17	▨	15.3	108.8	SC		**ALLUVIUM:** yellow brown, fine to medium CLAYEY SAND, moist, medium dense
5	R	44		13.1	98.0			Yellow brown, fine to medium SILTY SAND with minor CLAY, moist, dense
10	R	42		8.9	103.9	SM		
15	S	8						. . .increasing CLAY content, medium dense
20	S	9						
25								
30								
35								

Notes:
1. Boring terminated at 21'
2. No Groundwater Encountered
3. Boring backfilled with soil cuttings

***Note**

All blow counts associated with Modified California Sample are uncorrected. The sampler dimensions are as follows:
ID = 2.5" OD = 3"

Sample Types:
S - SPT Sample
▨ - Bulk Sample
T - Modified California Tube Sample
R - Modified California Ring Sample

Symbols:
▽ - Groundwater
◣ - End of Boring

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GEOTECHNICAL CONSULTANTS

Exploratory Boring Log

Boring No. B-3

Date Drilled:	May 29th, 2019	Drilling Equipment:	CME 75, Hollow Stem Auger
Logged By:	MJS	Borehole Diameter:	7"
Location:	See Boring Location Map	Drive Weights:	140 lbs. (Autohammer)
Geographic Position:	36.527588°, -120.414317°	Drop Height:	30"

Depth (ft)	Sample Type	Blows (blows/ft)	Bulk Sample	Moisture Content (%)	Dry Density (pcf)	USCS	Graphic Symbol	Material Description
	R	11	▨	8.2	95.8	SC		**ALLUVIUM:** yellow brown, fine to medium CLAYEY SAND with scattered GRAVEL, moist, medium dense
5	R	11		13.6	100.4			Yellow brown, fine to medium SILTY SAND with CLAY, moist, medium dense, with caliche
10	S	5				SM		. . .loose
15	S	10						. . .little to no CLAY, medium dense
20	S	50/4"						. . .light yellow brown, fine to coarse with scattered GRAVEL, very dense
25								
30								
35								

Notes:
1. Boring terminated at 21'
2. No Groundwater Encountered
3. Boring backfilled with soil cuttings

***Note**

All blow counts associated with Modified California Sample are uncorrected. The sampler dimensions are as follows:
ID = 2.5" OD = 3"

Sample Types:
S - SPT Sample
▨ - Bulk Sample
T - Modified California Tube Sample
R - Modified California Ring Sample

Symbols:
▽ - Groundwater
◣ - End of Boring

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Exploratory Boring Log

Boring No. B-4

Sheet 1 of 1

Date Drilled:	May 29th, 2019	Drilling Equipment:	CME 75, Hollow Stem Auger
Logged By:	MJS	Borehole Diameter:	7"
Location:	See Boring Location Map	Drive Weights:	140 lbs. (Autohammer)
Geographic Position:	36.529369°, -120.414904°	Drop Height:	30"

Depth (ft)	Samples: Sample Type	Samples: Blows (blows/ft)	Samples: Bulk Sample	Moisture Content (%)	Dry Density (pcf)	USCS	Graphic Symbol	Material Description
0	R	10	▨	7.6	93.3	SC		**ALLUVIUM:** yellow brown, fine to medium CLAYEY SAND, moist, medium dense
5	R	23		9.7	100.1	SM		Yellow brown, fine to medium SILTY SAND with CLAY, moist, medium dense, with caliche
10	S	8						Notes: 1. Boring terminated at 11' 2. No Groundwater Encountered 3. Boring backfilled with soil cuttings
15								
20								
25								
30								
35								

***Note**

All blow counts associated with Modified California Sample are uncorrected. The sampler dimensions are as follows:
ID = 2.5" OD = 3"

Sample Types:
S - SPT Sample
▨ - Bulk Sample
T - Modified California Tube Sample
R - Modified California Ring Sample

Symbols:
▽ - Groundwater
◣ - End of Boring

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Exploratory Boring Log

Boring No. B-5

Date Drilled:	May 29th, 2019	Drilling Equipment:	CME 75, Hollow Stem Auger
Logged By:	MJS	Borehole Diameter:	7"
Location:	See Boring Location Map	Drive Weights:	140 lbs. (Autohammer)
Geographic Position:	36.526944°, -120.413403°	Drop Height:	30"

Depth (ft)	Sample Type	Blows (blows/ft)	Bulk Sample	Moisture Content (%)	Dry Density (pcf)	USCS	Material Description
							This log contains factual information and interpretation of the subsurface conditions between the samples. The stratum indicated on this log represent the approximate boundary between earth units and the transition may be gradual. The log show subsurface conditions at the date and location indicated, and may not be representative of subsurface conditions at other locations and times.
0	R	15	▨	12.8	93.8	SC	**ALLUVIUM:** yellow brown, fine to medium CLAYEY SAND, moist, medium dense
5	R	12		11.6	106.2		. . .with caliche
10	S	9				SM	Yellow brown, fine to medium SILTY SAND with CLAY, moist, medium dense
15	R	18		18.8	106.0		. . .increasing CLAY content, with caliche
20	S	13				ML	Yellow brown, fine to medium SANDY SILT with CLAY, moist, stiff
25	R	18		15.8	110.1	CL	Yellow brown, fine to medium SANDY CLAY, moist, very stiff
30	S	14				SC	Yellow brown, fine to medium CLAYEY SAND, moist, medium dense, with caliche
35	R	27		27.0	90.2	CL	Yellow brown, SILTY CLAY with fine SAND, moist, very stiff
							. . .with caliche

***Note**

All blow counts associated with Modified California Sample are uncorrected. The sampler dimensions are as follows:
ID = 2.5" OD = 3"

Sample Types:
S - SPT Sample
▨ - Bulk Sample
T - Modified California Tube Sample
R - Modified California Ring Sample

Symbols:
▽ - Groundwater
◺ - End of Boring

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Exploratory Boring Log

Boring No. B-5

Date Drilled:	May 29th, 2019	Drilling Equipment:	CME 75, Hollow Stem Auger
Logged By:	MJS	Borehole Diameter:	7"
Location:	See Boring Location Map	Drive Weights:	140 lbs. (Autohammer)
Geographic Position:	36.526944°, -120.413403°	Drop Height:	30"

Depth (ft)	Samples: Sample Type	Samples: Blows (blows/ft)	Samples: Bulk Sample	Moisture Content (%)	Dry Density (pcf)	USCS	Graphic Symbol	Material Description
	S	15				CL		This log contains factual information and interpretation of the subsurface conditions between the samples. The stratum indicated on this log represent the approximate boundary between earth units and the transition may be gradual. The log show subsurface conditions at the date and location indicated, and may not be representative of subsurface conditions at other locations and times.

45
50
55
60
65
70
75

Notes:
1. Boring terminated at 41'
2. No Groundwater Encountered
3. Boring backfilled with soil cuttings

***Note**

All blow counts associated with Modified California Sample are uncorrected. The sampler dimensions are as follows:
ID = 2.5" OD = 3"

Sample Types:
S - SPT Sample
Bulk Sample
T - Modified California Tube Sample
R - Modified California Ring Sample

Symbols:
- Groundwater
- End of Boring

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Exploratory Boring Log

Boring No. B-6

Date Drilled:	May 29th, 2019	Drilling Equipment:	CME 75, Hollow Stem Auger
Logged By:	MJS	Borehole Diameter:	7"
Location:	See Boring Location Map	Drive Weights:	140 lbs. (Autohammer)
Geographic Position:	36.527767°, -120.413471°	Drop Height:	30"

Depth (ft)	Sample Type	Blows (blows/ft)	Bulk Sample	Moisture Content (%)	Dry Density (pcf)	USCS	Graphic Symbol	Material Description
	R	12	▨	11.6	89.5	SC		**ALLUVIUM:** yellow brown, fine to medium CLAYEY SAND, moist, medium dense
5	R	16		8.6	93.8			. . .with caliche
10	R	22		18.6	104.0	SM		Yellow brown, fine to medium SILTY SAND with minor CLAY, moist, medium dense, with caliche
15	S	8				ML		Yellow brown, fine to medium SANDY SILT with CLAY and interlayers of fine to medium SAND, moist, stiff, with caliche
20	S	12				SC		Yellow brown, fine to medium CLAYEY SAND, moist, medium dense
25								Notes: 1. Boring terminated at 21' 2. No Groundwater Encountered 3. Boring backfilled with soil cuttings
30								
35								

Material Description

This log contains factual information and interpretation of the subsurface conditions between the samples. The stratum indicated on this log represent the approximate boundary between earth units and the transition may be gradual. The log show subsurface conditions at the date and location indicated, and may not be representative of subsurface conditions at other locations and times.

***Note**

All blow counts associated with Modified California Sample are uncorrected. The sampler dimensions are as follows:

ID = 2.5" OD = 3"

Sample Types:

S - SPT Sample

▨ - Bulk Sample

T - Modified California Tube Sample

R - Modified California Ring Sample

Symbols:

▽ - Groundwater

◣ - End of Boring

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Exploratory Boring Log

Boring No. B-7

Sheet 1 of 1

Date Drilled:	May 29th, 2019	Drilling Equipment:	CME 75, Hollow Stem Auger
Logged By:	MJS	Borehole Diameter:	7"
Location:	See Boring Location Map	Drive Weights:	140 lbs. (Autohammer)
Geographic Position:	36.498163°, -120.446767°	Drop Height:	30"

Depth (ft)	Samples: Sample Type	Samples: Blows (blows/ft)	Samples: Bulk Sample	Moisture Content (%)	Dry Density (pcf)	USCS	Graphic Symbol	Material Description
0	R	15	▨	9.9	94.4	SC		**ALLUVIUM:** yellow brown, fine to medium CLAYEY SAND, moist, medium dense, with caliche
5	R	16		14.7	103.7			
10	S	7						. . .loose
15	S	10				SM		Yellow brown, fine to medium SILTY SAND with CLAY, moist, medium dense
20	S	10						. . .increasing CLAY content, with caliche
25								
30								
35								

This log contains factual information and interpretation of the subsurface conditions between the samples. The stratum indicated on this log represent the approximate boundary between earth units and the transition may be gradual. The log show subsurface conditions at the date and location indicated, and may not be representative of subsurface conditions at other locations and times.

Notes:
1. Boring terminated at 21'
2. No Groundwater Encountered
3. Boring backfilled with soil cuttings

***Note**

All blow counts associated with Modified California Sample are uncorrected. The sampler dimensions are as follows:
ID = 2.5" OD = 3"

Sample Types:
- S - SPT Sample
- Bulk Sample
- T - Modified California Tube Sample
- R - Modified California Ring Sample

Symbols:
- Groundwater
- End of Boring

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Exploratory Boring Log

Boring No. B-8

Date Drilled:	May 29th, 2019	Drilling Equipment:	CME 75, Hollow Stem Auger
Logged By:	MJS	Borehole Diameter:	7"
Location:	See Boring Location Map	Drive Weights:	140 lbs. (Autohammer)
Geographic Position:	36.525907°, -120.412653°	Drop Height:	30"

Depth (ft)	Sample Type	Blows (blows/ft)	Bulk Sample	Moisture Content (%)	Dry Density (pcf)	USCS	Graphic Symbol	Material Description
	R	14	▨	8.0	90.1	SC		**ALLUVIUM:** yellow brown, fine to medium CLAYEY SAND, moist, medium dense
5	R	18		12.1	103.5	SM		Yellow brown, fine to medium SILTY SAND with CLAY, moist, medium dense
10	R	17		24.6	93.5			. . .with caliche
15	S	10				ML		Yellow brown, fine to medium SANDY SILT with CLAY, moist, stiff, with caliche
20	S	10						. . .with interlayers of fine to medium SAND
25								
30								
35								

This log contains factual information and interpretation of the subsurface conditions between the samples. The stratum indicated on this log represent the approximate boundary between earth units and the transition may be gradual. The log show subsurface conditions at the date and location indicated, and may not be representative of subsurface conditions at other locations and times.

Notes:
1. Boring terminated at 21'
2. No Groundwater Encountered
3. Boring backfilled with soil cuttings

***Note**

All blow counts associated with Modified California Sample are uncorrected. The sampler dimensions are as follows:
ID = 2.5" OD = 3"

Sample Types:
S - SPT Sample
▨ - Bulk Sample
T - Modified California Tube Sample
R - Modified California Ring Sample

Symbols:
▽ - Groundwater
◣ - End of Boring

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Exploratory Boring Log

Boring No. B-9

Sheet 1 of 1

Date Drilled:	May 29th, 2019	Drilling Equipment:	CME 75, Hollow Stem Auger
Logged By:	MJS	Borehole Diameter:	7"
Location:	See Boring Location Map	Drive Weights:	140 lbs. (Autohammer)
Geographic Position:	36.525566°, -120.411976°	Drop Height:	30"

Depth (ft)	Samples: Sample Type	Samples: Blows (blows/ft)	Samples: Bulk Sample	Moisture Content (%)	Dry Density (pcf)	USCS	Graphic Symbol	Material Description
	R	16	▨	5.3	102.8	SC		**ALLUVIUM:** yellow brown, fine to medium CLAYEY SAND with scattered GRAVEL, moist, medium dense
5	R	34		8.7	104.6			Yellow brown, fine to medium SANDY SILT with CLAY, moist, hard, with caliche
10	S	10				ML		. . .stiff
15	S	7						. . .increasing SAND content, medium stiff
20	S	7				SM		Yellow brown, fine to medium SILTY SAND with minor CLAY, moist, medium dense
25								Notes: 1. Boring terminated at 21' 2. No Groundwater Encountered 3. Boring backfilled with soil cuttings
30								
35								

***Note**

All blow counts associated with Modified California Sample are uncorrected. The sampler dimensions are as follows:
ID = 2.5" OD = 3"

Sample Types:
S - SPT Sample
▨ - Bulk Sample
T - Modified California Tube Sample
R - Modified California Ring Sample

Symbols:
▽ - Groundwater
◺ - End of Boring

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Exploratory Boring Log

Boring No. B-10
Sheet 1 of 1

Date Drilled:	May 29th, 2019	Drilling Equipment:	CME 75, Hollow Stem Auger
Logged By:	MJS	Borehole Diameter:	7"
Location:	See Boring Location Map	Drive Weights:	140 lbs. (Autohammer)
Geographic Position:	36.525518°, -120.409517°	Drop Height:	30"

Depth (ft)	Samples: Sample Type	Samples: Blows (blows/ft)	Samples: Bulk Sample	Moisture Content (%)	Dry Density (pcf)	USCS	Graphic Symbol	Material Description
0	R	17	▨	6.1	94.0	SC		**ALLUVIUM:** yellow brown, fine to medium CLAYEY SAND, moist, medium dense
5	R	36		14.1	107.9			. . .brown, dense, with caliche
10	R	11		21.4	96.3	SM		Yellow brown, fine to medium SILTY SAND with CLAY and interlayers of fine to medium SAND, moist, medium dense
15	S	10						. . .no interlayers with caliche
20	S	7						
25								
30								
35								

Notes:
1. Boring terminated at 21'
2. No Groundwater Encountered
3. Boring backfilled with soil cuttings

***Note**
All blow counts associated with Modified California Sample are uncorrected. The sampler dimensions are as follows:
ID = 2.5" OD = 3"

Sample Types:
S - SPT Sample
▨ - Bulk Sample
T - Modified California Tube Sample
R - Modified California Ring Sample

Symbols:
▽ - Groundwater
◣ - End of Boring

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Exploratory Boring Log

Boring No. B-11
Sheet 1 of 1

Date Drilled:	May 29th, 2019	Drilling Equipment:	CME 75, Hollow Stem Auger
Logged By:	MJS	Borehole Diameter:	7"
Location:	See Boring Location Map	Drive Weights:	140 lbs. (Autohammer)
Geographic Position:	36.526428°, -120.409808°	Drop Height:	30"

Depth (ft)	Samples: Sample Type	Samples: Blows (blows/ft)	Samples: Bulk Sample	Moisture Content (%)	Dry Density (pcf)	USCS	Graphic Symbol	Material Description
	R	11		8.2	97.0	SC		**ALLUVIUM:** yellow brown, fine to medium CLAYEY SAND, moist, medium dense
5	R	35		16.7	91.2			. . .brown, dense, with caliche
10	S	6				SM		Yellow brown, fine to medium SILTY SAND with CLAY, moist, loose
15	S	8						. . .medium dense
20	S	7						
25								
30								
35								

This log contains factual information and interpretation of the subsurface conditions between the samples. The stratum indicated on this log represent the approximate boundary between earth units and the transition may be gradual. The log show subsurface conditions at the date and location indicated, and may not be representative of subsurface conditions at other locations and times.

Notes:
1. Boring terminated at 21'
2. No Groundwater Encountered
3. Boring backfilled with soil cuttings

***Note**
All blow counts associated with Modified California Sample are uncorrected. The sampler dimensions are as follows:
ID = 2.5" OD = 3"

Sample Types:
S - SPT Sample
Bulk Sample
T - Modified California Tube Sample
R - Modified California Ring Sample

Symbols:
- Groundwater
- End of Boring

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APPENDIX B

LABORATORY TESTS

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APPENDIX B

B-1.00 LABORATORY TESTS

B-1.01 Moisture Determination

The moisture content of tube and/or ring samples obtained from the test borings was determined in accordance with ASTM D2216, the standard method for determining the water content of soil using a drying oven. The mass of material remaining after oven drying is used as the mass of the solid particles. The results of these tests are provided on the boring logs in Appendix A.

B-1.02 Density of Tube Samples

The densities of tube and/or ring samples, which were obtained using a split-barrel sampler, were determined in accordance with ASTM D2937. The results of these tests are provided on the boring logs in Appendix A.

B-1.03 Soluble Sulfates and Chlorides

Tests were performed in accordance with California Test Methods 417 and 422 on two near-surface soil samples obtained during the field exploration. These tests were performed by Dellavalle Laboratory, Inc. located in Fresno, California. The test results are provided below in Table B1.

B-1.04 Soil Reactivity (pH) and Minimum Electrical Resistivity

Two near-surface soil samples were tested for soil reactivity (pH) and minimum electrical resistivity using California Test Method 643 (see Table B1). The pH measurement determines the degree of acidity or alkalinity in the soils. The minimum electrical resistivity is used as an indicator of how corrosive the soil is relative to buried metallic items.

TABLE B1: Summary of Corrosivity Tests

Sample Location	Soluble Sulfates (mg/kg)	Soluble Chlorides (mg/kg)	pH	Minimum Resistivity (ohm-cm)
B-4 @ 1' – 3'	5,040.0	5.0	6.84	700
B-10 @ 1' – 3'	4,260.0	19.0	6.62	690

B-1.05 Percent Passing #200 Sieve

Five soil samples were tested in accordance with ASTM D1140 to determine the percent passing the #200 sieve (see Table B2). This represents the amount of silt and clay that is present in the soil.

TABLE B2: PERCENT PASSING #200 SIEVE TEST RESULTS

Sample Location	Dry Weight Before Wash (grams)	Dry Weight After Wash (grams)	Percent Passing #200 Sieve
B-3 @ 1' – 3'	181.9	110.1	39
B-5 @ 1' – 3'	180.7	92.6	49
B-8 @ 1' – 3'	187.6	117.8	37
B-9 @ 1' – 3'	188.3	119.9	36
B-11 @ 1' – 3'	184.5	112.0	39

B-1.06 Atterberg Limits

The liquid limit, plastic limit, and the plasticity index of three near-surface soil samples were determined using the standard test methods of ASTM D4318 (See Figures B1 through B3).

B-1.07 Expansion Index

Expansion index testing was performed on a near-surface sample of the on-site soils in accordance with the standard test methods of ASTM D4829. The results of this test are shown on Figure B4.

B-1.08 Direct Shear

Two 3-point direct shear tests were performed on representative near-surface samples of soil using the standard test method of ASTM D3080 (consolidated and drained). Shear tests were performed on a direct shear machine of the strain-controlled type by Salem Engineering Group, Inc. To simulate possible adverse field conditions, the samples were saturated prior to shearing. Three soil specimens were sheared at varying normal loads for each test and the results plotted to establish the angle of the internal friction and cohesion of the tested samples. The results of these tests are shown on Figures B5 and B6.

B-1.09 One-Dimensional Consolidation Properties

The magnitude and rate of consolidation of soils obtained from test borings, when it is restrained laterally and drained axially while subjected to incrementally applied controlled-stress loading, was determined using the standard test methods of ASTM D2435.The results of these tests are shown on Figures B7 and B8.

B-1.10 Resistance Value

Two Resistance Value (R-value) test was performed on a representative sample of subgrade obtained from a planned paved area using test methods outlined in ASTM D2844 (see Figures B9 – B10).

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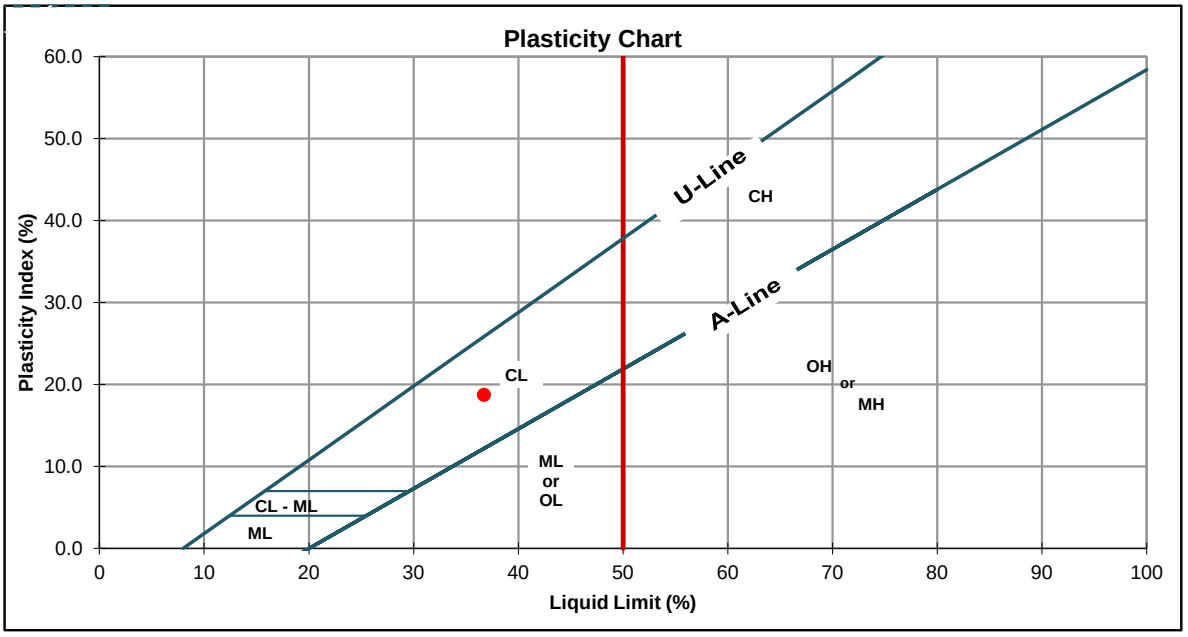
Figure B1
Laboratory Test Form | ASTM D4318
Plasticity Index (PI) of Soils

Project Number:	19G-0194-1/02	Lab ID:	19-002424
Project Name:	KAPP	Date Tested:	6/5/2019
Sampled By:	Megan S.	Tested By:	Kevin D.
Sample Date:	5/29/2019		
Sample Location:	B-2 @ 1' - 3'		
Sample Description:	Clayey SAND, fine to medium grained, yellow brown		

Plasticity Index Results

Average Liquid Limit:	37
Average Plastic Limit :	18
Plasticity Index:	19



Liquid Limit Data

	Trial 1	Trial 2	Trial 3
Wet Weight (gm.)	37.97	41.97	38.75
Dry Weight (gm.)	35.52	39.78	35.94
Tare Weight (gm.)	28.48	33.79	28.41
Number of Blows	34	26	25
Liquid Limit	34.8	36.5	37.3
Corrected Liquid Limit	36.1	36.7	37.3

Plastic Limit Data

	Trial 1	Trial 2
Wet Weight (gm.)	35.11	35.24
Dry Weight (gm.)	34.11	34.15
Tare Weight (gm.)	28.31	28.32
Moisture Content (%)	17.2	18.7

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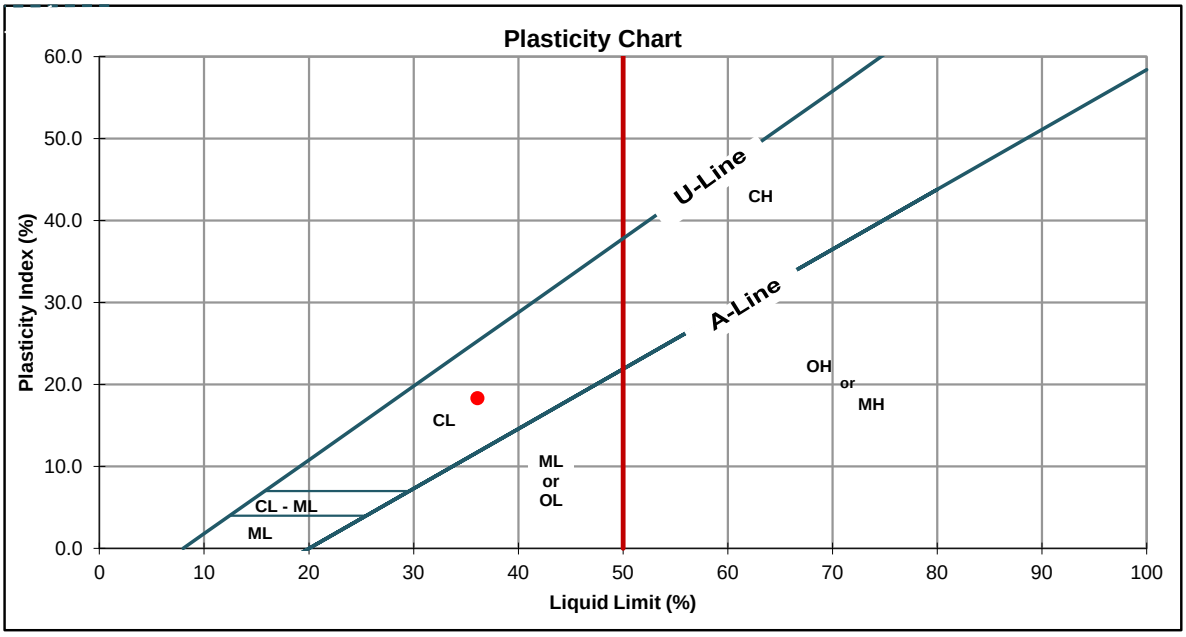
Figure B2
Laboratory Test Form | ASTM D4318
Plasticity Index (PI) of Soils

Project Number:	19G-0194-1/02	Lab ID:	19-002417
Project Name:	KAPP	Date Tested:	6/5/2019
Sampled By:	Megan S.	Tested By:	Kevin D.
Sample Date:	5/29/2019		
Sample Location:	B-4 @ 1' - 3'		
Sample Description:	Clayey SAND, fine to medium grained, yellow brown		

Plasticity Index Results

Average Liquid Limit:	36
Average Plastic Limit :	18
Plasticity Index:	18



Liquid Limit Data

	Trial 1	Trial 2	Trial 3
Wet Weight (gm.)	37.79	39.34	37.39
Dry Weight (gm.)	35.39	36.52	34.93
Tare Weight (gm.)	28.44	28.55	28.15
Number of Blows	35	29	25
Liquid Limit	34.5	35.4	36.3
Corrected Liquid Limit	36.0	36.0	36.3

Plastic Limit Data

	Trial 1	Trial 2
Wet Weight (gm.)	34.76	40.71
Dry Weight (gm.)	33.80	39.67
Tare Weight (gm.)	28.45	33.75
Moisture Content (%)	17.9	17.6

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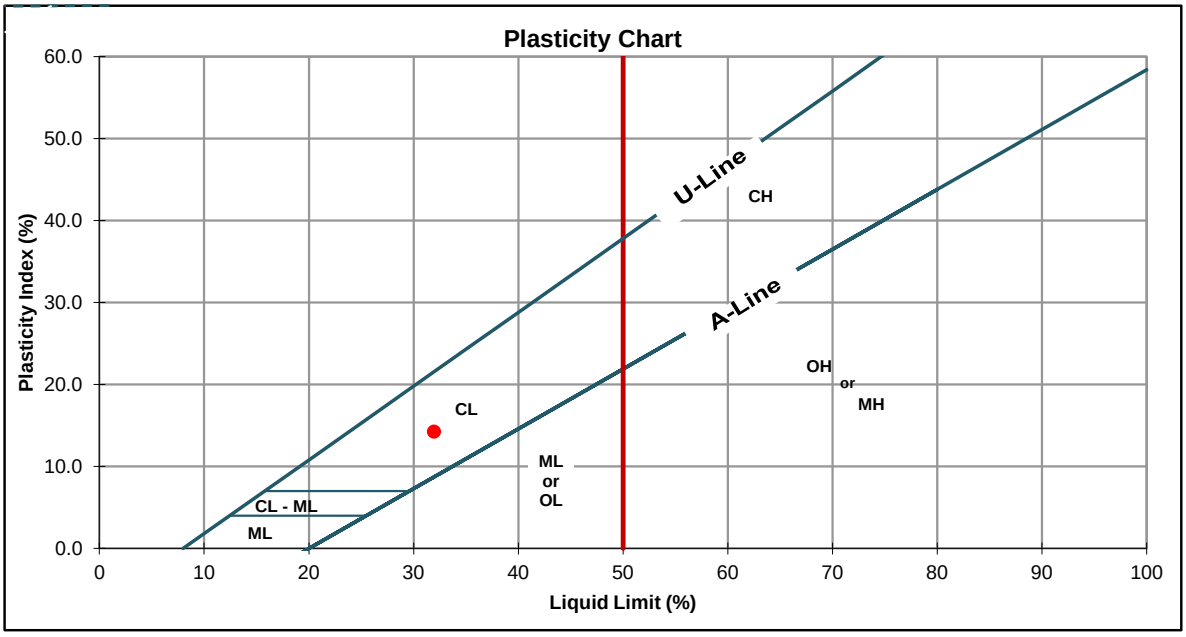
Figure B3
Laboratory Test Form | ASTM D4318
Plasticity Index (PI) of Soils

Project Number:	19G-0194-1/02	Lab ID:	19-002441
Project Name:	KAPP	Date Tested:	6/5/2019
Sampled By:	Megan S.	Tested By:	Kevin D.
Sample Date:	5/29/2019		
Sample Location:	B-7 @ 1' - 3'		
Sample Description:	Clayey SAND, fine to medium grained, yellow brown		

Plasticity Index Results

Average Liquid Limit:	32
Average Plastic Limit :	18
Plasticity Index:	14



Liquid Limit Data

	Trial 1	Trial 2	Trial 3
Wet Weight (gm.)	42.81	43.20	43.45
Dry Weight (gm.)	40.70	40.96	41.11
Tare Weight (gm.)	33.85	34.05	33.93
Number of Blows	33	28	17
Liquid Limit	30.8	32.4	32.6
Corrected Liquid Limit	31.9	32.9	31.1

Plastic Limit Data

	Trial 1	Trial 2
Wet Weight (gm.)	40.95	39.66
Dry Weight (gm.)	39.87	38.76
Tare Weight (gm.)	33.88	33.57
Moisture Content (%)	18.0	17.3

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Figure B4
Laboratory Test Form | ASTM D4829
Expansion Index of Soils

Project Number:	19G-0194-1/02	Lab ID:	19-002438
Project Name:	KAPP	Date Sampled:	5/29/2019
Sampled By:	Megan S.	Date Tested:	6/3/2019
Tested By:	Ryan R.		
Sample Location:	B-6 @ 1' - 3'		
Sample Description:	Clayey SAND, fine to medium grained, yellow brown		

Expansion Readings

Initial Sample Height (in):	1.0089
Final Sample Height (in):	1.0607
Expansion (in):	**0.0518**
Expansion Index, EI:	52

Classification of Expansive Soil

EI	Potential Expansion
0 - 20	Very Low
21 - 50	Low
51 - 90	Medium
91 - 130	High
>130	Very High

Expansion Index Data

Initial Set-Up Data		Final Data	
Sample + Tare Weight (gm):	733.4	Sample + Tare Weight (gm):	793.8
Tare Weight (gm):	365.5	Tare Weight (gm):	365.5
Initial Gauge Reading (in):	0.0089	Final Gauge Reading (in):	0.0607
Moisture Content And Density Data			
Wet Weight + Tare (gm):	300.0	Wet Weight + Tare (gm):	793.8
Dry Weight + Tare (gm):	266.2	Dry Weight + Tare (gm):	691.9
Tare Weight (gm):	0	Tare Weight (gm):	365.5
Moisture Content:	12.7%	Moisture Content:	31.2%
Initial Volume (ft^3):	0.007345	Final Volume (ft^3):	0.007649
Remolded Wet Density (pcf):	110.4	Final Wet Density (pcf):	123.4
Remolded Dry Density (pcf):	98.0	Final Dry Density (pcf):	94.1
Degree of Saturation:	**48**	Assumed Specific Gravity:	2.7

Results relate only to the items inspected or tested. Report shall not be reproduced, except in full, without written approval of the agency. (As required by ASTM E-329-18)

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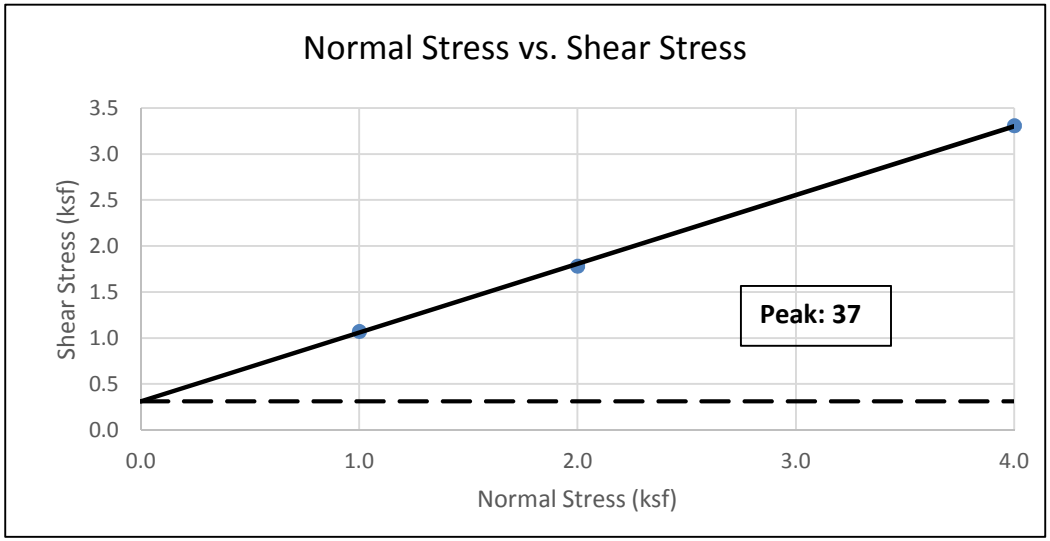
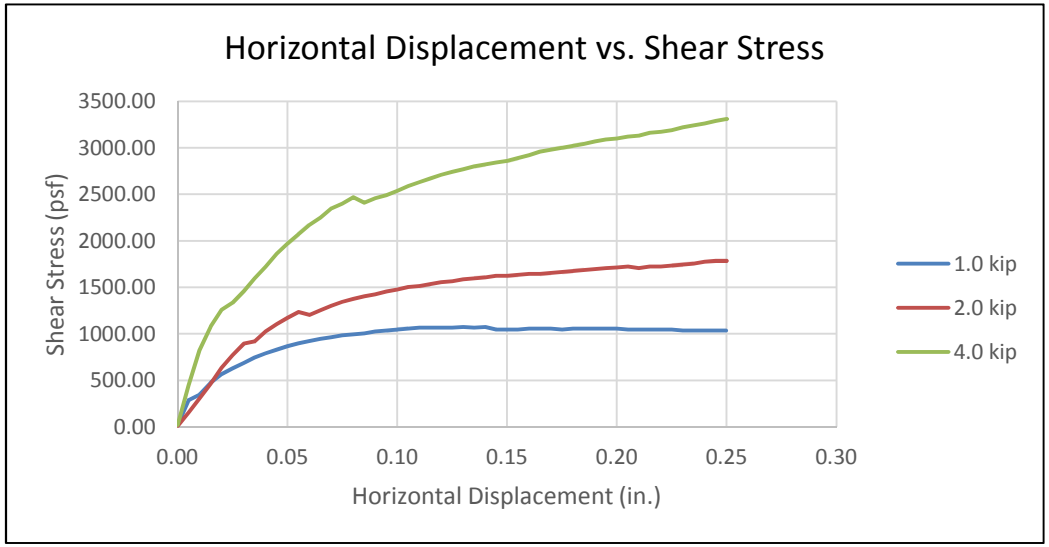
Figure B5
Direct Shear Test (ASTM D3080)

Project Name: KAPP
Project Number: 19G-0194-1/02
Client: RMA GeoScience
Boring: B-3 @ 5.5'
Soil Type: SC
Sample Type: Undisturbed Ring
Tested By: NL
Reviewed By: JM
Date of Test: 6/11/19
Test Equipment: GeoComp ShearTrac II

	Loading		
	1.0 kip	**2.0 kip**	**4.0 kip**
Normal Stress (ksf)	1.00	2.00	4.00
Shear Rate (in/min)	0.0025	0.0025	0.0025
Peak Shear Stress (ksf)	1.08	1.79	3.31
Residual Shear Stress (ksf)	0.00	0.00	0.00

Initial Height of Sample (in)	1.000	1.000	1.000
Post-Consol. Sample Height (in.)	0.847	0.839	0.807
Post-Shear Sample Height (in.)	0.829	0.815	0.778
Diameter of Sample (in)	2.416	2.416	2.416
Initial (pre-shear) Values			
Moisture Content (%)		13.6	
Dry Density (pcf)	99.5	100.0	98.3
Saturation %	52.8	53.5	51.2
Void Ratio	0.69	0.69	0.72
Consolidated Void Ratio	0.44	0.41	0.38
Final (post-shear) Values			
Final Moisture Content (%)	29.7	24.0	28.2
Dry Density (pcf)	22.9	29.4	28.0
Saturation %	198.1	173.4	227.7
Void Ratio	0.40	0.37	0.33





Peak Shear Strength Values		Residual Shear Strength Values	
Slope	0.75	**Slope**	0.00
Friction Angle	37	**Friction Angle**	0
Cohesion (psf)	313	**Cohesion (psf)**	0

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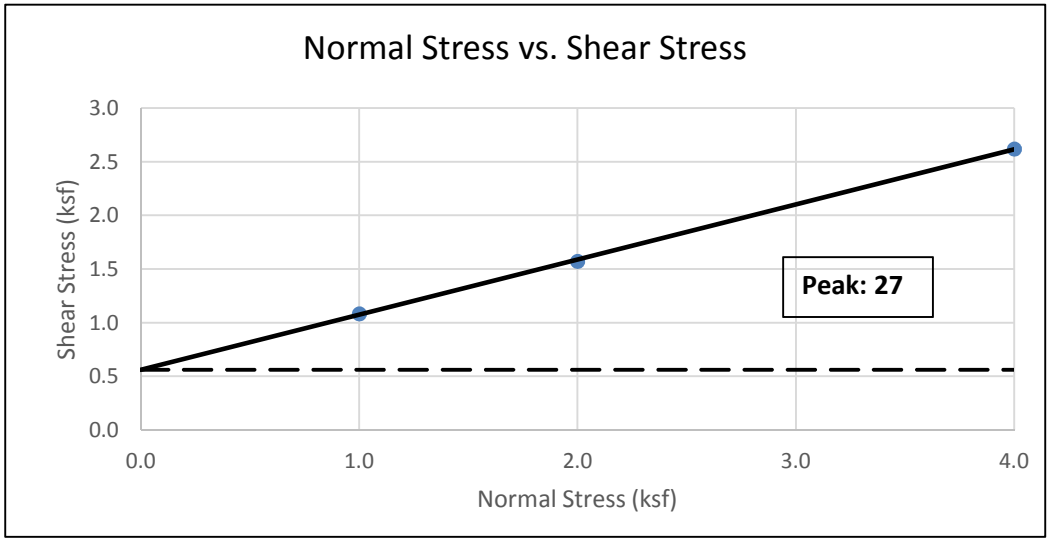
Fresno, CA 93722

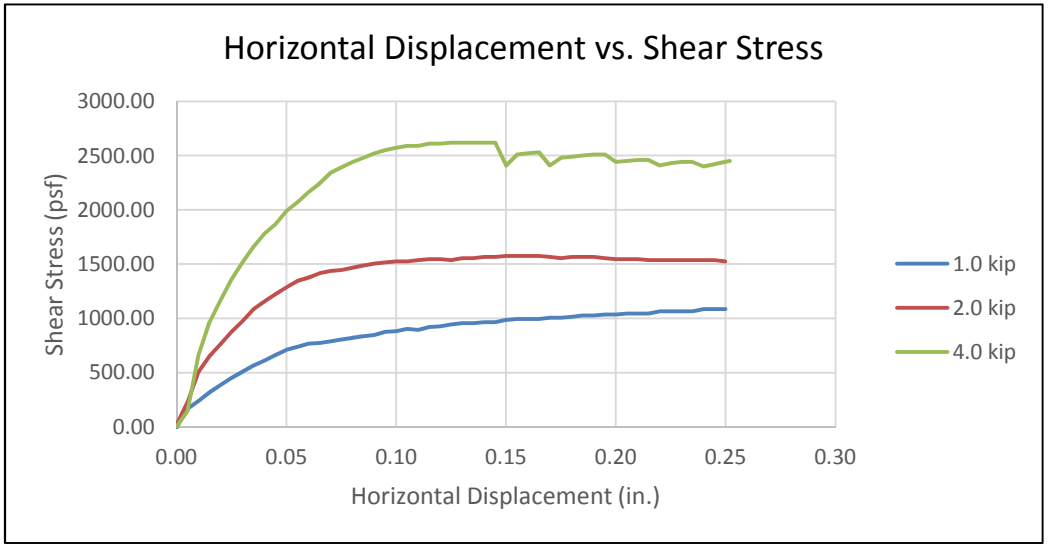
Figure B6
Direct Shear Test (ASTM D3080)

Project Name: KAPP
Project Number: 19G-0194-1/02
Client: RMA GeoScience
Boring: B-11 @ 5.5'
Soil Type: SC
Sample Type: Undisturbed Ring
Tested By: NL
Reviewed By: JM
Date of Test: 6/12/19
Test Equipment: GeoComp ShearTrac II

	Loading		
	1.0 kip	**2.0 kip**	**4.0 kip**
Normal Stress (ksf)	1.00	2.00	4.00
Shear Rate (in/min)	0.0025	0.0025	0.0025
Peak Shear Stress (ksf)	1.09	1.58	2.62
Residual Shear Stress (ksf)	0.00	0.00	0.00

Initial Height of Sample (in)	1.000	1.000	1.000
Post-Consol. Sample Height (in.)	0.908	0.844	0.822
Post-Shear Sample Height (in.)	0.894	0.823	0.801
Diameter of Sample (in)	2.416	2.416	2.416
Initial (pre-shear) Values			
Moisture Content (%)		16.7	
Dry Density (pcf)	101.0	106.7	95.7
Saturation %	67.5	77.7	59.2
Void Ratio	0.67	0.58	0.76
Consolidated Void Ratio	0.52	0.33	0.45
Final (post-shear) Values			
Final Moisture Content (%)	31.8	26.6	27.5
Dry Density (pcf)	26.3	29.6	30.2
Saturation %	175.0	239.3	181.1
Void Ratio	0.49	0.30	0.41





Peak Shear Strength Values		Residual Shear Strength Values	
Slope	0.51	**Slope**	0.00
Friction Angle	27	**Friction Angle**	0
Cohesion (psf)	563	**Cohesion (psf)**	0

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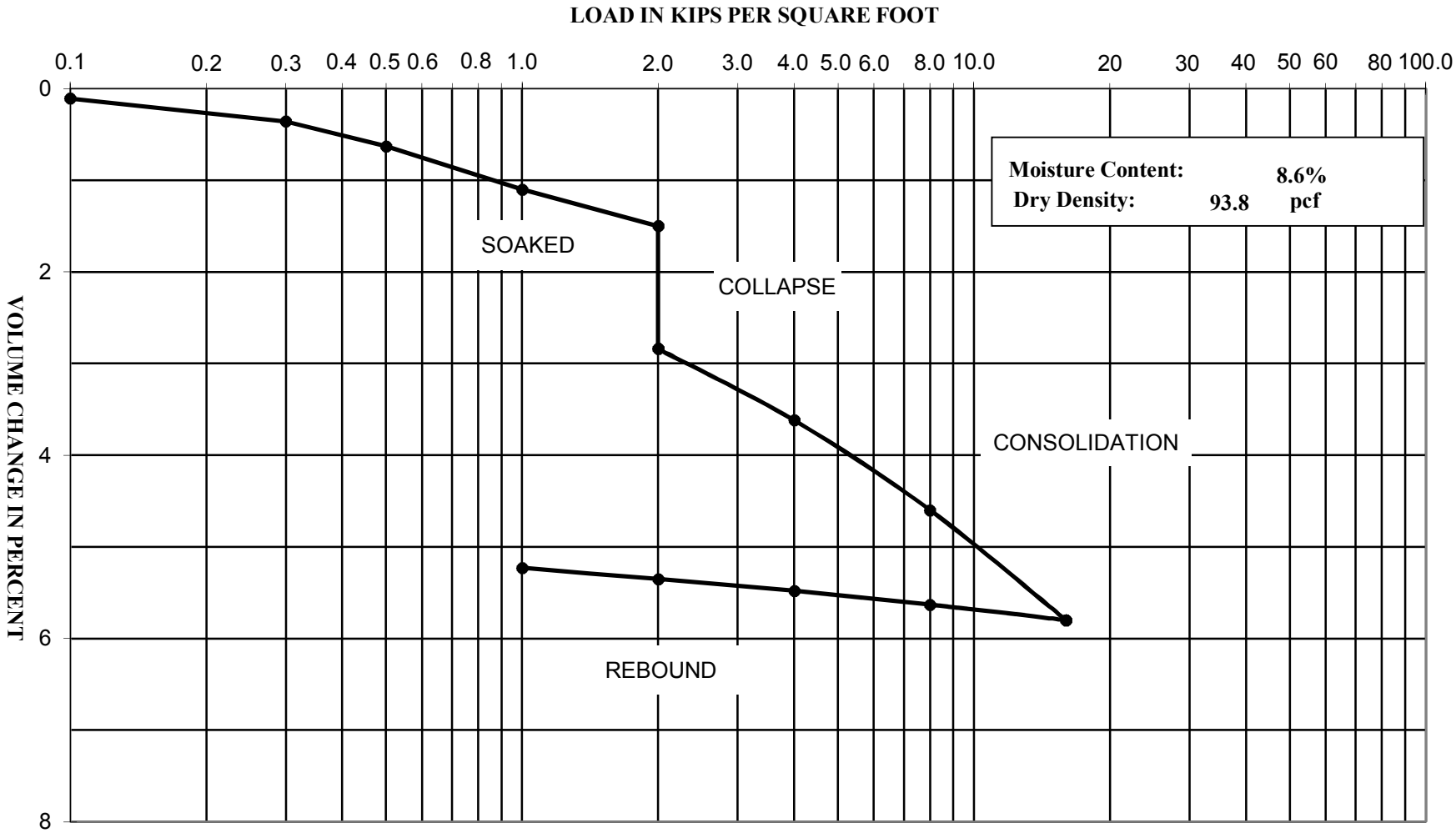
Figure B7
CONSOLIDATION - PRESSURE TEST DATA
ASTM D2435



Project Name: Kamm Avenue Pistachio Processing

Project Number: 19G-0194-1

Boring: B-6 @ 5.5'

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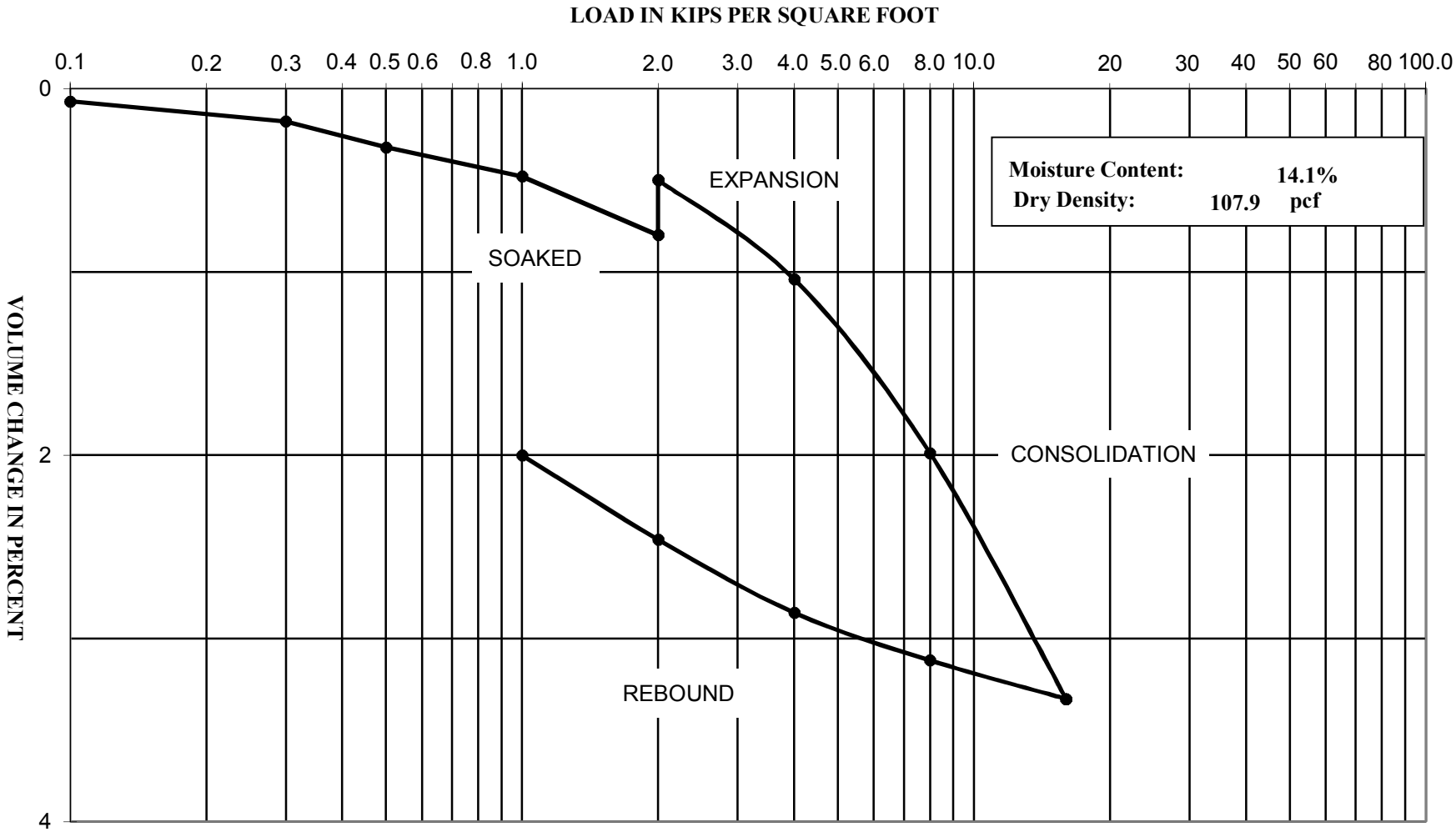
Figure B8
CONSOLIDATION - PRESSURE TEST DATA
ASTM D2435



Project Name: Kamm Avenue Pistachio Processing

Project Number: 19G-0194-1

Boring: B-10 @ 5.5'

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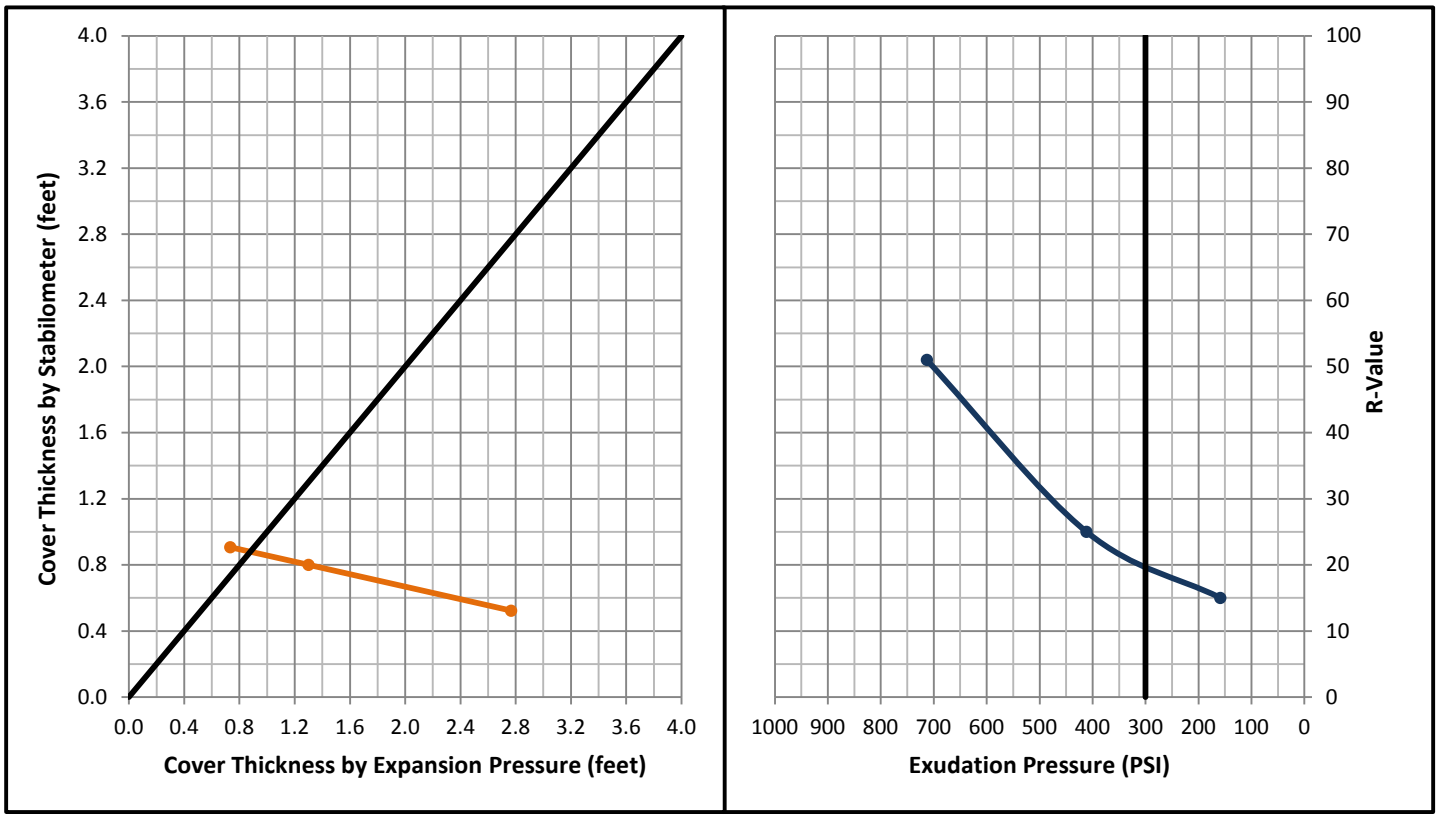
Figure B9
Laboratory Test Form | ASTM D2844
Resistance "R-Value" and Expansion Pressure of Compacted Soil

Sample Description: Clayey SAND, fine to medium grained, yellow brown

SPECIMEN	A	B	C
EXUDATION PRESSURE, LOAD (lb)	1996	5171	8955
EXUDATION PRESSURE, PSI	159	412	713
EXPANSION, * 0.0001 IN	22	39	83
EXPANSION PRESSURE, PSF	95	169	359
STABILOMETER PH AT 2000 LBS	123	103	55
DISPLACEMENT	3.50	4.42	4.1
RESISTANCE VALUE "R"	18	24	54
"R" VALUE CORRECTED FOR HEIGHT	15	25	51
% MOISTURE AT TEST	21.7	19.0	17.1
DRY DENSITY AT TEST, PCF	104.7	111.0	114.6
"R" VALUE AT 300 PSI EXUDATION PRESSURE	**20**		
"R" VALUE BY EXPANSION PRESSURE TI = 5.0, GF=1.50	**18**		



Project Number:	19G-0194-1/02	**Project Name:**	Kamm Avenue Pistachio Processing
Lab ID:	19-002422	**Test Date:**	6/3/2019
Sample Date:	5/29/2019	**Tested By:**	Ryan R.
Sampled By:	Megan S.	**Sample Location:**	B-1 @ 1' - 3'

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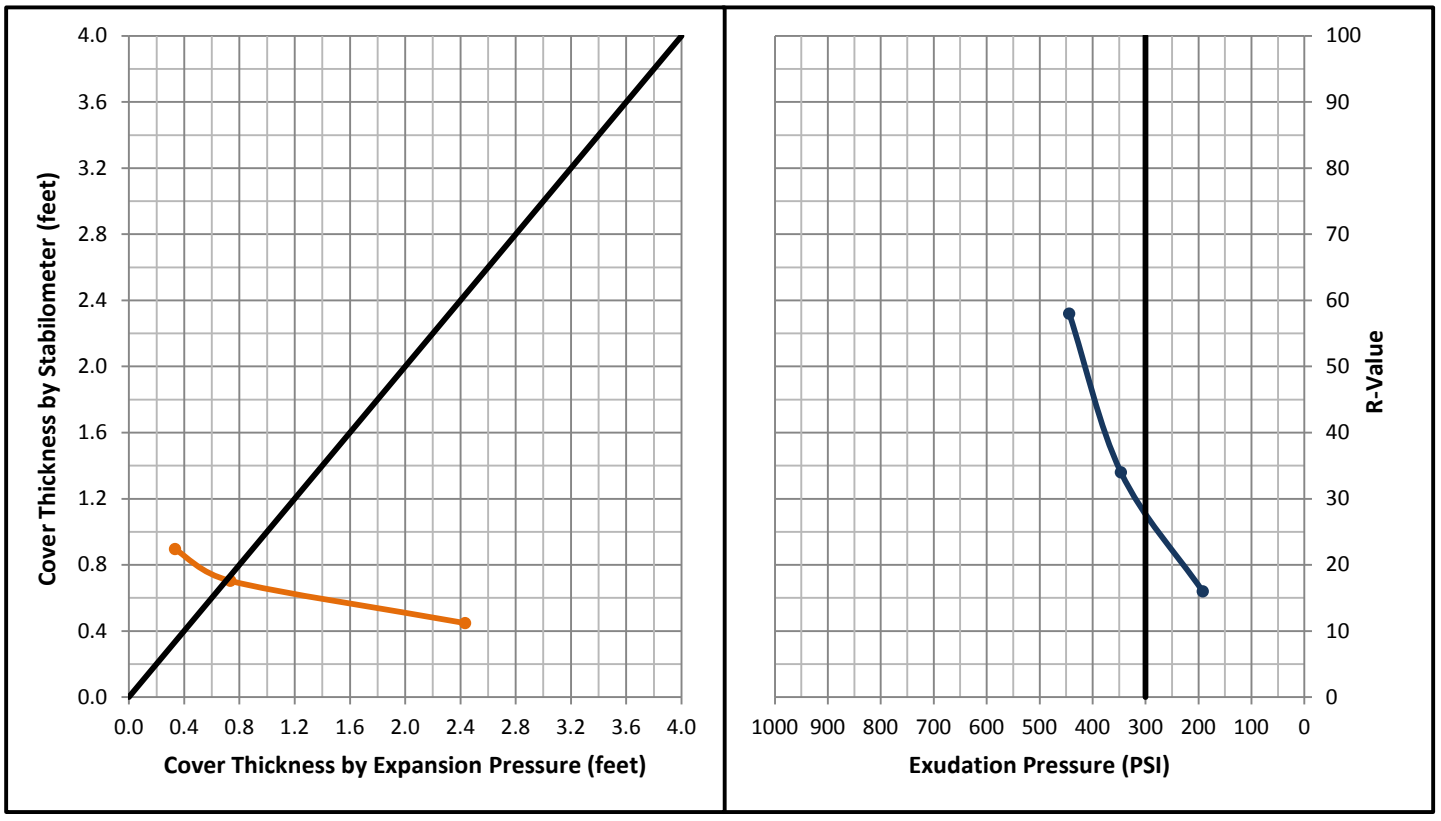
Figure B10
Laboratory Test Form | ASTM D2844
Resistance "R-Value" and Expansion Pressure of Compacted Soil

Sample Description: Clayey SAND, fine to medium grained, yellow brown

SPECIMEN	A	B	C
EXUDATION PRESSURE, LOAD (lb)	2412	4354	5581
EXUDATION PRESSURE, PSI	192	347	444
EXPANSION, * 0.0001 IN	10	22	73
EXPANSION PRESSURE, PSF	43	95	316
STABILOMETER PH AT 2000 LBS	121	90	57
DISPLACEMENT	3.55	3.70	3.34
RESISTANCE VALUE "R"	18	34	57
"R" VALUE CORRECTED FOR HEIGHT	16	34	58
% MOISTURE AT TEST	18.1	16.2	14.4
DRY DENSITY AT TEST, PCF	111.8	115.2	117.9
"R" VALUE AT 300 PSI EXUDATION PRESSURE	**27**		
"R" VALUE BY EXPANSION PRESSURE TI = 5.0, GF=1.50	**33**		



Project Number:	19G-0194-1/02	**Project Name:**	Kamm Avenue Pistachio Processing
Lab ID:	19-002419	**Test Date:**	6/3/2019
Sample Date:	5/29/2019	**Tested By:**	Ryan R.
Sampled By:	Megan S.	**Sample Location:**	B-10 @ 1' - 3'

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APPENDIX C

REFERENCES

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September 30, 2020 Project No. 19G-0344-0

Ms. Samantha Ens
Kamm Avenue Pistachio Plant, LLC
1306 W. Herndon Avenue
Fresno, California 93711

Subject: Addendum to Final Geotechnical Investigation Report
Kamm Avenue Pistachio Processing (KAPP)
Kamm Avenue, West of Hwy 33
Fresno County, California 93608

Dear Ms. Ens:

At your request, RMA GeoScience (RMA) has prepared this update to our Geotechnical Investigation Report prepared for the construction of Kamm Avenue Pistachio Processing on parcels described as APN 038-300-017S & APN 038-300-030S. In addition, the southwest portion of APN 038-300-030S will also be used for new construction, and an adjacent parcel to the west, APN 038-300-14S, will be used for activities described below.

Project Understanding

Based on recent e-mail exchanges and provided plans, this update provides our geotechnical opinion regarding the applicability of our geotechnical recommendations on construction and/or installation of the following: two water basins, dewatering/screening equipment, concrete pads. The new construction/installation will occur in the southwest portion of parcel APN 038-300-030S. We have referenced our previously completed Final Geotechnical Investigation Report, which was prepared by RMA GeoScience for the subject project.

A dewatering system, which will be built on the southeast portion of APN 038-300-030S, will include (2) 23' x 23' screen pads with equipment, conveyors, presses and augers, and concrete pavement. The basins will be approximately 450' x 450' each approximately 18 feet deep with side slopes no steeper than 2:1 (H:V). In addition, a 40' x 40' approximately 16' deep water basin will be constructed north of the dewatering equipment. Associated minor equipment and structures will be installed/constructed.

It is planned to use APN 038-300-14S for solid waste from crop harvest that will be trucked over to the site, dropped onto the ground and then disked in with the on-site soils. This will only be done during a 6-week harvest period. The site was vacant at the time of our visit as shown on the photo below.

Photo taken on September 25, 2020, from southwest corner of APN 038-300-14S looking northwest.

Conclusions and Recommendations

Based on specific data and information contained in this report, our understanding of the project, and our geotechnical engineering experience, it is our professional judgment that the additional construction described in above Project Understanding is geologically and geotechnically feasible.

RMA should be contacted to provide observation and testing during the earthwork for the construction/installation of the above mentioned structures.

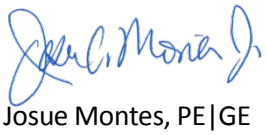
Closing Remarks

The findings, conclusions and recommendations in this addendum were prepared in accordance with generally accepted geotechnical engineering principles and practices. No other warranty, either express or implied, is made. This report has been prepared for KAPP to be used for the design and construction of the subject project. Anyone using this report for any other purpose must draw their own conclusions regarding required construction procedures and subsurface conditions.

The geotechnical and geologic consultant should be retained during the earthwork and foundation phases of construction to monitor compliance with the design concepts and recommendations, and if warranted, to provide additional recommendations. Should subsurface conditions be encountered during construction that are different from those encountered in our investigation and described in this report, this office should be notified immediately so that our recommendations may be re-evaluated. If you have any questions regarding this addendum, please contact the undersigned at your convenience.

Respectfully submitted,

RMA GeoScience



Josue Montes, PE|GE
Principal Geotechnical Engineer

Distribution: Addressee (one pdf copy to Samantha.Ens@touchstonepistachio.com)
Mr. Tony Gaytan, Morris General Contracting (pdf copy to Tony@morrisgeneralinc.com)

Appendix F

Hydrology/Water Quality Analysis

Kamm Avenue Pistachio Processing, LLC

Hydrology & Water Quality CEQA Analysis

For Proposed Kamm Avenue Pistachio Processing Project

Fresno County, California
October 2020

Prepared for:

Kamm Avenue Pistachio Processing, LLC
1306 W Herndon Avenue, Ste. 108, Fresno CA 93711

Prepared by:

Provost & Pritchard Consulting Group
130 N. Garden Street, Visalia, California 93291

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Report Prepared by:

Provost & Pritchard Consulting Group

- Dawn E. Marple, Principal Planner, Project Manager
- Mary E. Beatie, Senior Planner
- Calvin Monreal, PE CA #65453, Senior Engineer
- Debora De La Torre, EIT, Assistant Engineer
- Jackie Lancaster, Project Administrator

Table of Contents

1 Introduction 1-1

1.1 Project Overview 1-1

1.2 Project Location 1-2

1.3 Hydrological and Water Quality Components of Project 1-7

1.3.1 Surface Stormwater Run-off Generation and Containment 1-7

1.3.2 Irrigation Reuse Water Use 1-10

1.3.3 Green Waste Land Application 1-10

1.3.4 Existing Conditions 1-10

1.3.5 Flood Zones 1-11

1.3.6 Soils 1-11

2 Impact Analysis 2-1

2.1 Baseline Conditions 2-1

2.2 Effects on Water Quality Standards, Waste Discharge Requirements and Groundwater Management. 2-1

2.2.1 Regulatory Setting 2-1

2.2.2 Project Impact Analysis 2-6

2.3 Effects on Groundwater Supplies and Groundwater Recharge for Sustainable Groundwater Management of the Basin 2-9

2.3.1 Regulatory Setting 2-9

2.3.2 Project Impact Analysis 2-10

2.4 Effects on Existing Drainage Pattern of the Site or Area and Potential Release of Pollutants From Site Inundation 2-10

2.4.1 Regulatory Setting 2-10

2.4.2 Project Impact Analysis 2-11

2.5 Conflict with or Obstruct Implementation of a Water Quality Control Plan or Sustainable Groundwater Management Plan? 2-13

2.5.1 Regulatory Setting 2-13

2.5.2 Project Impact Analysis 2-14

List of Tables

Table 1: Existing Runoff at Site of Proposed Process Plant 1-7
Table 2: Change in Proposed Runoff at Site of Proposed Process Plant 1-7

List of Figures

Figure 1: Project Location 1-3
Figure 2: Water Connection to Project Site 1-4
Figure 3: Project Improvements Layout by APN 1-6
Figure 4: Site Surfacing Map 1-8
Figure 5: FEMA Flood Zones and Topo Map 1-9
Figure 6: Soils Map 1-12

1 Introduction

Provost & Pritchard (P&P) has prepared this technical report evaluating the Kamm Avenue Pistachio Processing Project (KAPP and Project) potential impacts under each of the Hydrology and Water Quality topical areas in Appendix G of the CEQA Guidelines (HWQ Report) in support of the Draft EIR (DEIR) for the Project being prepared by Fresno County (CEQA Lead Agency) and the County's CEQA consultants.

1.1 Project Overview

The Project is proposed by Kamm Avenue Pistachio Processing LLC (Applicant). The Applicant has applied to the Fresno County Department of Public Works and Planning (County) for a Conditional Use Permit, a height variance, a Site Plan Review to construct, operate and maintain a pistachio processing plant.

The Project facility has the capacity to process up to 60 million pounds of raw pistachios per year. The Project will exclusively use surface water for all operations, including CVP and supplemental surface water provided under contracts with pistachio growers operating approximately 2,556 irrigated acres in the Project area, and, if needed, CVP water stored in the Semitropic Water Bank available for use under an agreement with a water banking participant in exceptionally dry water years. The Project's process water demand will be approximately 65.4 million gallons (200.7 acre-feet per year-AFY), most of which will occur during the 6-week harvest period and be used in the hulling process. Hulling operations would require up to 1.8 million gallons (5.5 acre-feet) per day. All process water will be chlorinated as required for food processing purposes in a large intake tank. About 2.725 million gallons (8.4 acre-feet) per year of water will be treated to meet domestic water quality standards in an onsite facility and be used for process equipment, storage bin, and silo washing and by onsite employees. Total annual water demand will be about 68.1 million gallons (209 acre-feet).

Approximately 80 percent to 90 percent of water used by the Project will be recaptured, cleaned, then stored in two settling ponds on the southern border of the site, and conveyed for irrigation reuse to growers operating approximately 2,556 irrigated acres in the Project area. At a 90 percent recovery rate, approximately 58.8 million gallons per year, a maximum of 1.62 million gallons per day, and a seasonal average of about 1.4 million gallons per day of irrigation reuse water would be discharged to the settling ponds and used for irrigation on adjacent pistachio orchards.

Project operations will generate approximately 13 million pounds of hulling residue, 5 million pounds of precleaning twigs, leaves and similar pistachio tree materials, and 6 million pounds of empty pistachio shells per year. The hulling residue will be conveyed with recaptured process water from the facility to equipment located just north of the settling ponds and pressed to a moisture content of about 12 percent. The Project will market shell, precleaning and hulling residue solids for beneficial reuse. Almost all hulling residue will be conveyed offsite for beneficial reuse as feedstock for dairies. Shells and precleaning solids that are not sold for beneficial reuse will be shredded, if necessary, and deposited in locations outside of the mapped floodplains on an adjacent 160-acre solid materials management site or in unused locations of the 315-acre facility site south of the processing facility fence line and north of the settling ponds.

The site will be developed with administrative and pistachio process-related facilities, on-site parking, shop, two each scale houses and truck scales, storage silos, irrigation reuse water filters, screens and storage basins for future irrigation reuse water, domestic and fire flow water storage and appurtenant delivery devices, on-site storm water run-off storage basin and associated piping and appurtenances.

The Project would operate year-round to package and process harvested pistachios, shells and hulls for retail and wholesale customers. During an approximately 6-week harvest period, which typically occurs during August to October, there will be an additional team of with 60 employees seven days a week and 24 hours per day to receive, hull, heat, dry and store pistachio crops in onsite storage silos. During non-harvest operations, the Project will operate two shifts per day.

The Project will construct approximately 40 acres (1.7 million square feet (msf)) of various impervious surfacing that will result in stormwater run-off not currently occurring on the site. An appropriately designed and sized stormwater detention basin is proposed to capture this run-off and hold it on site for recharge to the groundwater.

1.2 Project Location

The site of the Project comprises approximately 475 acres, within Section 23, Township 16S and Range 14E on the Central Valley floor in western unincorporated Fresno County, California, between the California Aqueduct and Interstate 5 (I-5) (see **Figure 1**). The unincorporated community of Three Rocks, a US. Census designated place with a population of approximately 250, is located approximately 1.5 miles to the south of the Project facility's primary pistachio hulling and processing equipment to be located on the northerly-most 80 acres of the 475-acres. The nearest major roadway intersection to the Project site is West Kamm Avenue and State Route 33, approximately one mile to the east. I-5 is located approximately 2.5 miles west along Kamm Avenue. I-5 runs essentially north-south along the eastern toe of Coastal Range foothills. The California Aqueduct is approximately 1 mile north of the Project site. The general latitude and longitude for the Project site is 36.523532° and -120.411545°. The Project lies within the "Levis" California, U.S. Geological Survey (USGS) 7.5-minute quadrangle map.

Central Valley Project (CVP) water and other surface water supplies are provided to the Growers by WWD from an existing turnout (Lateral 10R) near mile post marker 124.16R along the California Aqueduct, essentially due north of the Project site. An existing 36-inch diameter steel pipeline from the California Aqueduct connects to an existing 34-inch diameter steel pipeline near Kamm Avenue. The 34-inch pipeline extends south of Kamm Avenue along the eastern border of the Project site. The turnouts and pipelines are part of and connected with the existing water supply and distribution network used by the area Growers. A lateral 15-inch connection from the 34-inch pipeline on the border of the Project will be constructed to deliver water for Project use. The Project location, the existing pumps and pipelines from the California Aqueduct to the Project site, and the approximate location of the proposed Project connection with the adjacent pipeline are shown in **Figure 1** & **Figure 2**.

Figure 1: Project Location

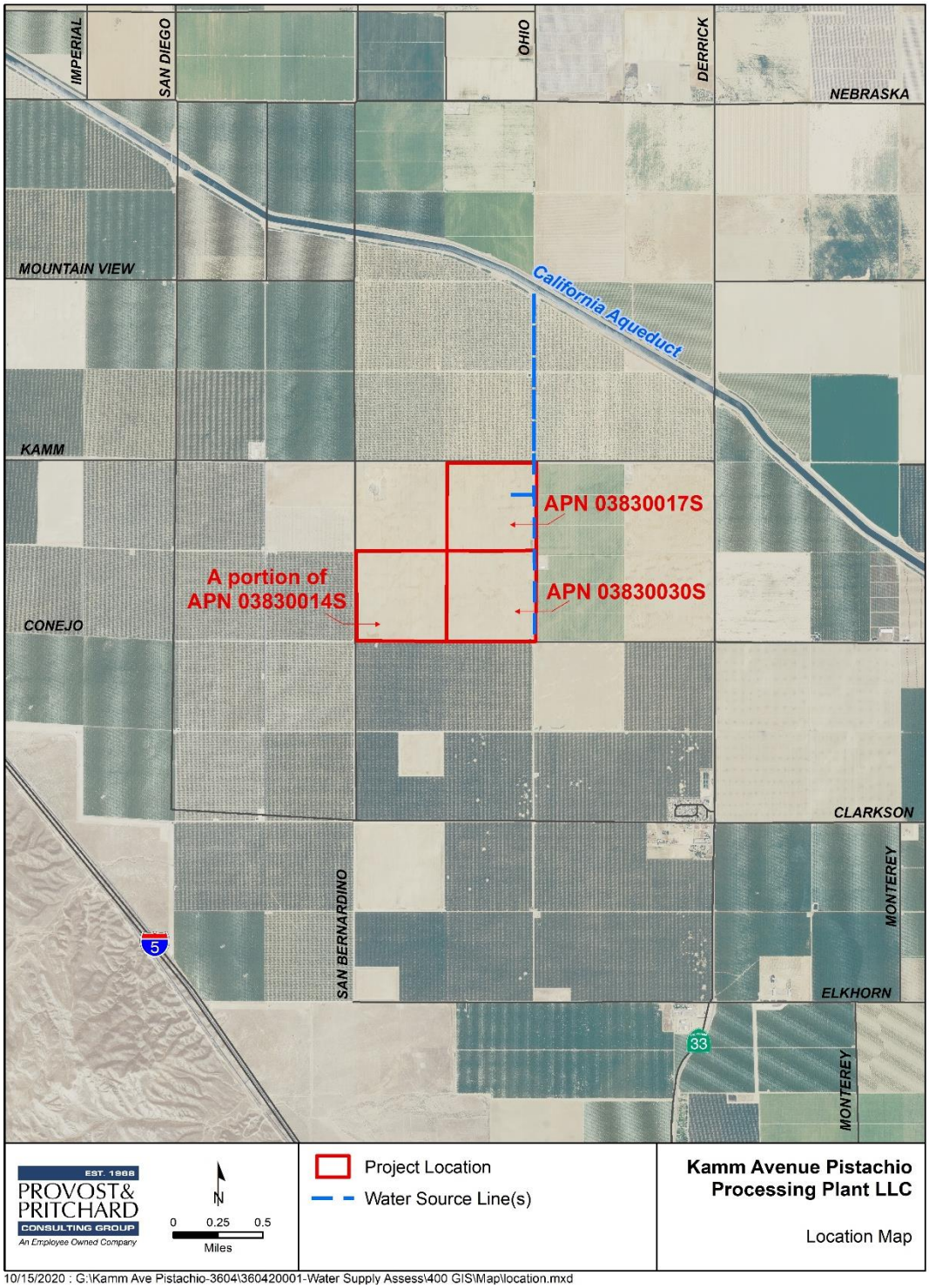
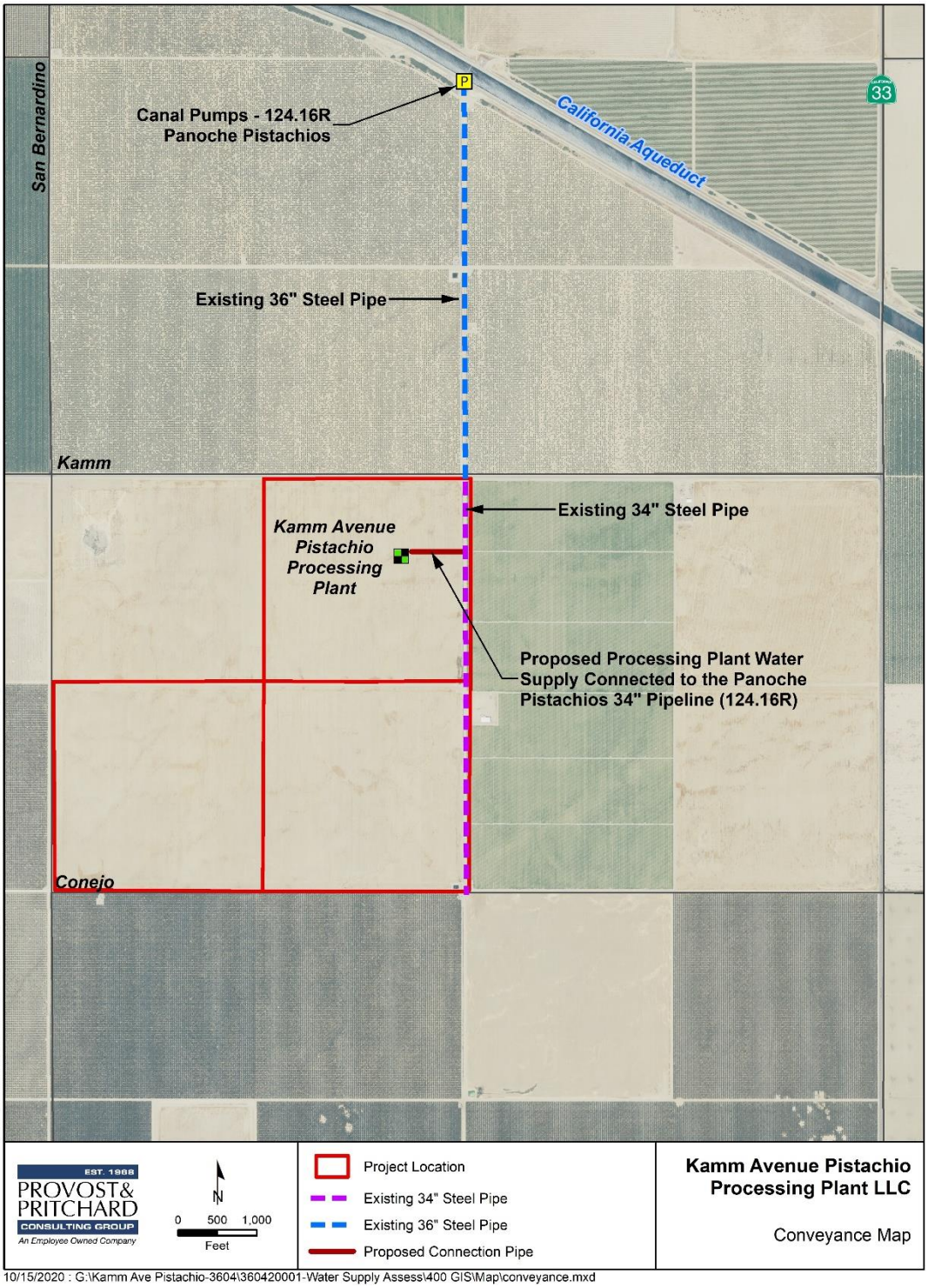


Figure 2: Water Connection to Project Site

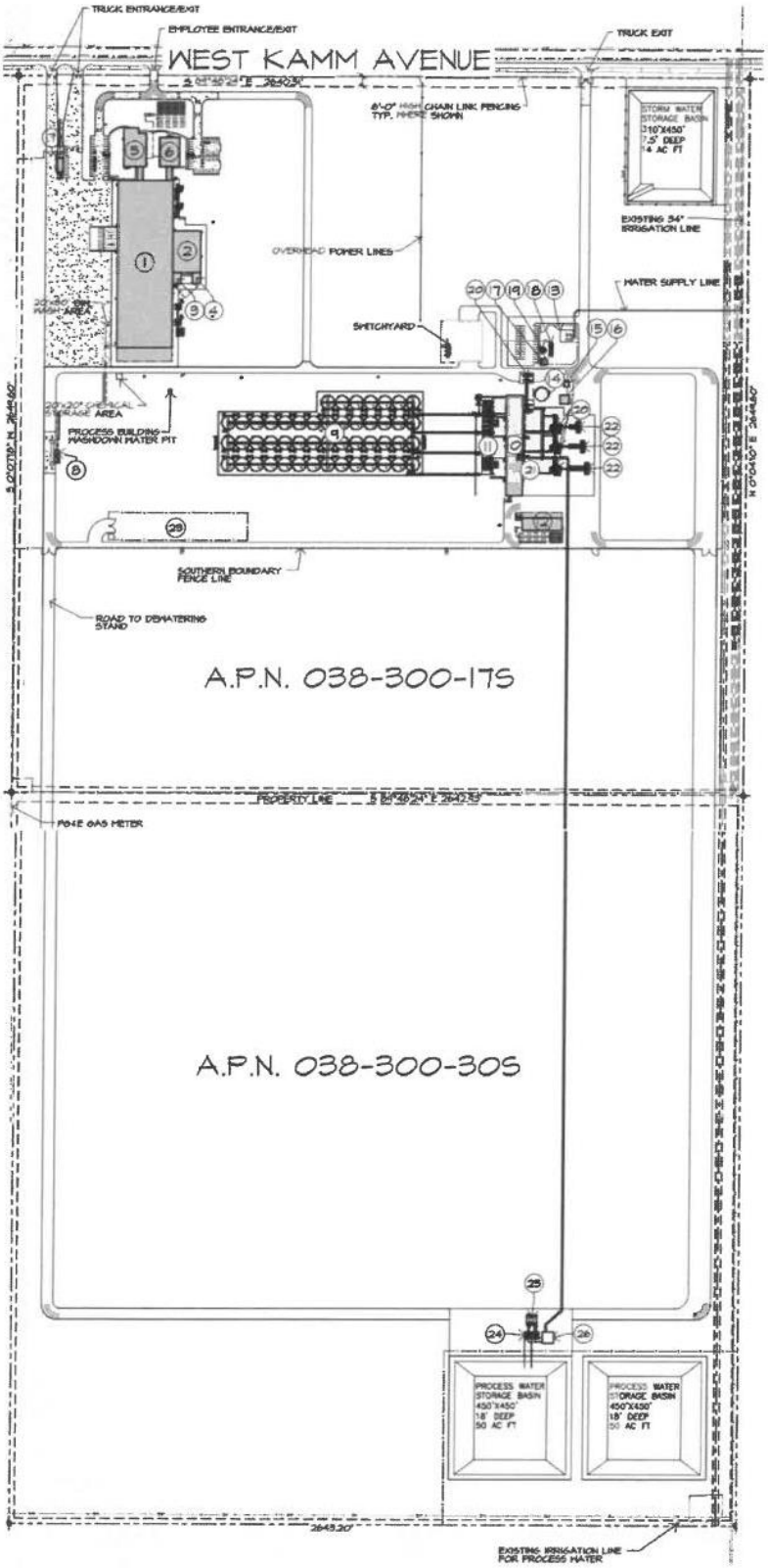


The Project processing facilities will be built on portions of Assessor's Parcel Number (APN) 038-300-17S and 038-300-30S (see **Figure 3**). The 80-acre main processing plant will be located on the northern half of APN 038-300-17S, a 155.8-acre parcel. Access roads, an underground irrigation reuse water conveyance pipeline, and two lined irrigation reuse water settling and cleaning ponds with appurtenant dewatering and pumping equipment will be located on portions of the southern half of APN 038-300-30S, a l60-acre parcel. Approximately 135 acres of the combined 315.8-acre parcels to the east would be used for the Project's processing facilities.

Almost all of the 13 million pounds per year of hulling residue per season will be beneficially reused in offsite locations. The Project will also market for beneficial reuse relatively inert shells (up to 6 million pounds per year) and precleaning twigs, stems, leaves (up to 5 million pounds per year).

Materials that are not beneficially reused will be shredded and placed in non-floodplain portions of the roughly 160-acre southerly half of APN 038-300-14S parcel and in unused portions of the 315 acre areas south of the main facility fence line and outside of the two settling ponds on APNs 038-300-17S and -30S. The potential coverage in years when demand is low for these materials is estimated to be approximately 8 acres at ½-foot in depth. The available land area for such coverage can be utilized to change the area and depth of coverage.

Figure 3: Project Improvements Layout by APN



1.3 Hydrological and Water Quality Components of Project

1.3.1 Surface Stormwater Run-off Generation and Containment

The Project proposes to construct a total of approximately 40 acres (1.7 million sq. ft.) of new impervious surfaces (structures/roofs, ground surfacing of asphalt and concrete) and approximately 76 acres of pervious landscape soil/grass within the 315.5-acre site. Approximately 200 acres of the 315.5-acre site will remain as existing bare soil/tilled ground with no changes proposed by the Project.[1] **Table 1 and Table 2** below show calculations for Existing runoff and Proposed Runoff respectively. The impervious surfaces are also depicted on **Figure 4** following the tables.

Table 1: Existing Runoff at Site of Proposed Process Plant

Existing Runoff					
Description of Area	**Area, ft²**	**Area, acres**	**Volume, ft³**	**Volume, yd³**	**Volume, acre-ft**
Bare Dirt	13,754,506	315.8	1,031,588	38,207	24

Table 2: Change in Proposed Runoff at Site of Proposed Process Plant

Proposed Runoff							
Description of Area	**Runoff Coefficient, C**	**Area, ft²**	**Area, acres**	**Rainfall Intensity, I**	**Volume Req., ft³**	**Volume Req., yd³**	**Volume Req., acre-feet**
Asphalt Concrete (Parking Area & Driving Paths)	0.7	1,023,586	23.50	0.5	358,255	13,269	8
Concrete	0.8	511,000	11.73	0.5	204,400	7,570	5
Roofs	0.8	204,369	4.69	0.5	81,748	3,028	2
Subtotal Impervious Areas		**1,738,955**	**40**	**0.5**	**644,403**	**23,867**	**15**
Pervious Landscape Soil & Grass	0.15	3,734,088	86	0.5	280,057	10,372	6
Total Basin Volume		**5,473,043**	**126**		**924,459**	**34,239**	**21**

[1] Because the Project proposes no change in run-off conditions for these 200 acres, they are not included in the calculation of run-off resulting from the Project in Table 2.

Figure 4: Site Surfacing Map

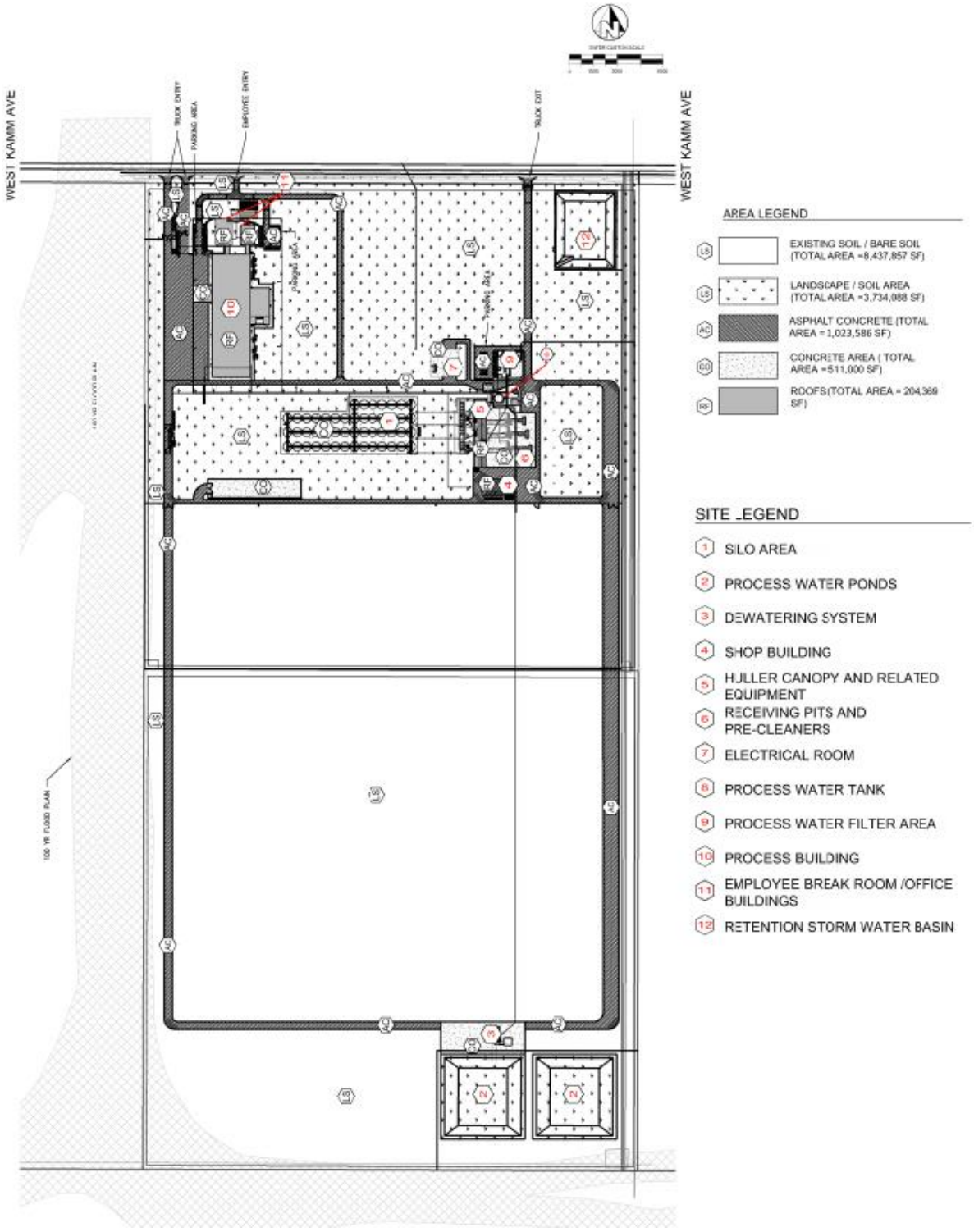
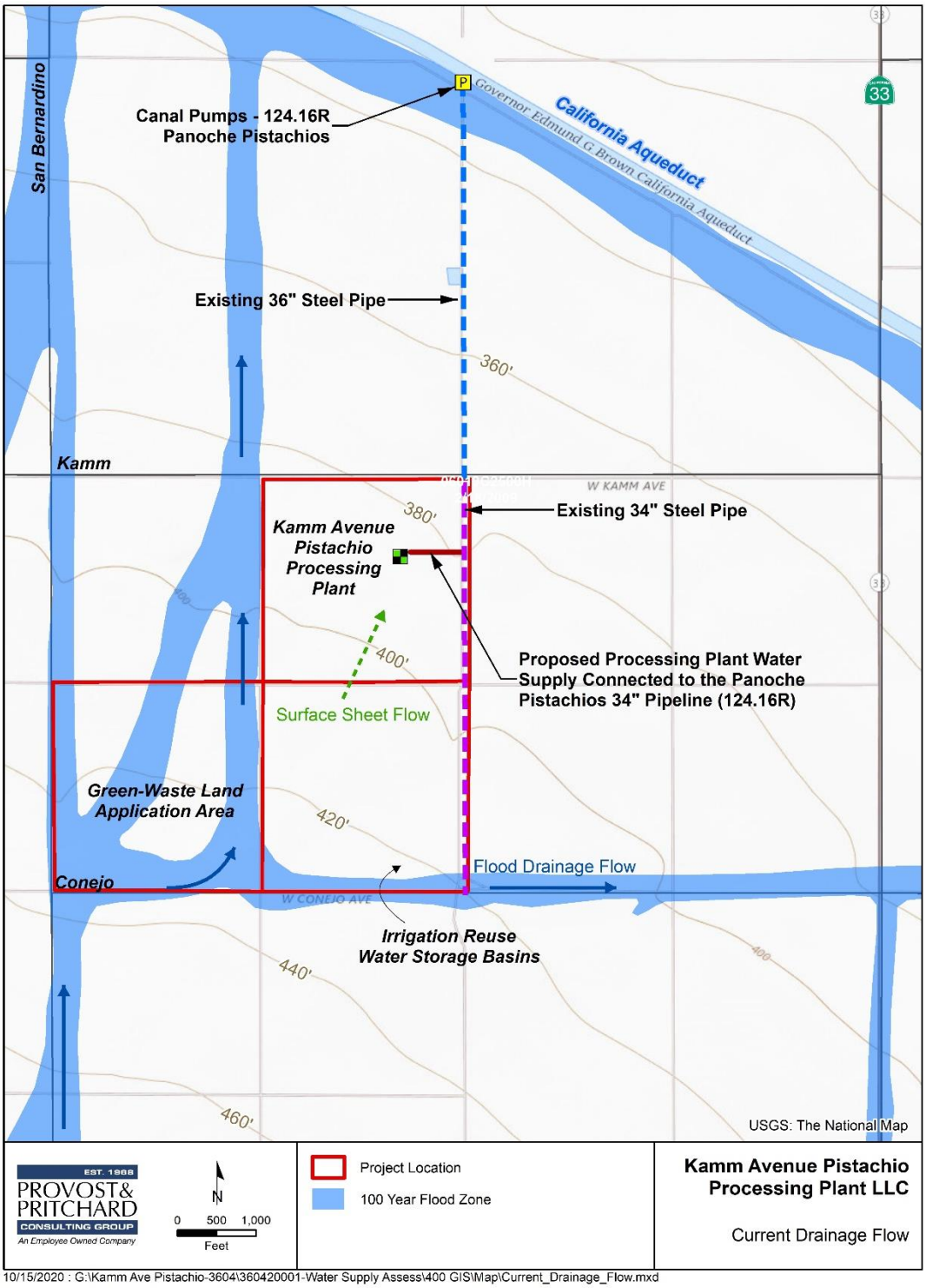


Figure 5: FEMA Flood Zones and Topo Map



Based on current site topography as illustrated in **Figure 5** above, the site currently slopes generally to the northeast.

To take advantage of the site's current aspect, a storm water collection basin is proposed in the northeast corner of the northerly 80-acre portion of the Project site, in close proximity to the majority of the proposed main impervious Project processing facilities. The basin will be designed to hold all Project-generated on-site run-off.

The Project's new impervious surfaces will result in approximately an additional 15 acre-feet per year (AFY) of surface run-off. Using the rational method areas were calculated for each proposed impervious surface type, which included asphalt, concrete, and roofs. Impervious areas for the Project comprise approximately 40 acres. Pervious surface including areas proposed as landscape soil/grass comprise approximately 76 acres of the 315.5-acre Project site. Fresno County design standards for permanent retention basins were utilized in calculating the proposed runoff. A rainfall intensity (I) of 0.50 was utilized and runoff coefficients for each specific proposed area of Project improvements were obtained as shown in the tables above. A total of 15 AFY of runoff water will be produced by the proposed 40-acre impervious improvements and an additional 6 AFY of runoff water will be produced by the pervious landscape soil/grass area improvements; thus, requiring a basin retention volume storage of approximately 21 acre-ft.

1.3.2 Irrigation Reuse Water Use

Most of the Project's water demand will occur during the 6-week harvest period, typically in September and October, and will be used in the hulling process. Hulling operations would require up to 1.8 million gallons (5.5 acre-feet) per day and a total of 64.9 million gallons (199.3 acre-feet) per harvest each year. A supply of 100,000 gallons (0.3 acre-feet) for fire suppression purposes will be maintained onsite in accordance with Fresno County Fire Department requirements. Approximately 350,400 gallons (1.07 acre-feet) would be also be used for onsite irrigation. Total Project irrigation reuse water demand will be approximately 65.4 million gallons (200.7 acre-feet) per year.

Most of the domestic water demand will be used for process equipment washing, which will occur 60 times per year. Process equipment washing will require 2,125,000 gallons (6.5 acre-feet) of domestic water per year. Bins used to store work in progress product will be washed 4 times per year, and storage silos will be washed once per year. These activities will require approximately 285,000 gallons (0.9 acre-feet) of domestic water per year. Employee consumption will require approximately 315,000 gallons (1.09 acre-feet) of domestic water per year.

1.3.3 Green Waste Land Application

Project operations will generate approximately 6 million pounds of pistachio shells and 5 million pounds of precleaning twigs, leaves and other pistachio tree remnants per year. Hulling residue will be conveyed with recaptured process water from the facility to equipment located just north of the settling ponds and pressed to a moisture content of about 12 percent. About 13 million pounds of pressed hulling residue will be produced each year. The Project will market shell, precleaning and hulling residue solids for beneficial reuse. Almost all hulling residue will be conveyed offsite for beneficial reuse as feedstock for dairies. Shells and precleaning solids that are not sold for beneficial reuse will be shredded, if necessary, and deposited in locations outside of the mapped floodplains on an adjacent 160-acre solid materials management site or in unused locations of the 315-acre facility site south of the processing facility fence line and north of the settling ponds.

1.3.4 Existing Conditions

The Project site is designated as Exclusive Agriculture in the Fresno County General Plan and zoned AE-20, Exclusive Agriculture, 20-acre minimum required. The site is located in the Westlands Water District. The Project parcels are owned by Ventana South and were acquired in 2011. The parcels have not been used for

commercial agricultural purposes since they were acquired. Historical records indicate that that the northern parcel, APN 038-300-17S, has not been used for agriculture since at least 2009. The southern parcel, APN 038-300-30S, has not been used for agriculture since 2006. The westerly parcel, APN 038-300-14S, has not been used for agriculture since 2006. None of the three parcels are identified as prime, statewide important, or unique farmland by the California Department of Conservation Farmland Mapping and Monitoring Program (FMMP). The current FMMP map for Fresno County identifies the Project site as farmland of local importance, which includes all farmable lands within the County that do not meet the definitions of prime, statewide, or unique and land that is or has been used for irrigated pasture, dryland farming, confined livestock and dairy, poultry facilities, aquaculture and grazing. APN 038-300-17S and the western 80 acres of APN 038-300-30S are subject to existing Williamson Act Contract No. 365. The eastern 80 acres of APN 038-030-30S are subject to existing Williamson Act Contract No. 1839. Notices of nonrenewal were filed with the County for the portions of these Williamson Act contracts applicable to the Project site on September 20, 2019.

The Project area was evaluated by a qualified biologist in April 2019. The evaluation found that the site was characterized by barren land, including plowed fields and roads with no vegetation, and areas characterized with annual non-native forbs and grasses. No shrubs, trees or jurisdictional wetlands or waters are located on the Project site. Due to the highly disturbed nature of the site from prior years of agricultural use, no special status plants have the potential to occur in the Project area. The biological evaluation also concluded that the site provides marginal or low habitat value for the few potential special status terrestrial or avian species that could occur, including the kit fox, burrowing owls and mountain plover. In late 2019, grading, excavation, foundation installation, crushed asphalt deposition and the placement of two storage silos and other structures occurred, primarily within the northern 80 acres of APN 038-300-17S.

Existing land uses surrounding the Project site consist of agricultural land, including thousands of acres of pistachio orchards owned and operated by affiliated entities that would be served by the proposed processing facilities. Approximately 320 acres of non-irrigated agricultural land is located to the west of the site (APN 038-300-14S). The FMMP map for the County identifies areas to the north, east and west as prime agricultural land, most of which is planted with pistachio trees. A solar power generation facility is located approximately 2 miles northeast of the site. The California aqueduct is located approximately 1 mile north. A water pipeline extends from an existing turnout in the Aqueduct along the eastern border of the site. A metered connection will be installed on the pipeline to provide water for the Project. Residential and related commercial land uses are located in Three Rocks, approximately 1.5 miles southeast of the main Project processing facilities. An existing electrical power line extends from the Giffen Substation operated by PG&E east to State Route 33, south to Kamm Avenue, and then going east along the northern border of the site.

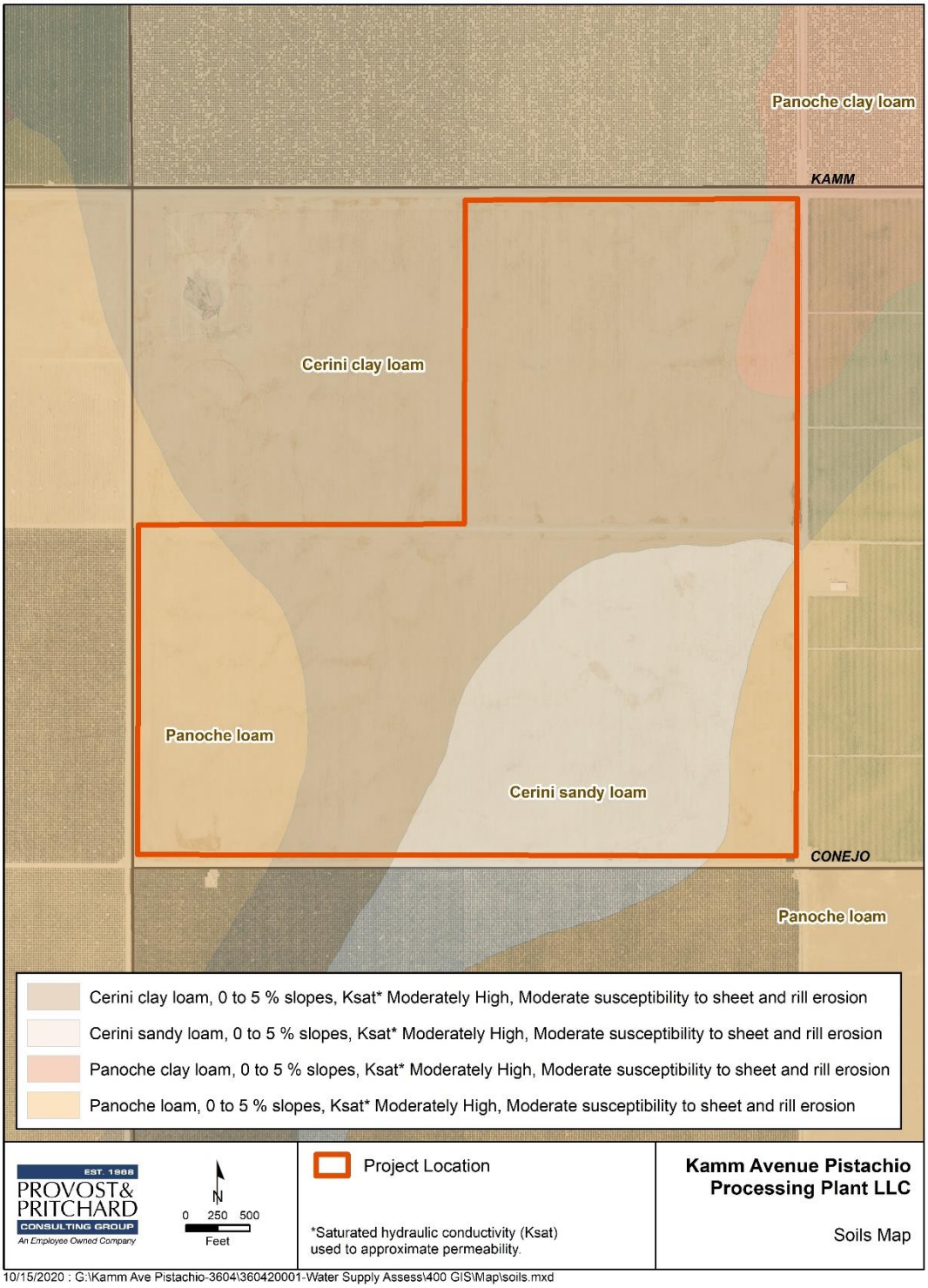
1.3.5 Flood Zones

As shown in **Figure 5** above, the Federal Emergency Management Agency (FEMA) has classified Flood Zones for the proposed project site and surrounding area. FEMA's Flood Insurance Rate Map (FIRM) has been superimposed over the proposed project site boundary. Portions of the Project lie within a Special Flood Hazard Zone (SFHZ) "A," which defines areas that are subject to inundation by the 100-year flood. Generally, there are no special requirements for non-occupied structures proposed within SFHZ "A." Base Flood Elevations are not calculated for areas designated Zone "A".

1.3.6 Soils

As shown on **Figure 6** below, soils across the Project site consist predominately of Cerini sandy- and clay-loams, and Panoche clay-loam and loam all on slopes of 0-5%. All four soil types exhibiting characteristics of moderately high permeability and moderate susceptibility to sheet and rill erosion.

Figure 6: Soils Map



2 Impact Analysis

This report has been prepared consistent with California Environmental Quality Act Appendix G Environmental Checklist Form part *X. (a. - e.) Hydrology and Water Quality*.

Available resources utilized to conduct preliminary analysis of the Project include:

1. Kamm Avenue Pistachio Processing Project, project description, provided by Applicant to Provost & Pritchard.
2. "On-site Stormwater Retention System" prepared by TriCity Engineering, date provided April 28, 2020.
3. "Kamm Avenue Water Supply Analysis", prepared by Provost & Pritchard, dated Sept. 21, 2020.
4. "Improvement Standards for Fresno County" October 1966, Fresno County Public Works & Development Services Department.
5. "Run-off Area Calculations", prepared by Provost & Pritchard, dated July 21, 2020.

2.1 Baseline Conditions

The Project site currently lies within the Westlands Water District, situated over the Westlands groundwater Basin. The site is currently fallow and uses no CVP surface water or groundwater to irrigate.

2.2 Effects on Water Quality Standards, Waste Discharge Requirements and Groundwater Management

2.2.1 Regulatory Setting

2.2.1.1 Federal Clean Water Act

The Federal Clean Water Act (CWA) 33 U.S.C. 1251-1387 originated in 1899 with the Rivers and Harbor Act. Since that time, the CWA has been modified by several amendments, notably, the Federal Water Pollution Control Act of 1972 (P.L.92-217), the Clean Water Act of 1977 (P.L. 95-217), and the Water Quality Act of 1987(P.L. 100-4). The federal Environmental Protection Agency (EPA) oversees the enforcement of the Clean Water Act but the EPA has delegated authority and enforcement to some states, including California.

The Clean Water Act's objective is "to restore and maintain the chemical, physical, and biological integrity of the Nation's waters." Discharge of pollutants into any navigable waters of the United States is prohibited, except within some provisions of the Clean Water Act. Pollutants include anything introduced from the outside world, or an increase in a material that is already present. This includes erosion of natural material into a watershed in excess of that which naturally occurs.

The Clean Water Act's jurisdiction includes Congress's authority to protect the flow of interstate commerce. One component is to protect navigable waters of the United States. The Clean Water Act defines "Navigable Waters" as "waters of the United States." Under the regulation of the EPA, "waters of the United States" includes the following:

1. All waters that are currently used, were used in the past, or may be susceptible to use in the future, in interstate or foreign commerce, including all waters that are subject to flow of the tide;
2. All interstate waters, including interstate "wetlands";

3. All other waters such as intrastate lakes, rivers, streams (including intermittent streams), mudflats, sand flats, wetlands , sloughs, prairie potholes, wet meadows, playa lakes, or natural ponds of which the use, degradation, or destruction would affect or could affect interstate or foreign commerce;
4. All impoundments of waters otherwise defined as waters of the United States under this definition;
5. Tributaries of waters identified in 1–4 of this definition;
6. The territorial seas; and
7. "Wetlands" adjacent to waters identified in 1–6 of this definition.

2.2.1.1.1 *Permitting and Compliance Under Federal Clean Water Act (CWA) Laws*

The CWA contains a broad range of policies that help meet its objectives, including the following:

1. Section 301 of the CWA. Prohibits discharges of pollutants, except as provided by the CWA.
2. Section 401 of the CWA. Requires any activity, which may result in any discharge into navigable water, to provide certification to the appropriate State Agency, and that any such discharge will comply with the applicable provisions of the CWA. In California, the enforcing agency is the applicable RWQCB.
3. Section 402 of the CWA. establishes a framework for regulating municipal and industrial discharges of storm water into waters of the United States under the National Pollution Discharge Elimination System (NPDES) permit program. The latest update to the NPDES program (referred to as Phase II rule – effective December 8, 1999), requires permitting for construction activity that disturbs land greater than or equal to one acre.
4. Section 404 of the CWA. Section 404 of the Clean Water Act requires a permit for the discharge or placement of dredge or fill material within "jurisdictional waters", or waters of the United States. This permit is issued by the United States Army Corps of Engineers (USACE).

   Jurisdiction of the Clean Water Act is limited to "waters of the United States" (often referred to as "jurisdictional waters"). The SWRCB defers determination of federal "jurisdictional waters" to the USACE. The United State Army Corps of Engineers will perform a Jurisdictional Determination to determine if storm water runoff from the project could reach waters of the United States. In addition, the USACE will determine if a 404 Permit is required.

5. National Pollution Discharge Elimination System (NPDES). The federal regulations for the process allow two permitting options for construction stormwater discharges: Individual, and General Permit. The California State Water Resources Control Board (SWRCB) has been delegated jurisdiction over water quality issues in the State of California. The SWRCB is governed by the Porter-Cologne Water Quality Act (Division 7 of the California Water Code), which establishes the legal framework for water quality control activities by the SWRCB. The SWRCB has opted to require one statewide Construction General Permit (called NPDES No. CAS000002) to cover all construction activity in the State of California, except on Tribal Lands, projects undertaken by the California Department of Transportation, and projects within the Lake Tahoe Hydrologic Unit. These exceptions are regulated under their own separate permits.

   The Central Valley Regional Water Quality Control Board (CVRWQCB) administers the federal storm water-permitting program in the Central Valley region. Construction activities on one acre or more are subject to the permitting requirements of the NPDES General Permit for Discharges of Storm Water Runoff Associated with Construction Activity (General Construction Permit). Additionally,

CVRWQCB is responsible for issuing Waste Discharge Requirements Orders under California Water Code Section 13260, Article 4, Waste Discharge Requirements.

The project site is, therefore, covered under the State's *Construction General Permit* (provided the provisions of the permit are followed).

The State *Construction General Permit* requires that all construction activity, which disturbs one or more acres, is subject to the following requirements:

1. Develop and implement a Storm Water Pollution Prevention Plan (SWPPP). The SWPPP must specify BMPs to prevent construction pollutants from mixing or contacting storm water and keeping all products of erosion from moving off site into receiving waters.
2. Eliminate or reduce non-storm water discharges to storm sewer systems and other waters of the United States.
3. Perform inspections of BMPs.
4. Prior to beginning grading or other land disturbance, the Landowner must provide notification to the State Water Resources Control Board. This obligation is met when the Landowner files a "Notice of Intent" (NOI), with the SWRCB, and pays the appropriate fee. The NOI is a mechanism to establish responsible parties, dischargers, and scope of the proposed operations.

The Kamm Avenue Pistachio Processing Project must comply with all the requirements of the NPDES permitting process, including noticing, preparation, and implementation of a storm water pollution prevention plan, and establishing a monitoring program.

2.2.1.2 Permitting and Compliance Under the State Porter-Cologne Water Quality Control Act Laws

The Water Quality Control Plan for the Tulare Lake Basin, Third Edition, revised January 2018 (Basin Plan) designates beneficial uses, establishes narrative and numerical water quality objectives, contains implementation plans and policies for protecting all waters of the Basin, and incorporates, by reference, plans and policies of the State Water Board. In accordance with Water Code section 13263(a), these requirements implement the Basin Plan.

The SWRCB has released a legal memorandum confirming the State's jurisdiction over isolated wetlands. The memorandum has indicated that discharges to "Waters of the State" are subject to state regulation. "Waters of the State" have been defined under State law to mean any surface water, groundwater, or saline water, within the State's boundary. As a result, the SWRCB's regulates discharges to "Waters of the State" and isolated waters similarly to waters of the United States. For non-federal jurisdictional waters, regulation is under the authority of Porter-Cologne (California Water Code Section 13000, et seq.) rather than the Federal Clean Water Act.

Water quality is further protected under the Porter-Cologne Water Quality Control Act by the SWRCB's nine Regional Water Quality Control Boards (RWQCBs), which enforce regional water quality standards. The project site falls within the jurisdiction of the Central Valley Board, with the applicable local office located in Fresno. (Other offices are located in the norther Central Valley Region in Sacramento and in Redding.)

The applicable RWQCB issues Report of Waste Discharge, Waste Discharge Requirement permits for discharges of any waste to land and groundwater from any source, and waste from agricultural operations to surface or groundwater Waters of the State pursuant to the NPDES Program.

2.2.1.3 Permitting and Compliance Under the State Lake or Streambed Alteration Agreement

The State of California Department of Fish and Wildlife (CDFW) will review the proposed project in accordance with the requirements of Section 1600 of the State Fish and Game Code. Section 1600 applies to all perennial, intermittent and ephemeral rivers, streams and lakes in the State.

2.2.1.4 Fresno County Review Authority

The County of Fresno, Public Works and Planning Department will review all grading and drainage improvements, including hydrology and hydraulic calculations. In accordance with the California Building Code, as adopted by the County of Fresno as well as, County of Fresno Title 15, Building and Construction Ordinance Code: Chapter 15.28 - GRADING AND EXCAVATION.

2.2.1.5 Fresno County General Plan

The following existing Fresno County General Plan policies have been adopted to protect water quality and to reduce flood hazards.

- *Policy ED-A.24 Recognizing that certain critical requirements of food processing industries, such as wastewater treatment, may require innovative, regional solutions, the County shall support and encourage technology development programs through collaboration with research institutions, such as the California Agriculture Technology Institute at CSU Fresno, and other responsible agencies, for use by industries and cities to support the expansion of agricultural industries.*
- *Policy HS-C.5 Where existing development is located in a flood hazard area, the County shall require that construction of flood control facilities proceed only after a complete review of the environmental effects and a project cost/benefit analysis*
- *Policy HS-C.9 The County shall prohibit the construction of essential facilities in the 100-year floodplain, unless it can be demonstrated that the facility can be safely operated and accessed during flood events.*
- *Policy HS-C.10 The County shall require that all placement of structures and/or floodproofing be done in a manner that will not cause floodwaters to be diverted onto adjacent property, increase flood hazards to other property, or otherwise adversely affect other property.*
- *Policy LU-A.3 The County may allow by discretionary permit in areas designated Agriculture, special agricultural uses and agriculturally-related activities, including value-added processing facilities, and certain non-agricultural uses listed in Table LU3. Approval of these and similar uses in areas designated Agriculture shall be subject to the following criteria:*
    - *a. The use shall provide a needed service to the surrounding agricultural area which cannot be provided more efficiently within urban areas or which requires location in a non-urban area because of unusual site requirements or operational characteristics;*
    - *b. The use should not be sited on productive agricultural lands if less productive land is available in the vicinity;*
    - *c. The operational or physical characteristics of the use shall not have a detrimental impact on water resources or the use or management of surrounding properties within at least one-quarter (1/4) mile radius;*
    - *d. A probable workforce should be located nearby or be readily available;*
    - *e. For proposed agricultural commercial center uses the following additional criteria shall apply:*
        1. *Commercial uses should be clustered in centers instead of single uses.*
        2. *To minimize proliferation of commercial centers and overlapping of trade areas, commercial centers should be located a minimum of four (4) miles from any existing or approved agricultural or rural residential commercial center or designated commercial area of any city or unincorporated community.*
        3. *New commercial uses should be located within or adjacent to existing centers.*
        4. *Sites should be located on a major road serving the surrounding area.*
        5. *Commercial centers should not encompass more than one-quarter (1/4) mile of road frontage, or one-eighth (1/8) mile if both sides of the road are involved, and should not provide potential for developments exceeding ten (10) separate business activities, exclusive of caretakers' residences;*
    - *f. For proposed value-added agricultural processing facilities, the evaluation under criteria "a" above, shall consider the service requirements of the use and the capability and capacity of cities and unincorporated communities to provide the required services; and*

g. *For proposed churches and schools, the evaluation under criteria LU-A.3a above shall include consideration of the size of the facility. Such facilities should be no larger than needed to serve the surrounding agricultural community.*
h. *When approving a discretionary permit for an existing commercial use, the criteria listed above shall apply except for LU-A.3b, e2, e4, and e5.*

- *Policy LU-C.8 Fresno County shall take into consideration the presence of the regulatory floodway or other designated floodway, the FEMA-designated 100-year floodplain, estimated 250-year floodplain, the Standard Project Flood, and the FMFCD Riverine Floodplain Policy in determining the location of future development within the San Joaquin River Parkway area. Any development sited in a designated 100-year floodplain shall comply with regulatory requirements at a minimum and with the FMFCD Riverine Floodplain Policy criteria, or requirements of other agencies having jurisdiction, where applicable.*
- *Policy OS-A.23 The County shall protect groundwater resources from contamination and overdraft by pursuing the following efforts:*
  a. *Identifying and controlling sources of potential contamination;*
  b. *Protecting important groundwater recharge areas;*
  c. *Encouraging water conservation efforts and supporting the use of surface water for urban and agricultural uses wherever feasible;*
  d. *Encouraging the use of treated wastewater for groundwater recharge and other purposes (e.g., irrigation, landscaping, commercial, and nondomestic uses);*
  e. *Supporting consumptive use where it can be demonstrated that this use does not exceed safe yield and is appropriately balanced with surface water supply to the same area;*
  f. *Considering areas where recharge potential is determined to be high for designation as open space; and*
  g. *Developing conjunctive use of surface and groundwater.*
- *Policy OS-A.24 The County shall require new development near rivers, creeks, reservoirs, or substantial aquifer recharge areas to mitigate any potential impacts of release of pollutants in storm waters, flowing river, stream, creek, or reservoir waters.*
- *Policy OS-A.27 The County shall monitor water quality regularly and take necessary measures to prevent contamination, including the prevention of hazardous materials from entering the wastewater system.*
- *Policy OS-A.28 The County shall only approve new wastewater treatment facilities that will not result in degradation of surface water or groundwater. The County shall generally require treatment to tertiary or higher levels.*
- *Policy OS-A.29 In areas with increased potential for groundwater degradation (e.g., areas with prime percolation capabilities, coarse soils, and/or shallow groundwater), the County shall only approve land uses with low risk of degrading groundwater.*
- *Policy PF-A.2 The County shall require new industrial development to be served by community sewer, stormwater, and water systems where such systems are available or can feasibly be provided.*
- *Policy PF-E.20 The County shall require new development of facilities near rivers, creeks, reservoirs, or substantial aquifer recharge areas to mitigate any potential impacts of release of pollutants in flood waters, flowing rivers, streams, creeks, or reservoir waters.*
- *Policy PF-E.21 The County shall require the use of feasible and practical best management practices (BMPs) to protect streams from the adverse effects of construction activities, and shall encourage the urban storm drainage systems and agricultural activities to use BMPs.*

2.2.2 Project Impact Analysis

2.2.2.1 Would the project:

- *violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or ground water quality? and*

- *conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan?*

The Project could impact surface or groundwater quality through the use of recaptured process water for irrigation reuse in offsite land application areas and the deposit of processing solids, such as shells, precleaning waste and hulling residue, most of which will be conveyed for beneficial reuse offsite, within the main Project area and adjacent solid materials management site. Based on water quality data from similar pistachio processing facilities the irrigation reuse water would contain 150 parts per million (ppm) of total Kjeldahle nitrogen, 600 ppm of potassium, 4200 ppm of biochemical oxygen demand (BOD) and 3700 ppm of total dissolved solids (TDS). The Project would also generate approximately 13 million pounds of hulling residue with a 12 percent moisture content after pressing, 5 million pounds of precleaning twigs, leaves and similar pistachio tree materials, and 6 million pounds of empty pistachio shells per year. The discharge of the irrigation reuse water, and the potential deposition of residual amounts of hulling residue not beneficially reused offsite and shell and precleaning materials that are not sold for reuse could significantly affect surface and groundwater if they result in increases in constituent loads that would violate any water quality standards or waste discharge requirements, otherwise substantially degrade surface or ground water quality, or conflict with or obstruct the implementation of a water quality control plan or sustainable groundwater management plan.

The discharge and irrigation reuse of the Project's recaptured process water and deposition of solids to land would be subject to the terms and conditions of Waste Discharge Requirements (WDRs) issued by the Regional Board. Multiple pistachio processing plants with similar operational characteristics as the Project have been issued WDRs by the Regional Board in the Central Valley, including the El Dorado plant located to the north of the Project in Fresno County. El Dorado is a pistachio processing plant that discharges up to 42 million gallons of process water per year, and up to 2.5 million gallons per day, on a 600-acre pistachio orchard land application area. Solids are removed from the facility's settling pond and deposited on an 80-acre solid reuse area. Prior to issuing WDRs for the facility, the Regional Board prepared and approved a Mitigated Negative Declaration (MND) for the proposed water and solid discharges and determined that, with mitigation, "there is no evidence that the issuance of WDRs …will have a significant effect on the environment." The mitigation measures (MMs) adopted by the Regional Board and also incorporated into the WDRs for the facility include annual, maximum daily, and average seasonal water discharge limits, agronomical application rates for nitrogen and hydraulic loading, a cycle average BOD loading rate, discharge prohibitions during and immediately after rainy periods, proper solid management and annual soil sampling within solid materials management areas, and the preparation and implementation of a salinity control plan and a wastewater and nutrient management plan within 180 days of the issuance of the WDRs.

The WDR states that with an average BOD concentration of 6,700 mg/L, and a maximum flow rate of 2.5 mgd, instantaneous BOD loading rates could range from about 200 lbs/acre/day to as high as 2,300 lbs/acre/day. The WDR concluded that, given the short processing season, soil lithology, depth to groundwater, and implementation of best management practices, monitoring of the application areas, and resting periods between applications, the discharge would not be expected to cause groundwater degradation due to organic loading. The WDR further requires a cycle average BOD loading rate of 100 lbs/acre/day.

For nitrogen, with an average nitrogen concentration of about 227 mg/L, an annual maximum discharge of 42 million gallons per year, and a 600 acre land application area, the WDR concluded that nitrogen loads would be about 132 lbs/acre/year, less than the nitrogen uptake for pistachios of 200 to 250 lbs/acre/year. The WDR

concluded that with proper management of the discharge water, and proper application of additional fertilizers, nitrogen loads of this magnitude would not degrade groundwater for nitrates.

For salinity, the WDR states that with an average EC and TDS of 3,800 umhos/cm and 5,200 mg/L, respectively, the El Dorado facility water discharge exceeds local groundwater quality. The WDR further states that there are no specific water quality objectives set for EC and TDS and that almost half of the salinity in the pistachio facility discharge water is from organic dissolved solids, which will break down in the soil profile. Much of the remaining portion is from potassium, which is a major plant nutrient that moves slowly through the soil profile and is readily taken up by crops. Given the short processing season, with depth-to-groundwater at greater than 350 feet below ground surface, and percolation of the discharge water through soils of alternating layers of sands and clays, the WDR found that the potential for the irrigation reuse water to reach and significantly impact groundwater was minimal. According to California Department of Water Resources Data Library[2] there is a well located approximately one-half mile to the east of the Project site that has depth to groundwater recorded at 490 feet. Therefore, the Project's irrigation reuse water has a minimal likelihood of reaching and significantly impacting groundwater.

For chloride, with an average concentration of 113 mg/L, the WDR concluded that due to generally poor quality groundwater near the El Dorado plant and settling ponds, and dilution of discharge water with higher-quality irrigation water, the facility would avoid significant chloride impacts to groundwater.

For potassium, the WDR concluded that with an average concentration of about 1,024 mg/L and an annual discharge of 42 million gallons, the El Dorado facility would result in a potassium load of about 600 lbs/acre/year, about three times higher than the general agronomic rate for potassium of about 200 lbs/acre/year for pistachio trees. The WDR found that potassium readily binds to soil, and crops can and will take up more potassium than required, if available, with no reduction in yield and did not include potassium load limits.

The Project would produce a maximum of 58.8 million gallons of irrigation reuse water during the harvest season assuming a recapture rate of 90 percent. The Project has contracted with adjacent growers to reuse this water for pistachio orchard irrigation on 2,556 acres of irrigated land, more than five times the land application area considered in the El Dorado WDR and MND. As a result, the Project will be able to manage the application of irrigation reuse water to meet the performance standards required by the Regional Board. The following mitigation measures will reduce potential water quality impacts from irrigation reuse water to less than significant levels:

MM-HWQ1: Discharge to the settling ponds shall not exceed the more restrictive of: (1) a maximum daily flow of 1.62 mgd, an average daily flow for the season of 1.4 mgd, or an annual flow for the season of 58.8 million gallons; or (2) flow limits in the Project WDRs issued by the Regional Board.

MM-HWQ2: The cycle average BOD loading rate to the land application areas shall not exceed the more restrictive of (1) 100 lbs/acre/day; or (2) BOD loading rates in the Project WDRs issued by the Regional Board.

MM-HWQ3: Hydraulic loading of irrigation reuse water and other irrigation water shall not exceed the more restrictive of: (1) reasonable agronomic rates designed to minimize the percolation of wastewater and irrigation water below the root zone (i.e., deep percolation) or (2) hydraulic loading rates in the Project WDRs issued by the Regional Board.

MM-HWQ4: Application of waste constituents in irrigation reuse water shall not exceed the more restrictive of: (1) reasonable agronomic rates to preclude creation of a nuisance or

[2] California Department of Water Resources. https://wdl.water.ca.gov/waterdatalibrary/GroundwaterBrowseData.aspx?LocalWellNumber=&StationId=17316&StateWellNumber=16S14E24B001M&SelectedCounties=&SiteCode=365303N1203974W001&SelectedGWBasins=. Accessed October 13, 2020.

degradation of groundwater, considering the crop, soil, climate, and irrigation management, and the annual nutritive loading to the land application areas, including the nutritive value of organic and chemical fertilizers and of the wastewater, shall not exceed the annual crop demand, except for potassium; or (2) nutritive constituent loading rates in the Project WDRs issued by the Regional Board.

MM-HWQ5: Irrigation with irrigation reuse water shall not be performed within the more restrictive of: (1) 24 hours of a storm event of measurable precipitation or when soils become saturated; (2) storm event and soil saturation limits in the Project WDRs issued by the Regional Board.

MM-HWQ6: Within 180 days of the issuance of the Project WDRs by the Regional Board the Project shall submit for Regional Board approval and implement the more restrictive of: (1) a Wastewater and Nutrient Management Plan with procedures for monitoring the land application areas, including daily records of wastewater applications and acreages, an action plan to deal with objectionable odors and/or nuisance conditions, calculations for monthly and annual water and nutrient balances, and management practices that will ensure wastewater, irrigation water, and commercial fertilizers are applied at agronomic rates, except for potassium; or (2) a Wastewater and Nutrient Management Plan specified in the Project WDRs issued by the Regional Board.

MM-HWQ6: Within 180 days of the issuance of the Project WDRs by the Regional Board the Project shall submit for Regional Board approval and implement in accordance with such approval the more restrictive of: (1) a Salinity Control Plan that incorporates current best practices that have been implemented in other pistachio processing plants in the region, such as in the Salinity Control Plan prepared in 2019 under WDR Order No. R5-2018-0005, to further reduce the salinity of the discharge to the maximum extent feasible, including an estimate on load reductions that may be attained through the methods identified, and provide a description of the tasks, cost, and time required to investigate and implement various elements in the salinity control plan; or (2) a Salinity Control Plan as specified in the Project WDRs issued by the Regional Board.

For solids management, the MND requires proper solids management and annual soil sampling in areas where solids are stored. The following mitigation measures will reduce potential water quality impacts from solids management to less than significant levels:

MM-HWQ7: No solids generated during the pistachio season shall be applied in mapped floodplains within the 160-acre solids materials management site or within the unused portions of the 315-acre facility site south of the processing plant fence line and north of the settling ponds.

MM-HWQ8: Solids generated during the pistachio season shall be managed by the more restrictive of: (1) even application and incorporation into the soil within the applicable portions of the 160-acre solids materials management site and the unused portions of the 315-acre facility site south as needed, to prevent odors and nuisance conditions; or (2) in accordance with solid management requirements specified in the Project WDRs issued by the Regional Board.

MM-HWQ9: Soil samples at each location where solids generated during the pistachio season have been applied and incorporated into the soil shall be taken, analyzed for constituents of concern and reported to the Regional Board by the more restrictive of: (1) once per year (2) in accordance with the sampling and reporting requirements in the Project WDRs issued by the Regional Board.

Based on the anticipated water quality of the irrigation reuse water, the availability of a large land application area for such water, the conveyance of hulling waste offsite for beneficial reuse, solid application to designated areas outside of mapped floodplains that primarily consist of relatively inert shells and precleaning pistachio tree materials, and the implementation of MM-HWQ-1 to MM HWA-9, project irrigation water reuse and solids management will avoid significant impacts related to the violation of any water quality standards or waste discharge requirements, otherwise substantially degrade surface or ground water quality or conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan.

2.3 Effects on Groundwater Supplies and Groundwater Recharge for Sustainable Groundwater Management of the Basin

2.3.1 Regulatory Setting

2.3.1.1 California Groundwater Sustainability Management Act (SGMA).

In 2014, California enacted the Sustainable Groundwater Management Act (SGMA) (Water Code §10720 *et seq.*). SGMA requires that groundwater basins designated by the state Department of Water Resources (DWR) as high priority and/or critically overdrafted must be managed under a Groundwater Sustainability Plan (GSP) that avoids "undesirable results" as defined in the Act within 20 years from January 31, 2020. The GSP must be developed by a Groundwater Sustainability Agency (GSA) approved by the DWR. As shown in **Figure 2**, the WWD service area boundary largely overlaps with DWR-designated San Joaquin Valley groundwater subbasin 5.22-9, which is commonly called the "Westside Subbasin." The DWR has designated the Westside Subbasin as high priority and critically overdrafted, and SGMA requires that a GSP be adopted by an approved GSA for the subbasin by January 31, 2020.

WWD was approved by the DWR as the primary GSA responsible for the Westside Subbasin in accordance with SGMA. A GSP and water budget for the Westside Subbasin was adopted by WWD and submitted for DWR review on January 31, 2020. The GSP includes certain groundwater projects and management actions (PMAs) that are projected to result in sustainable groundwater management in compliance with SGMA by 2040 and for 30 years thereafter. PMA-2 will decrease groundwater use in the Westside Subbasin from 1.3 AFY per acre in 2023 to 0.6 AFY per acre by 2030. PMA-4 requires that, if required by ongoing monitoring, groundwater extractions in certain locations will be replaced with other supplies (Luhdorff and Scalmanini 2020). No groundwater extracted from the Westside Subbasin or any other basin will be used by the Project.

2.3.1.2 State Department of Water Resources

The State Department of Water Resources, also located in Sacramento, is the agency with jurisdiction over water supplies. California Water Code (Sections 10004 et seq.) requires that the State Department of Water Resources update the California Water Plan every five years.

The 2018 California Water Plan[3] (the most recent) envisions a future where all Californians benefit from reduced flood risk, more reliable water supplies, reduced groundwater depletion, and greater habitat and species resiliency. It recommends actions to help align decision-making processes, track outcomes, and adaptively manage programs and investments to make the state's water resource systems more resilient and achieve the sustainability.

[3] California Department of Water Resources. *California Water Plan Update 2018*, *Managing Water Resources for Sustainability,* June 2019. Accessible on the web at: https://water.ca.gov/-/media/DWR-Website/Web-Pages/Programs/California-Water-Plan/Docs/Update2018/Final/California-Water-Plan-Update-2018.pdf

2.3.2 Project Impact Analysis

2.3.2.1 Would the Project substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin?

As documented in the WSA, 209 AFY of water will be required for pistachio processing. The water for processing would be delivered to the site via an existing 34" pipeline from the California Aqueduct to the site, then through an existing lateral pipeline to new a newly constructed connection and metering device.

No groundwater would be used for this project. All process and domestic use water would be surface supplies delivered from the California Aqueduct via pipeline to the site.

The Project would introduce new impervious areas through construction of access roads and parking, roofs over building construction, product storage silos, and concrete slabs. All stormwater runoff will be collected on-site for percolation back to the groundwater basin, within a stormwater retention basin to be located in the northeast corner of the northerly-most 80 acres of the Project site.

Surface water supplies in California, including the surface water provided to users in the Project region by WWD, are subject to variability due to hydrologic conditions and regulatory requirements. The Project will contract with affiliated entities that have surface water allocations from WWD for 2,556 acres of land and, if needed, CVP water stored in the Semitropic Water Bank available for use under an agreement with a water banking participant in exceptionally dry water years.

Based on information from similar processing facilities, approximately 80 to 90 percent of all water supplied to the Project will be captured, cleaned and distributed as irrigation reuse water in the vicinity of the Project. Consequently, the Project will not significantly affect the net supply of water for pistachio irrigation in the region. The Project will also not significantly affect groundwater supplies or conflict with groundwater sustainability management plans that have been developed by WWD for regional aquifers.

2.4 Effects on Existing Drainage Pattern of the Site or Area and Potential Release of Pollutants From Site Inundation

2.4.1 Regulatory Setting

2.4.1.1.1 *Federal Emergency Management Agency (FEMA) Flood Zones:*

The National Flood Insurance Act (1968) makes available federally subsidized flood insurance to owners of -prone properties. To facilitate identifying areas with flood potential, Federal Emergency Management Agency (FEMA) has developed Flood Insurance Rate Maps (FIRM) that can be used for planning purposes. Flood hazard areas identified on the Flood Insurance Rate Map are identified as a Special Flood Hazard Area (SFHA). SFHA are defined as the area that will be inundated by the flood event having a 1-percent chance of being equaled or exceeded in any given year. The 1-percent annual chance flood is also referred to as the base flood or 100-year flood. SFHAs are labeled as Zone A, Zone AO, Zone AH, Zones A1-A30, Zone AE, Zone A99, Zone AR, Zone AR/AE, Zone AR/AO, Zone AR/A1-A30, Zone AR/A, Zone V, Zone VE, and Zones V1-V30. Moderate flood hazard areas, labeled Zone B or Zone X (shaded) are also shown on the FIRM, and are the flood areas between the limits of the base flood and the 0.2-percent-annual-chance (or 500-year) flood. The areas of minimal flood hazard, which are the areas outside the SFHA and higher than the elevation of the 0.2-percent-annual-chance flood, are labeled Zone C or Zone X (unshaded).

2.4.1.1.2 *National Pollution Discharge Elimination System (NPDES).*

The federal regulations for the process allow two permitting options for construction stormwater discharges: Individual, and General Permit. The California State Water Resources Control Board (SWRCB) has been delegated jurisdiction over water quality issues in the State of California. The SWRCB is governed by the Porter-Cologne Water Quality Act (Division 7 of the California Water Code), which establishes the legal framework for water quality control activities by the SWRCB. The SWRCB has opted to require one statewide Construction General Permit (called NPDES No. CAS000002) to cover all construction activity in the State of California, except on Tribal Lands, projects undertaken by the California Department of Transportation, and projects within the Lake Tahoe Hydrologic Unit. These exceptions are regulated under their own separate permits.

2.4.2 Project Impact Analysis

2.4.2.1 Would the Project:

- *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 off-site;*
    - *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? and*
- *In flood hazard, tsunami, or seiche zones, risk release of pollutants due to project inundation?*

Figure 4 above illustrates the primary features of the Project and the various types of new surfacing that will replace the pistachio trees and cause changes to the stormwater runoff profile of the site. **Table 1,** and **Table 2,** above show, respectively the calculations of existing runoff and the runoff from the proposed Project.

Currently, an estimated 21 AFY of stormwater runoff is expected to be generated by the Project's proposed impervious and pervious improvements.

As shown on **Figure 6** above on-site soils are moderately susceptible to sheet and rill erosion, however, proposed hardscape and landscape surfacing of the site will minimize potential for significant erosion of on-site soils. The retention basin will capture siltation over-time, which will be removed as necessary, pursuant to standard basin maintenance tasks.

Although the site will increase the rate and amount of surface runoff, all stormwater runoff from the constructed Project facilities will be directed to a new stormwater retention basin to be constructed in the northeast corner of the northerly 80 site. The stormwater retention basin will be sized to collect the estimate 35 AFY resulting from the proposed new impervious surfacing, an increase of 12 AFY from the Project. The basin proposes to provide two feet of freeboard above the highest estimated elevation of water in the basin. The depth of the basin will be such that highest water elevation of water will not be above surrounding surface grade. The design of the basin, including inside and outside side slopes, will conform to County requirements and so as to not increase flood conditions on- or off-site outside the basin.

As noted, the proposed on-site retention basin will be sized according the County requirements and drainage calculations to collect and retain all additional stormwater runoff that will be generated by the Project; stormwater runoff is not expected to exceed the capacity of the on-site retention basin. The retention basin will allow stormwater to percolate to the groundwater basin

As shown in **Figure 5**, above, the site lies adjacent and to the north and east of a flood hazard Zone A as mapped by the FEMA, Panel No. 06019C2500H. This zone is described by FEMA as having no base flood elevation determined from a 100-year storm event.[4] Because the FEMA flood hazard zone does not come onto the project site and because the proposed retention basin will be designed to capture the increase in stormwater runoff generated by the Project, it is not anticipated that the Project will impede or redirect flood flows.

Tsunamis are giant waves caused by earthquakes or volcanic eruptions under the sea. Out in the depths of the ocean, tsunami waves do not dramatically increase in height. But as the waves travel inland, they build up to higher and higher heights as the depth of the ocean decreases. The speed of tsunami waves depends on ocean depth rather than the distance from the source of the wave. Tsunami waves may travel as fast as jet planes over deep waters, only slowing down when reaching shallow waters. While tsunamis are often referred to as tidal waves, this name is discouraged by oceanographers because tides have little to do with these giant waves.[5]

The site is situated on the floor of the Central Valley and is well inland from the Pacific Ocean which lies roughly 90 miles (as the crow flies) to the west. In addition, the Valley's westerly edge is formed by the Coastal Range mountains which rise to elevations in this area up to 3,000 ft. It is very unlikely the Project site could be adversely or significantly impacted by tsunami events emanating from the Pacific Ocean. The nearest mapped tsunami zones extend from the Pacific Ocean primarily along drainage ways east to the Salinas River in Monterey County, roughly 80 miles from the Project site and west of the Coastal Range.

Seismic seiches are standing waves set up on rivers, reservoirs, ponds, and lakes when seismic waves from an earthquake pass through the area. They are in direct contrast to tsunamis which are giant sea waves created by the sudden uplift of the sea floor.[6]

The nearest sizeable body of water that could incur seiches would be Pine Flat Reservoir, a man-made lake which is roughly 70 miles to the east of the site. The elevation of the Pine Flat Dam is 941.5 ft. and was built for flood control purposes on the Kings River in the foothills of the western slopes of the Sierra Nevada mountain range. It is unlikely that seiches or even dam breach or failure would result in significant adverse effects to the Project site.

Figure 5 shows the FEMA designated Flood Hazard Zone nearest the site[7]. A moderate rise in topography up to the west and south edges of the site directs flood flows away from the site. The site itself drains toward the north east naturally. Project activities would therefore not occur within any FEMA designated flood hazard areas and thereby would alter the flow the surface waters differently than how currently directed. The Project is designed to collect stormwater runoff from proposed new impervious surfaces in a planned stormwater retention basin situated in the northeast corner of the northerly-most 80-acre portion of the site, thereby taking advantage of the site's natural northeast aspect.

The rate and amount of surface runoff is determined by multiple factors, including topography, amount and intensity of precipitation, amount of impervious surfacing, amount of evaporation that occurs in the watershed, and amount of precipitation and imported water that infiltrates to the groundwater. The Project would not alter any precipitation amounts or intensities. The Project will involve the importation of surface water from the

[4] The term "100-year flood" is a term used to simplify the definition of a flood that statistically has a 1-percent chance of occurring in any given year. Likewise, the term "100-year storm" is used to define a rainfall event that statistically has this same 1-percent chance of occurring.
[5] https://oceanservice.noaa.gov/facts/tsunami.html
[6] https://www.usgs.gov/natural-hazards/earthquake-hazards/science/seismic-seiches?qt-science_center_objects=0#qt-science_center_objects
[7] Federal Emergency Management Agency, Flood Insurance Rate Map, Panel No. 06019C2500H. August 3, 2020. Accessible on the web at: https://msc.fema.gov/portal/search?AddressQuery=fresno%20county#searchresultsanchor

California Aqueduct of which 209 AFY will be used for the pistachio processing, distribution of wastewater for irrigation reuse water via on-site pipelines to collection basins, and distribution of said irrigation reuse water back to area farms for land application. The Project's approximately 136-acre site development area and would not significantly alter the overall topography of the area, and will utilize the natural direction of drainage flow on the site to necessitate only minimal grading to direct stormwater collection to the stormwater retention basin.

In addition, the Project would not alter precipitation amounts or intensities, evaporation rates, or the amount of precipitation that infiltrates into the ground water. Additionally, the amount of imported water used for construction of the project (such as water used for dust suppression) would not substantially alter groundwater infiltration rates. Therefore, the rate or amount of surface runoff resulting from the Project would not change relative to existing conditions.

Any increase in surface water runoff resulting from permanent project features would be contained on-site in a retention basin sized to collect the calculated run-off and would not influence surface runoff in a manner which would result in flooding on-site or off-site.

The settling ponds will be designed to contain all on-site generated run-off and thereby avoid any of the impacts listed in Section 2.4.2.1. above, including stormwater flooding, and would prevent any discharges from the developed pistachio processing and pond areas from occurring.

Mitigation Measure **MM-HWQ5** (as recommended above in Section 2.2.2.1.Project) would avoid the discharge of contaminated runoff in land application areas that are within mapped floodplains.

With mitigation incorporated, impacts on area hydrology resulting from the Project will be less than significant.

2.5 Conflict with or Obstruct Implementation of a Water Quality Control Plan or Sustainable Groundwater Management Plan?

2.5.1 Regulatory Setting

2.5.1.1.1 *Westlands Water Quality Coalition (ILRP)*

The District Water Quality Coalition (Coalition) has been approved by the RWQCB to serve as a third-party coalition for administering the terms and conditions of the ILRP as described in the Western Tulare Lake Basin General Order (GO) R5-2014-0001 that applies to irrigated lands within the WWD. The Coalition has been formed to represent landowners and operators irrigating agricultural lands (Members) under the GO. The GO outlines specific instructions for all landowners whose lands are being used for irrigated agricultural purposes.

2.5.1.1.2 *2017 Westlands Water Management Plan*[8]

The WWD provides surface and groundwater for agricultural and urban uses within its district boundary. The primary source of surface water is federal Central Valley Project Water that originates in North of Delta federal reservoirs and canal delivery systems. The WWD is required by state law to prepare and update every five years a Water Management Plan to inventory available water sources and forecast reliability and quantity of supplies and demands of these waters for the beneficial agricultural and urban use during the ensuing five-year planning period. The Plan also identifies Best Management Practices (BMP) and Operating Rules and Regulations to be

[8] Westlands Water District, prepared for U.S. Department of the Interior, Bureau of Reclamation. *Westlands Water District Water Management Plan 2017 Criteria*. Accessible on the web at: https://wwd.ca.gov/water-management/additional-water-management/water-management-plan-2017-2/.

applied throughout the District for the best conservation (banking) and management of water use and a budget based upon those BMPs.

2.5.1.1.3 *Sustainable Groundwater Management Act*

In 2014, California enacted the Sustainable Groundwater Management Act (SGMA) (Water Code §10720 *et seq.*). SGMA requires that groundwater basins designated by the state Department of Water Resources (DWR) as high priority and/or critically overdrafted must be managed under a Groundwater Sustainability Plan (GSP) that avoids "undesirable results" as defined in the Act within 20 years from January 31, 2020. The GSP must be developed by a Groundwater Sustainability Agency (GSA) approved by the DWR. As shown in **Figure 2**, the WWD service area boundary largely overlaps with DWR-designated San Joaquin Valley groundwater subbasin 5.22-9, which is commonly called the "Westside Subbasin." The DWR has designated the Westside Subbasin as high priority and critically overdrafted. In accordance with SGMA a GSP was adopted by WWD as the approved GSA for the subbasin by January 31, 2020.

As discussed in Section 2.2.1.2, *The Water Quality Control Plan for the Tulare Lake Basin, Third Edition, revised January 2018* (Basin Plan) is the applicable water quality control plan for the Project Area and designates beneficial uses, establishes narrative and numerical water quality objectives, contains implementation plans and policies for protecting all waters of the Basin, and incorporates, by reference, plans and policies of the State Water Board. In accordance with Water Code section 13263(a), these requirements implement the Basin Plan. As discussed in Section 2.2.2.1, with mitigation, the Project would not have a significant impact to the beneficial uses, water quality objectives, and other applicable elements of the Basin Plan.

2.5.2 Project Impact Analysis

2.5.2.1 Would the Project conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan?

The Project will not use groundwater, including groundwater extracted from the Westside Subbasin, or groundwater from other locations. A GSP has been submitted to DWR by WWD acting as the primary Westside Subbasin GSA that is intended to achieve all applicable SGMA requirements for the Subbasin. The requirements include avoiding undesirable results to groundwater supply and storage, groundwater quality, and subsidence. The primary PMAs that have been adopted in the Westside Subbasin GSP to comply with SGMA that could potentially affect groundwater conditions near the Project include: (1) a decrease in groundwater extraction from 1.3 AFY per acre to 0.6 AFY per acre during 2022-2030 to avoid reductions in groundwater supply and storage; and (2) the substitution of supplies other than groundwater in certain areas where subsidence due to groundwater extraction could occur, including the area in which the Project is located.

Project operations will not significantly affect the implementation of the Westside Subbasin GSP and the achievement of SGMA requirements. Approximately 80 to 90 percent of all Project water supplied by local growers will be returned for irrigation reuse on the same land where the growers operate 2,556 irrigable acres of pistachios. Irrigation reuse water supplied for Project pistachio processing will maintain existing patterns of surface water application in the vicinity of the Project and have no significant project-level and cumulative impacts to the volume of groundwater recharge in the Westside Subbasin. The Project's small amount of net water consumption during processing will not induce significant new surface or groundwater demand by the Growers. The Project will not use groundwater and will not directly or indirect impact subsidence risks in the Project area.

Consistent with the findings in other WDRs issued for similar facilities using the same or comparable quality surface source water, the facility will not deplete groundwater supplies or affect groundwater recharge. As in other permitted pistachio processing facilities, increased water usage at the will be discharged to cropland to replace irrigation water on existing agricultural land in the Project area.

Based on these considerations, the Project will not cause significant impacts related to substantial decrease in groundwater supplies, interfering substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin the last clause or obstructing implementation of a water quality control plan or sustainable groundwater management plan.

Appendix G

Water Supply Analysis

Kamm Avenue Pistachio Processing, LLC.

Water Supply Analysis

September 21, 2020

Prepared for:
Kamm Avenue Pistachio Processing, LLC.
Fresno, CA 93711

Prepared by:
Provost & Pritchard Consulting Group
Clovis, California 93611

Report Prepared for:

Kamm Avenue Pistachio Processing LLC.

1306 W Herndon Avenue, Ste. 108
Fresno, CA 93711

Report Prepared by:

Provost & Pritchard Consulting Group
Calvin Monreal, PE
Brian Ehlers PE-QA/QC

Contact:
Calvin Monreal, PE
559-326-1100, Ext. 329
2505 Alluvial Avenue
Clovis, CA 93611

Table of Contents

1 Introduction 1-1
1.1 Purpose 1-1
1.2 Project Overview 1-2
1.3 Project Water Demand 1-3
2 Project Water Supplies 2-1
2.1 Project Contracts with Growers 2-1
2.2 CVP and WWD Supplemental Water 2-2
2.3 WWD and the Sustainable Groundwater Management Act 2-3
2.4 Project Water Supply Reliability 2-5
2.4.1 CVP and WWD Supplemental Water Supplies 2-5
2.4.2 Grower Historical CVP and WWD Supplemental Supplies 2-6
2.4.3 Future Project Water Supply Reliability 2-6
2.4.4 Dry Year Reserve Supply 2-8
3 Potential Water Supply Impacts 3-1
3.1 Project Water Supply Sufficiency Impacts 3-1
3.2 Potential Groundwater and SGMA Impacts 3-2
3.3 Potential New Water Facility Impacts 3-3
4 References 4-1

Appendices

Appendix A Water Supply Agreement
Appendix B 2020-2021 Agricultural Water Allocation Application and Purchase Agreement
Appendix C 2019-2020 Agreement to Accept and Purchase Supplemental Water (revised)
Appendix D WWD Ag-Related M&I Use Determination for the Project
Appendix E WWD Water Transfer form

List of Figures

Figure 1-1: Project Location, Existing Pumps and Pipelines from the California Aqueduct, and Proposed Project Water Supply Connection 1-2

Figure 2-1: Locations of Growers and APNs Contracting to Provide Water for the Project 2-1

Figure 2-2: WWD Service Area (WWD 2020b) 2-2

Figure 2-3: WWD and Westside Subbasin Locations (Luhdorff and Scalmanini 2020) 2-4

Figure 2-4: Locations of WWD, Semitropic Water Storage District, CVP Consolidated Place of Use, and California Aqueduct San Luis Canal (source: USBR 2020) 2-9

List of Tables

Table 1-1: Estimated Annual Water Demand for the Project 1-3

Table 2-1: WWD CVP Contract Annual Allocation Percentage, and CVP and WWD Supplemental Water Supplies 1988 to 2020 (est.) (WWD 2020c) 2-5

Table 2-2: Deliveries of CVP Water to Growers and WWD Supplemental Water to Growers, 2014-2019 (data provided by Growers) 2-6

Abbreviations

AFY ..... Acre-Feet per Year
APN ..... Assessor's Parcel Number
BiOps ..... Biological Opinions
CEQA ..... California Environmental Quality Act
CESA ..... California Endangered Species Act
CFS ..... Cubic Feet per Second
COA ..... Coordinated Operation Agreement
County ..... Fresno County
CRS ..... Congressional Research Service
CVP ..... Central Valley Project
CVPIA ..... Central Valley Project Improvement Act
DOI ..... Departement of the Interior
DWR ..... Department of Water Resources
GSA ..... Groundwater Sustainability Agency
GSP ..... Groundwater Sustainability Plan
PMA ..... projects and management actions
Project ..... Kamm Avenue Pistachio Processing, LLC
MGD ..... Million Gallons per Day
SGMA ..... Sustainable Groundwater Management Act
SWP ..... (California) State Water Program
USBR ..... United States Bureau of Reclamation
WSA ..... Water Supply Analysis
WWD ..... Westland Water District

1 Introduction

This Water Supply Analysis (WSA) was prepared by the Provost & Pritchard Consulting Group for Kamm Avenue Pistachio Processing LLC. which has applied to the Fresno County Department of Public Works and Planning (County) for a Conditional Use Permit, a height variance, a Site Plan Review and early termination of certain agricultural land conservation contracts (Williamson Act Contracts) to construct, operate and maintain a proposed pistachio processing plant with the capacity to process 60 million pounds of finished pistachio products per year (Project). The Project would be located on an approximately 315.8-acre site to the south of Kamm Avenue, west of Highway 33, and east of Interstate 5 in the western portion of unincorporated Fresno County. The primary processing facility will be on the northern 80 acres of the site. Water settling and cleaning ponds are proposed to be located on the southern border of the site. The Project would provide pistachio processing capacity in the immediate vicinity of existing pistachio orchards that currently ship harvested crops for processing to more remote locations, including plants outside of the County.

The Project will utilize approximately 209 acre-feet per year (AFY) of water. Project water will be provided by contracts with growers operating approximately 2,556 irrigated acres of existing pistachio orchards in the vicinity of the Project (the "Growers") in accordance with the rules and regulations of the Westlands Water District (WWD 2017). Project water will consist of surface water supplies delivered to the Growers by WWD from the federal Central Valley Project (CVP). The Project could also be supplied with supplemental water obtained by WWD for water users in the District ("WWD Supplemental water"), including the Growers. As discussed below, during the three-year period from 2014 to 2016, CVP and WWD Supplemental water supplies were reduced significantly below historical levels in response to the most severe statewide drought of record. CVP and WWD Supplemental water deliveries to the Growers from these supplies exceeded the Project's demand in each of those years. To provide additional supply reliability, the Project has contracted with a landowner-member of the Poso Creek Water Company to provide up to 209 acre-feet of water from the existing Semitropic Water Bank to meet Project demands if Grower supplies are reduced below historically low levels in exceptionally dry future years.

Approximately 80 percent to 90 percent of the Project's water supply will be reused for irrigation by the Growers known as "irrigation reuse water". The Project will be connected with existing regional distribution facilities, including an adjacent existing pipeline, and existing pumps on the California Aqueduct to the north to obtain water supplies. Irrigation reuse water from the facility will be conveyed from the ponds on the south of Project site through existing irrigation infrastructure for reuse by the Growers. No groundwater will be used by the Project.

1.1 Purpose

The purpose of this WSA is to document that there will be sufficient water supplies available to serve the Project and reasonably foreseeable future development during normal, dry and multiple dry years in accordance with the California Environmental Quality Act (CEQA) and Guidelines

and California Water Code Section 10910 *et seq.* This WSA also considers the Project's potential impacts related to water supply under the CEQA Guidelines.

1.2 Project Overview

The Project processing facilities will be located on approximately 315.8 acres, within Section 23, Township 16S and Range 14E. An adjacent 160-acre site to the west will be used for solid materials management, including precleaning twigs and branches, empty shells, and pressed, demoisturized hulling residue.

CVP and other surface water supplies are provided to the Growers by WWD from an existing turnout (Lateral 10R) near mile post marker 124.16R along the California Aqueduct. There is an existing 36-inch diameter steel pipeline from the California Aqueduct that connects to an existing 34-inch diameter steel pipeline near Kamm Avenue owned and operated by WWD. The 34-inch pipeline extends south of Kamm Avenue along the eastern border of the Project site. The turnouts and pipelines are part of and connected with the existing water supply and distribution network used by the Growers. A lateral connection from the 34-inch pipeline on the border of the Project will be constructed to deliver water from the existing water supply and distribution network for Project use. The Project location, the existing pumps and pipelines from the California Aqueduct to the Project site, and the approximate location of the proposed Project connection with the adjacent pipeline are shown in **Figure 1-1**.

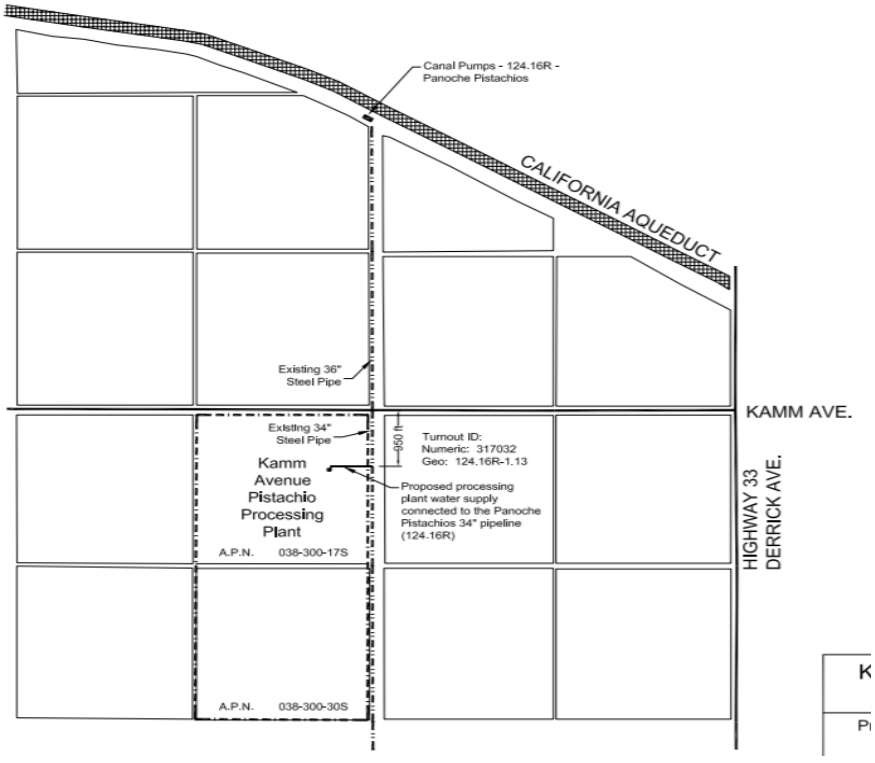


Figure 1-1: Project Location, Existing Pumps and Pipelines from the California Aqueduct, and Proposed Project Water Supply Connection

1.3 Project Water Demand

Most of the Project's water demand will occur during the 6-week harvest period, typically in September and October, and will be used in the hulling process. Hulling operations are estimated to require up to 1.8 million gallons (5.5 acre-feet) per day and a total of 64.9 million gallons (199.3 acre-feet) per harvest each year. A supply of 100,000 gallons (0.3 acre-feet) for fire suppression purposes will be maintained onsite in accordance with Fresno County Fire Department requirements. Approximately 350,400 gallons (1.07 acre-feet) would be also be used for onsite irrigation. Total non-domestic Project water demand are estimated to be approximately 65.4 million gallons (200.7 acre-feet) per year.

The Project will use filtered and chlorinated irrigation reuse water for hulling operations, fire suppression and landscaping. A portion of the irrigation reuse water will be treated onsite to domestic use standards for periodic process equipment, bin, and silo washing and employee use.

Most of the domestic water demand will be used for equipment washing, which will occur 60 times per year. Process equipment washing will require 2,125,000 gallons (6.5 acre-feet) of domestic water per year. Bins used to store work in progress product will be washed 4 times per year, and storage silos will be washed once per year. These activities will require approximately 285,00 gallons (0.9 acre-feet) of domestic water per year. Employee consumption will require approximately 315,000 gallons (1.09 acre-feet) of domestic water per year.

Table 1-1 summarizes the Project's total annual process and domestic water demand by primary use. The Project will require a total of approximately 68.1 million gallons (209 acre-feet) per year.

	Gallons	Acre-feet
Process water		
Hulling wash (harvest period only)	64,945,433	199.3
Fire suppression	100,000	0.3
Landscaping	350,400	1.08
Total Process	*65,395,833*	*200.7*
Domestic Water		
Process equipment wash	2,125,000	6.5
Bin wash	168,000	0.5
Silo wash	117,600	0.4
Employee	315,000	1.0
Total Domestic	*2,725,600*	*8.4*
Total Project water demand	**68,121,433**	**209**

Table 1-1: Estimated Annual Water Demand for the Project

The Project expects to recover approximately 80 to 90 percent of the water supplied to the facility, or from 167 to 188 AFY of irrigation reuse water. After removing solids, including demoisturized hulling residue, blank shells and twigs and stems, the irrigation reuse water will be conveyed to two water settling and cleaning ponds, each with 50 acre-feet storage capacity, located along the southern border of the Project site. The irrigation reuse water will be conveyed from the ponds to the regional irrigation distribution system for irrigation reuse by the Growers.

2 Project Water Supplies

2.1 Project Contracts with Growers

The Project will obtain water supplies under contracts with the Growers. As discussed below, the Growers are all located in the WWD service area and have rights to receive surface water supplies from WWD to irrigate approximately 2,556 acres of existing irrigable land used for pistachio orchards in the Project vicinity. The locations of the orchards and applicable Fresno County assessor's parcel numbers (APNs) are shown in **Figure 2-1**. The contracts will require that the Growers deliver sufficient water supplies each year to operate the Project. The contracting parties will be 104 Pistachios, LLC (APNs 038-210-69S and 038-210-74S), Derrick Pistachios, LLC (APNs 038-210-10S and 038-210-14S), Kamm Pistachios, LLC (APNs 038-210-08 and 038-210-09), Panoche Pistachios, LLC (APNs 038-210-15S, 038-210-70S and 038-210-76S), Three Rocks Pistachios, LLC (APNs 038-210-26, 038-210-27S, 038-210-54S and 038-210-63S), Tuscan Farms, LLC (APNs 038-141-52, 038-141-53, 038-210-01 and 038-210-02S), Granville Farms, LLC (APNs 038-141-54S, 038-141-55S, 038-141-55S and 038-141-56S) and Sommerville Farms, LLC (APNs 038-210-03S, 038-210-37S, 038-210-38S, 038-210-39S and 038-210-42S). The water supply contract between the Growers and the Project is included in **Appendix A**.

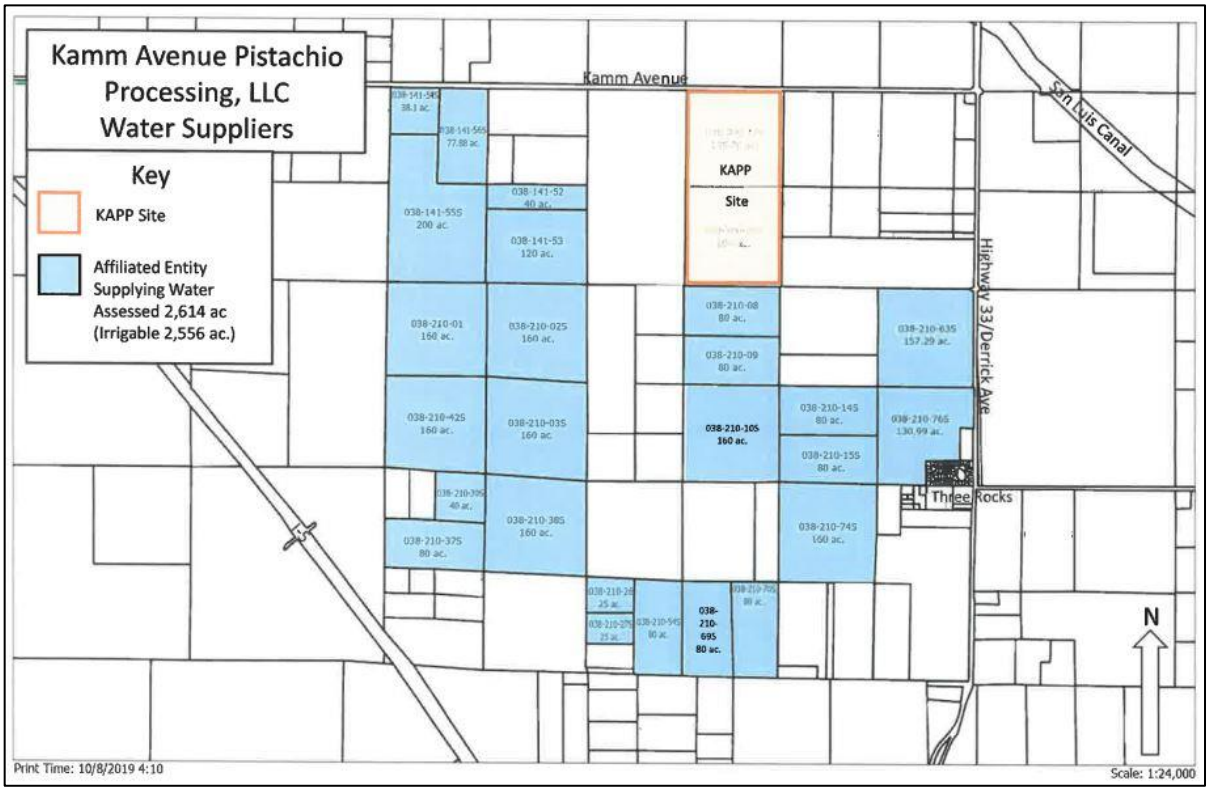


Figure 2-1: Locations of Growers and APNs Contracting to Provide Water for the Project

2.2 CVP and WWD Supplemental Water

The Project and all of the Growers are located within the WWD service area. As shown in **Figure 2-2** the WWD is located east of the coastal mountain range in the San Joaquin Valley, west of the City of Fresno, and is the largest agricultural water district in the United States. WWD encompasses approximately 1,000 square miles (approximately 614,000 acres) primarily consisting of farmland in western Fresno and Kings Counties.

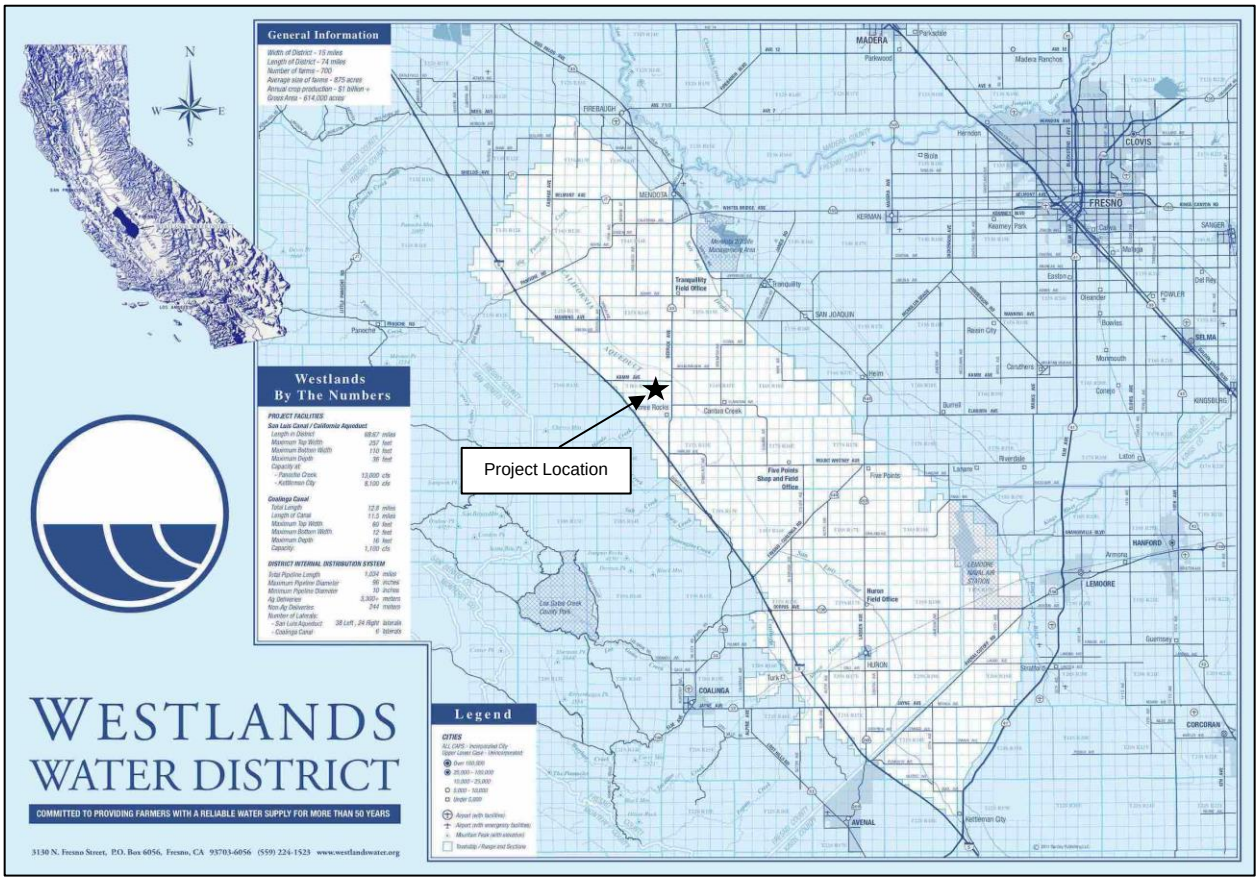


Figure 2-2: WWD Service Area (WWD 2020b)

WWD has a CVP contract entitlement of approximately 1,197,000 AFY which is delivered by the United States Bureau of Reclamation (USBR), primarily through the San Luis Canal or from the Mendota Pool. CVP operations are coordinated with the California State Water Project (SWP) under an Agreement between the United States of America and the State of California for Coordinated Operation Agreement of the Central Valley Project and the State Water Project (COA), which was executed in 1986. From 1988 through 2017, net CVP deliveries to WWD, which include rescheduled deliveries and other adjustments, averaged approximately 645,000 AFY, or about 54% of the contract entitlement amount. The COA was amended in 2018 (CRS 2020). WWD has indicated that the 2018 COA addendum could increase the District's CVP supplies by 48,000 acre-feet in wet water years, 85,000 acre-feet in dry years and by an average of 65,000 acre-feet in future years (Luhdorff and Scalmanini 2020).

WWD has adopted Terms and Conditions for Agricultural Water Service and Regulations for the Allocation of Agricultural Water (WWD 2017). The Growers are located in a portion of the WWD that is entitled to an allocation of 2.6 AFY per acre from the District's CVP contract under Article 2 of the WWD regulations. Each water user in the WWD must submit an allocation application annually on or before January 15 to receive CVP water, including CVP contract water, Long-Term Water acquired by the District, other water acquired by the District, and unused water rescheduled from a prior water year. The delivery and use of CVP water supplied by WWD is subject to the District's Terms and Conditions for Agricultural Water Service and Regulations for the Allocation of Agricultural Water. A copy of the 2020-2021 Agricultural Water Allocation Application and Purchase Agreement form submitted each year by WWD water users for CVP supplies, including the Growers, is included in **Appendix B**.

WWD supplements available CVP supplies with water obtained by the District from excess capacity that may be available in the CVP and SWP, other supplemental supplies, and other adjustments (WWD Supplemental water). Each water user in the WWD must submit a supplemental water application annually on or before May 15 to receive WWD Supplemental water if available from the District. The delivery and use of WWD Supplemental water is subject to the District's Terms and Conditions for Agricultural Water Service and the Regulations for the Allocation of Agricultural Water. A copy of the 2019-2020 Agreement to Accept and Purchase Supplemental Water submitted each year by WWD water users for WWD Supplemental Water supplies, including the Growers, is included in **Appendix C**.

Article 19.2.A of the WWD regulations defines an "Ag Related M&I Use" as "the use of water exclusively for purposes of commerce, trade or industry associated with the production of agricultural crops or livestock, or their related by-products, including human uses, other than housing, that are incidental to the Ag Related M&I Use." Nut processing plants have been considered to be a Ag Related M&I Use by the District, and WWD has confirmed that the Project is an Ag Related M&I Use (see **Appendix D**). Article 19.4.C provides that water may be transferred each year from "any available source" to satisfy an Ag Related M&I Use (WWD 2020a). The Project has an M&I account with WWD, and the Growers will transfer sufficient water supplies to operate the Project in accordance with the WWD regulations and the water supply Agreement with the Project. A copy of the Water Transfer form that will be used by the Growers to transfer water to the Project's M&I account with WWD is included in **Appendix E**.

2.3 WWD and the Sustainable Groundwater Management Act

In 2014, California enacted the Sustainable Groundwater Management Act (SGMA) (Water Code §10720 *et seq*.). SGMA requires that groundwater basins designated by the state Department of Water Resources (DWR) as high priority and/or critically overdrafted must be managed under a Groundwater Sustainability Plan (GSP) that avoids "undesirable results" as defined in the Act within 20 years from January 31, 2020. The GSP must be developed by a Groundwater Sustainability Agency (GSA) approved by the DWR. As shown in **Figure 2-3**, the WWD service area boundary largely overlaps with DWR-designated San Joaquin Valley groundwater subbasin 5.22-9, which is commonly called the "Westside Subbasin." The DWR has designated the Westside Subbasin as high priority and critically overdrafted, and SGMA requires that a GSP be adopted by an approved GSA for the subbasin by January 31, 2020.

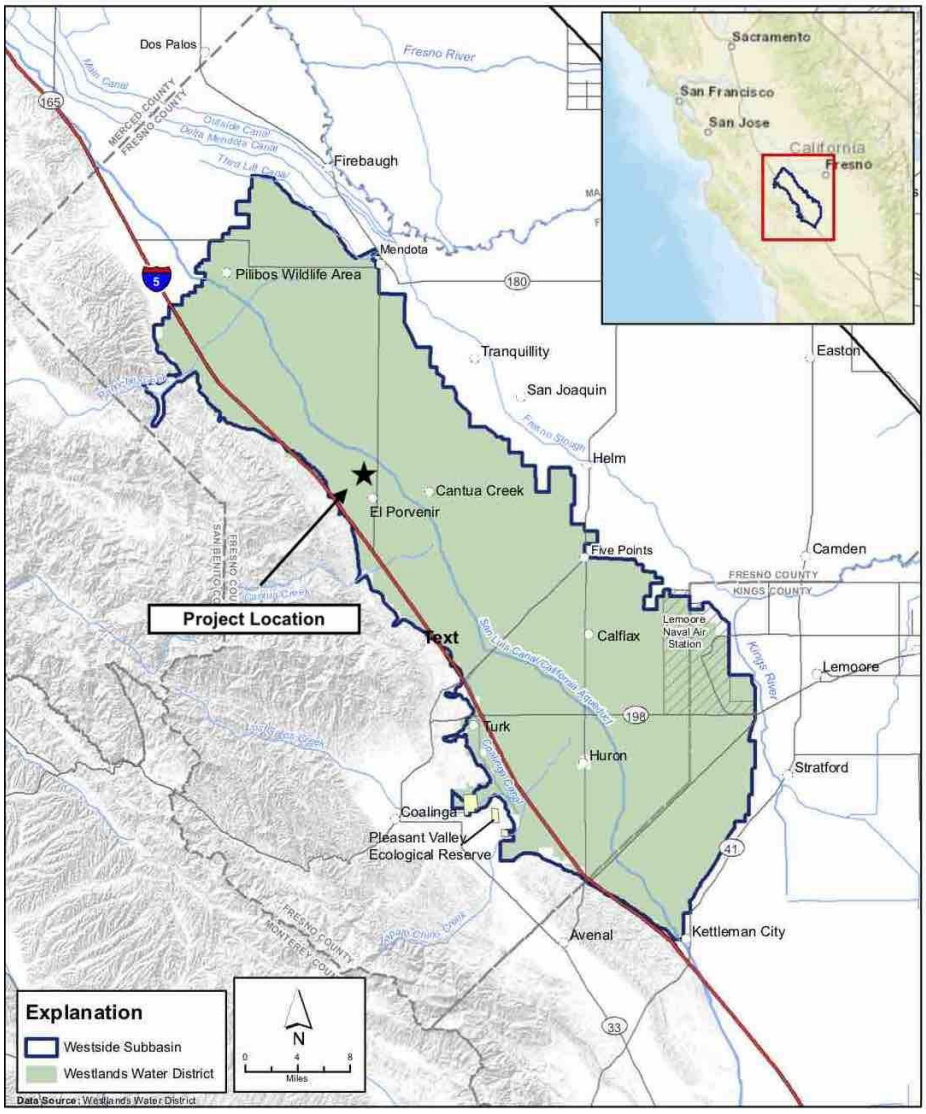


Figure 2-3: WWD and Westside Subbasin Locations (Luhdorff and Scalmanini 2020)

WWD was approved by the DWR as the primary GSA responsible for the Westside Subbasin in accordance with SGMA. A GSP and water budget for the Westside Subbasin was adopted by WWD and submitted for DWR review on January 31, 2020. The GSP includes certain groundwater projects and management actions (PMAs) that are projected to result in sustainable groundwater management in compliance with SGMA by 2040 and for 30 years thereafter. PMA-2 will decrease groundwater use in the Westside Subbasin from 1.3 AFY per acre in 2023 to 0.6 AFY per acre by 2030. PMA-4 requires that, if required by ongoing monitoring, groundwater extractions in certain locations will be replaced with other supplies (Luhdorff and Scalmanini 2020). No groundwater extracted from the Westside Subbasin or any other basin will be used by the Project.

2.4 Project Water Supply Reliability

2.4.1 CVP and WWD Supplemental Water Supplies

The Growers will use CVP water, including rescheduled deliveries and WWD Supplemental water to meet Project demand. As shown in Table 2, these supply sources have accounted for as much as 99.6 percent (2017) to 14.1 percent (2015) of the District's total water supplies since 1988. The amount of CVP and WWD Supplemental water supplied by WWD ranged from 1,247,712 acre-feet in 1988 to 117,029 acre-feet in 2009.

Year	CVP Allocation (percent of WWD contract)	CVP Water (AF)	WWD Supplemental Water (AF)	Total CVP and WWD Supplemental Water (AF)	Total WWD Supply (AF)
1988	100%	1,150,000	97,712	1,247,712	1,415,369
1989	100%	1,035,369	99,549	1,134,918	1,330,448
1990	50%	625,196	-2,223	622,973	941,475
1991	27%	229,666	77,399	307,065	930,008
1992	27%	208,668	100,861	309,529	952,152
1993	54%	682,833	82,511	765,344	1,142,864
1994	43%	458,281	108,083	566,364	947,905
1995	100%	1,021,719	121,747	1,143,466	1,351,306
1996	95%	994,935	172,609	1,167,544	1,310,497
1997	90%	968,408	261,085	1,229,493	1,354,401
1998	100%	945,115	162,684	1,107,799	1,177,004
1999	70%	806,040	111,144	917,184	1,155,816
2000	65%	695,693	133,314	829,007	1,252,301
2001	49%	611,267	135,039	746,306	1,036,898
2002	70%	776,526	64,040	840,566	1,151,609
2003	75%	863,150	32,518	895,668	1,163,626
2004	70%	800,704	44,407	845,111	1,151,983
2005	85%	996,147	98,347	1,094,494	1,190,270
2006	100%	1,076,461	38,079	1,114,540	1,185,476
2007	50%	647,864	61,466	709,330	1,106,884
2008	40%	347,222	102,862	450,084	995,505
2009	10%	202,991	70,149	273,140	821,210
2010	45%	590,059	79,242	669,301	880,597
2011	80%	876,910	191,686	1,068,596	1,173,976
2012	40%	405,451	123,636	529,087	995,241
2013	20%	188,448	143,962	332,410	1,071,823
2014	0%	98,573	26,382	124,955	839,669
2015	0%	82,429	34,600	117,029	828,163
2016	5%	9,204	174,374	183,578	867,732
2017	100%	911,307	174,490	1,085,797	1,089,788
2018	50%	580,050	55,872	635,922	1,006,260
2019	75%	788,852	53,433	842,285	1,007,270
2020 (est.)	20%	203,138	119,000	322,138	850,138
Total		20,878,676			35,675,664

Table 2-1: WWD CVP Contract Annual Allocation Percentage, and CVP and WWD Supplemental Water Supplies 1988 to 2020 (est.) (WWD 2020c)

CVP water accounted for about 20.9 million acre-feet (59 percent) and WWD Supplemental water accounted for about 2.4 million acre-feet (9 percent) of WWD's total water supply of 35.7 million acre-feet from 1988 to 2020. A severe drought reduced WWD's supply of CVP water to historically low levels during 2014-2016. In 2014 and 2015, the USBR allocated no water (zero percent) to WWD under the District's CVP contract. In 2016, the District's CVP allocation was 5 percent of the total contract amount. As shown in **Table 2-1**, total CVP Water delivered to WWD, including rescheduled deliveries and other adjustments, ranged from 9,204 acre-feet in

2016 to 98,573 acre-feet in 2014 during the drought. WWD Supplemental water partially offset the substantially reduced CVP water supplies during 2014-2016 as well as in other dry years. As shown in Table 2-1, WWD provided over 174,000 acre-feet of supplemental water in 2016 when CVP supplies were the lowest during the 1988-2000 period of record.

2.4.2 Grower Historical CVP and WWD Supplemental Supplies

As discussed in Section 2.2, the Growers are eligible to apply for and receive CVP water and WWD Supplemental Water in accordance with the WWD rules and regulations. **Table 2-2** summarizes the CVP and WWD Supplemental water deliveries received by the Growers from 2014 to 2019, including the historically single dry and multiple dry years that occurred during 2014-2016.

Year	CVP Allocation (percent of WWD contract)	CVP Water to Growers (AF)	WWD Supplemental Water to Growers(AF)	CVP and WWD Supplemental Water to Growers (AF)
2014	0%	79	184	263
2015	0%	181	1,263	1,444
2016	5%	780	1,204	1,984
2017	100%	6,852	1,653	8,504
2018	50%	7,160	412	7,572
2019	75%	9,835	309	10,144

Table 2-2: Deliveries of CVP Water to Growers and WWD Supplemental Water to Growers, 2014-2019 (data provided by Growers)

Table 2-2 shows that CVP and WWD Supplemental water deliveries exceeded the Project demand of 209 AFY in each year, including the 2014 to 2016 drought period, and the historically single dry CVP delivery year in 2016 (as shown in data provided by Growers). Total CVP Water and WWD Supplemental water deliveries to the Growers ranged from 263 acre-feet in 2014 to 1,984 acre-feet in 2016. The minimum amount of CVP and WWD Supplemental water delivered by WWD to the Growers, which occurred in 2014, was 54 acre-feet above the Project's annual water demand.

2.4.3 Future Project Water Supply Reliability

The future reliability of CVP and WWD Supplemental water deliveries to the Growers could be affected by several potential regulatory and hydrological factors, including climate change.

In May 2020, the Congressional Research Service published an updated report on the CVP in California. The report identified three regulatory constraints that could affect future CVP delivery reliability: (1) state water quality requirements pursuant to state and the federal water quality laws; (2) regulations and court orders pertaining to implementation of the federal Endangered Species Act; and (3) implementation of the 1992 Central Valley Project Improvement Act (CVPIA).

State water quality requirements could reduce CVP delivery reliability, particularly south of the Sacramento Delta, because the USBR and the SWP are required to maintain certain salinity levels at specific locations in the Delta. The USBR and the SWP extract water from pumping facilities located on the south of the Delta. To achieve applicable water quality requirements, pumping from the southern Delta facilities, and the amount of water delivered to CVP and SWP

water users south of the Delta must be reduced or curtailed at certain times of the year and in response to hydrological and Delta water quality conditions. In addition, in 2018 the state updated the 2006 Bay-Delta Plan to include certain minimum instream flow requirements in the San Joaquin River and its tributaries, including the Stanislaus, Tuolumne, and Merced Rivers. The flow requirements have not been finalized, but have been estimated to reduce water supplies obtained from affected streams by 7 percent to 38 percent per year depending on hydrological conditions. USBR and the federal Department of the Interior (DOI) filed lawsuits in 2019 challenging the state's CEQA review of the Bay-Delta Plan update.

Both the CVP and the SWP pump water from the Delta and operate statewide water storage and conveyance facilities under the COA that affect certain species listed under the federal Endangered Species Act (ESA) and the California Endangered Species Act (CESA), including the Delta smelt and anadromous salmonids. As a result, the USBR and SWP are required to obtain biological opinions (BiOps) from federal wildlife and similar findings from state agencies for CESA incidental take permits identifying water system operational requirements, such as seasonal pumping limits, that the agencies believe would sufficiently protect the affected species. Until 2016, the CVP and SWP operated under BiOps issued in 2008 (USBR 2008). SWP CESA coverage was predicated on the state finding that the federal BiOps were consistent with state law, a process called a "consistency determination." After the 2016 election, the Trump Administration proposed to modify CVP system operations to increase water supply deliveries, reopened federal ESA consultations, and issued amended federal BiOps in 2019. The proposed CVP modifications were finalized by the USBR in February 2020. The state and several nongovernmental third parties filed lawsuits challenging the CVP amendments, and one proposed CVP operational modification was enjoined by a federal court in May 2020. Since the state is legally challenging the 2019 BiOps, the SWP is unable to use the federal BiOps to obtain CESA coverage pursuant to a consistency determination and may not be able to operate joint water infrastructure under the COA as anticipated by the CVP amendments.

The CVPIA was enacted in 1992 and requires, among other provisions, that significant amounts of CVP water be dedicated to fish and wildlife purposes, including 800,000 acre-feet in average years, and 600,000 acre-feet in drought years. These and other CVPIA provisions have been controversial and subject to several lawsuits. According to the Congressional Research Service, the CVPIA decreased water availability and increased costs for agricultural and M&I contractors and created new water and funding sources for fish and wildlife. Consequently, the CVPIA "remains a source of tension, and some would prefer to see it repealed in part or in full." (CRS 2020).

Climate change could also affect the future reliability of CVP and WWD Supplemental water deliveries to the Growers by changing the amount and timing of rain and snow, and the amount and duration of seasonal snow melt and runoff, in applicable watersheds. Climate change impacts on CVP and other surface water supplies used by WWD have been most recently analyzed in the Westside Subbasin GSP, which was submitted to the DWR in accordance with SGMA at the end of January 2020. As required by SGMA, the GSP considers projections of CVP and other surface water deliveries to WWD over an approximately 70-year period (to water year 2069-70) including a "baseline" scenario, which accounts for regulatory constraints and historical hydrology but does not assume significant additional climate change impacts, a "2030 climate change" scenario, which assumes a moderate level of climate change impacts over the

analysis period based on DWR climate change guidance, and a "2070 climate change" scenario, which assumes more significant climate change effects on surface water supplies over the analysis period based on DWR guidance. The GSP states that regulatory constraints and moderate climate change consistent with the 2030 climate change scenario could reduce average annual CVP allocations from approximately 54 percent of the WWD contract amounts that occurred during 1988-2017 to 43 percent in the future (Luhdorff and Scalmanini 2020, p. 4-3). A greater degree of climate change consistent with the 2070 climate change scenario could reduce average annual CVP allocations to 29 percent of the WWD contract amount (Luhdorff and Scalmanini 2020, Appendix I, Table 5-3).

A decrease in reliability due to regulatory and/or climate change constraints would reduce the average annual amount of CVP and WWD Supplemental water available to the Growers over time. If the average annual reliability of CVP supplies was reduced to 29 percent as considered in the GSP 2070 climate change scenario, the Growers would receive approximately 0.754 acre-feet per acre (29 percent times the 2.6 acre-feet per acre allocation in Article 2 of the WWD Regulations) for use on 2,556 irrigable acres, an average of 1,927 acre-feet of CVP water per year. This reduced CVP supply would be more than 9 times the Project's annual demand. Rescheduled CVP deliveries and other enhanced COA supplies anticipated by WWD under the 2018 COA addendum, and, as shown in **Table 2-1** and **Table 2-2**, WWD Supplemental water, can be expected to further increase the amount of surface water delivered to the Growers by WWD under future conditions under significant climate change impact scenarios. The Growers would have sufficient surface water supplies to meet the Project demand of 209 AFY unless the aggregate amount of these supplies was less than approximately 0.082 acre-feet per acre, or 97 percent lower than the 2.6 acre-feet per acre allocation of CVP water in Article 2 of the WWD Regulations and more than 89 percent lower than the average annual CVP delivery of 0.754 acre-feet per acre estimated in the GSP in the 2070 climate change scenario. There is no substantial evidence that average annual CVP delivery reliability, and average annual deliveries of CVP rescheduled water, and WWD Supplemental water could be reduced to such an extent under any reasonably foreseeable regulatory, climate change or hydrological conditions.

2.4.4 Dry Year Reserve Supply

As discussed above, and as shown in **Table 2-1** and **Table 2-2**, the amount of CVP and WWD Supplemental water available to WWD and delivered to the Growers has varied each year in response to hydrological and regulatory conditions. In prior years, including the most severe single dry and multiple dry drought years on record, the Growers have received sufficient CVP and WWD Supplemental water to meet Project demand.

To further enhance the Project's water supply reliability, the Project has contracted with Farid Assemi, as trustee of the Amended and Restated Farid Assemi Revocable Trust, dated March 2, 2010 (FA 2010), a member-landowner of the Poso Creek Water Company (PCWC) to maintain a 209 acre-foot reserve supply in the Semitropic Water Bank for Project use in exceptionally dry water years in the event the Growers cannot meet Project demand. On May 29, 2020, the USBR issued a Final Environmental Assessment (final EA) and a Finding of No Significant Impact (EA-FONSI) in accordance with federal law allowing PCWC to store up to 100,000 AFY of CVP water in the Semitropic Water Bank, a water banking and recovery facility operated by the Semitropic Water Storage District (Semitropic) in Kern County, California. The May 2020 EA-

FONSI doubles the amount of CVP water PCWC may store in the water bank from a previously approved limit in 2017 of 50,000 AFY, The USBR also agreed to extend the time frame for the storage approval from 9 years to 25 years (USBR 2020).

As shown in **Figure 2-4**, the Semitropic Water Bank is located to the south of WWD and has access to the California Aqueduct-San Luis Canal used by the District. **Figure 2-4** also shows that WWD, the Semitropic Water Storage District and the Semitropic Water Bank are all located within the existing designated place-of-use for CVP water supplies.

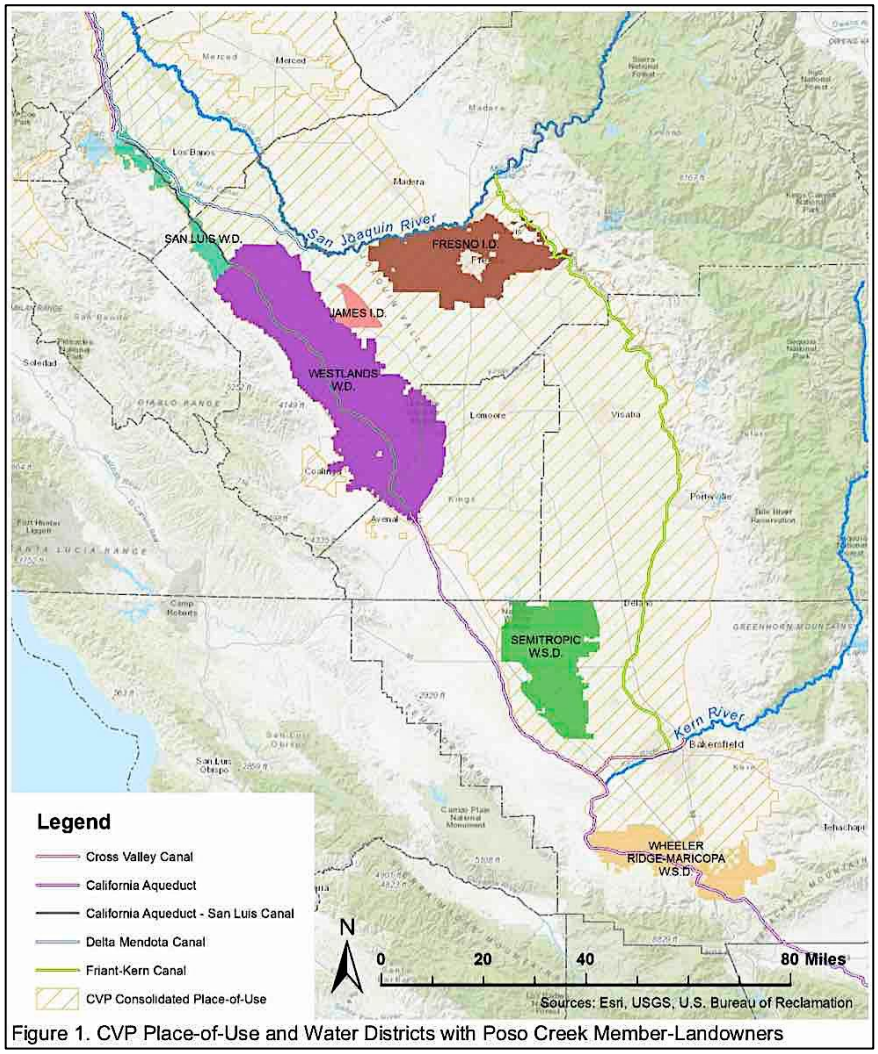


Figure 2-4: Locations of WWD, Semitropic Water Storage District, CVP Consolidated Place of Use, and California Aqueduct San Luis Canal (source: USBR 2020)

In 2007, PCWC entered into a long-term water banking contract with Semitropic for 60,000 acre-feet of guaranteed storage capacity and 20,000 AFY of firm stored water recovery and recharge capacity in the Semitropic Water Bank. The initial contract term ends in 2035 and may be extended under certain conditions for at least an additional 10 years. The contract provides PCWC with additional, lower priority firm storage, recharge and recovery rights to the extent that other Semitropic Water Bank participants do not fully utilize allocated capacity. According

to the USBR, since 2007, PCWC member-landowners have recharged 67,000 acre-feet and recovered approximately 22,500 acre-feet of CVP water, after accounting for losses due to banking, in the Semitropic Water Bank. Each member-landowner in the PCWC has a direct water banking relationship with Semitropic and can conduct water recharge and recovery activities independent of other member-landowners. Stored CVP water in the Semitropic Water Bank can be delivered within the CVP place-of-use through existing facilities by direct conveyance or exchanges among districts or other exchange participants. Exchanges of banked water from Semitropic to WWD would be accomplished with an exchange participant taking delivery of banked CVP water in exchange for a corresponding amount of the participant's water supplies located north and upstream of the WWD, such as in San Luis Reservoir. The exchange water can be held in a storage facility for later delivery. The May 2020 Final EA and EA-FONSI approved by the USBR identifies multiple exchange and conveyance mechanisms for delivering CVP water stored in the Semitropic Water Bank to upstream locations, including WWD (USBR 2020).

FA 2010 is a landowner-member of PCWC and has independent rights to recharge and recover CVP water in the Semitropic Water Bank as described in the Final EA and EA-FONSI (USBR 2020). FA 2010 currently has rights to more than 209 acre-feet of CVP water stored in the Semitropic Water Bank, and has contracted with the Project to maintain a minimum of 209 acre-feet in the bank, net of banking losses, during each water year for Project use. The stored CVP water will provide a reserve supply that will be delivered to the Project using the exchange mechanisms identified by the USBR in the final EA and EA-FONSI, or other approved exchange arrangements, in the event that Grower supplies could be reduced below the lowest levels in the historical record and are unable to meet Project demand. This precautionary dry year storage reserve ensures that, under these potentially severe water supply conditions, the Project would continue to operate using CVP water stored in the Semitropic Water Bank. The reserve supply contract is included in the Water Supply Agreement with Growers in **Appendix A.**

3 Potential Water Supply Impacts

CEQA requires an assessment of whether the Project will have sufficient water supplies available to serve the project and reasonably foreseeable future development during normal, dry and multiple dry years. CEQA also requires an assessment of Project impacts in relation to whether the Project would: (a) substantially decrease groundwater supplies or interfere substantially with groundwater recharge and impede a basin's sustainable groundwater management; (b) conflict with or obstruct implementation of a sustainable groundwater management plan; or (c) 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.

3.1 Project Water Supply Sufficiency Impacts

As discussed above, WWD has determined that the Project is an Ag Related M&I Use and may obtain sufficient water supplies from any source in accordance with Article 19 of the WWD Regulations. The Project will contract with Growers operating a total of 2,556 irrigable acres of pistachio orchards adjacent to the Project for an annual water supply of 209 AFY. The Growers will transfer the Project water in accordance with WWD rules and regulations. Approximately 80 to 90 percent of all water supplied to the Project will be reused for irrigation by the Growers. The Project would result in a net consumption of water ranging from 20.9 AFY to 41.8 AFY depending on the facility's irrigation water reuse efficiency. If the Project is not constructed, pistachios that would be processed in the proposed facility would be transported to other processing plants, and approximately the same amount of net water consumption would be used in these other locations. As a result, the Project would not significantly increase surface water demand in the region, including surface water supplies delivered by the CVP and the SWP to locations south of the Sacramento Delta.

Regulatory uncertainties and potential climate change impacts could reduce the amount of surface water available to WWD and to the Growers. The 50-year water budget analyses required by SGMA in the Westside subbasin GSP consider potential reductions from an historical average of 54 percent of WWD's CVP contract amount during 1989-2015 to 43 percent with existing regulatory trends and assuming moderate climate change impacts, to as much as 29 percent with more significant climate change impacts in the 2070 climate change scenario. Based on the CVP allocation of 2.6 AFY per acre in Article 2 of the WWD Regulations, an average annual delivery reliability of 29 percent would provide the Growers with 1,927 AFY from CVP supplies. The Growers would receive 200 percent of Project demand (418 AFY) if average annual CVP allocations were reduced to just over 6 percent of the WWD contract amount, and would receive sufficient surface water (209 AFY) to meet Project demand if CVP allocations were slightly above 3 percent of the WWD contract amount. Additional surface water from rescheduled CVP supplies and other COA adjustments, and WWD Supplemental water, which historically has provided about 9 percent of total WWD supplies (see Table 2-1) would likely be available to further augment available water for Project use assuming the most substantial future climate change and regulatory impacts on CVP supplies. There is no substantial evidence that regulatory or climate change impacts would reduce the average annual

reliability of CVP water, CVP rescheduled water and CVP supplies from other COA adjustments, and WWD Supplemental water supply reliability delivered to the Growers to a level that would not be sufficient to meet Project demand.

As shown in **Table 2-1** and **Table 2-2**, the single driest and direst multiple year drought years affecting CVP deliveries to WWD occurred during 2014-2016. The Growers received sufficient surface deliveries of CVP and WWD Supplemental water from WWD to meet Project demand in each of these years. This historical evidence indicates that the Growers would be able to supply the Project with sufficient water for pistachio processing operations using existing entitlement and water sources even if hydrological and regulatory conditions constrain WWD water deliveries to the extent that occurred in 2014-2016.

The Project has also contracted for an additional reserve CVP supply that would be maintained each water year by a member-landowner in the PCWC under an existing long-term banking and recovery contract with the Semitropic Water Bank. The reserve supply would be provided to the Project by exchanges to obtain water sources upstream of WWD as identified in the 2020 USBR final environmental assessment for the PCWC approval. PCWC's rights to store and recover water in the Semitropic Water Bank, and USBR's approval of CVP water storage in the bank, are subject to existing long term contracts that could be further extended under certain conditions and with the concurrence of the applicable parties.

The water supplied by the Growers, and the potential use of the CVP reserve supply in exceptionally dry years, would occur within the existing CVP place-of-use (see **Figure 2-4**: Locations of WWD, Semitropic Water Storage District, CVP Consolidated Place of Use, and California Aqueduct San Luis Canal (source: USBR 2020)). Approximately 80 to 90 percent of all water used by the Project for pistachio processing will be reused by the Growers for irrigation. The Project's net consumption of water will range from 20.9 AFY (with a 90 percent return to the Growers for irrigation) to 41.8 AFY (with an 80 percent return to the growers). This consumption amounts to an average of 0.0082 AFY per acre to 0.16 AFY per acre for the 2,556 irrigable acres of orchards operated by the Growers and represents a negligible amount of the Growers' total irrigation requirements per acre. The Project's net water consumption will not significantly impact the Growers' water demand. Project water use will also not result in a significant cumulative change in demand for WWD or CVP water supplies because a similar amount of facility-related water use, net of return for irrigation reuse, would occur in other Central Valley pistachio plants processing the same crops that would be delivered to the Project.

As a result, the Project will have sufficient water supplies available to serve the project and reasonably foreseeable future development during normal, dry, and multiple dry years. Project-level and cumulative impacts to water supplies will be less than significant.

3.2 Potential Groundwater and SGMA Impacts

As discussed in Section 2.3, the Project will not use groundwater, including groundwater extracted from the Westside Subbasin, or groundwater from other locations. A GSP has been submitted to DWR by WWD acting as the primary Westside Subbasin GSA that is intended to achieve all applicable SGMA requirements for the Subbasin. The requirements include avoiding undesirable results to groundwater supply and storage, groundwater quality, and subsidence. The

primary PMAs that have been adopted in the Westside Subbasin GSP to comply with SGMA that could potentially affect groundwater conditions near the Project include: (1) a decrease in groundwater extraction from 1.3 AFY per acre to 0.6 AFY per acre during 2022-2030 to avoid reductions in groundwater supply and storage; and (2) the substitution of supplies other than groundwater in certain areas where subsidence due to groundwater extraction could occur, including the area in which the Project is located.

Project operations will not significantly affect the implementation of the Westside Subbasin GSP and the achievement of SGMA requirements. Approximately 80 to 90 percent of all Project water supplied by the Growers will be returned for irrigation reuse on the same land where the Growers operate 2,556 irrigable acres of pistachios, the "land application area" for the Project's irrigation reuse water. The irrigation reuse water supplied for Project pistachio processing will maintain existing patterns of surface water application in the vicinity of the Project and have no significant project-level and cumulative impacts to the volume of groundwater recharge in the Westside Subbasin. The Project's small amount of net water consumption during processing will not induce significant new surface or groundwater demand by the Growers. The Project will not use groundwater and will not directly or indirect impact subsidence risks in the Project area.

SGMA requires that an adopted GSP avoid undesirable results to groundwater quality. The Project's potential impacts to ground and surface water quality are addressed in other technical studies and in the environmental impact report (EIR) for the Project in accordance with CEQA. As discussed in detail in these reports and in the EIR, all irrigation reuse water and solid material management related to the Project's pistachio processing operations that could potentially affect surface and ground water quality, will comply with all applicable laws and regulations. Permits that meet applicable water quality standards and objectives have been issued by responsible agencies for multiple pistachio processing plants incorporating substantially the same water reuse and solid material management as proposed for the Project. The project will not result in significant project-level and cumulative impacts from a conflict with or obstructing implementation of the water quality protection requirements of a sustainable groundwater management plan or applicable water quality control plans.

3.3 Potential New Water Facility Impacts

As shown in **Figure 1-1**, the Project will connect to the existing regional water distribution network used by the Growers by constructing a lateral from an existing, adjacent pipeline to the Project facilities. The lateral will be entirely contained within the Project footprint except for the physical connection with the adjacent pipeline. No significant impacts would occur from lateral construction.

The existing pipeline extends north to existing pumps operated by the Growers on the California Aqueduct. The Project's peak water use will occur during an approximately 6-week harvest period, which usually occurs in September and October. During this period, pistachio hulling operations would require up to 1.8 million gallons per day (MGD), or 5.5 acre-feet per day. This demand would require an instantaneous water demand flowrate of 2.8 cubic feet per second (CFS). Existing infrastructure, including the existing pipelines adjacent to the Project and the existing Aqueduct pumps used by the Growers, have sufficient capacity to supply a 2.8 CFS flow rate to the Project. Peak Project water demand will occur during the fall when irrigation

requirements are low, and water deliveries to the Project will not interfere with water deliveries to the Growers.

As discussed above, 80 percent to 90 percent of the water supplied to the Project will be returned to Growers for irrigation reuse. The Project's net consumption of water will range from 20.9 AFY (with a 90 percent return to the Growers for irrigation) to 41.8 AFY (with an 80 percent return to the growers). This consumption would reduce the total amount of irrigation water potentially available to the Growers by an average of 0.082 AFY per acre to 0.16 AFY per acre compared with an average application rate of approximately 3 AFY per acre for pistachio orchards. The Growers will be able to manage water supplies to accommodate the Project's incremental water consumption net of irrigation reuse water without significantly increasing demand for surface water, including CVP supplies pumped from the Sacramento Delta or WWD Supplemental water and no new facilities will be required to supply water to the Growers. As discussed above, the recharge, recovery and exchanges required for the Project's reserve supply in the Semitropic Water Bank will utilize existing water bank and conveyance facilities and no new facilities would be required. As a result, project-level and cumulative impacts related to the potential need for new or expanded water facilities will be less than significant.

4 References

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Appendix A

Water Supply Agreement

WATER SUPPLY AGREEMENT
(Kamm Avenue Pistachio Processing, LLC)

THIS WATER SUPPLY AGREEMENT (this "**Agreement**") is made effective as of ____ _____, 2020 ("**Effective Date**") by and between the undersigned parties (collectively, "**Water Providers**" and each a "**Water Provider**"), and Kamm Avenue Pistachio Processing, LLC, a California limited liability company ("**Water User**"). Water Providers and Water User are sometimes collectively referred to herein as the "**Parties**" and singularly by their individual names or as a "**Party**."

R E C I T A L S:

A. Water User has applied to the Fresno County Department of Public Works and Planning (the "**County**") for a Conditional Use Permit, a height variance, a Site Plan Review and early termination of certain agricultural land conservation contracts (Williamson Act Contracts) to construct, operate and maintain a proposed pistachio processing plant with the capacity to process 60 million pounds of finished pistachio products per year ("**Project**"). The Project is located on that certain real property located in Fresno County, California, as more particularly described in "**Exhibit A**" attached hereto and incorporated herein by this reference (the "**Property**"). The Project will utilize approximately 209 acre-feet of water per year.

B. By this Agreement and to meet the Project's water demand, Water Providers agree to provide irrigation water supplies to Water User on the terms and subject to the conditions of this Agreement.

C. The parties acknowledge that Water User will be obtaining water supplies from water transferred by the Water Providers herein to the Westlands Water District (the "**District**") account of Water User. Water Providers have agreed to supply water needed for the Project; a portion of which water may be sold back to one or more of the Water Providers, for irrigation reuse after the water has been utilized by Water User for the processing of pistachios ("**Irrigation Reuse Water**").

D. Water Providers have historically received sufficient water deliveries from the District to meet Project demand in the single driest year in the District's period of record. Water User agrees to secure an additional reserve banked supply of at least 209 acre-feet of water available for Project use in the event an historically unprecedented dry year occurs in which District supplies delivered to the Water Providers are insufficient to meet Project demand.

NOW THEREFORE, in consideration of the mutual covenants and conditions contained herein, the parties agree as follows:

1. Water Supplies. Water Providers agree to provide Water User with Water Supplies (as defined below) on an annual basis, and not as a permanent transfer of water rights, on the terms and subject to the conditions of this Agreement. The maximum amount of any Water Supplies that each Water Provider shall be required to provide to Water User in any Crop Year (as defined below) shall be equal to the Water Amount (as defined below).

a. "**Water Supplies**" shall mean all water allocations, carryover rights, rescheduling rights, supplemental water, distribution rights, delivery rights, and other water-related rights or entitlements available through the District.

b. As used herein, "**Water Amount**" shall be calculated, with respect to any Crop Year, as (i) the quantity of water which Water User needs to operate the Project for the then current Crop Year multiplied by (ii) the applicable "**Supply Factor**" for each Water Provider, as such Supply Factor is set forth on "**Exhibit B**" attached hereto and incorporated by this reference.

2. Delivery. Each Water Provider shall transfer their applicable Water Amount to Water User's account with the District for Water User to draw upon as needed for processing pistachios.

3. Water Pricing and Payment. Upon transfer of any Water Amount by a Water Provider to the District account of the Water User, Water User will reimburse the Water Provider for any costs paid by such Water Provider for the acquisition and transfer of the Water Amount. Notwithstanding the foregoing, to the extent that payment for any such Water Amount can be deferred by the Water Provider and paid directly by the Water User to the District at the time of actual use of the water, such structure is preferred.

To the extent that the District should bill any charges later in the season which would have the effect of increasing the amount which a Water Provider is obligated to pay for a Water Amount, a Water Provider shall bill such amounts to Water User upon receipt of such billing from the District.

Any required payment to a Water Provider hereunder for Water Amounts shall be made within 30 days of Water Provider's billing to Water User for the same.

4. Water Orders and Delivery. Water User shall notify each Water Provider of amounts and requested delivery times for Water Supplies. Each Water Provider shall cause such water to be timely transferred to Water User's water account with the District. Water shall be delivered to the Property, as near reasonably possible, to the requested delivery time in light of the total obligations of and demands upon the Distribution System. As used herein, "**Distribution System**" shall mean that system of interconnected booster pumps, filter stations, reservoirs, pipelines, and related equipment and facilities which serve the Property and the land farmed by the Water Providers.

5. Applicable Water Obligations.

a. Water User shall be obligated to take delivery of and pay for all Water Supplies ordered from each Water Provider.

b. In the event that a Water Provider determines that it has surplus Water Supplies in its water account or otherwise (i.e., above any rescheduled or carryover quantities that are held

by a Water Provider consistent with a Water Provider's rescheduling or carryover approach for the applicable Crop Year), it shall first offer such water to Water User, which may, at its option, purchase such water in accordance with the terms and conditions hereof. If Water User does not purchase such water, a Water Provider may subsequently utilize the surplus Water Supplies in any manner consistent with the Water Provider's applicable legal and contractual obligations.

c. Water User shall contract with a qualified third party in the form of "**Exhibit C**" of this Agreement to maintain a dry year reserve water supply of not less than 209 acre-feet in a permitted water banking facility with existing legal and physical capacity to recover and deliver stored water to meet all or a portion of Project demand in any water year in which the Water Providers and the Water User mutually agree that the Water Providers will not have sufficient supplies from the District to meet Project demand.

6. Irrigation Reuse Water. After use in the Project, each Water Provider agrees to purchase a portion of Water User's annual supply of Irrigation Reuse Water on the terms and conditions set forth herein.

a. Quantity. The Water Providers, collectively, shall purchase all of the Water User's Irrigation Reuse Water. Each Water Provider shall notify Water User of its desired quantity of Irrigation Reuse Water and Water User will deliver Irrigation Reuse Water accordingly. If the Water Providers collectively request more Irrigation Reuse Water than is available, the Water User shall deliver a proportionate amount of water based available quantity. If the Water Providers, collectively, fail to request at least all of the Irrigation Reuse Water then Water User shall have the right to require any one or more of the Water Providers to purchase that portion of the Irrigation Reuse Water which was not otherwise requested.

b. Quality. Irrigation Reuse Water delivered hereunder will be of a kind and quality which is suitable for use as irrigation water on pistachio trees. In no event should the Irrigation Reuse Water be applied to any other crops. The Irrigation Reuse Water is not to be considered "potable" or otherwise used for direct human consumption. Irrigation Reuse Water quality and use will comply with all applicable laws and regulations, including Waste Discharge Requirements for the Irrigation Reuse Water issued by the Central Valley Regional Water Quality Control Board.

c. Delivery. Irrigation Reuse Water will be delivered to each Water Provider through the Distribution System. Timing for delivery of the Irrigation Reuse Water will be dependent upon the timing of Water User's operations. The Water User and each Water Provider will work collectively and collaboratively to arrange for the delivery of the Irrigation Reuse Water to the Water Providers at times and locations which are mutually agreeable to Water User and Water Providers.

d. Payment. "**Crop Year**" shall mean (a) for the 2020 Crop Year in the District, commencing upon the Effective Date and terminating on February 28, 2021, and (b) for each succeeding crop year in the District, beginning on March 1 in each calendar year and continuing through the last day of February of the immediately succeeding calendar year. The Water Providers and Water User will meet and confer each year to determine the price for the Irrigation

Reuse Water for each Crop Year. If the Water Providers and Water User agree upon a price for the Irrigation Reuse Water, they shall memorialize such agreement by a writing and attach a copy of such writing to this Agreement in accordance with Section 17 of this Agreement. If the Parties are unable to reach agreement on the price for the Irrigation Reuse Water for any particular Crop Year or otherwise fail to set a rate, then the purchase price for Irrigation Reuse Water will be that rate established by the District for as the "out the tap" rate for irrigation water for that Crop Year. Water User will bill Water Providers for Irrigation Reuse Water, as it is delivered and payment on such bills will be due withing 30 days of receipt of same.

7. Term and Termination. This Agreement shall be effective from the Effective Date and continue in effect unless Water User gives written notice of termination in conformity with the provisions of Section 15 of this Agreement. Notice of termination under this Section 7 must be given by Water User to Water Provider no later than sixty (60) days prior to the termination of the then existing Crop Year.

8. Quality. Water Providers do not make, and hereby disclaim, any representation or warranty regarding the quality of any Water Supplies to be delivered under the terms of this Agreement. Water Providers shall have no obligation to provide water of any particular quality. Water User shall be solely responsible to determine whether any water supplied under the terms of this Agreement is fit for its intended or actual use of such water.

In its provision of Irrigation Reuse Water, Water User represents and warrants that the Irrigation Reuse Water will be of a kind and quality which will be suitable for irrigation of pistachio trees only. Water User affirmatively states that the Irrigation Reuse Water will not be suitable for irrigation of almonds or other crop for immediate human consumption. Similarly, the Irrigation Reuse Water will not be potable. Water Providers takes all responsibility for any use of the Irrigation Reuse Water for any purpose other than as irrigation water for pistachio trees.

9. Release and Indemnity. Water User hereby releases Water Providers from any and all claims or liabilities arising from the supply or delivery of water under this Agreement, and hereby agrees to defend, indemnify, and hold Water Providers harmless from and against any such claims or liabilities, except to the extent that such claims arise from Water Providers' intentional acts or gross negligence.

Water Providers, and each of them, hereby release Water User from any and all claims or liabilities arising from the supply or delivery of water under this Agreement, and hereby agrees to defend, indemnify, and hold Water User harmless from and against any such claims or liabilities, except to the extent that such claims arise from Water User's intentional acts or gross negligence.

10. Force Majeure. Each Water Providers shall use its good-faith best efforts to comply with its obligations under this Agreement. Water Providers shall have no liability hereunder when prevented from performing due to natural catastrophe, changes in law, the action of any governmental agency, or any other events outside of the reasonable control of Water Providers.

11. Time. Time is of the essence of this Agreement and each of its provisions.

12. Waiver. A waiver of any breach of this Agreement, by any party to this Agreement, shall not constitute a continuing waiver or a waiver of any subsequent breach of the same, or a waiver of any breach of another provision of this Agreement.

13. No Assignment. Neither Party to this Agreement may assign all or any part of this Agreement, or any interest herein without the prior written consent of the other Party.

14. Binding Effect. Subject to the provisions of Sections 7 and 13 of this Agreement, the provisions of this Agreement, and the covenants and conditions contained herein, shall be continuous and binding upon and inure to the benefit of the heirs, executors, trustees, beneficiaries, administrators, personal representatives, successors, and assigns of the parties to this Agreement.

15. Notices. Notices shall be in writing, addressed to the receiving Party at the address shown below the signatures affixed hereto, and deemed delivered and served: (i) upon personal delivery, (ii) three (3) business days after deposit in the United States mail, postage prepaid, (iii) the business day after deposit with a recognized overnight courier, (iv) upon delivery by fax (except that notice received after 5 p.m. shall be deemed given the next business day), provided that a transmission report is generated reflecting the accurate transmission of the notices. A Party may change its address for notices, etc., by notifying the other Party in the manner specified above.

16. Attorneys' Fees. In the event any legal action is commenced to enforce this Agreement or in the event a party hereto intervenes in any action in which the other Party is a litigant to enforce or protect the intervening Party's interests or rights hereunder, the "prevailing Party" shall be entitled to recover from the other Party hereto reasonable attorneys' fees and costs. The "prevailing Party" shall be the Party that receives substantially the relief desired, whether by dismissal, summary judgment, judgment or otherwise.

17. Modification. None of the covenants, terms or conditions hereof shall in any way be altered, waived, modified, changed, or abandoned except by a written instrument duly signed by the Parties.

18. Severability. If any word, phrase, clause, sentence, paragraph, or section of this Agreement is, or shall be, invalid for any reason, the same shall be deemed severable from the remainder and shall in no way affect or impair the validity of this Agreement or any portion hereof.

19. Governing Law. This Agreement shall be construed and enforced in accordance with the laws of the State of California.

[Signature pages to follow]

IN WITNESS WHEREOF, the Parties have executed this Agreement on the date first hereinabove written.

WATER USER:

Kamm Avenue Pistachio Processing, LLC, a California limited liability company

By:_____
Print Name:_____
Title:_____

WATER PROVIDER:

104 Pistachios, LLC, a California limited liability company

By:_____
Print Name:_____
Title:_____

Derrick Pistachios, LLC, a California limited liability company

By:_____
Print Name:_____
Title:_____

Kamm Pistachios, LLC, a California limited liability company

By:_____
Print Name:_____
Title:_____

Panoche Pistachios, LLC, a California limited liability company

By:_____
Print Name:_____
Title:_____

Three Rocks Pistachios, LLC, a California limited liability company

By:_____
Print Name:_____
Title:_____

Tuscan Farms, LLC, a California limited liability company

By:_____
Print Name:_____
Title:_____

Granville Farms, LLC, a California limited liability company

By:_____
Print Name:_____
Title:_____

Sommerville Farms, LLC, a California limited liability company

By:_____
Print Name:_____
Title:_____

Exhibit A

(Water User's Property)

Exhibit B

Supply Factor

Water Provider	Parcel Number	Acres	Supply Factor
104 Pistachios, LLC	038-210-69s	80 acres	
	038-210-74s	160 acres	
		Total Acres 240 acres	9.3897%
Derrick Pistachios, LLC	038-210-10S	164 acres	
	038-210-14S	69 acres	
		Total Acres 233 acres	9.1158%
Kamm Pistachios, LLC	038-210-08	79 acres	
	038-210-09	78 acres	
		Total Acres 157acres	6.1424%
Panoche Pistachios, LLC	038-210-15s	69 acres	
	038-210-70s	80 acres	
	038-210-76s	133 acres	
		Total Acres 282 acres	11.0329%
Three Rocks Pistachios, LLC	038-210-26	25 acres	
	038-210-27s	25 acres	
	038-210-54s	80 acres	
	038-210-63s	150 acres	
		Total Acres 280	10.9546%
Tuscan Farms, LLC	038-141-52	38 acres	
	038-141-53	118 acres	
	038-210-01	156 acres	
	038-210-02s	155 acres	
		Total Acres 467 acres	18.2707%
Granville Farms, LLC	038-141-54s	38 acres	
	038-141-55s	199 acres	
	038-141-56s	76 acres	
		Total Acres 313 acres	12.2457%
Sommerville Farms, LLC	038-210-03s	154 acres	
	038-210-37s	79 acres	
	038-210-38s	157 acres	
	038-210-39s	40 acres	
	038-210-42s	154 acres	
		Total Acres 584 acres	22.8482%

Exhibit C

Form of Dry Year Reserve Supply Agreement

DRY YEAR RESERVE SUPPLY AGREEMENT
(Kamm Avenue Pistachio Processing, LLC)

THIS DRY YEAR RESERVE SUPPLY AGREEMENT (this "**Agreement**") is made effective as of _____, 2020 ("**Effective Date**") by and between Farid Assemi, as Trustee of the Amended and Restated Farid Assemi Revocable Trust dated 3/2/2010, ("**Reserve Water Provider**") and Kamm Avenue Pistachio Processing, LLC, a California limited liability company ("**Water User**"). The Reserve Water Provider and Water User are sometimes collectively referred to herein as the "**Parties**" and singularly by their individual names or as a "**Party**."

R E C I T A L S:

E. Water User has applied to the Fresno County Department of Public Works and Planning (the "**County**") for a Conditional Use Permit, a height variance, a Site Plan Review and early termination of certain agricultural land conservation contracts (Williamson Act Contracts) to construct, operate and maintain a proposed pistachio processing plant with the capacity to process 60 million pounds of finished pistachio products per year ("**Project**"). The Project is located on that certain real property located in Fresno County, California, as more particularly described in "**Exhibit A**" attached to the Water Supply Agreement ("**WSA**") to which this Agreement is attached and incorporated herein by this reference. The Project will utilize approximately 209 acre-feet of water per year.

F. The parties acknowledge that Water User will be obtaining water supplies from water transferred by other parties as set forth in the WSA to the Westlands Water District account of Water User and that these supplies have historically been sufficient to meet Project demand in the driest single year and sequence of years in the District's period of record.

G. By this Agreement, Reserve Water Provider agrees to maintain and make available a minimum of 209 acre-feet in the Semitropic Water Bank owned and operated by the Semitropic Water Storage District in Kern County, California ("**Semitropic Water Bank**") for Project use only in the event that supplies provided under the WSA are insufficient to meet Project demand in an historically unprecedented dry year (the "**Dry Year Reserve Water Supply**").

NOW THEREFORE, in consideration of the mutual covenants and conditions contained herein, the parties agree as follows:

20. Reserve Water Provider Representations. The Reserve Water Provider represents and warrants that the following statements are true and accurate:

a. Reserve Water Provider is a member-landowner of the Poso Creek Water Company ("**PCWC**") a California mutual water corporation that has a long-term contract to recharge and store a maximum of 60,000 acre-feet within, and to recover, on a firm annual basis subject to applicable storage and banking losses, a maximum of 20,000 acre-feet per year from the Semitropic Water Bank.

b. In May, 2020 the United State Bureau of Reclamation ("**USBR**") approved the storage of up to 100,000 acre-feet per year of Central Valley Project ("**CVP**") water by PCWC in the Semitropic Water Bank, and to recover and use the stored CVP water within the CVP place-of-use, for a period of 25 years.

c. Reserve Water Provider has a direct water banking relationship with Semitropic Water Bank and can conduct water recharge and recovery activities independent of other member-landowners in the PCWC under the terms and conditions of PCWC's long-term contract with the Semitropic Water Bank and the May 2020 USBR approval for PCWC storage of CVP water.

d. As of the Effective Date, the Reserve Water Provider has stored and can recover for the benefit of the Water User at least 209 acre feet of CVP water in the Semitropic Water Bank, net of storage and banking losses.

21. Maintenance of Minimum Reserve Water Supply. The Reserve Water Supplier shall, by August 1 of each year, have stored a minimum of 209 acre feet of CVP water in the Semitropic Water Bank, net of storage and banking losses, exclusively reserved for the use of the Water User in the subsequent 12 month period ending July 31 of the next year (the "**Minimum Reserve Water Supply**"). The Reserve Water Supplier shall ensure that, if any portion of the Minimum Reserve Water Supply is utilized by the Water User in any prior 12-month period, additional CVP water supplies shall be recharged and stored or transferred from existing storage so that the Minimum Reserve Water Supply balance on August 1 of each year is not less than 209 acre-feet, net of storage and banking losses.

22. Water User Use of Dry Year Reserve Water Supply. The Water User shall obtain sufficient water supplies for the Project in accordance with the WSA to the maximum extent practicable. If at any time during the term of this Agreement Water User determines, in the reasonable exercise of its sole discretion, that the water supplies available under the WSA will not be sufficient to meet the Project's water needs, the Water User shall have the right to request, in writing to the Reserve Water Supplier, that up to 209 acre-feet, net of storage and banking losses, be recovered from the Semitropic Water Bank and delivered to the Project during any 12 month period beginning on August 1 and ending July 31 of the next year. The Reserve Water Supplier shall use its best efforts to recover and deliver the requested amount of Dry Year Reserve Water Supply to the Project as soon as possible after receipt of a written request for the use of Dry Year Reserve Water Supply from the Water User.

23. Water Pricing and Payment. The Water User will reimburse the Reserve Water Provider for any costs paid by such Reserve Water Provider for: (a) the acquisition and storage of the Minimum Reserve Water Supply in storage as of the Effective Date; (b) the maintenance of the Minimum Reserve Water Supply after the Effective Data; (c) additional recharge or

allocation from storage required to replenish the Minimum Reserve Water Supply no later than August 1 of each year in the event any portion of the Dry Year Reserve Water Supply was utilized by the Water User in the prior 12 month period; and (d) recovery, exchange and other applicable costs and expenses required to timely recover and deliver water stored by the Reserve Water Provider in the Semitropic Water Bank to the Project.

24. Substitute Dry Year Reserve Water Supply. If the PCWC's rights to store CVP water under its long-term contract with the Semitropic Water Bank or approval from the USBR should terminate or be modified in a manner that precludes performance of any of Reserve Water Provider's obligations under this Agreement, the parties shall use their joint best efforts to identify and establish a replacement Dry Year Reserve Water Supply of at least 209 acre-feet, net of storage and banking losses, that shall be available to the Water User on substantially the same or more favorable terms and conditions as set forth in this Agreement.

25. Term and Termination. This Agreement shall be effective from the Effective Date and continue in effect unless Water User gives written notice of termination in conformity with the provisions of Section 15 of this Agreement. Notice of termination under this Section 7 must be given by Water User to Reserve Water Provider no later than sixty (60) days prior to August 1 of each year.

26. Quality. Reserve Water Provider does not make, and hereby disclaims, any representation or warranty regarding the quality of any Dry Year Reserve Water Supply to be delivered under the terms of this Agreement. Reserve Water Providers shall have no obligation to provide water of any particular quality. Water User shall be solely responsible to determine whether any water supplied under the terms of this Agreement is fit for its intended or actual use of such water.

27. Release and Indemnity. Water User hereby releases Reserve Water Provider from any and all claims or liabilities arising from the supply or delivery of water under this Agreement, and hereby agrees to defend, indemnify, and hold Reserve Water Provider harmless from and against any such claims or liabilities, except to the extent that such claims arise from Reserve Water Provider's intentional acts or gross negligence.

Reserve Water Provider hereby releases Water User from any and all claims or liabilities arising from the supply or delivery of water under this Agreement, and hereby agrees to defend, indemnify, and hold Water User harmless from and against any such claims or liabilities, except to the extent that such claims arise from Water User's intentional acts or gross negligence.

28. Force Majeure. Reserve Water Provider shall use its good-faith best efforts to comply with its obligations under this Agreement. Reserve Water Provider shall have no liability hereunder when prevented from performing due to natural catastrophe, changes in law, the action of any governmental agency, or any other events outside of the reasonable control of the Reserve Water Provider.

29. Time. Time is of the essence of this Agreement and each of its provisions.

30. Waiver. A waiver of any breach of this Agreement, by any party to this Agreement, shall not constitute a continuing waiver or a waiver of any subsequent breach of the same, or a waiver of any breach of another provision of this Agreement.

31. No Assignment. Neither Party to this Agreement may assign all or any part of this Agreement, or any interest herein without the prior written consent of the other Party.

32. Binding Effect. Subject to the provisions of Sections 7 and 13 of this Agreement, the provisions of this Agreement, and the covenants and conditions contained herein, shall be continuous and binding upon and inure to the benefit of the heirs, executors, trustees, beneficiaries, administrators, personal representatives, successors, and assigns of the parties to this Agreement.

33. Notices. Notices shall be in writing, addressed to the receiving Party at the address shown below the signatures affixed hereto, and deemed delivered and served: (i) upon personal delivery, (ii) three (3) business days after deposit in the United States mail, postage prepaid, (iii) the business day after deposit with a recognized overnight courier, (iv) upon delivery by fax (except that notice received after 5 p.m. shall be deemed given the next business day), provided that a transmission report is generated reflecting the accurate transmission of the notices. A Party may change its address for notices, etc., by notifying the other Party in the manner specified above.

34. Attorneys' Fees. In the event any legal action is commenced to enforce this Agreement or in the event a party hereto intervenes in any action in which the other Party is a litigant to enforce or protect the intervening Party's interests or rights hereunder, the "prevailing Party" shall be entitled to recover from the other Party hereto reasonable attorneys' fees and costs. The "prevailing Party" shall be the Party that receives substantially the relief desired, whether by dismissal, summary judgment, judgment or otherwise.

35. Modification. None of the covenants, terms or conditions hereof shall in any way be altered, waived, modified, changed, or abandoned except by a written instrument duly signed by the Parties.

36. Severability. If any word, phrase, clause, sentence, paragraph, or section of this Agreement is, or shall be, invalid for any reason, the same shall be deemed severable from the remainder and shall in no way affect or impair the validity of this Agreement or any portion hereof.

37. Governing Law. This Agreement shall be construed and enforced in accordance with the laws of the State of California.

[Signature pages to follow]

IN WITNESS WHEREOF, the Parties have executed this Agreement on the date first hereinabove written.

WATER USER:	**RESERVE WATER PROVIDER**:
Kamm Avenue Pistachio Processing, LLC, a California limited liability company	The Amended and Restated Farid Assemi Revocable Trust dated 3/2/2010
By:_____	By:_____
Print Name:_____	Print Name:_____
Title:_____	Title:_____

Appendix B

2020-2021 Agricultural Water Allocation Application and Purchase Agreement

WESTLANDS WATER DISTRICT

2020-2021 AGRICULTURAL WATER ALLOCATION APPLICATION AND PURCHASE AGREEMENT

This Agricultural Water Allocation Application and Purchase Agreement must be received by January 15, 2020, in the District's Fresno or Five Points Offices. Postmarks will not be accepted.

_____, herein referred to as "Water User," hereby applies for agricultural water for the March 2020 – February 2021 Water Year and agrees, as a condition of the allocation and furnishing of any agricultural water during that water year and in accordance with the District's Regulations, policies, and applicable agreements, as follows:

1. To accept, if and when provided by the District, the total amount of: a) CVP contract water requested on the application form(s); b) the allocation of Long-Term Water acquired by the District; c) other water acquired by the District; and d) Water User's unused water rescheduled from a prior water year, unless Water User provides written notice to the District before the last day of the water year that Water User will not reschedule such water. Notwithstanding the foregoing, no water will be allocated or rescheduled to any land for which water charges, assessments, land-based charges, or any other money owed to the District have been delinquent for 30 days or more at the time the water is allocated or to any land for which advance payment is required until such advance payment is received, or in lieu thereof security, in a form acceptable to the General Manager, for such payment has been provided.

2. To make all payments by the due dates specified in the District's Terms and Conditions for Agricultural Water Service.

3. Except as otherwise provided by the District, to remain liable to the District for any unused portion of the water unless the District is able to sell the water to another water user or the water has been transferred to another water user.

4. To comply with the Terms and Conditions for Agricultural Water Service and the Regulations for the Allocation of Agricultural Water, copies of which will be furnished upon request, both of which are incorporated herein as though set forth at length.

5. Allocation calculations will be based on irrigable acres as determined by U. S. Farm Service Agency (FSA) measurements or District measurements.

6. The District will notify Water User as to the amounts of water allocated to him and maintain a record of the revisions, if any, of his allocated water supply.

7. Water User recognizes that, upon his application for agricultural water and the District's allocation of water to him, he is liable for all such water allocated to him except as otherwise provided by the District.

8. The District may use any funds held for the benefit of or on behalf of Water User to pay or offset any monetary obligation Water User has to the District.

9. Water User hereby further agrees that there are no intended third party beneficiaries to this Agreement and nothing contained herein, expressed or implied, is intended to give to any person, partnership, corporation, joint venture, limited liability company or other form of organization or association any right, remedy or claim under or pursuant hereto, and any agreement or covenant required herein to be performed by or on behalf of Water User or the District shall be for the sole and exclusive benefit of Water User or the District.

_____ _____
Date Print Name

_____
Signature

_____
Title

WESTLANDS WATER DISTRICT

2020-2021 AGRICULTURAL WATER ALLOCATION

APPLICATION AND PURCHASE AGREEMENT

WATER USER: _____ PREPARED BY: _____
(Please Print)

ADDRESS: _____

_____ _____
(Signature)

_____

TELEPHONE: (____) _____-_____

ACCOUNT NO: _____

LAND DESCRIPTION	FIELD NO.	FSA ACRES	FALLOWED ACRES [1]	ACRE-FEET REQUESTED [2]	DISTRICT USE ONLY

TOTAL ACRES: 0

TOTAL FALLOWED ACRES: 0

TOTAL AMOUNT OF CENTRAL VALLEY PROJECT CONTRACT WATER REQUESTED 0 ACRE-FEET

[1] WESTLANDS IS REQUESTING AN ESTIMATE ON THE NUMBER OF ACRES YOU EXPECT TO FALLOW. PROVIDING THIS INFORMATION WILL NOT IMPACT YOUR REQUEST FOR A WATER SUPPLY ALLOCATION. THIS INFORMATION WILL ONLY BE USED TO EDUCATE THE PUBLIC ON HOW THE CONTINUED LACK OF WATER SUPPLY IS IMPACTING OUR WATER USERS.

[2] PLEASE ENTER ACRE-FEET REQUESTED FOR EACH FIELD USING WHOLE ACRE-FEET

PLEASE SIGN AGREEMENT ON THE REVERSE

Appendix C

2019-2020 Agreement to Accept and Purchase Supplemental Water (revised)

2019-2020 AGREEMENT TO ACCEPT AND PURCHASE SUPPLEMENTAL WATER
REVISED

Water User Name _____ Telephone No. _____

WWD Account No. _____ Amount Requested (AF) _____

☐ I request **only** supplemental non-Project water.

☐ I will take **either** supplemental non-Project or supplemental Project water.

I, herein referred to as "Water User", hereby request that the District purchase on my behalf the amount of water requested above for the March 2019 – February 2020 Water Year and agree, as a condition of the allocation and furnishing of any agricultural water during that water year and in accordance with the District's Regulations, policies, and applicable agreements, as follows:

1. To accept, if and when provided by the District, the total amount of Supplemental Water requested herein. Notwithstanding the foregoing, the District will not allocate water to land for which charges or assessments have been delinquent for 30 days or more at the time water is allocated or to any land for which advance payment is required until such advance payment is received, or in lieu thereof security, in a form acceptable to the General Manager, for such payment has been provided.

2. To purchase the requested quantity of water if the District makes the water available. I understand, however, that I can revoke this agreement by written notice to the District, provided the District has not already agreed with other agencies to acquire water on my behalf.

3. Water will become available as it is acquired and is dependent on various factors, including excess capacity available in the Central Valley Project and State Water Project.

4. To pay the actual delivered cost of Supplemental Water, to make advance payment for such water purchased on my behalf by the District at the time payment is requested and to make all payments by the due dates specified in the District's Terms and Conditions for Agricultural Water Service.

5. The District, in its sole discretion and dependent upon actual water supplies for the year, may withdraw water made available for allocation, and reduce my outstanding water request by the same amount, if any advance payment for such water is delinquent for 30 days or more.

6. Except as otherwise provided by the District, to remain liable to the District for any unused portion of the water unless the District is able to sell the water to another water user or the water has been transferred to another water user.

7. To comply with the Terms and Conditions for Agricultural Water Service and the Regulations for the Allocation of Agricultural Water, copies of which will be furnished upon request, both of which are incorporated herein as though set forth at length.

8. Allocation calculations will be based on irrigable acres as determined by U. S. Farm Service Agency or District measurements.

9. The District will notify Water User as to the amounts of water allocated to him/her and maintain a record of the revisions, if any, of his allocated water supply.

10. The District may use any funds held for the benefit of or on behalf of Water User to pay or offset any monetary obligation Water User has to the District.

11. Water User hereby further agrees that there are no intended third party beneficiaries to this Agreement and nothing contained herein, expressed or implied, is intended to give to any person, partnership, corporation, joint venture, limited liability company or other form of organization or association any right, remedy or claim under or pursuant hereto, and any agreement or covenant required herein to be performed by or on behalf of Water User or the District shall be for the sole and exclusive benefit of Water User or the District.

Date _____ Print Name _____

Signature _____

I, herein referred to as "Landowner," hereby attest that the Water User possesses my land, that is the subject of this Agreement to Accept and Purchase Supplemental Water (Agreement), pursuant to a valid lease, and I consent to the Water User's request for Supplemental Water for the March 2019 – February 2020 Water Year and agree, as a condition of the allocation and furnishing of any agricultural water during that water year to also be bound by all the terms of this Agreement in the event that I regain possession of the land that is subject to this Agreement before all the water that has been requested herein is delivered and all District costs are paid.

Date _____ Print Name (Landowner) _____

Signature _____

Please complete this agreement and return it to the Fresno Office no later than close of business, May 15, 2019. Mail it to: Westlands Water District, P.O. Box 6056, Fresno, CA 93703. Requests postmarked, but not received by the due date are not considered timely.

Appendix D

WWD Ag-Related M&I Use Determination for the Project

Westlands Water District
3130 N. Fresno Street, P.O. Box 6056, Fresno, California 93703-6056, (559) 224-1523, FAX (559) 241-6277

August 14, 2020

Samantha Ens
Kamm Avenue Pistachio Processing, LLC
1306 W Herndon Ave, Ste 108
Fresno, CA 93711

Regarding: Municipal and Industrial Water Service
(Account T-4920)

Dear Ms. Ens:

Westlands Water District has reviewed your application for Municipal and Industrial (M&I) water service at meter location TD124.16-1.13. Your application and annual supply allotment of 5 AF have been approved. It is important that you monitor your usage, and do not exceed your annual supply allotment. Failure to stay within your supply allotment can result in additional costs or potential loss of water service.

Activation of your service requires payment in full of the enclosed invoice, and your account will be billed on an annual or monthly frequency based upon your individual usage patterns and adopted District policies.

Your compliance with District Regulations and Terms and Conditions is appreciated. Please contact Customer Accounting Representative, Lyvia Nguyen, at (559) 241-6217 if you have any questions.

Sincerely,

Richard Lopez
Supervisor of Customer Accounting

Enclosure

Westlands Water District
3130 N. Fresno Street, P.O. Box 6056, Fresno, California 93703-6056, (559) 224-1523, FAX (559) 241-6277

August 19, 2020

Received
AUG 24 2020
Scanned

Ms. Samantha Ens
Kamm Avenue Pistachio Processing, LLC
1306 W Herndon Ave, Ste 108
Fresno, CA 93711

Regarding: Ag Related Entity Status for Municipal and Industrial Water User
T-4920

Dear Ms. Ens:

The District has reviewed your letter, dated May 27, 2020, requesting Ag Related entity status for your Municipal and Industrial (M&I) water account at meter location TD124.16R-1.13. After careful consideration of all available information concerning your account, the District has approved your request.

Your M&I account has an annual supply of 5 AF. It is imperative that you monitor your usage and submit an Ag Related water transfer before depleting this supply. In accordance with Article 19 Regulations, subsection 19.4C, *"...A M&I Water User may annually transfer into the M&I Water User's account a quantity of water, from any source available to the M&I Water User, sufficient to satisfy any Ag Related M&I Use for the water year...."*

Your compliance with District Rules and Regulations and Terms and Conditions is appreciated. Please contact Customer Accounting at (559) 241-6250 if you have any questions.

Sincerely,

Bobbie Ormonde
Deputy General Manager of Finance & Administration

WESTLANDS WATER DISTRICT

OFFICE--3130 N. FRESNO STREET/MAILING--P. O. BOX 6056, FRESNO, CA 93703
TELEPHONE: WATER DEPT. (559) 241-6250/OTHER (559) 224-1523/FAX (559) 241-6276

TERMS AND CONDITIONS FOR MUNICIPAL AND INDUSTRIAL WATER SERVICE

1. The furnishing of water to and its use by the water user shall be subject to all regulations of the Board of Directors of the District as the same may exist now or hereafter be amended or adopted. In the event of a conflict between the terms and conditions set forth herein and the regulations, the latter shall be controlling.

2. All water delivered shall be pursuant to a request by the water user for the delivery of a stated amount to a specific location. The request shall be made within the time and in the manner prescribed by the General Manager.

3. Water will be furnished by the District subject to the terms and conditions under which the water is made available to the District and if, in the exclusive judgment of the District, the water and facilities for its delivery are available; provided, that the District will use its best efforts, to the extent that it has water and capacity available and taking into account the requirements of other water users to receive water from its facilities, to provide such water in the manner and at the times requested. The District may temporarily discontinue water service or reduce the amount of water to be furnished for the purpose of such investigation, inspection, maintenance, repair, or replacement as may be reasonably necessary of any of the District 's facilities. Insofar as feasible, the District will give the water user notice in advance of such temporary discontinuance or reduction, except in case of emergency, in which event no notice need be given. No liability shall accrue against the District or any of its officers, directors, or employees for damage, direct or indirect, because of the failure to provide water as a result of system malfunctions, interruptions in service necessary to properly operate and maintain the water distribution system, or other causes which are beyond the District's reasonable control.

4. By taking delivery of water from the District, the water user assumes responsibility for, and agrees to hold the District harmless from, all damage or claims for damage, which may arise from his furnishing or use of the water after it leaves the District facilities.

5. The water furnished by the District is not potable (suitable for drinking, cooking, bathing, or other domestic use) and the District does not warrant the quality or potability of water so furnished. By taking delivery of water from the District, the water user assumes responsibility for, and agrees to hold the District harmless from, damage or claims for damage arising out the non-potability of water furnished by the District. Untreated water must never be used for any type of human consumptive needs. A water user defined and operating as a Public Water Supply (PWS) shall be responsible for any water treatment, including but not limited to filtration and chlorination achieved through central treatment or point-of-entry (POE) treatment devices approved by the California Department of Health Services (DHS), in order to provide water safe for human consumption as required by Federal, State or local law or regulation.

According to DHS, the use of POE treatment systems by individual customers of a constructed conveyance system may not provide a continuous safe, potable supply of water due to inadequate operation and maintenance of these systems by the owners, unless they are a regulated PWS. Individual use of POE devices ("Water Treatment Exclusion") may only be used if they are approved by DHS and are regularly maintained by a State-licensed operator or service provider.

Facilities in place prior to July 2001, may continue to use bottled water for drinking and cooking ("Alternative Water Exclusion"). After July 2001, the District cannot furnish new municipal and industrial water service if bottled water use is the basis for the potable water supply unless approved by DHS. Bottled water may only be obtained from a State-licensed provider.

DHS mandates the District conduct periodic surveys of water use as required by the Safe Drinking Water Act and to collect records for Alternative Water and Treatment Exclusions. Records for exclusions include invoices or statements of bottled water delivery from a licensed provider or maintenance and service records for a POE system from a licensed operator. Water users who fail to complete a survey or provide records showing an approved exclusion requested by the District shall have water service discontinued if no response is received after a reasonable attempt has been made to obtain the information.

6. All water will be measured by the District with meters installed by it and such measurements shall be final and conclusive.

7. Charges for water, hereinafter referred to as "water charges", shall be established by the Board of Directors. The water charges shall include District operation and maintenance costs and any other costs determined by the Board to be payable as part of the water charges. Water charges shall be adjusted retroactively to the extent required and authorized by federal or state law or regulations or District regulations. The General Manager may adjust the water charges as necessary and legally authorized to account for increases or decreases in the estimates used to establish the water charges.

8. As a condition of the District continuing to furnish water, the water user shall make payment for the amount billed after the District's billing and by the 25th of the month in which the bill is mailed; provided, that the due date will be not less than 15 calendar days after the billing date. Charges not paid by the due date shall be delinquent; provided, that payments postmarked on or before the due date shall be deemed to have been received by that date. The payment of water charges or related penalties or interest shall be made at the District's Fresno office. When any deadline established herein falls on a Saturday, Sunday, or holiday, it shall be extended to the next working day.

9. All claims for overcharges or errors must be made in writing and filed with the District at its Fresno Office within 10 working days after the date the bill is received by the water user. In the event the water user files a timely written protest, the District's Finance & Administration Committee shall consider the protest at its next regular meeting and notify the water user in writing of its decision. The Committee's decision shall be final, unless a written appeal to the Board of Directors is filed with the Secretary of the District within 15 working days after notice of the decision. In the event of an appeal, the decision of the Board shall be final. The filing of a protest or an appeal does not nullify the payment requirement or the District's right to discontinue water service as provided in these terms and conditions. However, in the event the protest or appeal is sustained, the District will refund the amount of the overcharge and penalty, if any.

10. On the first day following the due date, a penalty of 10 percent of the water charges which became delinquent on the preceding day shall be added to the water charges and penalties and interest, if any, due and owing to the District, the total of which are hereinafter referred to as "unpaid charges." Prior unpaid charges shall accrue interest at a monthly rate of 1½ percent. The interest shall not, however, accrue after the unpaid charges have been added to, and become a part of, the annual assessment levied on the land by the District. All payments and credits shall be applied to the earliest unpaid charges.

11. At the time of filing the District's assessment book with the District Tax Collector, unpaid charges may be added to and become a part of the assessment levied by the District on the land which received the water or for which other water charges were incurred. The District shall notify the landowner of the expected amount prior to its addition to the annual assessment. The amount so added shall be a lien on the land and impart notice thereof to all persons. If the assessment becomes delinquent, penalties and interest will be added as provided by law.

12. To supplement the procedure described in paragraph 11, the District may elect to file and record a Certificate of Unpaid Water Charges as provided in California Water Code Section 36729. This

Certificate creates a lien in the amount of unpaid charges on any land owned by the delinquent water user, or acquired by the water user before the lien's expiration, within the recording County.

13. Except as provided in paragraph 15, municipal and industrial water service shall not be provided to any parcel of land for which the unpaid charges for such service are a lien on the land or for which the assessment is delinquent.

14. Except as provided in paragraph 15, municipal and industrial water service shall not be provided to any person who owes the District unpaid charges notwithstanding the fact that the unpaid charges have been added to the assessment(s) on the parcel(s) for which they were incurred.

15. Where the District furnishes residential water service to persons other than the water user to whom the service is billed, the District shall make a reasonable, good faith effort to inform the actual users of the services when the account is delinquent. This shall be done by a notice that service will be terminated in 10 days. The notice shall inform the actual users that they have the right to become customers of the District without being required to pay the amount due on the delinquent account.

The District is not required to make service available to the actual users unless each actual user agrees to the terms and conditions of service. However, if one or more actual users are willing and able to assume responsibility for the entire account to the satisfaction of the District, or if there is a physical means legally available to the District of selectively terminating service to those actual users who have not met the requirements of the District's terms and conditions, the District shall make service available to the actual users who have met those requirements. In making service available to an actual user, the District may require that a deposit be paid to the District prior to establishing an account and furnishing service. If a deposit is required, it shall be based solely upon the creditworthiness of the actual user as determined by the District.

The District will give notice of the delinquency and impending termination of residential water service, at least 10 days prior to the proposed termination, by means of a notice mailed postage prepaid or by personal delivery to the water user to whom the service is billed not earlier than 19 days from the date of mailing the District's bill for services, and the 10-day period shall not commence until 5 days after the mailing of the notice. When the day established for the discontinuance of water service falls on a Saturday, Sunday, or District holiday, such water service shall be discontinued on the next working day.

The District will make a reasonable, good faith effort to contact an adult person residing at the premises of the water user by telephone or in person at least 48 hours prior to any termination of residential water service.

The District will comply with all other applicable provisions of California Government Code Sections 60370-60375.5 regarding termination of residential water service.

16. Except as provided in paragraph 15, in the event water service hereunder is discontinued as a result of nonpayment of water charges, all unpaid charges for such service which are due the District from the person in default must be paid before water service can be restored.

17. If a water user's delinquent charges are unpaid for 30 days or more, or if a water user's delinquent charges are added to the annual assessments on any lands within the District, or the procedure in paragraph 12 is implemented, the General Manager shall require, as a condition of resumption of water service, that advance payment of all water charges be made for the 12-month period immediately following resumption of service, according to a schedule to be determined by the General Manager. A written guarantee in a form satisfactory to the General Manager from a recognized financial lending institution may be substituted in lieu of advance payment.

18. The General Manager, after consultation with and approval by the Finance & Administration Committee, may also require advance payment and/or payment by cashier's check or such other actions as he may deem necessary when a water user's account is determined, based on the payment history or other actions of the water user, to create a financial risk or hardship for the District or its landowners. Circumstances which constitute the basis for such a determination include but are not limited to the following: (1) instances of a water user's checks being returned unpaid or (2) instances where a water user whose account is delinquent has, in violation of District regulations, taken water from a District delivery.

19. By applying for or taking delivery of municipal and industrial water from the District, the water user agrees to these terms and conditions of service.

20. The District may modify or terminate these terms and conditions; provided, that such modifications or terminations are prospective only and notice thereof is given prior to the effective date by mail to the water user.

Adopted: 1/14/02
Revised: 1/15/13

ARTICLE 19. REGULATIONS REGARDING THE APPLICATION FOR AND USE OF MUNICIPAL AND INDUSTRIAL WATER WITHIN WESTLANDS WATER DISTRICT

19.1 PURPOSE

Westlands Water District has a long-term contractual entitlement to receive from the United States an annual supply of 1,150,000 acre-feet (AF) of Central Valley Project (CVP) water. The contracts between Westlands Water District and the United States allow the District to make CVP water available for municipal, industrial and domestic uses. The District may also acquire additional water supplies for these purposes. This Article establishes the rules and procedures for making application for and the use of municipal and industrial (M&I) water.

19.2 GLOSSARY OF TERMS AND DEFINITIONS

Unless specified below, the terms and definitions contained in Article 2 of these Regulations shall apply.

A. "Ag Related M&I Use" – the use of water exclusively for purposes of commerce, trade or industry associated with the production of agricultural crops or livestock, or their related by-products, including human uses, other than housing, that are incidental to the Ag Related M&I Use.

B. "Historic Use" – the greatest annual quantity of CVP water delivered for M&I Use to an M&I Water User at a point of delivery during the five-year period immediately preceding June 30, 2001.

C. "M&I Use" – the use of water for drinking, cooking, bathing, showering, dish washing, and maintaining oral hygiene or purposes of commerce, trade or industry.

D. "M&I Water Application" - an agreement in a form approved by the General Manager or his designee between the District and an M&I Water User, which describes the point of delivery for such water and the estimated quantity of water that will be made available by the District for M&I Use.

E. "M&I Water User" - individual or entity who has executed and submitted to the District an M&I Water Application or to whom the District makes water available for M&I Use.

19.3 M&I WATER AVAILABILITY

A. The General Manager shall set aside from the District's CVP water supply or other sources he deems appropriate water for M&I Use.

B. The General Manager or his designee shall assist any M&I Water User in identifying a source of water that can be made available to the District for M&I Use; provided, that this provision shall not impose on the District or its employees an obligation to incur any expense or other obligation on behalf of such M&I Water User.

19.4 APPLICATION FOR WATER

A. Except for M&I Use initiated before July 1, 2001, to receive water for M&I Use, a proposed M&I Water User must file at the District's Fresno office an M&I Water Application. Upon approval by the District, the M&I Water Application shall constitute a valid agreement for M&I Use until the M&I Water User notifies the District in writing that such M&I Use will be terminated. Every M&I Water Application shall identify the point of delivery and the intended use of the M&I Water.

B. An M&I Water Application for use in excess of 5 acre-feet, or 5 acre-feet per 160 acres when such application is for a solar development covering such acreage, per year shall identify a source of water that will, at the applicant's expense, be made available to the District for the proposed M&I Use.

C. Notwithstanding Section 19.4 B. of this Article, a M&I Water User may annually transfer into the M&I Water User's account a quantity of water, from any source available to the M&I Water User, sufficient to satisfy any Ag Related M&I Use for the water year; provided, the M&I Water User shall acknowledge in writing that the District has no obligation to make available to the M&I Water User, in any

year, a quantity of water in excess of the quantity transferred into the M&I Water User's account.

D. A supplemental M&I Water Application shall be filed by any M&I Water User before the quantity of water for M&I Use made available to such M&I Water User is increased (i) above Historic Use, for M&I Water Users receiving M&I water before July 1, 2001, or (ii) above the quantity stated in the initial M&I Water Application, for M&I Use initiated after June 30, 2001.

19.5 USE OF WATER

A. The unauthorized use or taking of water for M&I Use, or the waste or unreasonable use of water, are prohibited. Water made available for M&I Use may only be used at the point of delivery and for the purpose(s) identified in the M&I Water Application. Except as provided in Section 19.5 B. of this Article, the transfer of M&I water is prohibited.

B. M&I water identified pursuant to Section 19.4 B. of this Article or water transferred by the M&I Water User pursuant to Section 19.4 C. of this Article may be transferred within the District's boundaries. Nothing contained in this Article shall prevent an M&I Water User from changing the place of use of its M&I water within the District's boundaries.

C. All M&I Water Users shall implement conservation measures adopted by the Water Policy Committee of the Board of Directors or its successor.

D. All M&I Water Users shall cooperate in the District's efforts to comply with the terms of the Compliance Agreement between the California Department of Health Services and Westlands Water District, dated June 1, 2001.

E. Every point of delivery for M&I Water shall be equipped with a backflow prevention device of a design approved by the General Manager.

F. The General Manager is authorized, after written notice to the M&I Water User, to discontinue water service to any M&I Water User who violates this Article or the Terms and Conditions for Municipal and Industrial Water Service.

G. In the event the District's water supply is insufficient to meet all demands for water, including demands for irrigation, the General Manager is authorized to

reduce the quantity of water made available for M&I Use or to impose such temporary conservation actions or other measures, as he deems necessary to protect the public health and safety.

19.6 COMPLIANCE WITH TERMS AND CONDITIONS

Each M&I Water User shall comply with the Terms and Conditions for Municipal and Industrial Water Service, as amended by the Board from time to time. Failure to comply with the Terms and Conditions for Municipal and Industrial Water Service may be grounds for termination of M&I Water Use service, and no water shall be furnished to an M&I Water User who fails to make required payments pursuant to the Terms and Conditions for Municipal and Industrial Water Service, as amended by the Board, from time to time.

19.7 MISCELLANEOUS

A. The General Manager may do all things necessary to implement and effectuate these Regulations.

B. An appeal from any decision made pursuant to these Regulations shall be made to the Finance and Administration Committee of the Board of Directors. Such appeal shall be in writing and shall be filed with the District Secretary within 15 working days after notice of the decision. The decision of the Finance and Administration Committee may be appealed to the Board of Directors. Such appeal shall be in writing and shall be filed with the District Secretary within 15 working days after notice of the decision. The decision of the Board shall be final.

C. The General Manager shall provide notice of any changes or revision to these Regulations to all District landowners and M&I Water Users.

Appendix E

WWD Water Transfer form

WWD 554
Rev. 07/16

Westlands Water District

3130 N. Fresno Street, P.O. Box 6056, Fresno, California 93703-6056, (559) 241-6250, FAX: (559) 241-6276

WWD Transaction No._____

WATER TRANSFER

_____, Westlands Water District Account No._____, hereinafter referred to as "Transferor," and _____, Westlands Water District Account No. _____, hereinafter referred to as "Transferee," agree as follows:

1. Subject to District review, Transferor transfers _____ acre-feet of agricultural water supply during the 20_____ Water Year. Indicate type of water to be transferred: _____

2. Transferor and Transferee authorize the District to act as their agent and do all things necessary to effect the transfer in accordance with District Regulations. Transferor and Transferee understand and agree that District acceptance of and consent to this transfer is based on conditions known to the District at the time of the processing and that District consent may be revoked if it is later determined that such conditions or knowledge were in error.

3. Transferor and Transferee expressly warrant and represent that they have the power and authority to transfer and receive the water allocation free and clear of any claim by third parties.

4. Transferor and Transferee agree to indemnify and hold the District harmless from any liability of any type or nature, including but not limited to any claim made by either of the parties hereto, or by any third party which asserts that the District has wrongfully allocated or delivered water to a person not entitled to it, or has wrongfully refused to allocate or deliver water to a person entitled to it, in connection with the District's consenting to and participating in the within transfer.

5. Transferee agrees to pay the District for the water allocation transferred to him as a result of this agreement. The payment shall be made in accordance with the Agricultural Water Allocation Application and Purchase Agreement. Transferor understands that his water supply will be reduced by this amount and transferor is relieved of his obligation, as a water user, to pay for the water transferred under this agreement. However, nothing in this agreement shall constitute a waiver of existing or future landowner obligations with respect to liability for water allocated or furnished to lands owned by either the Transferor or Transferee.

6. The District may use any funds held for the benefit of or on behalf of the Transferee to pay or offset any monetary obligation the Transferee has to the District.

7. If the water that is the subject of this Water Transfer is intended to satisfy any Ag Related M&I Use, Transferee acknowledges that the District has no obligation or duty to make available to the Transferee (M&I Water User), in any year, a quantity of water in excess of the quantity transferred into the Transferee's (M&I Water User's) account pursuant to this Water Transfer.

TRANSFEROR:

_____
Print Name

_____
Signature

Date: _____

TRANSFEREE:

_____
Print Name

_____
Signature

Date: _____

Appendix H

Noise Assessment

ENVIRONMENTAL NOISE ASSESSMENT

KAMM AVENUE PISTACHIO PLANT
FRESNO COUNTY, CALIFORNIA

WJVA Report No. 20-027

PREPARED FOR

KAMM AVENUE PISTACHIO PROCESSING, LLC
1306 WEST HERNDON AVENUE, SUITE 110
FRESNO, CALIFORNIA 93711

PREPARED BY

WJV ACOUSTICS, INC.
VISALIA, CALIFORNIA

wjv acoustics

SEPTEMBER 11, 2020

1. INTRODUCTION

Project Description

The project is the construction and operation of a pistachio plant, with the capacity to process 60 million pounds of pistachios per year. The Project would be located on approximately 315.8 acres to the south of Kamm Avenue, west of Highway 33, and east of Interstate 5 (I-5) in the western portion of unincorporated Fresno County. The Project would provide pistachio processing capacity in the immediate vicinity of existing pistachio orchards that currently ship harvested crops for processing to more remote locations, including plants outside of the County.

The Project would operate year-round to package and process harvested pistachios for retail and wholesale customers. During an approximately 6-week harvest period, which typically occurs during August to October, the Project would operate seven days a week and 24 hours per day to receive, hull, heat, dry and store pistachio crops in onsite storage silos. During non-harvest operations, the Project will operate two shifts per day five or six days per week depending on pistachio product market conditions. The Project will have a full-time workforce of 60 employees. An additional 60 workers will be employed during the 6-week harvest period. The primary pistachio processing facilities will be located within an approximately 80-acre fenced area bordered by Kamm Avenue to the north. The project site plan is provided as Figure 1.

Environmental Noise Assessment

This environmental noise assessment has been prepared to determine if significant noise impacts would be produced by the project and to describe mitigation measures for noise if significant impacts are determined. The environmental noise assessment, prepared by WJV Acoustics, Inc. (WJVA), is based upon the project site plan prepared by GMA Consulting Engineers and Architects (dated 8-25-20), project-related traffic data provided by JLB Traffic Engineering, Inc. and a project site visit on August 6 and 7, 2020. Revisions to the site plan, project-related traffic data or other project-related information available to WJVA at the time the analysis was prepared may require a reevaluation of the findings and/or recommendations of the report.

Appendix A provides definitions of the acoustical terminology used in this report. Unless otherwise stated, all sound levels reported in this analysis are A-weighted sound pressure levels in decibels (dB). A-weighting de-emphasizes the very low and very high frequencies of sound in a manner similar to the human ear. Most community noise standards utilize A-weighted sound levels, as they correlate well with public reaction to noise. Appendix B provides typical A-weighted sound levels for common noise sources.

In terms of human perception, a 5 dB increase or decrease is considered to be a noticeable change in noise levels. Additionally, a 10 dB increase or decrease is perceived by the human ear as half as loud or twice as loud. In terms of perception, generally speaking the human ear cannot perceive an increase (or decrease) in noise levels less than 3 dB.

2. THRESHOLDS OF SIGNIFICANCE

The CEQA Guidelines apply the following questions for the assessment of significant noise impacts for a project:

a. Would the project result in generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?

b. Would the project result in generation of 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?

a. Noise Level Standards

Fresno County

General Plan

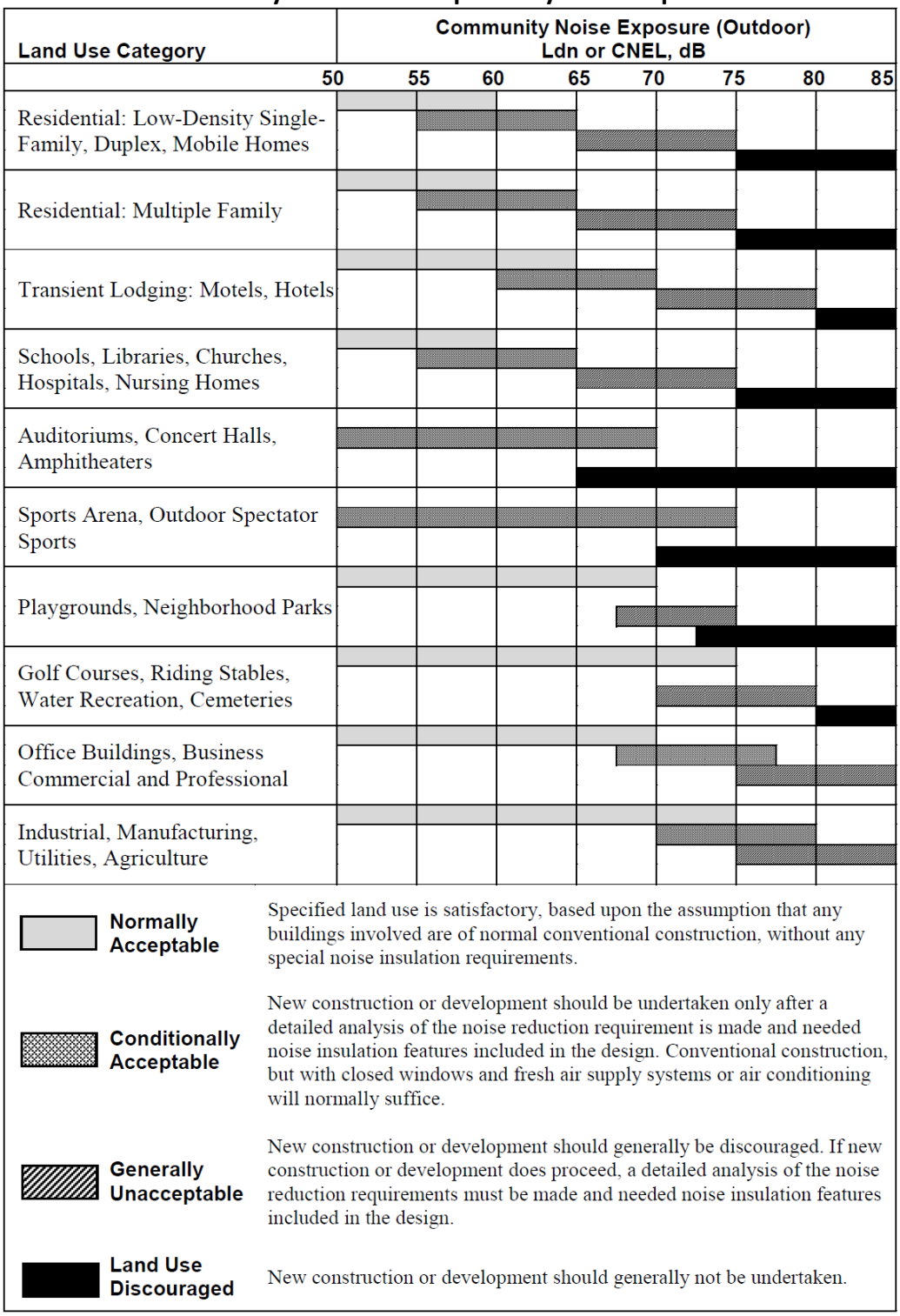
Goal HS-G of the Fresno County General Plan[1] provides the following Noise Goal:

> *To protect residential and other noise-sensitive uses from exposure to harmful or annoying noise levels; to identify maximum acceptable noise levels compatible with various land use designations; and to develop a policy framework necessary to achieve and maintain a healthful noise environment.*

The Fresno County Noise Element of the General Plan establishes noise level criteria in terms of the Day-Night Average Level (L_{dn}/DNL) metric. The L_{dn} is the time-weighted energy average noise level for a 24-hour day, with a 10 dB penalty added to noise levels occurring during the nighttime hours (10:00 p.m.-7:00 a.m.). Table HS-1 (provided below as Table I) of the Fresno County General Plan provides the maximum allowable exterior noise exposure levels for various land use types. For residential land uses, the noise level standards typically apply to outdoor activity areas. Outdoor activity areas generally include backyards of single-family residences and individual patios or decks and outdoor common use areas of multi-family residential developments. The intent of the exterior noise level requirement is to provide an acceptable noise environment for outdoor activities and recreation.

Although not expressly stated in the noise element, WJVA has assumed that the county also requires that interior noise levels attributable to exterior noise sources not exceed 45 dB L_{dn}. An interior noise level standard of 45 dB L_{dn} is consistent with earlier versions of the County's noise element, the HUD noise standards and the California Noise Insulation Standards. The intent of the interior noise level standard is to provide an acceptable noise environment for indoor communication and sleep.

Table I Fresno County Land Use Compatibility Noise Exposure



Ordinance Code

Chapter 8.40 of the Fresno County Ordinance Code[2] (noise ordinance) applies to noise sources that are not pre-empted from local control by existing state or federal regulations. Pre-empted noise sources include traffic on public roadways, railroad operations and aircraft in flight.

The noise ordinance addresses the statistical distribution of noise over time and allows for progressively shorter periods of exposure to levels of increasing loudness. Table II summarizes the exterior noise level standards of the ordinance. The standards are to be adjusted by -5 dB if the noise source of concern consists primarily of speech or music. The ordinance is to be applied during any one-hour time period of the day or night and the standards are 5 dB more restrictive during the nighttime hours of 10:00 p.m. to 7:00 a.m. The standards of the noise ordinance may be adjusted upward (made less restrictive) if existing ambient noise levels without the source of concern already exceed the noise ordinance standards.

TABLE II

EXTERIOR NOISE LEVEL STANDARDS, DBA
FRESNO COUNTY NOISE ORDINANCE

Category	Cumulative # Min/Hr. (L_n)[1]	Daytime (7 am-10 pm)	Nighttime (10 pm-7 am)
1	30 (L_{50})	50(45)[2]	45(40)[2]
2	15 (L_{25})	55(50)[2]	50(45)[2]
3	5 ($L_{8.3}$)	60(55)[2]	55(50)[2]
4	1 ($L_{1.7}$)	65(60)[2]	60(55)[2]
5	0 (L_{max})	70(65)[2]	65(60)[2]

[1]In layman's terms, the noise level standards shown may not be exceeded for more than the specified number of minutes within any one-hour time period. The L_n value shown in parenthesis indicates the percent of the time during an hour that a particular noise level may not be exceeded. For example, the L_{50} represents 50% of the hour, or 30 minutes.

[2]Adjusted standard for a noise source consisting primarily of speech or music.

Source: Fresno County Ordinance Code

State of California

There are no state noise standards that are applicable to the project.

Federal Noise Standards

There are no federal noise standards that are applicable to the project.

b. Construction Noise and Vibration

Section 8.40.060(c) of the Fresno County Ordinance Code (Noise Source Exemptions) states that noise associated with construction activities would be exempt form the noise standards provided above in Table II, provided such activities do not take place before six a.m. or after nine p.m. on any day except Saturday or Sunday, or before seven a.m. or after five p.m. on Saturday or Sunday.

There are no Fresno County Vibration level standards. Some guidance is provided by the Caltrans Transportation and Construction Vibration Guidance Manual[3]. The Manual provides guidance for determining annoyance potential criteria and damage potential threshold criteria. These criteria are provided below in Table III and Table IV, and are presented in terms of peak particle velocity (PPV) in inches per second (in/sec).

TABLE III

GUIDELINE VIBRATION ANNOYANCE POTENTIAL CRITERIA

Human Response	Maximum PPV (in/sec)	
	Transient Sources	Continuous/Frequent Intermittent Sources
Barely Perceptible	0.04	0.01
Distinctly Perceptible	0.25	0.04
Strongly Perceptible	0.9	0.1
Severe	2.0	0.4

Source: Caltrans

TABLE IV

GUIDELINE VIBRATION DAMAGE POTENTIAL THRESHOLD CRITERIA

Structure and Condition	Maximum PPV (in/sec)	
	Transient Sources	Continuous/Frequent Intermittent Sources
Extremely fragile, historic buildings, ancient monuments	0.12	0.08
Fragile buildings	0.2	0.1
Historic and some old buildings	0.5	0.25
Older residential structures	0.5	0.3
New residential structures	1.0	0.5
Modern industrial/commercial buildings	2.0	0.5

Source: Caltrans

3. SETTING

The Project would be located on approximately 315.8 acres to the south of Kamm Avenue, west of Highway 33, and east of Interstate 5 (I-5) in the western portion of unincorporated Fresno County. The project site is currently undeveloped agricultural land, surrounded by agricultural land uses.

Sensitive receptors located in the project vicinity include the residential community of Three Rocks, located west of State Route 33 (Derreck Avenue), south of Kamm Avenue. Three Rocks is located approximately 1.25 miles southeast of the project site, and approximately 2 miles from the main processing area. There are additional residential land uses located along the northern side of Kamm Avenue, approximately 1.25 miles northwest of the project site. These residential land uses are owned by the project applicant, and are used for employee housing purposes.

a. Background Noise Level Measurements

Existing ambient noise levels in the project vicinity are dominated by traffic noise along Kamm Avenue and State Route 33 (SR 33). Additional sources of noise observed during site inspection included noise associated with agricultural activities, aircraft overflights, birds, barking dogs and roosters.

Measurements of existing ambient noise levels in the project vicinity were conducted on August 6 and August 7, 2020. Long-term (24-hour) ambient noise level measurements were conducted at two (2) locations (sites LT-1 and LT-2). One long-term ambient noise measurement site was located in the vicinity of existing residential land uses near the community of Three Rocks (LT-1), and was exposed to traffic noise associated with SR 33 as well as noise associated with agricultural activities and residential activities (including roosters and dogs). The location of LT-1 was selected as a long-term noise monitoring site as it represents noise-sensitive receptors (residential land uses) in the vicinity of the project site.

A second long-term ambient noise monitoring site (LT-2) was located in the vicinity of existing residential land uses on the property of the project applicant. The residences are used as employee housing, and are located on the north side of Kamm Avenue. The location of LT-2 was selected as a long-term noise monitoring site as it represents noise-sensitive receptors (residential land uses) in the vicinity of the project site.

Additionally, short-term (15-minute) ambient noise level measurements were conducted at four (4) locations (Sites ST-1 through ST-4). The project vicinity and locations of the noise monitoring sites are shown on Figure 2. Two (2) individual measurements were taken at each of the four short-term sites to quantify ambient noise levels in the morning and afternoon hours.

Noise monitoring equipment consisted of Larson-Davis Laboratories Model LDL-820 sound level analyzers equipped with B&K Type 4176 1/2" microphones. The equipment complies with the specifications of the American National Standards Institute (ANSI) for Type I (Precision) sound level

meters. The meters were calibrated with a B&K Type 4230 acoustic calibrator to ensure the accuracy of the measurements.

Measured hourly energy average noise levels (L_{eq}) at site LT-1 ranged from a low of 41.7 dB between 2:00 p.m. and 3:00 p.m. to a high of 57.1 dB between noon and 1:00 p.m. Hourly maximum (L_{max}) noise levels at site LT-1 ranged from 54.5 to 80.2 dB. Residual noise levels at the monitoring site, as defined by the L_{90} statistical descriptor ranged from 35.1 to 42.9 dB. The L_{90} is a statistical descriptor that defines the noise level exceeded 90% of the time during each hour of the sample period. The L_{90} is generally considered to represent the residual (or background) noise level in the absence of identifiable single noise events from traffic, aircraft and other local noise sources. The measured L_{dn} value at site LT-1 during the 24-hour noise measurement period was 52.2 dB L_{dn}. Figure 3 graphically depicts hourly variations in ambient noise levels at the LT-1 long-term monitoring site as well as a site photograph.

Measured hourly energy average noise levels (L_{eq}) at site LT-2 ranged from a low of 50.6 dB between 5:00 p.m. and 6:00 p.m. to a high of 60.5 dBA between noon and 1:00 p.m. Hourly maximum (L_{max}) noise levels at site LT-2 ranged from 71.6 to 84.3 dB. Residual noise levels at the monitoring site, as defined by the L_{90}, ranged from 28.3 to 39.8 dB. The measured L_{dn} value at site LT-2 during the 24-hour noise measurement period was 61.6 dB L_{dn}. Figure 4 graphically depicts hourly variations in ambient noise levels at the LT-2 long-term monitoring site as well as a site photograph.

Table V provides the measured L_{50} noise levels at the two measurement sites for the 24-hour measurement period. The L_{50} is a statistical descriptor that defines the noise level exceeded 50% of the time during each hour of the sample period. The L_{50} statistical descriptor represents the most restrictive of the County's noise level standards, and will therefore be used to demonstrate project compliance with the County's applicable noise level standards.

TABLE V

SUMMARY OF 24-HOUR NOISE LEVEL MEASUREMENTS, dB L_{50}
KAMM AVENUE PISTACHIO PLANT
FRESNO COUNTY
AUGUST 6, 2020

Time	A-Weighted Decibels, dBA L_{50}	
	LT-1	LT-2
12:00 a.m.	37.0	35.6
1:00 a.m.	36.9	35.1
2:00 a.m.	37.0	35.1
3:00 a.m.	41.3	35.9
4:00 a.m.	44.1	34.8
5:00 a.m.	47.2	40.9
6:00 a.m.	45.8	43.9
7:00 a.m.	42.4	42.3
8:00 a.m.	42.4	42.2
9:00 a.m.	43.2	42.1
10:00 a.m.	41.8	39.3
11:00 a.m.	39.8	39.7
12:00 p.m.	42.4	45.6
1:00 p.m.	42.3	43.4
2:00 p.m.	39.8	42.6
3:00 p.m.	40.1	39.0
4:00 p.m.	42.6	36.8
5:00 p.m.	42.3	38.5
6:00 p.m.	44.3	40.1
7:00 p.m.	43.1	37.3
8:00 p.m.	44.0	37.3
9:00 p.m.	39.0	38.7
10:00 p.m.	37.9	32.6
11:00 p.m.	39.2	37.6

Source: WJV Acoustics, Inc.

The short-term site noise measurement data included energy average (L_{eq}) maximum (L_{max}) as well as five (5) individual statistical parameters. Observations were made of the dominant noise sources affecting the measurements. The statistical parameters describe the percent of time a noise level was exceeded during the measurement period. Table VI summarizes short-term noise measurement results.

TABLE VI

SUMMARY OF SHORT-TERM NOISE MEASUREMENT DATA
KAMM AVENUE PISTACHIO PLANT
FRESNO COUNTY
AUGUST 6 & 7, 2020

Site	Time	A-Weighted Decibels, dBA							Sources
		L_{eq}	L_{max}	L_2	L_8	L_{25}	L_{50}	L_{90}	
ST-1	8:15 a.m.	61.7	80.6	74.0	59.2	46.1	39.0	28.9	TR
ST-1	2:45 p.m.	62.4	83.7	75.1	63.4	48.1	42.6	31.4	TR
ST-2	8:35 a.m.	68.8	83.6	79.5	74.7	63.5	54.8	46.7	TR, AC
ST-2	3:05 p.m.	66.6	79.5	73.0	71.2	64.7	55.5	43.2	TR
ST-3	9:00 a.m.	69.4	82.0	80.1	74.2	65.7	62.9	61.1	TR, AG
ST-3	3:30 p.m.	67.4	78.0	75.8	72.1	63.2	61.4	58.3	TR
ST-4	9:20 a.m.	67.6	81.9	78.5	73.5	60.2	50.3	34.9	TR, AG
ST-4	3:50 p.m.	64.2	80.1	77.7	71.0	61.8	52.4	36.1	TR, AC

TR: Traffic AC: Aircraft Agriculture Activities

Source: WJV Acoustics, Inc.

Short-term noise measurements were conducted for 15-minute periods. Site ST-1 was located south of Kamm Avenue, in the vicinity of the project site, ST-2 was located at the southwest corner of Kamm Avenue and SR 33. Site ST-3 was located along the west side of SR 33 in the vicinity of the community of Three Rocks. Site ST-4 was located along the west side of SR 33 approximately half way between the community of Three Rocks and Kamm Avenue. The dominant source of noise at all four short-term measurement sites was vehicle traffic along Kamm Avenue and/or SR 33. Additional sources of noise included small aircraft overflights, military aircraft overflights and noise associated with agricultural activities.

4. PROJECT IMPACTS AND MITIGATION MEASURES

a. Project Traffic Noise Impacts on Existing Noise-Sensitive Land Uses (Less Than Significant)

WJVA utilized the FHWA Traffic Noise Model[4] to quantify expected project-related increases in traffic noise exposure at representative noise-sensitive receptor locations in the project vicinity. Traffic noise exposure levels for Existing, Existing Plus Project, 2040 No Project and 2040 Plus Project traffic conditions were calculated based upon the FHWA Model and traffic volumes provided by JLB Traffic Engineering, Inc. The day/night distribution of traffic and the percentages of trucks on the roadways used for modeling were also obtained from JLB Traffic Engineering, Inc. The Noise modeling assumptions used to calculate project traffic noise are provided as Appendix C.

Project-related significant impacts would occur if an increase in traffic noise associated with the project would result in noise levels exceeding the County's applicable noise level standards at the location(s) of sensitive receptors. For the purpose of this analysis a significant impact is also assumed to occur if traffic noise levels were to increase by 3 dB at sensitive receptor locations where noise levels already exceed the County's applicable noise level standards (without the project), as 3 dB generally represents the threshold of perception in change for the human ear. This analysis of project traffic noise focuses on residential land uses, as they represent the most restrictive noise level criteria by land use type provided in the General Plan. The County's exterior noise level standard for residential land uses is 60 dB L_{dn}. The locations of the modeled traffic noise receptors are provided as Figure 5.

Table VII provides a comparison of traffic noise levels at the two modeled receptor locations for Existing, Existing Plus Project, 2040 and 2040 Plus Project traffic conditions. As described in Table VII, project-related traffic is not expected to result in noise levels at any sensitive receptors to exceed the County's noise level standard (R-1), or result in an increase of 3 dB at any sensitive receptor locations where noise levels already exceed the County's noise level standard without the implementation of the project (R-2). Therefore, project-related increases in traffic noise exposure is considered to be less than significant.

TABLE VII

PROJECT-RELATED INCREASES IN TRAFFIC NOISE, dB, CNEL
KAMM AVENUE PISTACHIO PLANT
FRESNO COUNTY

Modeled Receptor	Existing	Existing Plus Project	2040 No Project	2040 Plus Project	Change (Maximum)	Significant Impact?
R-1	52	54	53	56	3	No
R-2	67	68	69	69	1	No

Source: WJV Acoustics, Inc.
JLB Traffic Engineering, Inc.

b. Noise Impacts from On-Site Noise Sources (No Impact)

The Project would operate year-round to package and process harvested pistachios for retail and wholesale customers. During an approximately 6-week harvest period, which typically occurs during August to October, the Project will operate seven days a week and 24 hours per day to receive, hull, heat, dry and store pistachio crops in onsite storage silos.

Dryer Units

The dominant on-site noise-producing component of the pistachio plant are the grain dryer units used to dry and process the freshly harvest nuts. The project would include fourteen (14) GSI 2426X grain dryer units. In order to assess potential noise levels associated with the use of these grain dryer units, WJVA staff conducted reference noise level measurements of the same GSI 2426X units, while in use, at an existing pistachio processing facility located in Terra Bella, California on September 2, 2020. Noise measurement equipment used was the same as described above.

Noise level measurements indicated that the GSI 2426X grain dryer produced noise levels of approximately 96 dB at a distance of approximately fifteen (15) feet directly in from the unit (facing directly toward the fan). This represents the loudest portion of the unit. WJVA also conducted noise level measurements at a 90-degree side angle of the unit, where noise was measured to be approximately 93 dB at t distance of approximately fifteen feet from the unit.

Additional observed sources of noise associated with the Terra Bella facility included conveyor belts, fork lift and truck movements and human voices. WJVA staff conducted reference noise level measurements at two (2) additional locations at distances outside of the main processing area. Both locations were located approximately 400 feet from the main processing area. These two reference noise measurement sites (TB-1 and TB-2) are provided as Figure 6. A photograph of the measured GSI 2426X dryers are provided as Figure 7.

Measurement location TB-1 was located approximately 400 feet west of the main processing area, and was partially acoustically shielded by intervening ancillary buildings. Plant operational noise was measured to be approximately 62 dB at TB-1. Measurement location TB-2 was located approximately 400 south of the project site, with very little acoustical shielding between the main processing area and the measurement location. Plant operational noise was measured to be approximately 66 dB at TB-2.

The closest sensitive receptors (residential land uses) to the proposed main processing area are located approximately 10,000 feet to the southeast (Three Rocks community, vicinity of LT-1 on Figure 2) and approximately 7,000 feet (applicant owned employee housing, LT-2 on Figure 2). Taking into account the above described reference noise level measurements and the typical rate of noise attenuation with increased distance from a point source (- 6 dB/doubling of distance), pistachio plant noise levels would be expected to be in the range of approximately 31-34 dB at the residential land uses within the Three Rocks community and approximately 35-38 dB at the applicant-owned employee housing residential land uses.

The above-described project operational noise levels do not exceed the County's daytime noise

level standard of 50 dB L_{50} or the County's nighttime noise level standard of 45 dB L_{50} for stationary (non-transportation) noise standards (provided above as Table II) at the closest sensitive receptor locations. Furthermore, the project's operational noise levels would not be expected to exceed existing (without project) ambient noise levels (see Table V) at the locations of the sensitive receptors.

It should be noted, the project's operational noise levels provided above do not take into account any acoustical shielding that would be provided by intervening ancillary buildings or atmospheric and ground absorption. Additionally, the project's operational noise levels represent only those that would be expected to occur during peak harvest season (approximately 6-week harvest period, which typically occurs during August to October). Operational noise levels during the remainder of the year would be expected to be significantly lower. Therefore, the above-described noise levels should be considered a worst-case assessment of project-related noise levels at nearby sensitive receptor locations. Additional mitigation measures are not required.

Spreader/Shredder

The project would also utilize a spreader (shredder) equipment to distribute processed solid waste (hulls, twigs, leaves) onto an adjacent 160-acre parcel of land, west of the main project site. The use of the spreader equipment would coincide with the above-described peak harvest season.

The exact make/model of the spreader to be utilized was not known at the time of this analysis. However, according to the project applicant, the shredder would be comparable to a Meyer Farm Equipment Large Capacity SXI Industrial Spreader. The spreader is either used in conjunction with a tractor or a truck to pull the equipment. WJVA staff spoke with a Meyer Farm Equipment representative, who indicated that no noise level data is available through the manufacturer. However, the Meyer representative indicated that the noise levels associated with the spreader are typically less than that of the tractor or truck being utilized to pull the spreader.

WJVA has conducted measurements of the noise levels produced by slowly moving trucks and tractors for a number of studies. Such truck/tractor movements would be expected to produce noise levels in the range of 65 to 70 dBA at a distance of 100 feet. Taking into account standard rates of noise attenuation with increased distance from the source, noise levels associated with spreader equipment would be expected to be less than 35 dB at the closest sensitive receptor locations. Such levels are below the County's noise level standards, and additional mitigation measures are not required.

c. Noise From Construction (No Impact)

Construction noise would occur at various locations within and near the project site through the build-out period. The distance from the closest residences to the project site is approximately 6,000 feet. Table VIII provides typical construction-related noise levels at distances of 100 feet, 200 feet, and 300 feet. As a point of reference, the loudest equipment provided on Table VIII (concrete saw) would be less than 45 dB at a distance of 7,000 feet from the source, and would be inaudible above existing ambient noise levels.

Construction noise is typically not considered to be a significant impact if construction is limited to the daytime hours and construction equipment is adequately maintained and muffled. Extraordinary noise-producing activities (e.g., pile driving) are not anticipated. The County Code of Ordinances typically restricts hours of construction activity to occur between the hours of 6:00 a.m. to 9:00 p.m. Monday through Friday and between 7:00 a.m. to 5:00 p.m. Saturday and Sunday. However, it should be noted that due to the distances between the project site and the closest sensitive receiver locations, noise associated with construction activities would not be expected to exceed any noise level standard or exceed existing ambient noise levels at any hour of the day, if construction activities were to occur outside of the typically permitted hours of construction.

TABLE VIII

TYPICAL CONSTRUCTION EQUIPMENT MAXIMUM NOISE LEVELS, dBA

Type of Equipment	100 Ft.	200 Ft.	300 Ft.
Concrete Saw	84	78	74
Crane	75	69	65
Excavator	75	69	65
Front End Loader	73	67	63
Jackhammer	83	77	73
Paver	71	65	61
Pneumatic Tools	79	73	69
Dozer	76	70	66
Rollers	74	68	64
Trucks	80	72	70
Pumps	74	68	64
Scrapers	81	75	71
Portable Generators	74	68	64
Backhoe	80	74	70
Grader	80	74	70

Source: FHWA
Noise Control for Buildings and Manufacturing Plants, Bolt, Beranek & Newman, 1987

d. Vibration Impacts (No Impact)

The dominant sources of man-made vibration are sonic booms, blasting, pile driving, pavement breaking, demolition, diesel locomotives, and rail-car coupling. None of these activities are anticipated to occur with construction or operation of the proposed project. Due to the distances between the project site and the closest sensitive receptor locations, vibration from construction activities would not be expected to be detected at the closest sensitive land uses during any period of project construction. As a point of reference, typical vibration levels at distances of 100 feet and 300 feet are summarized by Table IX.

TABLE IX TYPICAL VIBRATION LEVELS DURING CONSTRUCTION		
	PPV (in/sec)	
Equipment	@ 100´	@ 300´
Bulldozer (Large)	0.011	0.006
Bulldozer (Small)	0.0004	0.00019
Loaded Truck	0.01	0.005
Jackhammer	0.005	0.002
Vibratory Roller	.03	0.013
Caisson Drilling	.01	0.006
Source: *Caltrans*		

After full project build out, it is not expected that ongoing operational activities will result in any vibration impacts at nearby sensitive uses. Additional mitigation is not required.

e. Noise Impacts from Nearby Airports or Airstrips (No Impact)

The Project site is not located within two miles of a public airport or private airstrip.

5. IMPACT SUMMARY

The project would not be expected to result in any significant noise impacts at any sensitive receptor locations. The closest sensitive receptors to the project site are located at distances of approximately one to two miles from the main noise-producing processing area. As such, noise levels associated with the processing area (dryers, fans, conveyer belts, forklift, truck and vehicle movements, etc.) are attenuated by distance, atmospheric absorption and ground absorption, resulting in noise levels below the County's applicable nose level standards and below existing (without project) ambient noise levels at the sensitive receptor locations. It should be noted however, project-related noise levels described above in section 4.b do not take into account any atmospheric or ground absorption, and were calculated based only on the attenuation provided by increased distances from the noise source, and should therefore be considered a worst-case assessment of project-related noise levels at nearby sensitive receptor locations.

Project-related increases in traffic noise would not be expected to result in an exceedance of the County's applicable transportation noise level standards or result in an increase greater than 3 dB L_{dn} at existing receptor locations where transportation noise exposure levels already exceed the County's noise level standards, without the project. Additional mitigation measures are therefore not required.

6. SOURCES CONSULTED

1. Fresno County General Plan, October 3, 2000.

2. Fresno County Code of Ordinances, *Health and Safety,* 2001.

3. California Department of Transportation, *Transportation and Construction Vibration Guidance Manual,* September 2013.

4. Federal Highway Administration, *Traffic Noise Model, Version 2.5,* April 14, 2004

FIGURE 1: PROJECT SITE PLAN

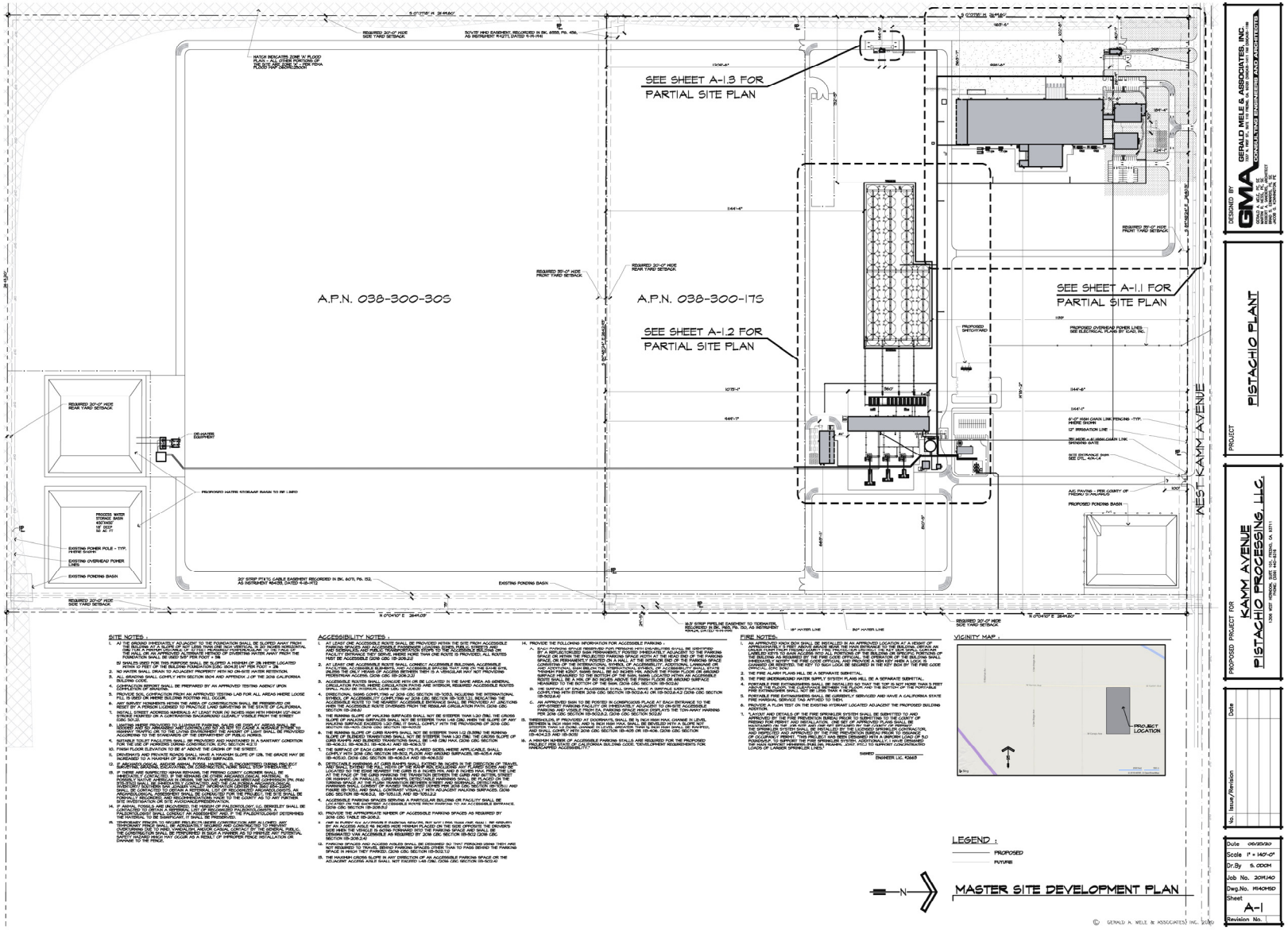


FIGURE 2: PROJECT VICINITY AND AMBIENT NOISE MONITORING SITES

FIGURE 3: HOURLY NOISE LEVELS AT LONG-TERM MONITORING SITE LT-1

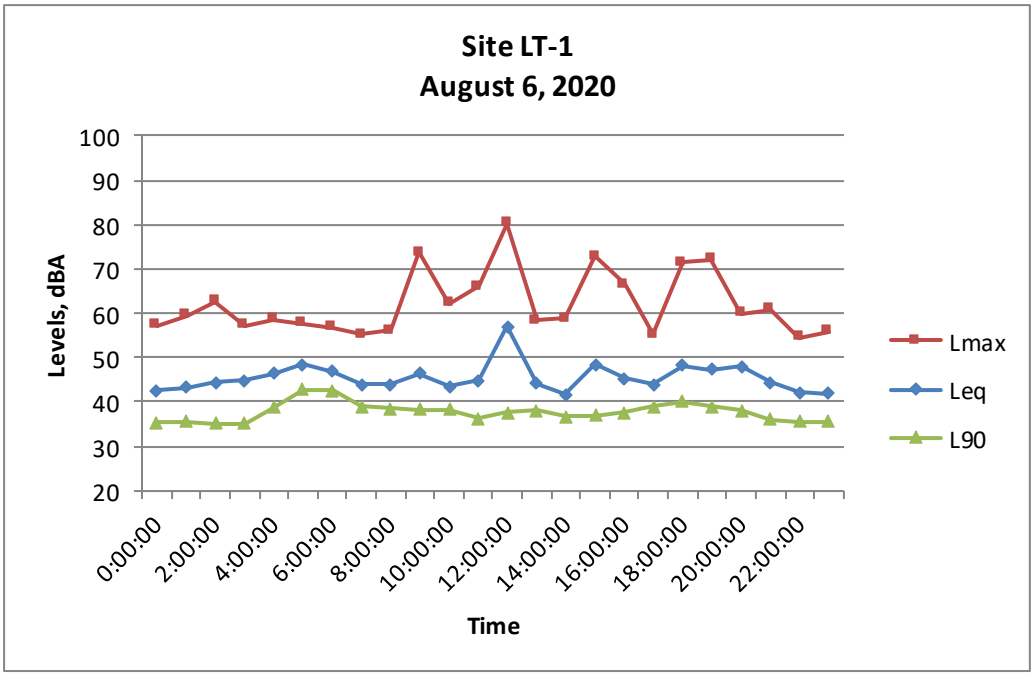


FIGURE 4: HOURLY NOISE LEVELS AT LONG-TERM MONITORING SITE LT-2

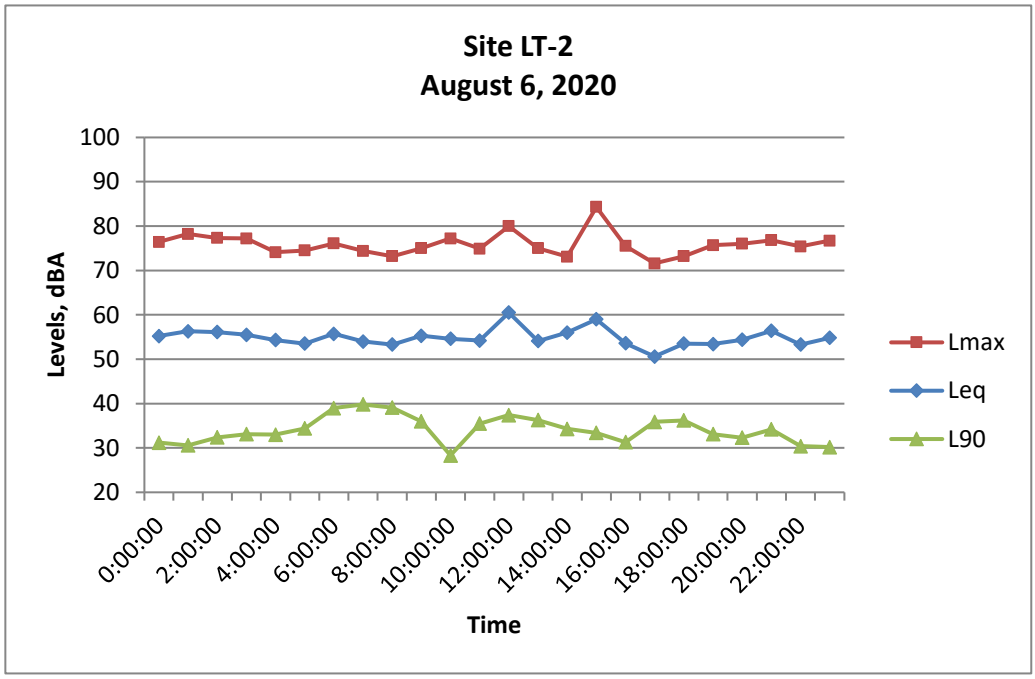


FIGURE 5: LOCATIONS OF MODELED TRAFFIC NOISE RECEPTORS

FIGURE 6: PISTACHIO PLANT REFERENCE MEASUREMENT LOCATIONS

FIGURE 7: GSI 2426 DRYERS AT TERRA BELLA PISTACHIO PLANT

APPENDIX A-1

ACOUSTICAL TERMINOLOGY

AMBIENT NOISE LEVEL: The composite of noise from all sources near and far. In this context, the ambient noise level constitutes the normal or existing level of environmental noise at a given location.

CNEL: Community Noise Equivalent Level. The average equivalent sound level during a 24-hour day, obtained after addition of approximately five decibels to sound levels in the evening from 7:00 p.m. to 10:00 p.m. and ten decibels to sound levels in the night before 7:00 a.m. and after 10:00 p.m.

DECIBEL, dB: A unit for describing the amplitude of sound, equal to 20 times the logarithm to the base 10 of the ratio of the pressure of the sound measured to the reference pressure, which is 20 micropascals (20 micronewtons per square meter).

DNL/L_{dn}: Day/Night Average Sound Level. The average equivalent sound level during a 24-hour day, obtained after addition of ten decibels to sound levels in the night after 10:00 p.m. and before 7:00 a.m.

L_{eq}: Equivalent Sound Level. The sound level containing the same total energy as a time varying signal over a given sample period. L_{eq} is typically computed over 1, 8 and 24-hour sample periods.

NOTE: The CNEL and DNL represent daily levels of noise exposure averaged on an annual basis, while L_{eq} represents the average noise exposure for a shorter time period, typically one hour.

L_{max}: The maximum noise level recorded during a noise event.

L_n: The sound level exceeded "n" percent of the time during a sample interval (L_{90}, L_{50}, L_{10}, etc.). For example, L_{10} equals the level exceeded 10 percent of the time.

A-2

ACOUSTICAL TERMINOLOGY

NOISE EXPOSURE CONTOURS: Lines drawn about a noise source indicating constant levels of noise exposure. CNEL and DNL contours are frequently utilized to describe community exposure to noise.

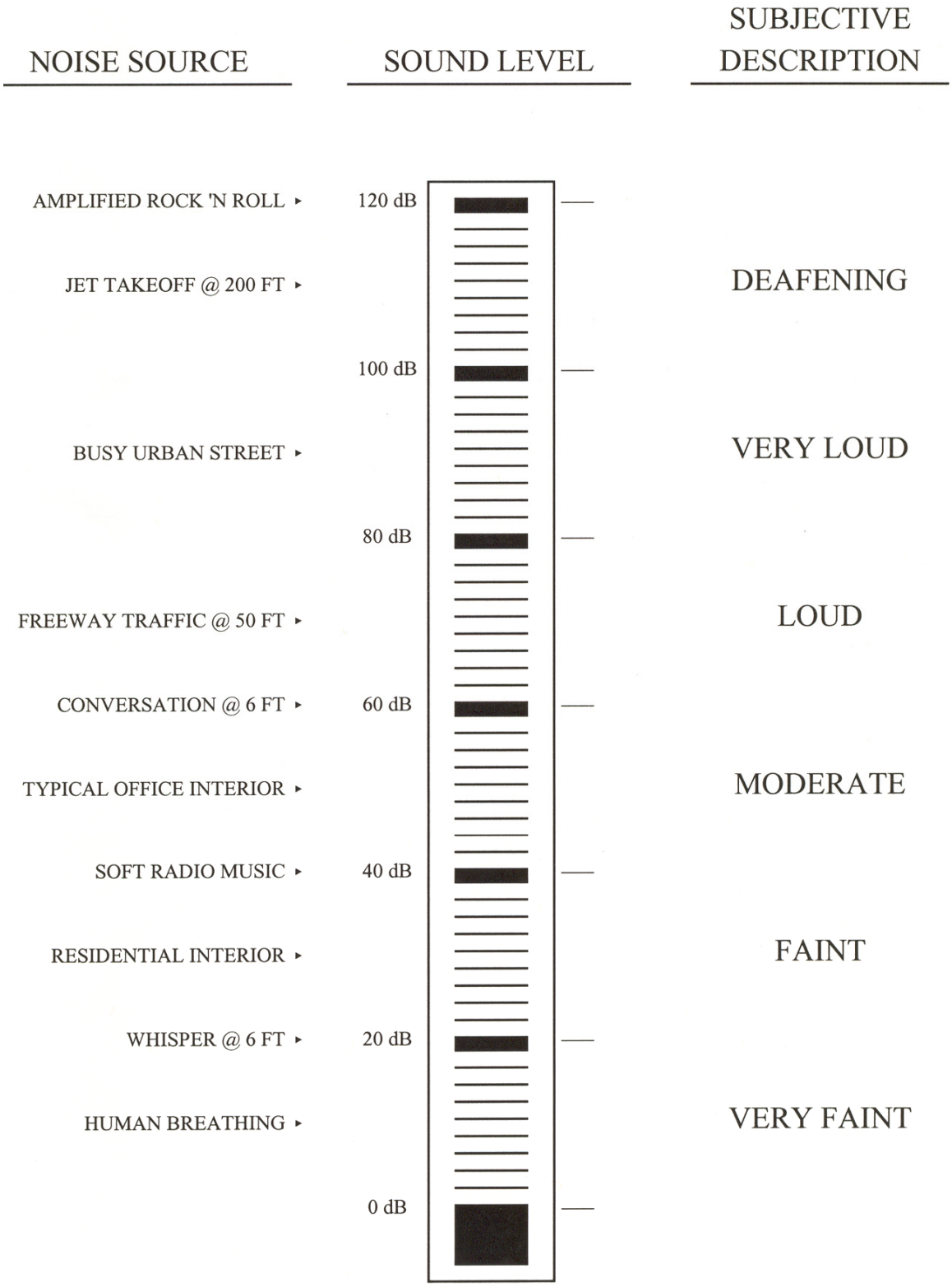
NOISE LEVEL REDUCTION (NLR): The noise reduction between indoor and outdoor environments or between two rooms that is the numerical difference, in decibels, of the average sound pressure levels in those areas or rooms. A measurement of Anoise level reduction" combines the effect of the transmission loss performance of the structure plus the effect of acoustic absorption present in the receiving room.

SEL or SENEL: Sound Exposure Level or Single Event Noise Exposure Level. The level of noise accumulated during a single noise event, such as an aircraft overflight, with reference to a duration of one second. More specifically, it is the time-integrated A-weighted squared sound pressure for a stated time interval or event, based on a reference pressure of 20 micropascals and a reference duration of one second.

SOUND LEVEL: The sound pressure level in decibels as measured on a sound level meter using the A-weighting filter network. The A-weighting filter de-emphasizes the very low and very high frequency components of the sound in a manner similar to the response of the human ear and gives good correlation with subjective reactions to noise.

SOUND TRANSMISSION CLASS (STC): The single-number rating of sound transmission loss for a construction element (window, door, etc.) over a frequency range where speech intelligibility largely occurs.

APPENDIX B
EXAMPLES OF SOUND LEVELS



APPENDIX C

TRAFFIC NOISE MODELING CALCULATIONS

WJV Acoustics, Inc
FHWA-RD-77-108
Calculation Sheets
September 4, 2020

Project #:	20-027
Description:	Existing
Ldn/Cnel:	Ldn
Site Type:	Soft

Contour Levels (dB)	60	65	70	75					

Segment	Roadway Name	Segment Description	ADT	%Day	%Evening	%Night	%Med	%Heavy	Speed	Distance	Offset
1	Kamm Ave R-1	I-5 to Project Site	329	74		26	22	28	55	270	
2	SR 33 R-2	South of Kamm	2074	74		26	22	28	55	85	

WJV Acoustics, Inc
FHWA-RD-77-108
Calculation Sheets
September 4, 2020

Project #:	20-027
Description:	Existing + Project
Ldn/Cnel:	Ldn
Site Type:	Soft

Contour Levels (dB): 60, 65, 70, 75

Segment	Roadway Name	Segment Description	ADT	%Day	%Evening	%Night	%Med	%Heavy	Speed	Distance	Offset
1	Kamm Ave R-1	I-5 to Project Site	487	74		26	15	45	55	270	
2	SR 33 R-2	South of Kamm	2292	74		26	22	28	55	85	

WJV Acoustics, Inc
FHWA-RD-77-108
Calculation Sheets
September 4, 2020

Project #:	20-027
Description:	2040
Ldn/Cnel:	Ldn
Site Type:	Soft

Contour Levels (dB)	60	65	70	75					

Segment	Roadway Name	Segment Description	ADT	%Day	%Evening	%Night	%Med	%Heavy	Speed	Distance	Offset
1	Kamm Ave R-1	I-5 to Project Site	508	74		26	22	28	55	270	
2	SR 33 R-2	South of Kamm	3208	74		26	22	28	55	85	

WJV Acoustics, Inc
FHWA-RD-77-108
Calculation Sheets
September 4, 2020

Project #:	20-027
Description:	2040 + Project
Ldn/Cnel:	Ldn
Site Type:	Soft

Contour Levels (dB)

60	65	70	75					

Segment	Roadway Name	Segment Description	ADT	%Day	%Evening	%Night	%Med	%Heavy	Speed	Distance	Offset
1	Kamm Ave R-1	I-5 to Project Site	666	74		26	17	41	55	270	
2	SR 33 R-2	South of Kamm	3426	74		26	22	28	55	85	

Appendix I

Traffic Impact Analysis

Traffic Impact Analysis Report

Kamm Avenue Processing Plant

Located at
34411 W. Kamm Avenue
Cantua Creek, CA 93608

In the County of Fresno, California

Prepared for:
Kamm Avenue Pistachio Processing, LLC
1396 W. Herndon Ave., Ste. 101
Fresno, CA 93711-7126

October 6, 2020

Project No. 009-018

Traffic Engineering, Transportation Planning, & Parking Solutions
516 W. Shaw Ave., Ste. 103
Fresno, CA 93704
Phone: (559) 570-8991
www.JLBtraffic.com

Traffic Engineering, Transportation Planning, & Parking Solutions

Traffic Impact Analysis Report

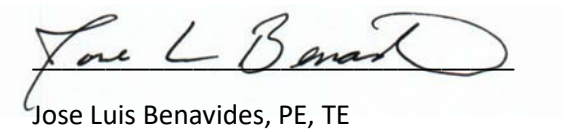
For the Kamm Avenue Processing Plant located at 34411 W. Kamm Avenue, Cantua Creek, CA 93608

In the County of Fresno, CA

October 6, 2020

This Traffic Impact Analysis Report has been prepared under the direction of a licensed Traffic Engineer. The licensed Traffic Engineer attests to the technical information contained therein and has judged the qualifications of any technical specialists providing engineering data from which recommendations, conclusions, and decisions are based.

Prepared by:



Jose Luis Benavides, PE, TE

President

Traffic Engineering, Transportation Planning, & Parking Solutions
516 W. Shaw Ave., Ste. 103
Fresno, CA 93704
Phone: (559) 570-8991
www.JLBtraffic.com

Table of Contents

Introduction and Summary....1
Introduction....1
Summary....2
Existing Traffic Conditions....2
Existing plus Project Traffic Conditions....3
Near Term Year 2025 plus Project Traffic Conditions....3
Cumulative Year 2040 No Project Traffic Conditions....3
Cumulative Year 2040 plus Project Traffic Conditions....4
Scope of Work....5
Study Facilities....5
Study Intersections....5
Study Segments....5
Study Scenarios....6
Existing Traffic Conditions....6
Existing plus Project Traffic Conditions....6
Near Term Year 2025 plus Project Traffic Conditions....6
Cumulative Year 2040 No Project Traffic Conditions....6
Cumulative Year 2040 plus Project Traffic Conditions....6
Level of Service Analysis Methodology....7
Criteria of Significance....7
Operational Analysis Assumptions and Defaults....7
Existing Traffic Conditions....8
Roadway Network....8
Traffic Signal Warrants....8
Preliminary Construction-Related Traffic....8
Results of Existing Traffic Index Analysis....9
Kamm Avenue Pavement Condition Index....10
Results of Existing Level of Service Analysis....11
Existing plus Project Traffic Conditions....14
Project Description....14

Project Access 15
Trip Generation 15
Trip Distribution 17
Traffic Signal Warrants 17
Results of Existing plus Project Traffic Index Analysis 17
Results of Existing plus Project Level of Service Analysis 19
Vehicle Miles Traveled Analysis 20
Near Term Year 2025 plus Project Traffic Conditions 25
Traffic Signal Warrants 25
Results of Near Term Year 2025 plus Project Traffic Index Analysis 25
Results of Near Term Year 2025 plus Project Level of Service Analysis 27
Cumulative Year 2040 No Project Traffic Conditions 29
Traffic Signal Warrants 29
Results of Cumulative Year 2040 No Project Traffic Index Analysis 29
Results of Cumulative Year 2040 No Project Level of Service Analysis 30
Cumulative Year 2040 plus Project Traffic Conditions 32
Traffic Signal Warrants 32
Left-Turn Lane Warrant Analysis 32
Results of Traffic Index Analysis 34
Results of Cumulative Year 2040 plus Project Level of Service Analysis 36
Queuing Analysis 38
Conclusions and Recommendations 39
Existing Traffic Conditions 39
Existing plus Project Traffic Conditions 39
Near Term Year 2025 plus Project Traffic Conditions 40
Cumulative Year 2040 No Project Traffic Conditions 40
Cumulative Year 2040 plus Project Traffic Conditions 40
Study Participants 41
References 41

List of Figures

Figure 1: Vicinity Map **12**
Figure 2: Existing - Traffic Volumes, Geometrics and Controls **13**
Figure 3: Project Site Plan **22**
Figure 4: Project Only Trips **23**
Figure 5: Existing plus Project - Traffic Volumes, Geometrics and Controls **24**
Figure 6: Near Term Year 2025 plus Project - Traffic Volumes, Geometrics and Controls **28**
Figure 7: Cumulative Year 2040 No Project - Traffic Volumes, Geometrics and Controls **31**
Figure 8: Cumulative Year 2040 plus Project - Traffic Volumes, Geometrics and Controls **37**

List of Tables

Table I: Existing Traffic Index **9**
Table II: Existing Intersection LOS Results **11**
Table III: Existing Segment LOS Results **11**
Table IV: Project Trip Generation **16**
Table V: Existing plus Project Traffic Index – Daily Peak Season **18**
Table VI: Existing plus Project Traffic Index – Daily Average **18**
Table VII: Existing plus Project Intersection LOS Results **19**
Table VIII: Existing plus Project Segment LOS Results **19**
Table IX: Near Term Year 2025 plus Project Traffic Index - Peak **26**
Table X: Near Term Year 2025 plus Project Traffic Index - Average **26**
Table XI: Near Term Year 2025 plus Project Intersection LOS Results **27**
Table XII: Near Term Year 2025 plus Project Segment LOS Results **27**
Table XIII: Cumulative Year 2040 No Project Traffic Index **29**
Table XIV: Cumulative Year 2040 No Project Intersection LOS Results **30**
Table XV: Cumulative Year 2040 No Project Segment LOS Results **30**
Table XVI: Cumulative Year 2040 plus Project Intersection Volumes and Speeds **32**
Table XVII: AASHTO Guide for Left-Turn Lanes on Two-Lane Highways **33**
Table XVIII: Interpolation of Cumulative Year 2040 plus Project Intersection Volumes to AASHTO Volumes **34**
Table XIX: Cumulative Year 2040 plus Project Traffic Index - Peak **35**
Table XX: Cumulative Year 2040 plus Project Traffic Index - Average **35**
Table XXI: Cumulative Year 2040 plus Project Intersection LOS Results **36**
Table XXII: Cumulative Year 2040 plus Project Segment LOS Results **36**
Table XXIII: Queuing Analysis **38**

List of Appendices

Appendix A: Scope of Work
Appendix B: Traffic Counts
Appendix C: Traffic Modeling
Appendix D: Methodology
Appendix E: Traffic Index
Appendix F: Existing Traffic Conditions
Appendix G: Existing plus Project Traffic Conditions
Appendix H: Near Term Year 2025 plus Project Traffic Conditions
Appendix I: Cumulative Year 2040 No Project Traffic Conditions
Appendix J: Cumulative Year 2040 plus Project Traffic Conditions
Appendix K: Traffic Signal Warrants

Introduction and Summary

Introduction

This Report describes a Revised Traffic Impact Analysis (TIA) prepared by JLB Traffic Engineering, Inc. (JLB) for the proposed Kamm Avenue Processing Plant (Project) located on approximately 316 acres at 34411 W. Kamm Avenue, Cantua Creek, CA 93608 (APN 038-300-17S and 038-300-30S) in the County of Fresno. The Project proposes to construct operate and maintain a pistachio processing plant with the capacity to receive, hull, dry, store, process, package and ship 60 million pounds of finished pistachio products per year. The Project would serve the immediate vicinity of existing pistachio orchards that currently ship crops for processing to more remote locations. Currently, the developer's product is transported to a processing plant in Firebaugh over 21 miles away. Based on information provided by the developer, the Project proposes to be constructed in a single phase. Figure 1 shows the location of the proposed Project site relative to the surrounding roadway network.

The Project proposes to include the following facilities:

- One (1) 130,000 square-foot processing/packing building
- One (1) 15,000 square-foot cold storage building
- One (1) 1,200 square-foot motor control center (MCC) building
- One (1) 1,200 square-foot air compressor building
- One (1) 12,156 square-foot administrative office building
- One (1) 8,818 square-foot breakroom/supervisor office building
- One (1) 1,000 square-foot main scale house/guard shack and 80' truck scale
- One (1) 200 square-foot scale house and 80-foot truck scale
- Forty-nine (49) 48-foot diameter x 65-foot tall storage silos
- One (1) 21,600 square-foot huller canopy and related equipment
- Thirteen (13) 27 MMbtu/hr natural gas fired column dryers
- One (1) 6,750 square-foot shop building with a 2,920 square-foot canopy
- Four (4) sand and media raw water filters
- One (1) 353,000-gallon water storage tank
- One (1) 324 square-foot fire pump house
- One (1) 972 square-foot storage warehouse
- One (1) 225 square-foot domestic water treatment plant control room
- Three (3) domestic water treatment filters
- One (1) 70,000-gallon domestic water storage tank
- Three (3) precleaning equipment installations
- One (1) One huller pit to collect hulling process water and equipment washroom water
- Three (3) excavated and cement-lined hulling pits to receive raw pistachios during the harvest period
- One (1) 50,000 square-foot fenced fumigation operations area
- One (1) 400 square-foot fenced chemical storage area
- Connections and metering equipment to supply water
- Two (2) underground 18-inch diameter pipelines

- Two (2) hulling process water and hull residue agitators, separators and screen systems
- Two (2) lined 450 square-foot process water settling and cleaning ponds
- Paved or improved primary access and secondary roads, truck turnaround areas, and employee parking facilities
- Five (5) septic systems for employee waste
- One (1) 310-foot x 400-foot unlined stormwater retention basin
- Black chain link security fencing 6 feet in height, with access gates
- Natural gas connections and metering equipment
- Electrical power connections and metering equipment

The purpose of this TIA is to evaluate the potential on-site and off-site traffic impacts, identify short-term roadway and circulation needs, determine potential mitigation measures, and identify any critical traffic issues that should be addressed in the on-going planning process. The TIA primarily focused on evaluating traffic conditions at study intersections and segments that may potentially be impacted by the proposed Project during the heaviest two-week peak period of the year. The Scope of Work was prepared via consultation with County of Fresno and Caltrans staff.

Summary

The potential traffic impacts of the proposed Project were evaluated in accordance with the standards set forth by the Level of Service (LOS) policy of the County of Fresno and Caltrans.

Existing Traffic Conditions

- At present, the segments of Kamm Avenue between Interstate 5 and Main Project Access and Main Project Access and State Route 33 currently observe a TI of 8.5 in both directions.
- Based on information provided by County of Fresno staff, the segment of Kamm Avenue between Interstate 5 and San Bernardino Avenue alignment has an "Excellent" Pavement Condition Index (PCI) rating of 100, while the segment of Kamm Avenue between San Bernardino Avenue alignment and State Route 33 has a "Good" PCI rating of 87.
- Furthermore, the segment of Kamm Avenue between Interstate 5 and San Bernardino Avenue alignment experienced a 0.1-foot asphalt concrete overlay in 2013, and the segment of Kamm Avenue between San Bernardino Avenue alignment and State Route 33 experienced a chip seal in 2008.
- At present, all study intersections operate at an acceptable LOS during both peak periods. Similarly, all study segments operate at an acceptable LOS.

Existing plus Project Traffic Conditions

- Based on the latest Project Site Plan, access to the proposed Project will be from a total of three (3) points. JLB analyzed the location of the proposed access points to be constructed relative to the existing local roads in the Project's vicinity. A review of the Project's access points to be constructed indicates that they are located at points that minimize traffic operational impacts to the existing roadway network.
- Under this scenario, the proposed Project is estimated to generate a maximum of 590 daily trips, 103 AM peak hour trips and 23 PM peak hour trips.
- Under this scenario, the segment of Kamm Avenue between Interstate 5 and Main Project Access is projected to observe a TI of 9.0 and 8.5 in the eastbound and westbound directions, respectively. Additionally, the segment of Kamm Avenue between Main Project Access and State Route 33 is projected to observe a TI of 9.0 and 8.5 in the eastbound and westbound directions, respectively. As a result, the Project is projected to have an impact of 0.5 to the TI for the segment of Kamm Avenue between Interstate 5 and State Route 33 in the eastbound direction only.
- Under this scenario, all study intersections are projected to operate at an acceptable LOS during both peak periods. Similarly, all study segments are projected to operate at an acceptable LOS.
- The Project site is located within Traffic Analysis Zone 2270 that has an average VMT per employee of 41.67. In this case, the 15 percent VMT reduction threshold is 35.41 VMT per employee.
- Based on Fresno COG ABM output, the Project will produce a 36.6 average (tour-based) VMT per employee (prior to accounting for carpooling). Therefore, a carpooling program with 23 percent or more employee participation will reduce VMT by more than 15 percent below the existing average VMT of 41.67 for the type of project and project location. With the recommended mitigation measure to incentivize and encourage carpooling, VMT from this facility would be reduced to less than significant.

Near Term Year 2025 plus Project Traffic Conditions

- Under this scenario, the segment of Kamm Avenue between Interstate 5 and Main Project Access is projected to observe a TI of 9.0 and 8.5 in the eastbound and westbound directions, respectively. Additionally, the segment of Kamm Avenue between Main Project Access and State Route 33 is projected to observe a TI of 9.0 and 8.5 in the eastbound and westbound directions, respectively. As a result, the Project is projected to have an impact of 0.5 to the TI for the segment of Kamm Avenue between Interstate 5 and State Route 33 in the eastbound direction only.
- Under this scenario, all study intersections are projected to operate at an acceptable LOS during both peak periods. Similarly, all study segments are projected to operate at an acceptable LOS.

Cumulative Year 2040 No Project Traffic Conditions

- Under this scenario, the segments of Kamm Avenue between Interstate 5 and Main Project Access and Main Project Access and State Route 33 are projected to observe a TI of 9.0 in both directions. As a result, by the Cumulative Year 2040 scenario, both segments of Kamm Avenue are projected to have an impact of 0.5 to the TI in both directions.
- Under this scenario, all study intersections are projected to operate at an acceptable LOS during both peak periods. Similarly, all study segments are projected to operate at an acceptable LOS.

Cumulative Year 2040 plus Project Traffic Conditions

- Based on the findings of the Left-Turn Lane Warrant, a westbound left-turn pocket would not be warranted at the intersection of Main Project Access and Kamm Avenue.
- Under this scenario, the segment of Kamm Avenue between Interstate 5 and Main Project Access is projected to observe a TI of 9.0 in both directions. Additionally, the segment of Kamm Avenue between Main Project Access and State Route 33 is projected to observe a TI of 9.0 in both directions. As a result, the Project is projected to have a cumulative impact of 0.5 to the TI for the segments of Kamm Avenue between Interstate 5 and Main Project Access in the eastbound and westbound directions. Additionally, the Project is projected to have a cumulative impact of 0.5 to the TI for the segment of Kamm Avenue between Main Project Access and State Route 33 in both directions.
- Under this scenario, all study intersections are projected to operate at an acceptable LOS during both peak periods. Similarly, all study segments are projected to operate at an acceptable LOS.

Scope of Work

The TIA primarily focused on evaluating traffic conditions at study intersections and segments that may potentially be impacted by the proposed Project. On July 16, 2020, a Draft Scope of Work to the County of Fresno and Caltrans staff for their review and comment. On July 16, 2020 the County of Fresno and Caltrans both responded accepting the Draft Scope of Work as presented. The Scope of Work for this Project was based on communication with County of Fresno and Caltrans staff. The Draft Scope of Work and the comments received from the lead agency and responsible agencies are included in Appendix A.

Study Facilities

The existing peak hour turning movement and segment volume counts were conducted at the study intersections and segments on October 1, 2019. Seasonal and daily factors were provided by County of Fresno staff to better reflect annual average daily and peak hour volumes. Based on information provided by the County, a seasonal factor of 0.96 and a daily factor of 0.89 was applied to the turning movement and segment volume counts. The traffic counts for the existing study intersections and segments are contained in Appendix B. The existing intersection turning movement volumes (adjusted with a 0.96 seasonal and 0.89 daily factor), intersection geometrics and traffic controls are illustrated in Figure 2.

Study Intersections

1. Interstate 5 Southbound (SB) Ramps / Kamm Avenue
2. Interstate 5 Northbound (NB) Ramps / Kamm Avenue
3. Main Project Access / Kamm Avenue
4. State Route 33 / Kamm Avenue

Study Segments

1. Kamm Avenue between Interstate 5 and Main Project Access
2. Kamm Avenue between Main Project Access and State Route 33

Study Scenarios

Existing Traffic Conditions

This scenario evaluates the Existing Traffic Conditions based on existing traffic volumes (adjusted with a 0.96 seasonal and 0.89 daily factor) and roadway conditions from traffic counts and field surveys conducted on October 1, 2019.

Existing plus Project Traffic Conditions

This scenario evaluates total traffic volumes and roadway conditions based on the Existing plus Project Traffic Conditions. The Existing plus Project traffic volumes were obtained by adding the Project Only Trips to the Existing Traffic Conditions scenario. The Project Only Trips to the study facilities were developed based on existing travel patterns, the Fresno COG Project Select Zone, the existing roadway network, engineering judgement, data provided by the developer, knowledge of the study area and the County of Fresno General Plan Circulation Diagram in the vicinity of the Project. The Fresno COG models for the Project Select Zone are contained in Appendix C.

Near Term Year 2025 plus Project Traffic Conditions

This scenario evaluates total traffic volumes and roadway conditions based on the Near Term Year 2025 plus Project Traffic Conditions. The Near Term Year 2025 traffic volumes were obtained from the Fresno COG traffic model runs (Base Year 2019 and Cumulative Year 2035) and existing traffic counts. For those locations where the Fresno COG model showed little to no growth, JLB expanded the existing traffic volumes (adjusted with a 0.96 seasonal and 0.89 daily factor) by a minimum average annual growth rate. Based on a review of the Annual Average Daily Traffic (AADT) volumes obtained from Caltrans for State Route 33, JLB calculated the growth rate for the last 5-year, 10-year, 15-year and 20-year periods. Based on this data, traffic volumes on State Route 33 near the vicinity of Kamm Avenue declined at an annual rate of 1.37 percent during the last 5-year period, increased at an annual rate of 1.14 percent during the last 10-year period, increased at an annual rate of 2.10 percent during the last 15-year period, and declined at an annual rate of 3.49 percent during the last 20-year period. Thus, to provide a conservative analysis of traffic operations and impact, JLB utilized an average annual growth rate of 2.1 percent to expand the existing traffic volumes (adjusted with a 0.96 seasonal and 0.89 daily factor) for six (6) years. Finally, JLB added the Project Only Trips to obtain the Near Term Year 2025 plus Project traffic volumes.

Cumulative Year 2040 No Project Traffic Conditions

This scenario evaluates total traffic volumes and roadway conditions based on the Cumulative Year 2040 No Project Traffic Conditions. The Cumulative Year 2040 No Project traffic volumes were obtained by subtracting the Project Only Trips from the Cumulative Year 2040 plus Project Traffic Conditions scenario.

Cumulative Year 2040 plus Project Traffic Conditions

This scenario evaluates total traffic volumes and roadway conditions based on the Cumulative Year 2040 plus Project Traffic Conditions. The Cumulative Year 2040 plus Project traffic volumes were obtained by expanding existing traffic volumes (adjusted with a 0.96 seasonal and 0.89 daily factor) by an average annual growth rate of 2.1 percent for 21 years and adding the Project Only Trips.

Level of Service Analysis Methodology

Level of Service (LOS) is a qualitative index of the performance of an element of the transportation system. LOS is a rating scale running from "A" to "F", with "A" indicating no congestion of any kind and "F" indicating unacceptable congestion and delays. LOS in this study describes the operating conditions for signalized and unsignalized intersections.

The *Highway Capacity Manual* (HCM) is the standard reference published by the Transportation Research Board and contains the specific criteria and methods to be used in assessing LOS. Synchro software was used to define LOS in this study. Details regarding these calculations are included in Appendix D.

Criteria of Significance

The County of Fresno has established LOS C as the acceptable level of traffic congestion on county roads and streets that fall entirely outside the Sphere of Influence (SOI) of a City. For those areas that fall within the SOI of a City, the LOS criteria of the City are the criteria of significance used in this Report. LOS C is used to evaluate the potential significance of LOS impacts to Fresno County intersections and segments that fall outside the SOI of a City. In this case, all study facilities fall outside the SOI of a City, therefore, the County of Fresno LOS threshold is utilized.

Caltrans endeavors to maintain a target LOS at the transition between LOS C and D on State highway facilities consistent with the *Caltrans Guide for the Preparation of Traffic Impact Studies* dated December 2002. However, Caltrans acknowledges that this may not always be feasible and recommends that the lead agency consult with Caltrans to determine the appropriate target LOS. In this TIA, all study facilities within Caltrans jurisdiction utilize LOS C to evaluate the potential significance of LOS impacts.

Operational Analysis Assumptions and Defaults

The following operational analysis values, assumptions and defaults were used in this study to ensure a consistent analysis of LOS among the various scenarios.

- The number of observed pedestrians at existing intersections was utilized under all study scenarios
- At existing intersections, the observed approach Peak Hour Factor (PHF) is utilized in all study scenarios.
- A PHF of 0.88 is utilized for the Main Project Access during both peak periods in all study scenarios.

Existing Traffic Conditions

Roadway Network

The Project site and surrounding study area are illustrated in Figure 1. Important roadways serving the Project are discussed below.

Interstate 5 is an existing north-south four-lane freeway in the vicinity of the proposed Project. Interstate 5 spans the West Coast originating in San Diego, California and culminating at Blaine Washington. In this area, Interstate 5 serves most traffic destined for the Bay Area and southern California as it provides a shorter travel distance and avoids urban traffic when compared to California's State Route 99.

Kamm Avenue is an existing east-west two-lane undivided arterial adjacent to the proposed Project. In this area, Kamm Avenue exists between Interstate 5 and State Route 33.

State Route 33 is an existing north-south two-lane undivided arterial in the vicinity of the proposed Project. In this area, State Route 33 extends north of Interstate 5, approximately 6.45 miles south of Kamm Avenue. State Route 33 is also known as Derrick Avenue and provides connection to the communities of Mendota, Firebaugh and Dos Palos to the north.

Traffic Signal Warrants

Peak hour traffic signal warrants, as appropriate, were prepared for the unsignalized intersections in the Existing Traffic Conditions scenario. These warrants are found in Appendix K. These warrants were prepared pursuant to the CA MUTCD guidelines for the preparation of traffic signal warrants. Under this scenario, none of the unsignalized intersections satisfy the peak hour signal warrant during either peak period. Based on the signal warrants and engineering judgement, signalization of these intersections is not recommended, especially since these operate at an acceptable LOS during both peak periods.

Preliminary Construction-Related Traffic

Some preliminary construction activity for the proposed Project took place in the summer of 2019. Based on information provided by the developer, on the day the existing turning movement and segment volume counts were collected (October 1, 2019), the construction site observed eight (8) passenger vehicles from employees whose shift began at 5:30 AM and ended at 3:00 PM. Moreover, no trucks or heavy vehicle equipment entered or exited the Project site on the day the counts were collected. Considering that construction work begins promptly, all employees are assumed to have arrived before 5:30 AM. Similarly, it is assumed that all employees vacate the site promptly after work has ended. Consequently, construction-related traffic is not projected to have had an impact on the peak hour LOS analysis. Furthermore, JLB was informed that employees reside in the cities of Kerman and Fresno making State Route 33 their most likely travel path to work and home. Since the segment volume counts were collected at a point located approximately 1,350 feet west of San Bernardino Avenue alignment, construction-related traffic would not have been observed. As a result, construction-related traffic did not have an impact on the daily LOS analysis.

Results of Existing Traffic Index Analysis

The Traffic Index (TI) represents the sum of the 18-kip Equivalent Single-Axle Loads (ESALs) expected on a given lane over a given period of time. The TI for the study roadway segments utilized the Caltrans Highway Design Manual methodology. The TI analysis and calculations are provided in Appendix E. Table I presents the number of vehicles classified by axle in the eastbound and westbound directions, the product of ESAL constants and the number of vehicles in the respective direction, and the resulting total ESALs for the respective direction. The total ESALs are used in Table 613.3C of the Caltrans Highway Design Manual to determine the TI of the segment for the respective direction. Table I presents the Existing TI based on existing traffic volumes and vehicle classifications. The existing segment volume counts were conducted at the study segments on October 1, 2019. A seasonal factor of 0.96 and a daily factor of 0.89 was applied to the segment volume counts. The traffic counts for the existing study segments are contained in Appendix B. As can be seen from Table I, the segments of Kamm Avenue between Interstate 5 and Main Project Access and Main Project Access and State Route 33 currently observe a TI of 8.5 in both directions.

Table I: Existing Traffic Index

Kamm Avenue between Interstate 5 SB Ramps and Main Project Access	***Eastbound***	***Westbound***	***Totals***	***ESAL 20-Year Constant***	***Eastbound 20-Year ESAL***	***Westbound 20-Year ESAL***
Passenger Cars	94	72	166	-	-	-
2-Axle Trucks	36	36	72	1,380	49,680	49,680
3-Axle Trucks	1	1	2	3,680	3,680	3,680
4-Axle Trucks	6	3	9	5,880	35,280	17,640
5-Axle Trucks	44	36	80	13,780	606,320	496,080
Totals	181	148	329	-	694,960	567,080
Traffic Index					**8.5**	**8.5**
Kamm Avenue between Main Project Access and State Route 33	***Eastbound***	***Westbound***	***Totals***	***ESAL 20-Year Constant***	***Eastbound 20-Year ESAL***	***Westbound 20-Year ESAL***
Passenger Cars	94	72	166	-	-	-
2-Axle Trucks	36	36	72	1,380	49,680	49,680
3-Axle Trucks	1	1	2	3,680	3,680	3,680
4-Axle Trucks	6	3	9	5,880	35,280	17,640
5-Axle Trucks	44	36	80	13,780	606,320	496,080
Totals	181	148	329	-	694,960	567,080
Traffic Index					**8.5**	**8.5**

Note: Traffic Index obtained for 20-Year Design from Table 613.3c from the Caltrans Design Manual

Kamm Avenue Pavement Condition Index

The Pavement Condition Index (PCI) is a numerical index between 0 and 100. The PCI is a simple, convenient and inexpensive way to monitor the condition of the surface of roads, identify maintenance and rehabilitation (M-and-R) needs as well as ensure that road maintenance budgets are spent wisely.

Based on information provided by County of Fresno staff, the segment of Kamm Avenue between Interstate 5 and San Bernardino Avenue has an "Excellent" PCI rating of 100, while the segment of Kamm Avenue between San Bernardino Avenue and State Route 33 has a "Good" PCI rating of 87. Furthermore, the segment of Kamm Avenue between Interstate 5 and San Bernardino Avenue alignment experienced a 0.1-foot asphalt concrete overlay in 2013. An asphalt concrete overlay is the application of a new layer of asphalt to a deteriorating surface. Rather than tearing up old asphalt surface entirely, an asphalt concrete overlay uses the existing layers as a base for the new asphalt pavement. Asphalt concrete overlays generate less roadway noise than a Portland cement concrete surface and is typically less noisy than chip seal surfaces.

Additionally, the segment of Kamm Avenue between San Bernardino Avenue alignment and State Route 33 experienced a chip seal in 2008. A chip seal is used as a wearing course, to waterproof the surface, seal small cracks and improve the surface friction. Since chip seals do not significantly increase the structural capacity of pavement, the existing pavement must be structurally sound in order to obtain a long performance life. Chip seals typically provide good performance on highways with 5,000 vehicles per day for about 4-7 years. In this case, traffic volumes on this segment of Kamm Avenue are less than 400 vehicles per day. However, performance varies depending on factors such as traffic volume and load, existing pavement conditions, size, rate and type of aggregate, type and rate of binder and environmental conditions.

Results of Existing Level of Service Analysis

Figure 2 illustrates the Existing Traffic Conditions turning movement volumes, intersection geometrics and traffic controls. The existing peak hour turning movement volume counts were conducted at the study intersections on October 1, 2019. A seasonal factor of 0.96 and a daily factor of 0.89 was applied to the turning movement volume counts. The traffic counts for the existing study intersections are contained in Appendix B. LOS worksheets for the Existing Traffic Conditions scenario are provided in Appendix F. Table II presents a summary of the Existing peak hour LOS at the study intersections, while Table III presents a summary of the Existing LOS for the study segments.

At present, all study intersections operate at an acceptable LOS during both peak periods. Similarly, all study segments operate at an acceptable LOS.

Table II: Existing Intersection LOS Results

ID	*Intersection*	*Intersection Control*	*AM (5:30 – 6:30) Peak Hour*		*PM (3:30 – 4:30) Peak Hour*	
			Average Delay (sec/veh)	*LOS*	*Average Delay (sec/veh)*	*LOS*
1	Interstate 5 SB Ramps / Kamm Avenue	One-Way Stop	8.6	A	0.0	A
2	Interstate 5 NB Ramps / Kamm Avenue	One-Way Stop	8.5	A	8.4	A
3	Main Project Access / Kamm Avenue	Does Not Exist	N/A	N/A	N/A	N/A
4	State Route 33 / Kamm Avenue	One-Way Stop	10.5	B	10.0	B

Note: LOS = Level of Service based on average delay on signalized intersections and All-Way STOP Controls
LOS for two-way and one-way STOP controlled intersections are based on the worst approach/movement of the minor street.

Table III: Existing Segment LOS Results

ID	*Segment*	*Limits*	*Lanes*	*24-hour Volume*	*LOS*
1	Kamm Avenue	Interstate 5 and Main Project Access	2	329	B
2	Kamm Avenue	Main Project Access and State Route 33	2	329	B

Note: LOS = Level of Service per the Florida Roadway Segment LOS Tables

Kamm Avenue Processing Plant - County of Fresno
Vicinity Map

Figure 1

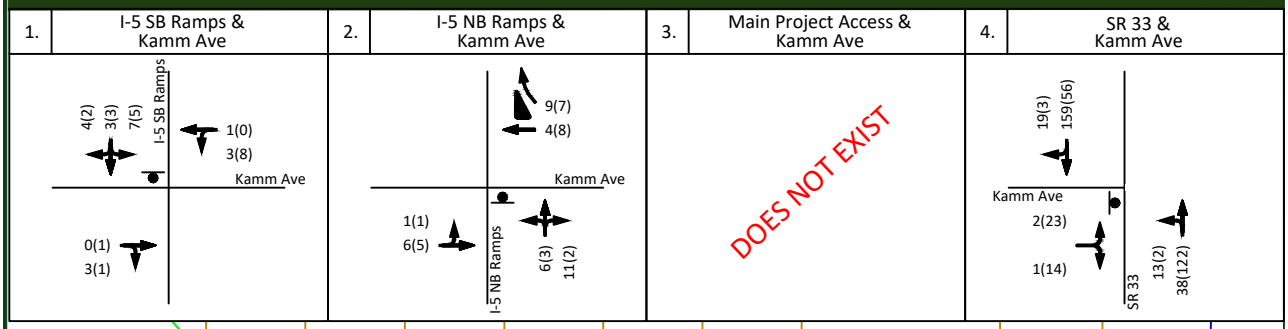
JLB TRAFFIC ENGINEERING, INC.

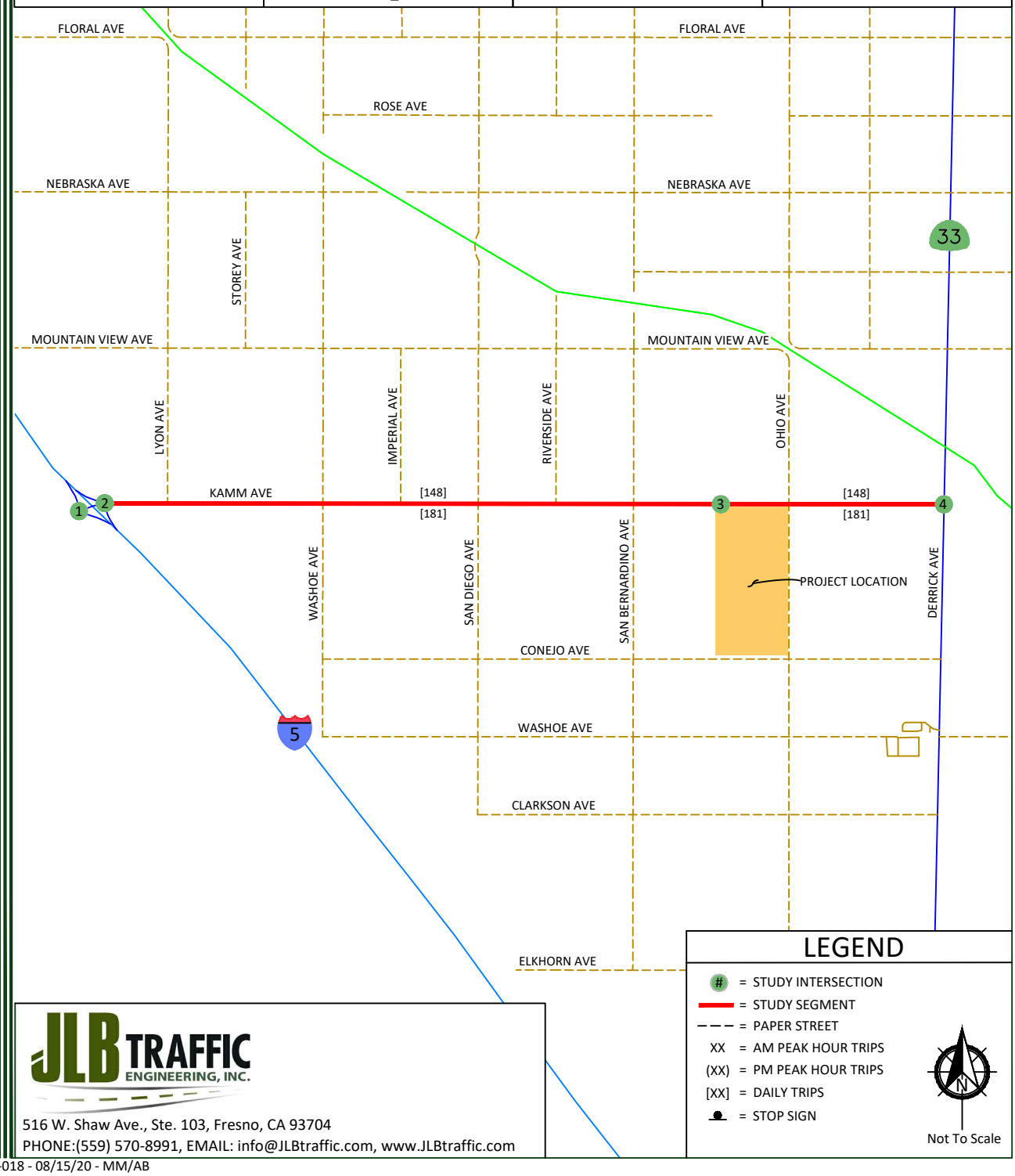
516 W. Shaw Ave., Ste. 103, Fresno, CA 93704
PHONE:(559) 570-8991, EMAIL: info@JLBtraffic.com, www.JLBtraffic.com

009-018 - 08/15/20 - MM/AB

Kamm Avenue Processing Plant - County of Fresno
Existing - Traffic Volumes, Geometrics and Controls

Figure 2





LEGEND

- # = STUDY INTERSECTION
- = STUDY SEGMENT
- = PAPER STREET
- XX = AM PEAK HOUR TRIPS
- (XX) = PM PEAK HOUR TRIPS
- [XX] = DAILY TRIPS
- = STOP SIGN

N

Not To Scale

JLB TRAFFIC ENGINEERING, INC.

516 W. Shaw Ave., Ste. 103, Fresno, CA 93704
PHONE:(559) 570-8991, EMAIL: info@JLBtraffic.com, www.JLBtraffic.com

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Existing plus Project Traffic Conditions

Project Description

The Project proposes to construct operate and maintain a pistachio processing plant with the capacity to receive, hull, dry, store, process, package and ship 60 million pounds of finished pistachio products per year. The Project would serve the immediate vicinity of existing pistachio orchards that currently ship crops for processing to more remote locations. Currently, the developer's product is transported to a processing plant in Firebaugh over 21 miles away. Based on information provided by the developer, the Project proposes to be constructed in a single phase. Figure 3 shows the latest Project Site Plan.

The Project proposes to include the following facilities:

- One (1) 130,000 square-foot processing/packing building
- One (1) 15,000 square-foot cold storage building
- One (1) 1,200 square-foot motor control center (MCC) building
- One (1) 1,200 square-foot air compressor building
- One (1) 12,156 square-foot administrative office building
- One (1) 8,818 square-foot breakroom/supervisor office building
- One (1) 1,000 square-foot main scale house/guard shack and 80' truck scale
- One (1) 200 square-foot scale house and 80-foot truck scale
- Forty-nine (49) 48-foot diameter x 65-foot tall storage silos
- One (1) 21,600 square-foot huller canopy and related equipment
- Thirteen (13) 27 MMbtu/hr natural gas fired column dryers
- One (1) 6,750 square-foot shop building with a 2,920 square-foot canopy
- Four (4) sand and media raw water filters
- One (1) 353,000-gallon water storage tank
- One (1) 324 square-foot fire pump house
- One (1) 972 square-foot storage warehouse
- One (1) 225 square-foot domestic water treatment plant control room
- Three (3) domestic water treatment filters
- One (1) 70,000-gallon domestic water storage tank
- Three (3) precleaning equipment installations
- One (1) One huller pit to collect hulling process water and equipment washroom water
- Three (3) excavated and cement-lined hulling pits to receive raw pistachios during the harvest period
- One (1) 50,000 square-foot fenced fumigation operations area
- One (1) 400 square-foot fenced chemical storage area
- Connections and metering equipment to supply water
- Two (2) underground 18-inch diameter pipelines
- Two (2) hulling process water and hull residue agitators, separators and screen systems
- Two (2) lined 450 square-foot process water settling and cleaning ponds
- Paved or improved primary access and secondary roads, truck turnaround areas, and employee parking facilities
- Five (5) septic systems for employee waste

- One (1) 310-foot x 400-foot unlined stormwater retention basin
- Black chain link security fencing 6 feet in height, with access gates
- Natural gas connections and metering equipment
- Electrical power connections and metering equipment

Project Access

Based on the latest Project Site Plan, access to the proposed Project will be from a total of three (3) points. The Main Project Access is located on the western end of the Project and is proposed as a full access. This access is intended to serve as inbound and outbound access for shipping trucks and as inbound access only for regular solid waste, seasonal solid waste and harvest trucks. Another access point is located approximately 450 feet east of the Main Project Access and is proposed as a full access also. This access is intended to serve as inbound and outbound access for employees, visitors, delivery services and maintenance vehicles. The final access point is located approximately 500 feet west of the eastern end of the Project and is also proposed as full access. This access is intended to serve as outbound access only for seasonal solid waste and harvest trucks. JLB analyzed the location of the proposed access points to be constructed relative to the existing local roads in the Project's vicinity. A review of the Project's access points to be constructed indicates that they are located at points that minimize traffic operational impacts to the existing roadway network.

Trip Generation

Trip generation rates for the proposed Project were prepared based on data within the Project Description. While it is reasonable to assume that carpooling will take place between some of the employees, to be conservative in assessing the Project's traffic impacts, this TIA assumes that no carpooling will take place. Based on the Project Description, the Project will employ up to 60 staff during the off-peak season and up to 120 staff during the peak harvest season. For purposes of this TIA, the peak harvest season will be analyzed.

As described in the Project Description, traffic to the Project will consist of the following types: non-harvest employees, harvest (seasonal) employees, visitors, delivery vehicles, occasional maintenance vehicles, recycled waste vehicles, solid waste vehicles, seasonal harvest trucks, and shipping trucks. Due to the nature of the facility and the distance from any major cities, there will be no on-site sales.

Harvest season will generally run from early September to mid-October. During the two (2) week peak harvest season up to 150 harvest trucks will deliver crop to the Project site. The harvest trucks are owned by others and as a result would not be stored at the Project site. During the peak harvest season, the Project anticipates receiving up to eight (8) trucks per day for outbound shipment of hulled pistachio product. It is projected that the Project site is going to receive nine (9) total solid waste and two (2) recycled waste vehicles during the peak harvest season.

Peak hour trip generation was determined based on information contained within the Project Description and communication with the Project proponent. Based on communication with the Project proponent, the plant will run two (2) 12-hour shifts for the hulling operation during peak harvest season. Shifts are proposed to be from a) 6:00 AM to 6:00 PM and b) 6:00 PM to 6:00 AM. Another two (2) 8-hour shifts for the processing operations are proposed to be from a) 6:00 AM to 2:30 PM and b) 2:30 PM to 11:00 AM. As a result, most employee-related traffic to and from the Project is projected to take place between the hours of 5:30 to 6:30 AM, 2:00 to 3:00 PM, and 5:30 to 6:30 PM. Furthermore, the Project expects to limit shipping trucks, visitors, solid waste vehicles and delivery vehicles to the hours between 8:00 AM and 5:00 PM. Based on communication with County of Fresno and Caltrans staff, it was decided that the Project should analyze the existing peak period as observed on State Route 33. For this reason, JLB collected a 24-hour volume count for State Route 33 and determined that the AM peak period takes place between 5:00 AM and 7:00 AM, while the PM peak takes place between 3:00 PM and 5:00 PM. For this reason, the PM peak hour trip rate for employee-related trips was determined to be zero (0). Similarly, the visitor, delivery, maintenance, recycled, solid waste, and shipping truck vehicle trips during the AM peak period was determined to be zero (0). Table I illustrates the Project's daily, AM and PM peak hour trip generation during peak harvest season.

Table IV presents the trip generation for the proposed Project with trip generation rates for Employees, Visitors, Delivery Services, Regular Solid Waste, Seasonal Solid Waste, Harvest Trucks and Shipping Trucks. The proposed Project is estimated to generate a maximum of 590 daily trips, 103 AM peak hour trips and 23 PM peak hour trips.

Table IV: Project Trip Generation

Land Use (ITE Code)	*Size*	*Unit*	*Daily*		*AM (5:30 – 6:30) Peak Hour*						*PM (3:30 – 4:30) Peak Hour*					
			Rate	*Total*	*Trip Rate*	*In %*	*Out %*	*In*	*Out*	*Total*	*Trip Rate*	*In %*	*Out %*	*In*	*Out*	*Total*
Employees	120	EA	2.00	240	0.75	67	33	60	30	90	0.00	0	0	0	0	0
Visitors	2	EA	2.00	4	0.00	0	0	0	0	0	1.00	50	50	1	1	2
Delivery Vehicles	2	EA	2.00	4	0.00	0	0	0	0	0	1.00	50	50	1	1	2
Maintenance Vehicles	2	EA	2.00	4	0.00	0	0	0	0	0	1.00	50	50	1	1	2
Recycled Waste	2	EA	2.00	4	0.00	0	0	0	0	0	0.24	0	0	0	0	0
Solid Waste	9	EA	2.00	18	0.084	0	0	0	0	0	0.24	50	50	1	1	2
Harvest Trucks	150	EA	2.00	300	0.00	52	48	7	6	13	.084	48	52	6	7	13
Shipping Trucks	8	EA	2.00	16	0.00	0	0	0	0	0	0.24	40	60	1	1	2
Total Driveway Trips				**590**				**67**	**36**	**103**				**11**	**12**	**23**

Note: EA = Each

Trip Distribution

The trip distribution assumptions for the proposed Project were developed based on existing travel patterns, the Fresno COG Project Select Zone, the existing roadway network, engineering judgement, data provided by the developer, knowledge of the study area and the County of Fresno General Plan Circulation Diagram in the vicinity of the Project. Figure 4 illustrates the Project Only Trips to the study intersections and segments.

Traffic Signal Warrants

Peak hour traffic signal warrants, as appropriate, were prepared for the unsignalized intersections in the Existing plus Project Traffic Conditions scenario. These warrants are found in Appendix K. These warrants were prepared pursuant to the CA MUTCD guidelines for the preparation of traffic signal warrants. Under this scenario, none of the unsignalized intersections are projected to satisfy the peak hour signal warrant during either peak period. Based on the signal warrants and engineering judgement, signalization of these intersections is not recommended, especially since these are projected to operate at an acceptable LOS during both peak periods.

Results of Existing plus Project Traffic Index Analysis

Table V presents the Existing plus Project TI based on peak seasonal operations. The peak being analyzed in this TIA is that for the busiest two-week period of the year. As can be seen from Table V, the segment of Kamm Avenue between Interstate 5 and Main Project Access is projected to observe a TI of 9.5 in both directions. The segment of Kamm Avenue between Main Project Access and State Route 33 is projected to observe a TI of 10.0 and 9.5 in the eastbound and westbound directions, respectively.

Worth noting is that harvest trucks and associated solid waste trucks will not run a majority of the year, but rather other truck loads (such as shipping trucks) will run at reduced levels for most of the year. Therefore, assuming that the overall trip generation of the Project is evenly distributed throughout the year, the TI is projected to be much lower. Table VI presents the Existing plus Project TI based on an annualized distribution of the Project. As can be seen from Table VI, the segment of Kamm Avenue between Interstate 5 and Main Project Access is projected to observe a 9.0 and 8.5 in the eastbound and westbound directions, respectively. Additionally, the segment of Kamm Avenue between Main Project Access and State Route 33 is projected to observe a TI of 9.0 and 8.5 in the eastbound and westbound directions, respectively. As a result, the Project is projected to have an impact of 0.5 to the TI for the segment of Kamm Avenue between Interstate 5 and State Route 33 in the eastbound direction only.

Table V: Existing plus Project Traffic Index – Daily Peak Season

Kamm Avenue between Interstate 5 SB Ramps and Main Project Access	*Eastbound*	*Westbound*	*Totals*	*ESAL 20-Year Constant*	*Eastbound 20-Year ESAL*	*Westbound 20-Year ESAL*
Passenger Cars	109	87	196	-	-	-
2-Axle Trucks	36	36	72	1,380	49,680	49,680
3-Axle Trucks	1	1	2	3,680	3,680	3,680
4-Axle Trucks	6	3	9	5,880	35,280	17,640
5-Axle Trucks	107	99	206	13,780	1,474,460	1,364,220
Totals	259	226	485	-	1,563,100	1,435,220
Traffic Index					**9.5**	**9.5**
Kamm Avenue between Main Project Access and State Route 33	***Eastbound***	***Westbound***	***Totals***	***ESAL 20-Year Constant***	***Eastbound 20-Year ESAL***	***Westbound 20-Year ESAL***
Passenger Cars	203	181	384	-	-	-
2-Axle Trucks	36	36	72	1,380	49,680	49,680
3-Axle Trucks	14	14	28	3,680	51,520	51,520
4-Axle Trucks	6	3	9	5,880	35,280	17,640
5-Axle Trucks	139	131	270	13,780	1,915,420	1,805,180
Totals	398	365	763	-	2,051,900	1,924,020
Traffic Index					**10.0**	**9.5**

Note: Traffic Index obtained for 20-Year Design from Table 613.3c from the Caltrans Design Manual

Table VI: Existing plus Project Traffic Index – Daily Average

Kamm Avenue between Interstate 5 SB Ramps and Main Project Access	*Eastbound*	*Westbound*	*Totals*	*ESAL 20-Year Constant*	*Eastbound 20-Year ESAL*	*Westbound 20-Year ESAL*
Passenger Cars	103	81	184	-	-	-
2-Axle Trucks	36	36	72	1,380	49,680	49,680
3-Axle Trucks	1	1	2	3,680	3,680	3,680
4-Axle Trucks	6	3	9	5,880	35,280	17,640
5-Axle Trucks	54	46	100	13,780	744,120	633,880
Totals	200	167	367	-	832,760	704,880
Traffic Index					**9.0**	**8.5**
Kamm Avenue between Main Project Access and State Route 33	***Eastbound***	***Westbound***	***Totals***	***ESAL 20-Year Constant***	***Eastbound 20-Year ESAL***	***Westbound 20-Year ESAL***
Passenger Cars	157	135	292	-	-	-
2-Axle Trucks	36	36	72	1,380	49,680	49,680
3-Axle Trucks	5	5	10	3,680	18,400	18,400
4-Axle Trucks	6	3	9	5,880	35,280	17,640
5-Axle Trucks	52	44	96	13,780	716,560	606,320
Totals	256	223	479	-	819,920	692,040
Traffic Index					**9.0**	**8.5**

Note: Traffic Index obtained for 20-Year Design from Table 613.3c from the Caltrans Design Manual

Results of Existing plus Project Level of Service Analysis

The Existing plus Project Traffic Conditions scenario assumes that the existing roadway geometrics and traffic controls will remain in place. Figure 5 illustrates the Existing plus Project turning movement volumes, intersection geometrics and traffic controls. LOS worksheets for the Existing plus Project Traffic Conditions scenario are provided in Appendix G. Table VII presents a summary of the Existing plus Project peak hour LOS at the study intersections, while Table VIII presents a summary of the Existing plus Project LOS for the study segments.

Under this scenario, all study intersections are projected to operate at an acceptable LOS during both peak periods. Similarly, all study segments are projected to operate at an acceptable LOS.

Table VII: Existing plus Project Intersection LOS Results

ID	*Intersection*	*Intersection Control*	*AM (5:30 – 6:30) Peak Hour*		*PM (3:30 – 4:30) Peak Hour*	
			Average Delay (sec/veh)	*LOS*	*Average Delay (sec/veh)*	*LOS*
1	Interstate 5 SB Ramps / Kamm Avenue	One-Way Stop	8.7	A	0.0	A
2	Interstate 5 NB Ramps / Kamm Avenue	One-Way Stop	8.5	A	8.4	A
3	Main Project Access / Kamm Avenue	One-Way Stop	0.0	A	9.8	A
4	State Route 33 / Kamm Avenue	One-Way Stop	10.6	B	10.2	B

Note: LOS = Level of Service based on average delay on signalized intersections and All-Way STOP Controls
LOS for two-way and one-way STOP controlled intersections are based on the worst approach/movement of the minor street.

Table VIII: Existing plus Project Segment LOS Results

ID	*Segment*	*Limits*	*Lanes*	*24-hour Volume*	*LOS*
1	Kamm Avenue	Interstate 5 and Main Project Access	2	485	B
2	Kamm Avenue	Main Project Access and State Route 33	2	763	B

Note: LOS = Level of Service per the Florida Roadway Segment LOS Tables

Vehicle Miles Traveled Analysis

Senate Bill (SB) 743 (Steinberg 2013) was approved by then Governor Brown on September 27, 2013. SB 743 created a path to revise the definition of transportation impacts according to California Environmental Quality Act (CEQA). The revised CEQA Guidelines requiring VMT analysis became effective December 28, 2018; however, agencies had until July 1, 2020 to finalize their local guidelines on VMT analysis. The intent of SB 743 is to align CEQA transportation study methodology with and promote the statewide goals and policies of reducing VMT and greenhouse gases (GHG). Three objectives of SB 743 related to development are to reduce GHG, diversify land uses, and focus on creating a multimodal environment. It is hoped that this will spur infill development.

The State of California Governor's Office of Planning and Research (OPR) published a Technical Advisory (TA) on *Evaluating Transportation Impacts in CEQA* (December 2018) to provide advice and recommendations, which agencies and other entities may use at their discretion. The TA acknowledges that lead agencies should set criteria and thresholds for VMT and transportation impacts. However, it provides guidance to residential, office and retail uses, citing these as the most common land uses. Beyond these three land uses, there is no guidance provided for any other land use type. In other words, the TA does not establish any presumptive thresholds or analytical methods for assessing VMT in relation to agricultural projects and operations. The TA also notes that land uses may have a less than significant impact if located within low VMT areas of a region and suggests that screening maps be used for this determination. As of the date of this Report, the County of Fresno had not finalized its VMT guidelines. In addition, those that were prepared by Fresno COG for the County's consideration have not been approved by the County. As a result, the VMT analysis presented in this Report was performed pursuant to the TA.

VMT is simply the product of a number of trips and those trips' lengths. The first step in a VMT analysis is to establish the baseline average VMT, which requires the definition of a region. The Fresno COG Draft SB 743 Implementation Regional Guidelines were available for use at the time of the preparation of this Report. Per Fresno COG Guidelines, VMT for the region defined by the Fresno County border which includes all of its incorporated cities is 25.60 average VMT per employee. The OPR TA recommend a 15 percent reduction in average VMT for residential and commercial facilities, but do not include a recommendation for agricultural facilities. The TA likewise recommend a countywide averaging approach for VMT that includes transit-served incorporated areas in the county average, but also provide broad flexibility for local jurisdictions to tailor VMT assessment methodologies to the particular attributes of their communities. In San Bernardino County, for example, the Board of Supervisors directed that the average VMT from incorporated cities be excluded from VMT averages for purposes of assessing VMT in projects proposed in unincorporated areas so as to more accurately disclose actual VMT from unincorporated county areas. OPR's Director has also acknowledged that more work is required to understand and apply VMT in rural counties. Because OPR's recommended VMT thresholds and methodologies do not include recommendations for agricultural processing facilities in rural locations, the County has the flexibility to set or apply their own VMT thresholds of significance for the project and the project location.

Based on the Fresno COG ABM, the Project is located within Traffic Analysis Zone 2270. Per the Fresno COG VMT Screening Application, the average VMT per employee for TAZ 2270 is 41.67. In this case, the 15 percent VMT reduction threshold is 35.41 VMT per employee. For purposes of this Report, VMT of the proposed Project was determined using the Fresno COG activity-based model (ABM). Based on Fresno COG ABM output, the Project will produce a 36.6 average (tour-based) VMT per employee (prior to accounting for carpooling).

The Project is located in a rural agricultural area of Fresno County. Employees of agricultural production facilities in Fresno County generally operate single-occupancy vehicles to work. For instance, approximately one-third of year-round employees who work in agriculture carpool and approximately one-half to two-thirds of seasonal employees who work in agriculture carpool during the peak harvest season. This is largely due to temporary employment of an additional member of the same household or neighborhood during the harvest season. Carpooling is a cost-effective, readily-available, and demonstrated VMT reduction method for employees. To assure adequate VMT reduction is achieved by the Project, a mitigation measure to require the applicant to incentivize employee carpooling with preferred parking locations and encourage carpooling by helping to match willing carpool drivers with riders from the same neighborhoods is recommended.

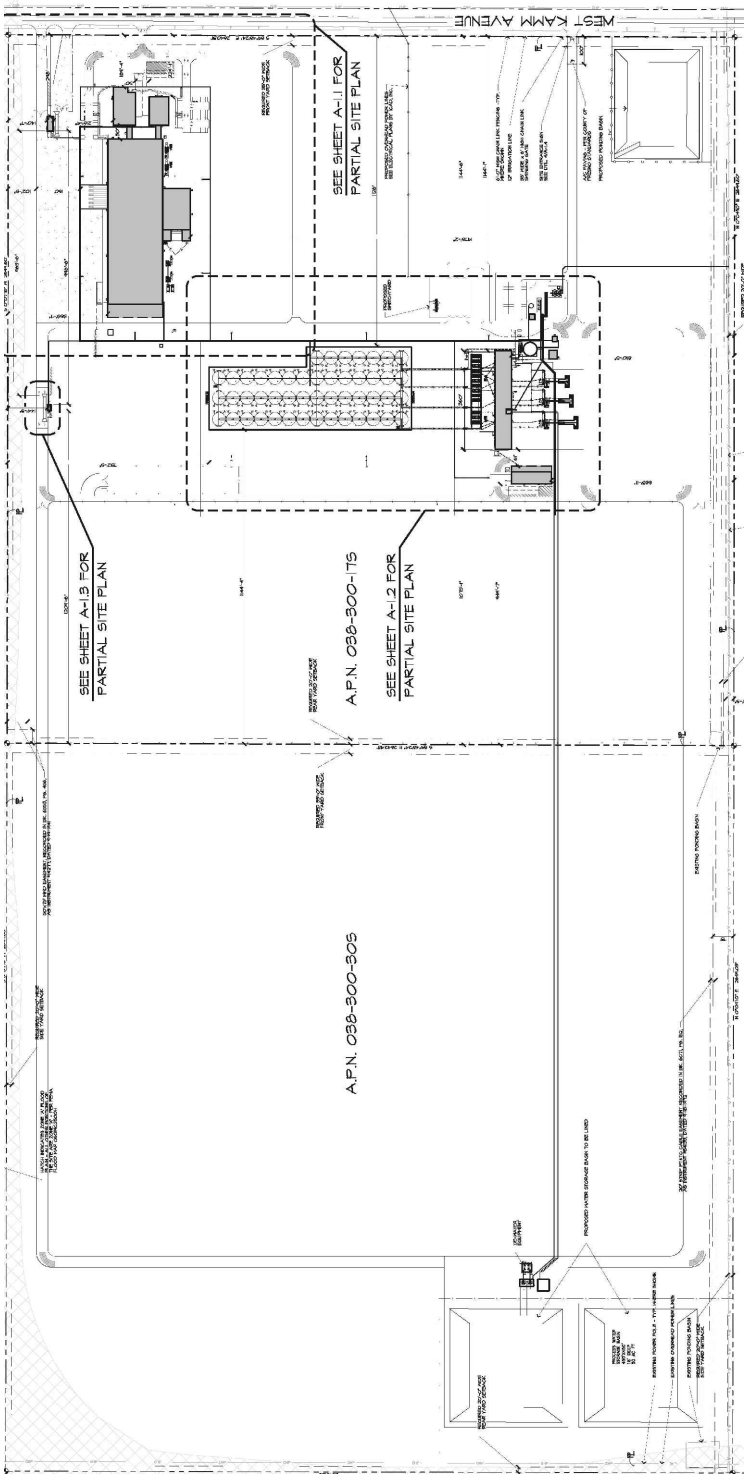
The purpose of SB 743 is to reduce VMT and GHG emissions. As discussed in the Project Description, the proposed Project would serve the immediate vicinity of existing pistachio orchards that currently ship crops for processing to more remote locations. The pistachios from local orchards that would be processed by the Project have been and continue to be transported to more distant processing plants, including one in Firebaugh over 21 miles away. As a result, the proposed Project will reduce heavy-duty VMT and GHG emissions during harvest season. These heavy-duty VMT and GHG emissions reductions will help offset VMT and GHG emissions from light-duty VMT of Project employees. Worthy of note is that the analysis methodology used in this TIA assumes no carpool/vanpool/rideshare program activity. Considering employee carpool/vanpool/rideshare participation rates of pistachio facilities in the region (including facilities approved and operating in Fresno County) are known to be substantial, the implementation of a carpool/vanpool/rideshare program would likely also reduce VMT estimates of the Fresno COG ABM.

It is recommended that the Project provide carpool/vanpool/rideshare programs to reduce VMT impacts. Carpooling is a long-established and effective transportation mode for agricultural processing facilities. In August 2020, for example, Madera County approved a conditional use permit for the construction and operation of the new 102-acre Dry Ranch pistachio processing facility. The Project Description/Operating Statement of Dry Ranch indicated ridesharing rates for plant employees, particularly during the peak harvest season, would range from 50 to 70 percent.

As a result, a carpooling program with 23 percent or more employee participation will reduce VMT by more than 15 percent below the existing average VMT of 41.67 for the type of project and project location. With the recommended mitigation measure to incentivize and encourage carpooling, VMT from this facility would be reduced to less than significant based on the methodology described herein.

Kamm Avenue Processing Plant - County of Fresno
Project Site Plan

Figure 3



JLB TRAFFIC ENGINEERING, INC.
516 W. Shaw Ave., Ste. 103, Fresno, CA 93704
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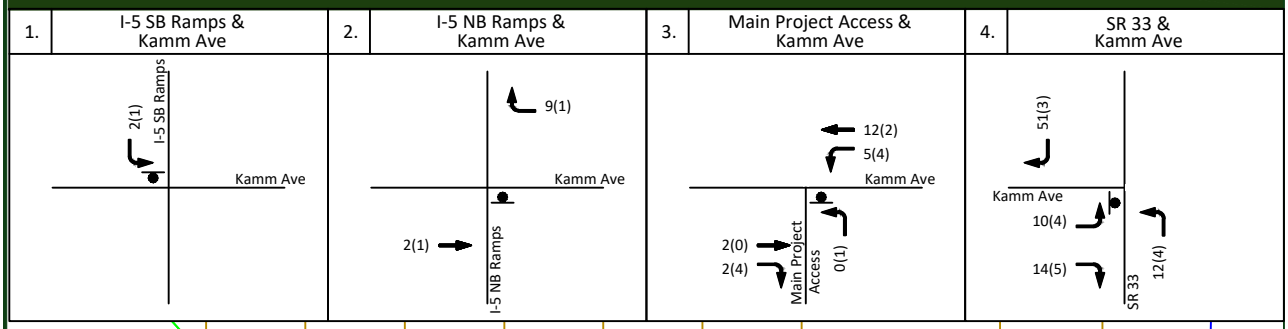
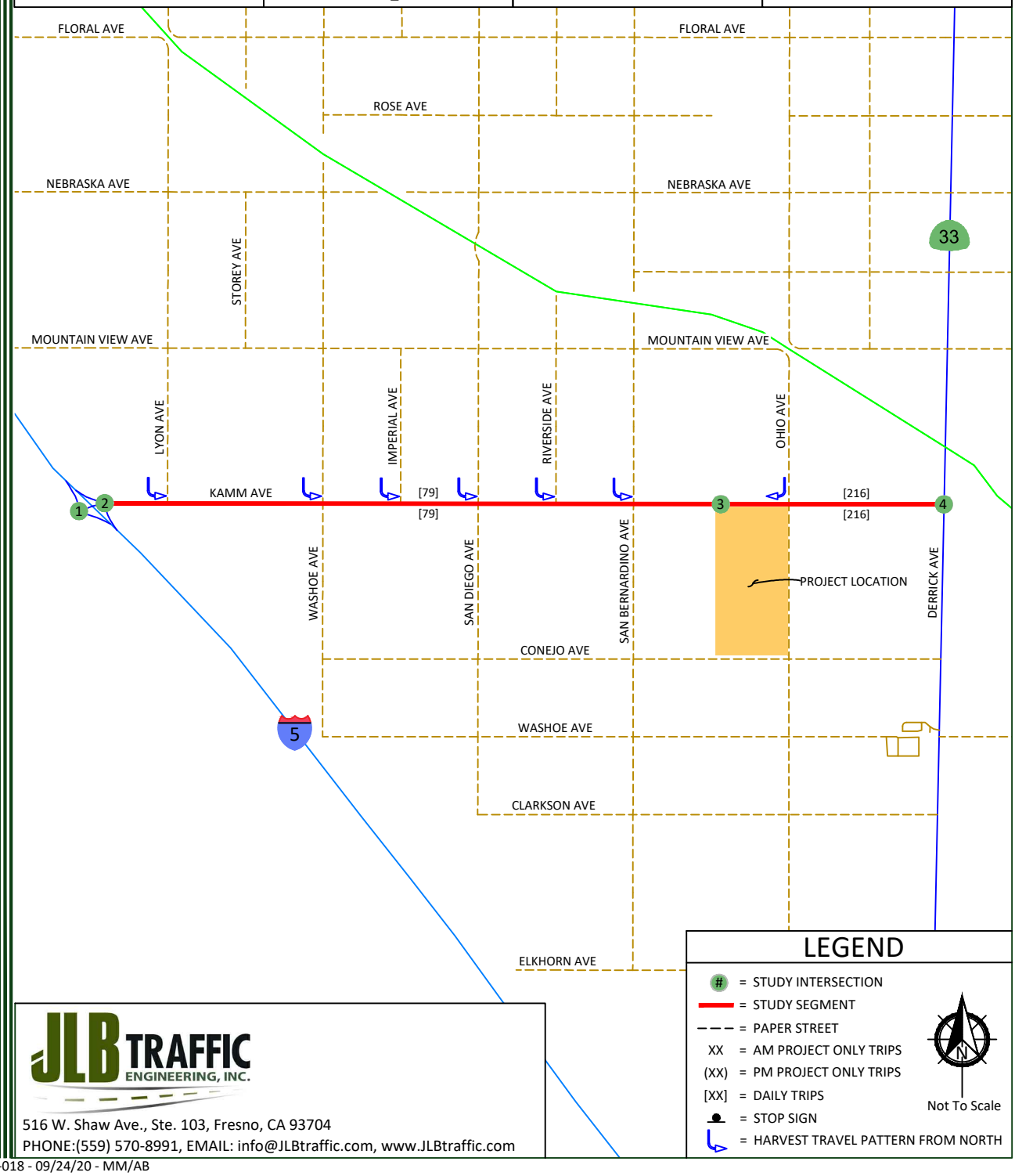
Not To Scale

Kamm Avenue Processing Plant - County of Fresno
Project Only Trips

Figure 4





LEGEND

- # = STUDY INTERSECTION
- = STUDY SEGMENT
- = PAPER STREET
- XX = AM PROJECT ONLY TRIPS
- (XX) = PM PROJECT ONLY TRIPS
- [XX] = DAILY TRIPS
- = STOP SIGN
- = HARVEST TRAVEL PATTERN FROM NORTH

N

Not To Scale

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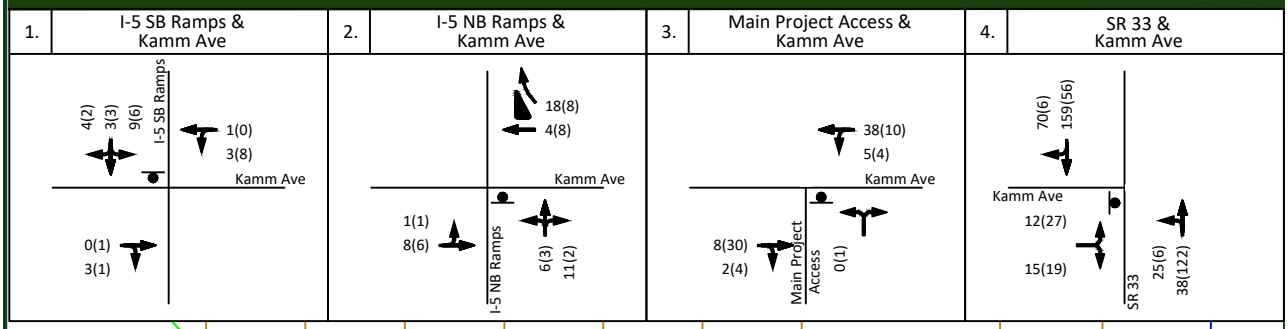
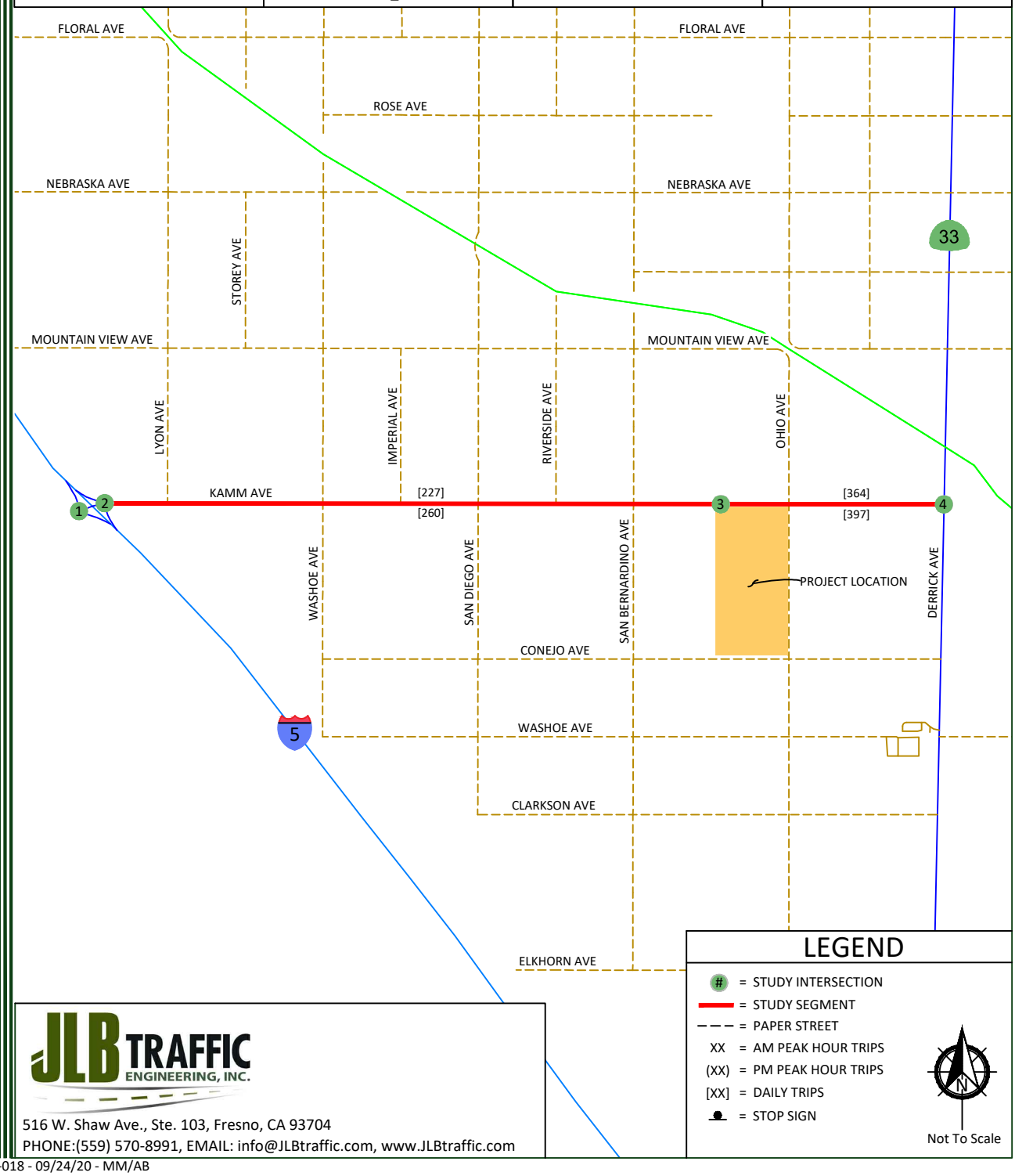
Kamm Avenue Processing Plant - County of Fresno
Existing plus Project - Traffic Volumes, Geometrics and Controls

Figure 5





LEGEND

- # = STUDY INTERSECTION
- = STUDY SEGMENT
- = PAPER STREET
- XX = AM PEAK HOUR TRIPS
- (XX) = PM PEAK HOUR TRIPS
- [XX] = DAILY TRIPS
- = STOP SIGN

N

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516 W. Shaw Ave., Ste. 103, Fresno, CA 93704
PHONE:(559) 570-8991, EMAIL: info@JLBtraffic.com, www.JLBtraffic.com

Near Term Year 2025 plus Project Traffic Conditions

Traffic Signal Warrants

Peak hour traffic signal warrants, as appropriate, were prepared for the unsignalized intersections in the Near Term Year 2025 plus Project Traffic Conditions scenario. These warrants are found in Appendix K. These warrants were prepared pursuant to the CA MUTCD guidelines for the preparation of traffic signal warrants. Under this scenario, none of the unsignalized intersections are projected to satisfy the peak hour signal warrant during either peak period. Based on the signal warrants and engineering judgement, signalization of these intersections is not recommended, especially since these are projected to operate at an acceptable LOS during both peak periods.

Results of Near Term Year 2025 plus Project Traffic Index Analysis

Table IX presents the Near Term Year 2025 plus Project TI based on peak seasonal operations. The peak being analyzed in this TIA is that for the busiest two-week period of the year. As can be seen from Table IX, the segment of Kamm Avenue between Interstate 5 and Main Project Access is projected to observe a TI of 9.5 in both directions. The segment of Kamm Avenue between Main Project Access and State Route 33 is projected to observe a TI of 10.0 in both directions.

Worth noting is that harvest trucks and associated solid waste trucks will not run a majority of the year, but rather other truck loads (such as shipping trucks) will run at reduced levels for most of the year. Therefore, assuming that the overall trip generation of the Project is evenly distributed throughout the year, the TI is projected to be much lower. Table X presents the Near Term Year 2025 plus Project TI based on an annualized distribution of the Project. As can be seen from Table X, the segment of Kamm Avenue between Interstate 5 and Main Project Access is projected to observe a TI of 9.0 and 8.5 in the eastbound and westbound directions, respectively. Additionally, the segment of Kamm Avenue between Main Project Access and State Route 33 is projected to observe a TI of 9.0 and 8.5 in the eastbound and westbound directions, respectively. As a result, the Project is projected to have an impact of 0.5 to the TI for the segment of Kamm Avenue between Interstate 5 and State Route 33 in the eastbound direction only.

Table IX: Near Term Year 2025 plus Project Traffic Index - Peak

Kamm Avenue between Interstate 5 SB Ramps and Main Project Access	*Eastbound*	*Westbound*	*Totals*	*ESAL 20-Year Constant*	*Eastbound 20-Year ESAL*	*Westbound 20-Year ESAL*
Passenger Cars	121	97	218	-	-	-
2-Axle Trucks	41	41	82	1,380	56,580	56,580
3-Axle Trucks	1	1	2	3,680	3,680	3,680
4-Axle Trucks	7	3	10	5,880	41,160	17,640
5-Axle Trucks	113	104	217	13,780	1,557,140	1,433,120
Totals	283	246	529	-	1,658,560	1,511,020
Traffic Index					**9.5**	**9.5**
Kamm Avenue between Main Project Access and State Route 33	*Eastbound*	*Westbound*	*Totals*	*ESAL 20-Year Constant*	*Eastbound 20-Year ESAL*	*Westbound 20-Year ESAL*
Passenger Cars	215	191	406	-	-	-
2-Axle Trucks	41	41	82	1,380	56,580	56,580
3-Axle Trucks	14	14	28	3,680	51,520	51,520
4-Axle Trucks	7	3	10	5,880	41,160	17,640
5-Axle Trucks	145	136	281	13,780	1,998,100	1,874,080
Totals	422	385	807	-	2,147,360	1,999,820
Traffic Index					**10.0**	**10.0**

Note: Traffic Index obtained for 20-Year Design from Table 613.3c from the Caltrans Design Manual

Table X: Near Term Year 2025 plus Project Traffic Index - Average

Kamm Avenue between Interstate 5 SB Ramps and Main Project Access	*Eastbound*	*Westbound*	*Totals*	*ESAL 20-Year Constant*	*Eastbound 20-Year ESAL*	*Westbound 20-Year ESAL*
Passenger Cars	115	91	206	-	-	-
2-Axle Trucks	41	41	82	1,380	56,580	56,580
3-Axle Trucks	1	1	2	3,680	3,680	3,680
4-Axle Trucks	7	3	10	5,880	41,160	17,640
5-Axle Trucks	60	51	111	13,780	826,800	702,780
Totals	224	187	411	-	928,220	780,680
Traffic Index					**9.0**	**8.5**
Kamm Avenue between Main Project Access and State Route 33	*Eastbound*	*Westbound*	*Totals*	*ESAL 20-Year Constant*	*Eastbound 20-Year ESAL*	*Westbound 20-Year ESAL*
Passenger Cars	169	145	314	-	-	-
2-Axle Trucks	41	41	82	1,380	56,580	56,580
3-Axle Trucks	5	5	10	3,680	18,400	18,400
4-Axle Trucks	7	3	10	5,880	41,160	17,640
5-Axle Trucks	58	49	107	13,780	799,240	675,220
Totals	280	243	523	-	915,380	767,840
Traffic Index					**9.0**	**8.5**

Note: Traffic Index obtained for 20-Year Design from Table 613.3c from the Caltrans Design Manual

Results of Near Term Year 2025 plus Project Level of Service Analysis

The Near Term Year 2025 plus Project Traffic Conditions scenario assumes that the existing roadway geometrics and traffic controls will remain in place. Figure 6 illustrates the Near Term Year 2025 plus Project turning movement volumes, intersection geometrics and traffic controls. LOS worksheets for the Near Term Year 2025 plus Project Traffic Conditions scenario are provided in Appendix H. Table XI presents a summary of the Near Term Year 2025 plus Project peak hour LOS at the study intersections, while Table XII presents a summary of the Near Term Year 2025 plus Project LOS for the study segments.

Under this scenario, all study intersections are projected to operate at an acceptable LOS during both peak periods. Similarly, all study segments are projected to operate at an acceptable LOS.

Table XI: Near Term Year 2025 plus Project Intersection LOS Results

ID	*Intersection*	*Intersection Control*	*AM (5:30 – 6:30) Peak Hour*		*PM (3:30 – 4:30) Peak Hour*	
			Average Delay (sec/veh)	*LOS*	*Average Delay (sec/veh)*	*LOS*
1	Interstate 5 SB Ramps / Kamm Avenue	One-Way Stop	8.7	A	0.0	A
2	Interstate 5 NB Ramps / Kamm Avenue	One-Way Stop	8.5	A	8.4	A
3	Main Project Access / Kamm Avenue	One-Way Stop	0.0	A	9.9	A
4	State Route 33 / Kamm Avenue	One-Way Stop	10.9	B	10.4	B

Note: LOS = Level of Service based on average delay on signalized intersections and All-Way STOP Controls
LOS for two-way and one-way STOP controlled intersections are based on the worst approach/movement of the minor street.

Table XII: Near Term Year 2025 plus Project Segment LOS Results

ID	*Segment*	*Limits*	*Lanes*	*24-hour Volume*	*LOS*
1	Kamm Avenue	Interstate 5 and Main Project Access	2	529	B
2	Kamm Avenue	Main Project Access and State Route 33	2	807	B

Note: LOS = Level of Service per the Florida Roadway Segment LOS Tables

Kamm Avenue Processing Plant - County of Fresno
Cumulative Year 2025 plus Project - Traffic Volumes, Geometrics and Controls

Figure 6

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516 W. Shaw Ave., Ste. 103, Fresno, CA 93704
PHONE:(559) 570-8991, EMAIL: info@JLBtraffic.com, www.JLBtraffic.com

Cumulative Year 2040 No Project Traffic Conditions

Traffic Signal Warrants

Peak hour traffic signal warrants, as appropriate, were prepared for the unsignalized intersections in the Cumulative Year 2040 No Project Traffic Conditions scenario. These warrants are found in Appendix K. These warrants were prepared pursuant to the CA MUTCD guidelines for the preparation of traffic signal warrants. Under this scenario, none of the unsignalized intersections are projected to satisfy the peak hour signal warrant during either peak period. Based on the signal warrants and engineering judgement, signalization of these intersections is not recommended, especially since these are projected to operate at an acceptable LOS during both peak periods.

Results of Cumulative Year 2040 No Project Traffic Index Analysis

Table XVIII presents the Cumulative Year 2040 No Project TI based on existing traffic volumes and vehicle classifications. As can be seen from Table XIII, the segments of Kamm Avenue between Interstate 5 and Main Project Access and Main Project Access and State Route 33 are projected to observe a TI of 9.0 in both directions. As a result, by the Cumulative Year 2040 scenario, both segments of Kamm Avenue are projected to have an impact of 0.5 to the TI in both directions.

Table XIII: Cumulative Year 2040 No Project Traffic Index

Kamm Avenue between Interstate 5 SB Ramps and Main Project Access	***Eastbound***	***Westbound***	***Totals***	***ESAL 20-Year Constant***	***Eastbound 20-Year ESAL***	***Westbound 20-Year ESAL***
Passenger Cars	145	111	256	-	-	-
2-Axle Trucks	55	55	110	1,380	75,900	75,900
3-Axle Trucks	2	2	4	3,680	7,360	7,360
4-Axle Trucks	9	5	14	5,880	52,920	29,400
5-Axle Trucks	68	56	124	13,780	937,040	771,680
Totals	279	229	508	-	1,073,220	884,340
Traffic Index					**9.0**	**9.0**
Kamm Avenue between Main Project Access and State Route 33	***Eastbound***	***Westbound***	***Totals***	***ESAL 20-Year Constant***	***Eastbound 20-Year ESAL***	***Westbound 20-Year ESAL***
Passenger Cars	145	111	256	-	-	-
2-Axle Trucks	55	55	110	1,380	75,900	75,900
3-Axle Trucks	2	2	4	3,680	7,360	7,360
4-Axle Trucks	9	5	14	5,880	52,920	29,400
5-Axle Trucks	68	56	124	13,780	937,040	771,680
Totals	279	229	508	-	1,073,220	884,340
Traffic Index					**9.0**	**9.0**

Note: Traffic Index obtained for 20-Year Design from Table 613.3c from the Caltrans Design Manual

Results of Cumulative Year 2040 No Project Level of Service Analysis

The Cumulative Year 2040 No Project Traffic Conditions scenario assumes that the existing roadway geometrics and traffic controls will remain in place. Figure 7 illustrates the Cumulative Year 2040 No Project turning movement volumes, intersection geometrics and traffic controls. LOS worksheets for the Cumulative Year 2040 No Project Traffic Conditions scenario are provided in Appendix I. Table XIV presents a summary of the Cumulative Year 2040 No Project peak hour LOS at the study intersections, while Table XV presents a summary of the Cumulative Year 2040 No Project LOS for the study segments.

Under this scenario, all study intersections are projected to operate at an acceptable LOS during both peak periods. Similarly, all study segments are projected to operate at an acceptable LOS.

Table XIV: Cumulative Year 2040 No Project Intersection LOS Results

ID	*Intersection*	*Intersection Control*	*AM (5:30 – 6:30) Peak Hour*		*PM (3:30 – 4:30) Peak Hour*	
			Average Delay (sec/veh)	*LOS*	*Average Delay (sec/veh)*	*LOS*
1	Interstate 5 SB Ramps / Kamm Avenue	One-Way Stop	8.7	A	0.0	A
2	Interstate 5 NB Ramps / Kamm Avenue	One-Way Stop	8.5	A	8.5	A
3	Main Project Access / Kamm Avenue	Does Not Exist	N/A	N/A	N/A	N/A
4	State Route 33 / Kamm Avenue	One-Way Stop	11.9	B	10.9	B

Note: LOS = Level of Service based on average delay on signalized intersections and All-Way STOP Controls.
LOS for two-way STOP controlled intersections are based on the worst approach/movement of the minor street.

Table XV: Cumulative Year 2040 No Project Segment LOS Results

ID	*Segment*	*Limits*	*Lanes*	*24-hour Volume*	*LOS*
1	Kamm Avenue	Interstate 5 and Main Project Access	2	508	B
2	Kamm Avenue	Main Project Access and State Route 33	2	508	B

Note: LOS = Level of Service per the Florida Roadway Segment LOS Tables

Kamm Avenue Processing Plant - County of Fresno
Cumulative Year 2040 No Project - Traffic Volumes, Geometrics and Controls

Figure 7

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PHONE:(559) 570-8991, EMAIL: info@JLBtraffic.com, www.JLBtraffic.com

Cumulative Year 2040 plus Project Traffic Conditions

Traffic Signal Warrants

Peak hour traffic signal warrants, as appropriate, were prepared for the unsignalized intersections in the Cumulative Year 2039 plus Project Traffic Conditions scenario. These warrants are found in Appendix K. These warrants were prepared pursuant to the CA MUTCD guidelines for the preparation of traffic signal warrants. Under this scenario, none of the unsignalized intersections are projected to satisfy the peak hour signal warrant during either peak period. Based on the signal warrants and engineering judgement, signalization of these intersections is not recommended, especially since these are projected to operate at an acceptable LOS during both peak periods.

Left-Turn Lane Warrant Analysis

Left-turn lane warrant analysis for the Main Project Access was conducted pursuant to the methodology in the latest edition of the American Association of State Highway and Transportation Officials (AASHTO) guidelines. Table XVI provides key data collected for the intersection of Main Project Access and Kamm Avenue to determine if a westbound left-turn lane is warranted.

Table XVI: Cumulative Year 2040 plus Project Intersection Volumes and Speeds

Intersection	*Time of Day*	V_A	V_L	V_s	P_L	V_O	*Assumed 85th Percentile Speed of Eastbound Traffic*
Main Project Access / Kamm Avenue	AM (5:30 – 6:30) Peak Hour	58	5	53	8.6	14	60
	PM (3:30 – 4:30) Peak Hour	19	4	15	21.1	51	60

Note: All volumes shown are peak flow rate in vehicles per hour (VPH), which take into account peak hour factors
V_A = Advancing Volume in the Westbound Direction
V_L = Westbound Left-Turning Volume
V_S = Straight Westbound Through Volume
P_L = Percent of Westbound Left-Turn vehicles
V_O = Opposing Eastbound Volume

As shown on Table XVI, the projected peak flow volumes for the eastbound opposing traffic are 14 and 51 for the AM and PM peak hours, respectively. During the respective peak periods, five (5) AM and four (4) PM peak flow westbound left-turns are projected. These left-turn volumes equate to 8.6 and 21.1 percent of the AM and PM peak hour traffic, respectively, advancing westbound volume (V_A). The critical speed for the westbound left-turns is that of the opposing westbound volume (V_O) which is assumed to be 60 MPH. The critical percentage of left-turns is that of the 10 percent left-turns category for the AM peak and 20 percent during the PM peak.

Table XVII: AASHTO Guide for Left-Turn Lanes on Two-Lane Highways

Opposing Volume (V_O) (veh/hr)	*Advancing Volume (V_A) (veh/hr)*			
	5% Left-Turns	*10% Left-Turns*	*20% Left-Turns*	*30% Left-Turns*
40-MPH Operating Speed				
800	330	240	180	160
600	410	305	225	200
400	510	380	275	245
200	640	470	350	305
100	720	515	390	340
50-MPH Operating Speed				
800	280	210	165	135
600	350	260	195	170
400	430	320	240	210
200	550	400	300	270
100	615	445	335	295
60-MPH Operating Speed				
800	230	170	125	115
600	290	210	160	140
400	365	270	200	175
200	450	330	250	215
100	505	370	275	240

Source: Table 9-23 "Guide for Left-Turn Lanes on Two-Lane Highways (10)", 2011 AASHTO.

In order to determine if the intersection satisfies the AASHTO guidelines for the consideration of the installation a left-turn lane, a linear interpolation of Table XVII volumes was conducted. Table XVIII shows the results of the linear interpolation. Based on the observed traffic volumes, the intersection of Main Project Access and Kamm Avenue is not projected to satisfy the ASSHTO left-turn lane warrant. JLB interpolated the minimum westbound advancing volume (V_A) which would warrant a westbound left-turn pocket. Based on the data contained within Table XVII, the minimum westbound advancing volume (V_A) required would be 407 and 271 during the AM and PM peaks, respectively. Based on these findings, a westbound left-turn pocket would not be warranted.

Table XVIII: Interpolation of Cumulative Year 2040 plus Project Intersection Volumes to AASHTO Volumes

V_O AASHTO	Percent Left Turns	V_O Observed	V_A AASHTO	V_A Observed	V_A Interpolated	V_A Observed > V_A Interpolated	Left-Turn Warrant Satisfied?
100	5%		505				
		14 AM (5:30 – 6:30) Peak Hour		58	407	No	No
100	10%		370				
100	20%		275				
		51 PM (3:30 – 4:30) Peak Hour		19	271	No	No
100	30%		240				

Note: All volumes shown are peak flow rate in vehicles per hour (VPH), unless otherwise indicated.
V_A = Advancing Volume in the Westbound Direction
V_O = Opposing Eastbound Volume

Results of Traffic Index Analysis

Table XIX presents the Cumulative Year 2040 plus Project TI based on peak seasonal operations. The peak being analyzed in this TIA is that for the busiest two-week period of the year. As can be seen from Table XIX, the segment of Kamm Avenue between Interstate 5 and Main Project Access is projected to observe a TI of 9.5 in both directions. The segment of Kamm Avenue between Main Project Access and State Route 33 is projected to observe a TI of 10.0 in both directions.

I Worth noting is that harvest trucks and associated solid waste trucks will not run a majority of the year, but rather other truck loads (such as shipping trucks) will run at reduced levels for most of the year. Therefore, assuming that the overall trip generation of the Project is evenly distributed throughout the year, the TI is projected to be much lower. Table XX presents the Cumulative Year 2040 plus Project TI based on an annualized distribution of the Project. As can be seen from Table XX, the segment of Kamm Avenue between Interstate 5 and Main Project Access is projected to observe a TI of 9.0 in both directions. Additionally, the segment of Kamm Avenue between Main Project Access and State Route 33 is projected to observe a TI of 9.0 in both directions. As a result, the Project is projected to have a cumulative impact of 0.5 to the TI for the segments of Kamm Avenue between Interstate 5 and Main Project Access in the eastbound and westbound directions. Additionally, the Project is projected to have a cumulative impact of 0.5 to the TI for the segment of Kamm Avenue between Main Project Access and State Route 33 in both directions.

Table XIX: Cumulative Year 2040 plus Project Traffic Index - Peak

Kamm Avenue between Interstate 5 SB Ramps and Main Project Access	*Eastbound*	*Westbound*	*Totals*	*ESAL 20-Year Constant*	*Eastbound 20-Year ESAL*	*Westbound 20-Year ESAL*
Passenger Cars	160	126	286	-	-	-
2-Axle Trucks	55	55	110	1,380	75,900	75,900
3-Axle Trucks	2	2	4	3,680	7,360	7,360
4-Axle Trucks	9	5	14	5,880	52,920	29,400
5-Axle Trucks	131	119	250	13,780	1,805,180	1,639,820
Totals	357	307	664	-	1,941,360	1,752,480
Traffic Index					**9.5**	**9.5**
Kamm Avenue between Main Project Access and State Route 33	***Eastbound***	***Westbound***	***Totals***	***ESAL 20-Year Constant***	***Eastbound 20-Year ESAL***	***Westbound 20-Year ESAL***
Passenger Cars	254	220	474	-	-	-
2-Axle Trucks	55	55	110	1,380	75,900	75,900
3-Axle Trucks	15	15	30	3,680	55,200	55,200
4-Axle Trucks	9	5	14	5,880	52,920	29,400
5-Axle Trucks	163	151	314	13,780	2,246,140	2,080,780
Totals	496	446	942	-	2,430,160	2,241,280
Traffic Index					**10.0**	**10.0**

Note: Traffic Index obtained for 20-Year Design from Table 613.3c from the Caltrans Design Manual

Table XX: Cumulative Year 2040 plus Project Traffic Index - Average

Kamm Avenue between Interstate 5 SB Ramps and Main Project Access	*Eastbound*	*Westbound*	*Totals*	*ESAL 20-Year Constant*	*Eastbound 20-Year ESAL*	*Westbound 20-Year ESAL*
Passenger Cars	154	120	274	-	-	-
2-Axle Trucks	55	55	110	1,380	75,900	75,900
3-Axle Trucks	2	2	4	3,680	7,360	7,360
4-Axle Trucks	9	5	14	5,880	52,920	29,400
5-Axle Trucks	78	66	144	13,780	1,074,840	909,480
Totals	298	248	546	-	1,211,020	1,022,140
Traffic Index					**9.0**	**9.0**
Kamm Avenue between Main Project Access and State Route 33	***Eastbound***	***Westbound***	***Totals***	***ESAL 20-Year Constant***	***Eastbound 20-Year ESAL***	***Westbound 20-Year ESAL***
Passenger Cars	208	174	382	-	-	-
2-Axle Trucks	55	55	110	1,380	75,900	75,900
3-Axle Trucks	6	6	12	3,680	22,080	22,080
4-Axle Trucks	9	5	14	5,880	52,920	29,400
5-Axle Trucks	76	64	140	13,780	1,047,280	881,920
Totals	354	304	658	-	1,198,180	1,009,300
Traffic Index					**9.0**	**9.0**

Note: Traffic Index obtained for 20-Year Design from Table 613.3c from the Caltrans Design Manual

Results of Cumulative Year 2040 plus Project Level of Service Analysis

The Cumulative Year 2040 plus Project Traffic Conditions scenario assumes that the existing roadway geometrics and traffic controls will remain in place. Figure 8 illustrates the Cumulative Year 2040 plus Project turning movement volumes, intersection geometrics and traffic controls. LOS worksheets for the Cumulative Year 2040 plus Project Traffic Conditions scenario are provided in Appendix J. Table XXI presents a summary of the Cumulative Year 2040 plus Project peak hour LOS at the study intersections, while Table XXII presents a summary of the Cumulative Year 2040 plus Project LOS for the study segments.

Under this scenario, all study intersections are projected to operate at an acceptable LOS during both peak periods. Similarly, all study segments are projected to operate at an acceptable LOS.

Table XXI: Cumulative Year 2040 plus Project Intersection LOS Results

ID	*Intersection*	*Intersection Control*	*AM (5:30 – 6:30) Peak Hour*		*PM (3:30 – 4:30) Peak Hour*	
			Average Delay (sec/veh)	*LOS*	*Average Delay (sec/veh)*	*LOS*
1	Interstate 5 SB Ramps / Kamm Avenue	One-Way Stop	8.7	A	0.0	A
2	Interstate 5 NB Ramps / Kamm Avenue	One-Way Stop	8.5	A	8.5	A
3	Main Project Access / Kamm Avenue	One-Way Stop	0.0	A	10.0	B
4	State Route 33 / Kamm Avenue	One-Way Stop	12.0	B	11.2	B

Note: LOS = Level of Service based on average delay on signalized intersections and All-Way STOP Controls.
LOS for two-way STOP controlled intersections are based on the worst approach/movement of the minor street.

Table XXII: Cumulative Year 2040 plus Project Segment LOS Results

ID	*Segment*	*Limits*	*Lanes*	*24-hour Volume*	*LOS*
1	Kamm Avenue	Interstate 5 and Main Project Access	2	664	B
2	Kamm Avenue	Main Project Access and State Route 33	2	942	B

Note: LOS = Level of Service per the Florida Roadway Segment LOS Tables

Kamm Avenue Processing Plant - County of Fresno
Cumulative Year 2040 plus Project - Traffic Volumes, Geometrics and Controls

Figure 8

JLB TRAFFIC ENGINEERING, INC.
516 W. Shaw Ave., Ste. 103, Fresno, CA 93704
PHONE:(559) 570-8991, EMAIL: info@JLBtraffic.com, www.JLBtraffic.com

Queuing Analysis

Table XXIII provides a queue length summary for all lanes at the study intersections under all study scenarios. The queuing analyses for the study intersections are contained in the LOS worksheets for the respective scenarios. Appendix D contains the methodologies used to evaluate these intersections. Queuing analyses were completed using Sim Traffic output information. Synchro provides both 50th and 95th percentile maximum queue lengths (in feet). According to the Synchro manual, "the 50th percentile maximum queue is the maximum back of queue on a typical cycle and the 95th percentile queue is the maximum back of queue with 95th percentile volumes." The queues shown on Table XXIII are the 95th percentile queue lengths for the respective lane movements.

The Caltrans Highway Design Manual (HDM) provides guidance for determining deceleration lengths for the left-turn and right-turn lanes based on design speeds. Per the HDM criteria, "tapers for right-turn lanes are usually un-necessary since the main line traffic need not be shifted laterally to provide space for the right-turn lane. If, in some rare instances, a lateral shift were needed, the approach taper would use the same formula as for a left-turn lane." Therefore, a bay taper length pursuant to the Caltrans HDM would need to be added, as necessary, to the recommended storage lengths presented in Table XXIII.

The storage capacity for the Cumulative Year 2040 plus Project Traffic Conditions shall be based on the SimTraffic output files and engineering judgement. The values in bold presented in Table XXIII are the projected queue lengths that will likely need to be accommodated by the Cumulative Year 2040 plus Project Traffic Conditions scenario. At the remaining approaches of the study intersections, the existing storage capacity will be sufficient to accommodate the maximum queue.

Table XXIII: Queuing Analysis

ID	*Intersection*	*Existing Queue Storage Length (ft.)*		*Existing*		*Existing plus Project*		*Near Term Year 2025 plus Project*		*Cumulative Year 2040 No Project*		*Cumulative Year 2040 plus Project*	
				AM	*PM*	*AM*	*PM*	*AM*	*PM*	*AM*	*PM*	*AM*	*PM*
1	Interstate 5 SB Ramps / Kamm Avenue	SB L-T-R	>300	43	23	32	36	34	34	51	32	41	36
2	Interstate 5 NB Ramps / Kamm Avenue	NB L-T-R	>300	28	16	34	20	48	8	44	27	58	24
3	Main Project Access / Kamm Avenue	NB L-R	*	*	*	0	0	0	17	*	*	0	25
4	State Route 33 / Kamm Avenue	EB L-R	>500	22	94	45	75	53	75	35	64	40	91
		NB L-T	>500	0	0	37	14	36	0	21	0	23	14

Note: * = Does not exist or is not projected to exist

Conclusions and Recommendations

Conclusions and recommendations regarding the proposed Project are presented below.

Existing Traffic Conditions

- At present, the segments of Kamm Avenue between Interstate 5 and Main Project Access and Main Project Access and State Route 33 currently observe a TI of 8.5 in both directions.
- Based on information provided by County of Fresno staff, the segment of Kamm Avenue between Interstate 5 and San Bernardino Avenue alignment has an "Excellent" PCI rating of 100, while the segment of Kamm Avenue between San Bernardino Avenue alignment and State Route 33 has a "Good" PCI rating of 87.
- Furthermore, the segment of Kamm Avenue between Interstate 5 and San Bernardino Avenue alignment experienced a 0.1-foot asphalt concrete overlay in 2013, and the segment of Kamm Avenue between San Bernardino Avenue and State Route 33 experienced a chip seal in 2008.
- At present, all study intersections operate at an acceptable LOS during both peak periods. Similarly, all study segments operate at an acceptable LOS.

Existing plus Project Traffic Conditions

- Based on the latest Project Site Plan, access to the proposed Project will be from a total of three (3) points. JLB analyzed the location of the proposed access points to be constructed under relative to the existing local roads in the Project's vicinity. A review of the Project's access points to be constructed indicates that they are located at points that minimize traffic operational impacts to the existing roadway network.
- The proposed Project is estimated to generate a maximum of 590 daily trips, 103 AM peak hour trips and 23 PM peak hour trips.
- Under this scenario, the segment of Kamm Avenue between Interstate 5 and Main Project Access is projected to observe a TI of 9.0 and 8.5 in the eastbound and westbound directions, respectively. Additionally, the segment of Kamm Avenue between Main Project Access and State Route 33 is projected to observe a TI of 9.0 and 8.5 in the eastbound and westbound directions, respectively. As a result, the Project is projected to have an impact of 0.5 to the TI for the segment of Kamm Avenue between Interstate 5 and State Route 33 in the eastbound direction only.
- Under this scenario, all study intersections are projected to operate at an acceptable LOS during both peak periods. Similarly, all study segments are projected to operate at an acceptable LOS.
- The Project site is located within Traffic Analysis Zone 2270 that has an average VMT per employee of 41.67. In this case, the 15 percent VMT reduction threshold is 35.41 VMT per employee.
- Based on Fresno COG ABM output, the Project will produce a 36.6 average (tour-based) VMT per employee (prior to accounting for carpooling). Therefore, a carpooling program with 23 percent or more employee participation will reduce VMT by more than 15 percent below the existing average VMT of 41.67 for the type of project and project location. With the recommended mitigation measure to incentivize and encourage carpooling, VMT from this facility would be reduced to less than significant.

Near Term Year 2025 plus Project Traffic Conditions

- Under this scenario, the segment of Kamm Avenue between Interstate 5 and Main Project Access is projected to observe a TI of 9.0 and 8.5 in the eastbound and westbound directions, respectively. Additionally, the segment of Kamm Avenue between Main Project Access and State Route 33 is projected to observe a TI of 9.0 and 8.5 in the eastbound and westbound directions, respectively. As a result, the Project is projected to have an impact of 0.5 to the TI for the segment of Kamm Avenue between Interstate 5 and State Route 33 in the eastbound direction only.
- Under this scenario, all study intersections are projected to operate at an acceptable LOS during both peak periods. Similarly, all study segments are projected to operate at an acceptable LOS.

Cumulative Year 2040 No Project Traffic Conditions

- Under this scenario, the segments of Kamm Avenue between Interstate 5 and Main Project Access and Main Project Access and State Route 33 are projected to observe a TI of 9.0 in both directions. As a result, by the Cumulative Year 2040 scenario, both segments of Kamm Avenue are projected to have an impact of 0.5 to the TI in both directions.
- Under this scenario, all study intersections are projected to operate at an acceptable LOS during both peak periods. Similarly, all study segments are projected to operate at an acceptable LOS.

Cumulative Year 2040 plus Project Traffic Conditions

- Based on the findings of the Left-Turn Lane Warrant, a westbound left-turn pocket would not be warranted at the intersection of Main Project Access and Kamm Avenue.
- Under this scenario, the segment of Kamm Avenue between Interstate 5 and Main Project Access is projected to observe a TI of 9.0 in both directions. Additionally, the segment of Kamm Avenue between Main Project Access and State Route 33 is projected to observe a TI of 9.0 in both directions. As a result, the Project is projected to have a cumulative impact of 0.5 to the TI for the segments of Kamm Avenue between Interstate 5 and Main Project Access in the eastbound and westbound directions. Additionally, the Project is projected to have a cumulative impact of 0.5 to the TI for the segment of Kamm Avenue between Main Project Access and State Route 33 in both directions.
- Under this scenario, all study intersections are projected to operate at an acceptable LOS during both peak periods. Similarly, all study segments are projected to operate at an acceptable LOS.

Study Participants

JLB Traffic Engineering, Inc. Personnel:

Jose Luis Benavides, PE, TE	Project Manager
Susana Maciel, EIT	Project Engineer
Matthew Arndt, EIT	Engineer I/II
Jove Alcazar, EIT	Engineer I/II
Jesus Garcia	Engineer I/I
Javier Rios	Engineer I/II
Dennis Wynn	Sr. Engineering Technician
Adrian Benavides	Engineering Aide
Justin Barnett	Engineering Aide

Persons Consulted:

Jeff Roberts	Kamm Avenue Pistachio Processing Plan, LLC
Samantha Ens	Kamm Avenue Pistachio Processing Plan, LLC
Brian Spaunhurst	County of Fresno
David Padilla	Caltrans
Kai Han, TE	Fresno COG

References

1. County of Fresno, *2000 General Plan*.
2. City of Fresno, *2035 General Plan*.
3. Fresno Council of Governments, *Fresno County SB 743 Implementation Regional Guidelines*, July 2020.
4. Governor's Office of Planning and Research, *Technical Advisory on Evaluating Transportation Impacts in CEQA*, State of California, December 2018.
5. *Guide for the Preparation of Traffic Impact Studies*, Caltrans, dated December 2002.
6. California Air Pollution Control Officers Association, *Quantifying Greenhouse Gas Mitigation Measures*, August 2010.
7. *Trip Generation Manual,* 10th Edition, Washington D.C., Institute of Transportation Engineers, 2017.
8. *2014 California Manual on Uniform Traffic Control Devices*, Caltrans, November 7, 2014.

Appendix A: Scope of Work

July 16, 2020

Brian Spaunhurst
County of Fresno
2220 Tulare Street, 6th Floor
Fresno, CA 93721

Via Email Only: bspaunhurst@fresnocountyca.gov

Subject: ***Proposed Scope of Work for the Preparation of a Traffic Impact Analysis for the Kamm Avenue Pistachio Plant (KAPP) Project in the County of Fresno (JLB Project 009-018)***

Dear Mr. Spaunhurst,

JLB Traffic Engineering, Inc. (JLB) hereby submits this Draft Scope of Work for the preparation of a Traffic Impact Analysis (TIA) for the Kamm Avenue Processing Plant (KAPP) located on approximately 315.8 acres to the south of Kamm Avenue, west of State Route 33, and east of Interstate 5 in the western portion of unincorporated Fresno County. The Project would provide pistachio processing capacity in the immediate vicinity of existing pistachio orchards that currently ship harvested crops for processing to more remote locations, including plants outside of Fresno County. The Project vicinity is shown in Exhibit A, while the Project Site Plan is presented in Exhibit B.

The Project would operate year-round to package and process harvested pistachios for retail and wholesale customers. During an approximately six-week harvest period which typically occurs during last week of August through first week of October, the Project will operate seven days a week and 24 hours per day to receive, hull, heat, dry and store pistachio crops in onsite storage silos. During non-harvest operations, the Project will operate two shifts per day, five or six days a week depending on pistachio market conditions. The Project will have a full-time workforce of 60 employees. An additional 60 employees will be hired during the six-week harvest period. The primary pistachio processing facilities will be located within an approximately 80-acre fenced area bordered by Kamm Avenue to the north. Two process water settling and cleaning ponds, each with 50 acre-feet storage capacity, will be located along the southern border of the site and will be connected to the processing plant via an underground pipeline.

Electrical and natural gas service will be provided by the Pacific Gas and Electric Company (PG&E). Project water would be supplied by the Wetlands Water District from existing conveyance facilities that extend from the California Aqueduct to a pipeline traversing the east side of the Project area. The Project will contract with affiliated growers in the vicinity to obtain sufficient water supplies to operate the processing plant during average, dry and multiple year drought conditions. Approximately 80 to 90 percent of all water used by the Project will be recaptured, cleaned, and used by local pistachio growers for irrigation.

Major components of the Project would include the following:

- (1) 130,000 square-foot processing and packing building with appurtenant equipment
- (1) 15,000 square-foot cold storage building
- (49) 48-foot diameter by 65-foot tall storage silos with appurtenant scaffolding and access equipment
- (1) 21,600 square-foot huller canopy and related equipment
- (13) 27 MMbtu/hr natural gas fired column dryers
- (1) 353,000-gallon process water storage tank and a 70,000 domestic water storage tank.
- An onsite domestic water treatment facility, including a facility control room and domestic water treatment filters.
- Access roads, scales, signage and related facilities for harvest and shipping truck loading and unloading and employee and other vehicular access and parking facilities.
- Other necessary infrastructure for Project operations and maintenance, including a shop building, a chemical storage warehouse, a fire pumphouse, a motor control center, a compressor building, and administration office building, breakroom and supervisor office building, guard shacks, sand and media raw water filters and process water separators and screens.

The purpose of the TIA is to evaluate the potential on-site and off-site traffic impacts, identify short-term roadway and circulation needs, determine potential mitigation measures, and identify any critical traffic issues that should be addressed in the on-going planning process. In order to evaluate on-site and off-site traffic impacts of the proposed Project, JLB proposes the following Scope of Work.

Scope of Work

- JLB will perform a site visit to observe existing traffic conditions, especially during the AM and PM peak hours. Existing roadway conditions including geometrics and traffic controls will be verified.
- JLB will evaluate onsite and offsite circulation and provide recommendations as necessary to improve circulation to and within the Project site. Particular attention will be paid to conflicting traffic movements and the location of local roadways to the major streets.
- JLB will prepare California Manual on Uniform Traffic Control Devices (CA MUTCD) peak hour signal warrants for unsignalized study intersections under all study scenarios.
- JLB will forecast trip distribution on the basis of turn count information and knowledge of the existing and planned circulation network in the vicinity of the Project.
- JLB will evaluate existing and forecast future levels of service (LOS) at the study intersection(s) and/or segment(s). JLB will use HCM 6th Edition or HCM 2000 methodologies as appropriate within Synchro software to perform this analysis for the AM and PM peak hours. JLB will identify the cause(s) of poor level of service and proposed improvement measures (if any).
- JLB will prepare a table with the Project's pro-rata fair share allocation to improvement measures identified (if any) that are not currently funded by an existing funding source.
- JLB will prepare a qualitative discussion of the Project's Vehicles Miles Traveled (VMT) based on output from the Fresno COG model and project specific data.

Study Scenarios:

1. Existing Traffic Conditions with needed improvements (if any);
2. Existing plus Project Traffic Conditions with proposed mitigation measures (if any);
3. Year 2025 plus Project Traffic Conditions with proposed mitigation measures (if any);
4. Cumulative Year 2040 No Project Traffic Conditions with proposed improvement measures (if any); and
5. Cumulative Year 2040 plus Project Traffic Conditions with proposed mitigation measures (if any).

Weekday peak hours to be analyzed (Tuesday, Wednesday or Thursday only):

The proposed study periods have been determined based on prior communication with County of Fresno and Caltrans staff.

1. 5 - 7 AM peak hour
2. 3 - 5 PM peak hour

Study Intersections:

1. Kamm Avenue / I-5 SB Ramps
2. Kamm Avenue / I-5 NB Ramps
3. Kamm Avenue / Main Project Access Point
4. Kamm Avenue / SR 33

Queuing analysis is included in the proposed Scope of Work for the study intersection(s) listed above under all study scenarios. This analysis will be utilized to recommend minimum storage lengths for left-turn and right-turn lanes at all study intersections.

Study Segments:

1) Kamm Avenue between I-5 and Main Project Access Point
2) Kamm Avenue between Main Project Access Point and SR 33

Traffic Index Analysis:

Since the proposed development may introduce additional truck traffic to the roadways in the vicinity of the project, it is assumed that the Traffic Index (TI) will need to be analyzed for the study segments under all study scenarios. This analysis will be utilized to evaluate truck traffic impact to the pavement structure of the roadway(s) analyzed within the TIA.

Project Trip Generation

Trip generation rates for the proposed Project were prepared based on data within the Project Description. While its is reasonable to assume that carpooling will take place between some of the employees, to be conservative in the Project's traffic impacts, this TIA assumes that no carpooling would take place. Based on information from the Project Description, the Project will employ up to 60 staff during off peak season and up to 120 staff during the peak harvest season. For purposes of this TIA, the peak harvest season will be analyzed.

As described in the Project Description, traffic to the Project will consist of the following types: process employees, seasonal harvest employees, visitors, delivery vehicles, occasional maintenance vehicles, recycled waste vehicles, solid waste vehicles, seasonal harvest trucks, and shipping trucks. Due to the nature of the facility and the distance from any major cities, there will be no on-site sales.

Harvest season, will generally run from early September to mid-October. During the two (2) week peak harvest season up to 150 harvest trucks will deliver crop to the Project site. The harvest trucks are owned by others and as a result would not be stored at the Project site. During the peak harvest season, the Project anticipates receiving up to 8 trucks per day for outbound shipment of hulled pistachio product. It is projected that the Project site is going to receive 9 total solid waste and 2 recycled waste vehicles during the peak harvest season.

Peak hour trip generation was determined based on information contained within the Project Description and communication with the project proponent. Based on communication with the project proponent, the plant will run two 12-hour shifts for the hulling operation during peak harvest season. Shifts are proposed to be from 1) 6:00 AM to 6:00 PM and 2) 6:00 PM to 6:00 AM. Another two 8 hour shifts for the processing operations are proposed to be from 1) 6:00 AM to 2:30 PM and 2) 2:30 PM to 11:00 AM. As a result, most employee related traffic to and from the Project is projected to take place between the hours of 5:30 to 6:30 AM , 2:00 to 3:00 PM, and 5:30 to 6:30 PM. Furthermore, the Project expects to limit shipping trucks, visitors, solid waste vehicles and delivery vehicles to the hours between 8:00 AM and 5:00 PM. Based on communication with County of Fresno and Caltrans staff, it was decided that the Project should analyze the existing peak period as observed on SR 33. For this reason, JLB collected a 24-hour volume count for SR 33 and determined that the AM peak period takes place between 5 and 7 AM while the PM peak takes place between 3 and 5. For this reason, the PM peak hour trip rate for employee related trips was determined to be zero (0). Similarly, the Visitor, delivery, maintenance, recycled, solid waste, and shipping truck vehicle trips during the AM peak period was determined to be zero (0). Table I illustrates the Project's daily, AM and PM peak trip generation during peak harvest season.

Table I: Project Trip Generation (Peak Harvest Season)

Land Use (ITE Code)	*Size*	*Unit*	*Daily*		*AM Peak Hour (5:30 - 6:30)*						*PM Peak Hour (3:30 - 4:30)*					
			Rate	*Total*	*Trip Rate*	*In %*	*Out %*	*In*	*Out*	*Total*	*Trip Rate*	*In %*	*Out %*	*In*	*Out*	*Total*
Employees	120	ea.	2.00	240	0.75	67	33	60	30	90	0.00	0	0	0	0	0
Visitors	2	ea.	2.00	4	0.00	0	0	0	0	0	1.00	50	50	1	1	2
Delivery Vehicles	2	ea.	2.00	4	0.00	0	0	0	0	0	1.00	50	50	1	1	2
Maintenance Vehicles	2	ea.	2.00	4	0.00	0	0	0	0	0	1.00	50	50	1	1	2
Recycled Waste	2	ea.	2.00	4	0.00	0	0	0	0	0	0.24	0	0	0	0	0
Solid Waste	9	ea.	2.00	18	0.00	0	0	0	0	0	0.24	50	50	1	1	2
Harvest Trucks	150	ea.	2.00	300	0.084	52	48	7	6	13	0.084	48	52	6	7	13
Shipping Trucks	8	ea.	2.00	16	0.00	0	0	0	0	0	0.24	40	60	1	1	2
Total Project Trips				**590**				**67**	**36**	**103**				**11**	**12**	**23**

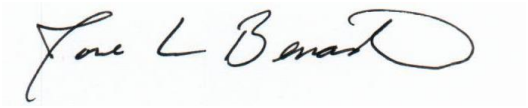
Note: ea. = each

Near Term Projects to be Included

JLB will be consulting with County of Fresno staff to determine which Projects should be included in the Near Term plus Project analysis. JLB will include Near Term Projects in the vicinity of the proposed Project under the Near Term plus Project analysis for which the County or Caltrans has knowledge of and for which it is anticipated that said project(s) is/are projected to be whole or partially built by the Near Term Project year 2025. County of Fresno and Caltrans, as appropriate, would provide JLB with Near Term Project details such as a project description, location, proposed land uses with breakdowns and type of residential units and amount of square footages for non-residential uses.

The Scope of Work is based on our understanding of this Project and our experience with similar TIAs. If you have any questions or require additional information, please contact me at (559) 570-8991, or via email at jbenavides@jlbtraffic.com.

Sincerely,



Jose Luis Benavides, P.E., T.E.
President

cc: David Padilla, Caltrans
Ejaz Ahmad, County of Fresno
Steve White, County of Fresno

Exhibit A - Aerial

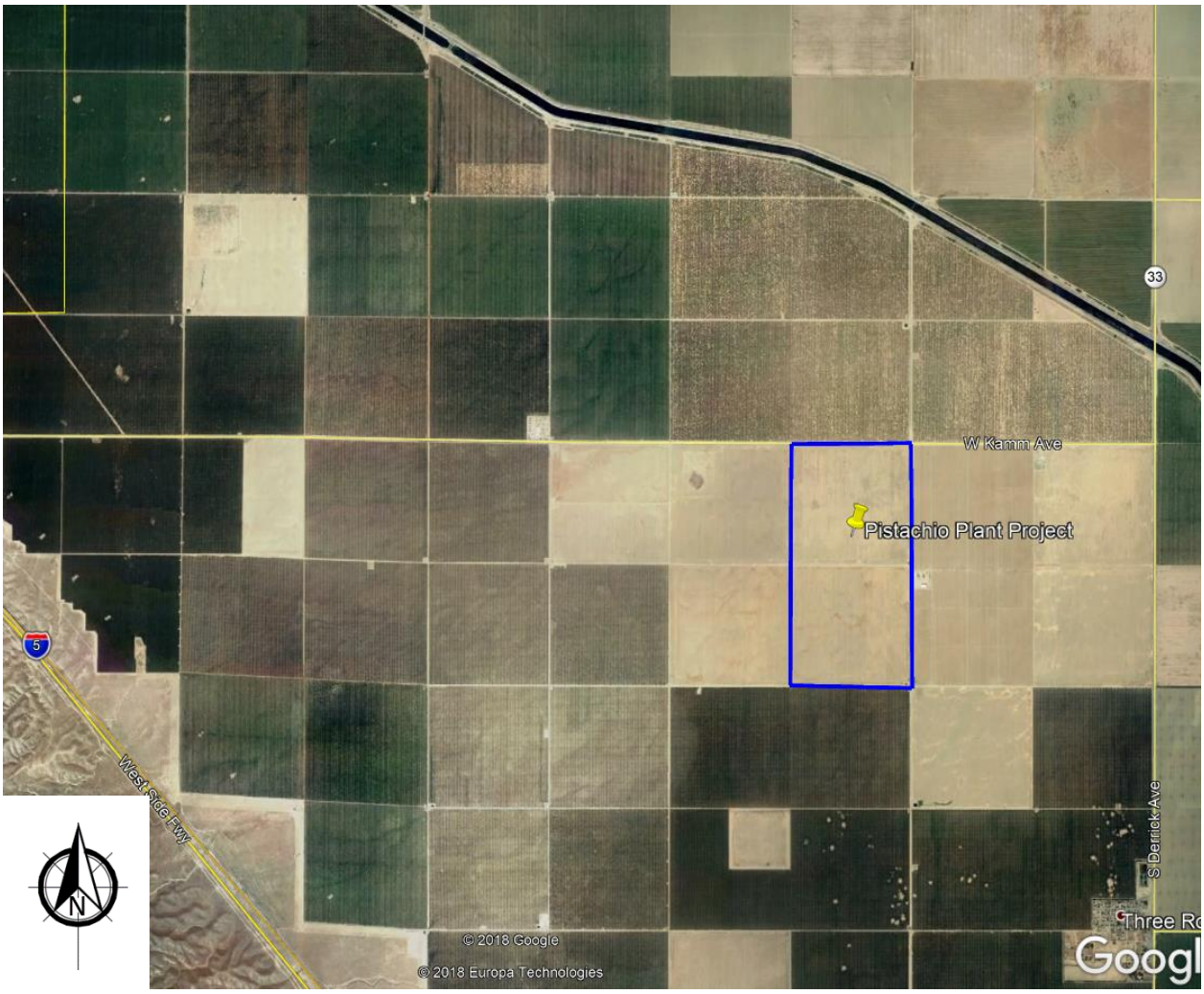
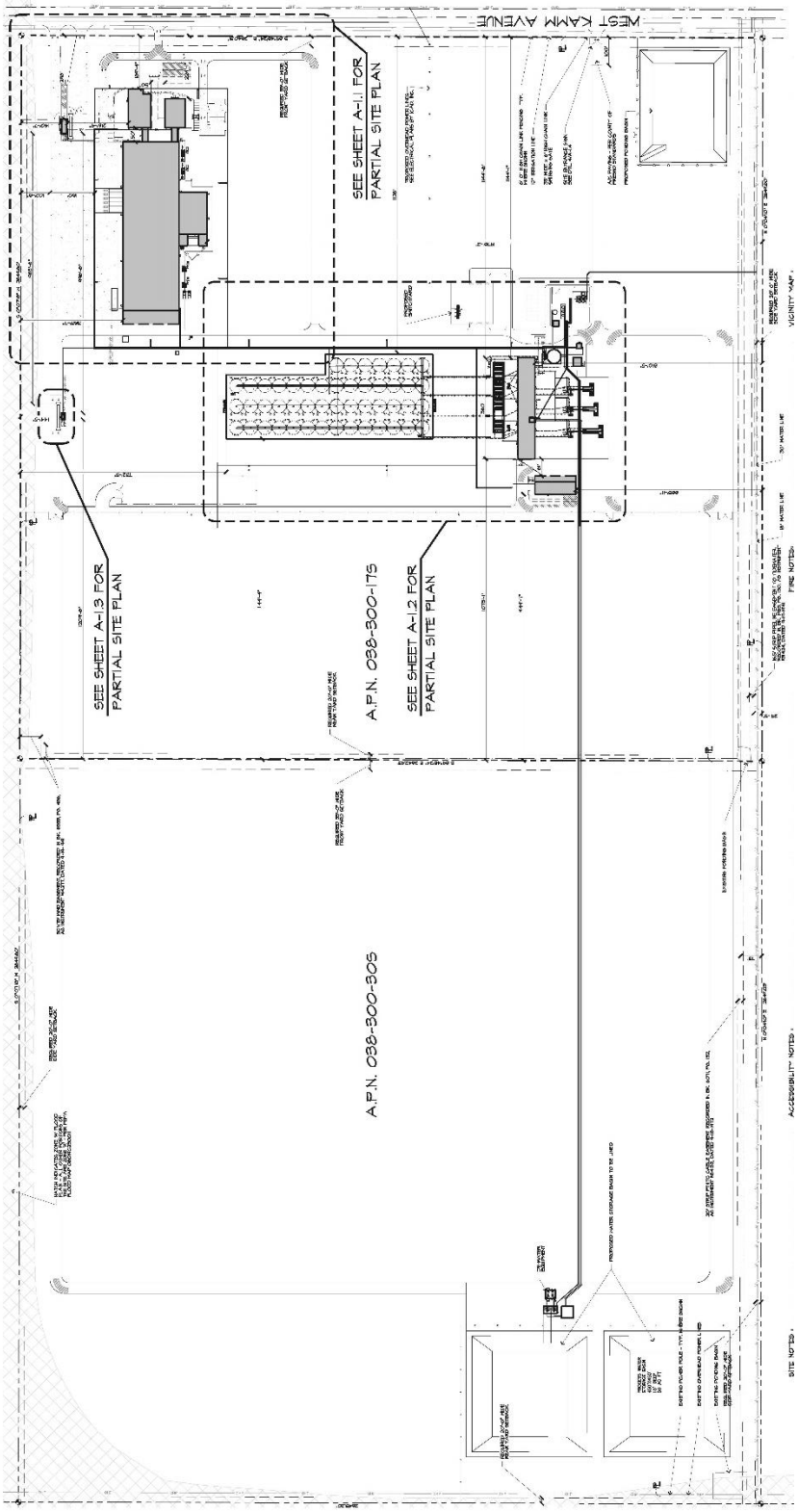


Exhibit B - Site Plan



Jose Benavides

From: Padilla, Dave@DOT <dave.padilla@dot.ca.gov>
Sent: Thursday, July 16, 2020 1:54 PM
To: Jose Benavides; Spaunhurst, Brian
Cc: Steven White; Jeff Roberts; Travis Crawford; Samantha Ens
Subject: RE: L07162020 KAPP TIA.pdf

Hello Jose,

We have reviewed the proposed draft SOW and we have no concerns. Please route the completed TIA for our review.

Thank you,

David Padilla
Associate Transportation Planner
Office of Planning & Local Assistance
Caltrans-District 6

From: Jose Benavides <jbenavides@jlbtraffic.com>
Sent: Thursday, July 16, 2020 12:10 PM
To: Spaunhurst, Brian <bspaunhurst@fresnocountyca.gov>
Cc: Padilla, Dave@DOT <dave.padilla@dot.ca.gov>; Steven White <stwhite@fresnocountyca.gov>; Jeff Roberts <JRoberts@assemigroup.com>; Travis Crawford <Travis@candbplanning.com>; Samantha Ens <Samantha.Ens@touchstonepistachio.com>
Subject: L07162020 KAPP TIA.pdf

EXTERNAL EMAIL. Links/attachments may not be safe.

Good afternoon Brian,

Attached you will find a draft scope of work for the preparation of a TIA for the Kamm Avenue Pistachio Plant. The reason I am sending you this is because the project has been modified to approximately 1/4 of the size that we were considering. To a large degree our proposed scope of work is the same as that which the County previously approved with the following exceptions.

1. Due to the reduction of the project size, we are no longer proposing to analyze phases within the project, but just buildout.
2. For TIA purposes we are no longer assuming any carpooling
3. The new version will also address VMT.

Are you by any chance available to discuss over the attached proposed scope of work over the phone later this afternoon?

Sincerely,

Jose Luis Benavides, P.E., T.E.
President

Jose Benavides

From: Spaunhurst, Brian <bspaunhurst@fresnocountyca.gov>
Sent: Thursday, July 16, 2020 2:32 PM
To: Jose Benavides
Cc: Padilla, Dave@DOT; White, Steven; Jeff Roberts; Travis Crawford; Samantha Ens; Hensley, Gloria
Subject: RE: L07162020 KAPP TIA.pdf

Good Afternoon Jose,

As we discussed earlier, the proposed SOW is acceptable to me.

Respectfully,

Brian Spaunhurst | Senior Planner
Department of Public Works and Planning | Design Division
2220 Tulare St. 7th Floor Fresno, CA 93721
Main Office: (559) 600-4109 Direct: (559) 600-4532
Your input matters! Customer Service Survey

From: Jose Benavides <jbenavides@jlbtraffic.com>
Sent: Thursday, July 16, 2020 12:10 PM
To: Spaunhurst, Brian <bspaunhurst@fresnocountyca.gov>
Cc: Padilla, Dave@DOT <dave.padilla@dot.ca.gov>; White, Steven <stwhite@fresnocountyca.gov>; Jeff Roberts <JRoberts@assemigroup.com>; Travis Crawford <Travis@candbplanning.com>; Samantha Ens <Samantha.Ens@touchstonepistachio.com>
Subject: L07162020 KAPP TIA.pdf

CAUTION!!! - EXTERNAL EMAIL - THINK BEFORE YOU CLICK

Good afternoon Brian,

Attached you will find a draft scope of work for the preparation of a TIA for the Kamm Avenue Pistachio Plant. The reason I am sending you this is because the project has been modified to approximately 1/4 of the size that we were considering. To a large degree our proposed scope of work is the same as that which the County previously approved with the following exceptions.

1. Due to the reduction of the project size, we are no longer proposing to analyze phases within the project, but just buildout.
2. For TIA purposes we are no longer assuming any carpooling
3. The new version will also address VMT.

Are you by any chance available to discuss over the attached proposed scope of work over the phone later this afternoon?

Sincerely,

Jose Luis Benavides, P.E., T.E.
President

Appendix B: Traffic Counts

Prepared by National Data & Surveying Services

I-5 SB Ramps & Kamm Ave

Peak Hour Turning Movement Count

ID: 19-07356-001
City: Cantua Creek

Day: Tuesday
Date: 10/01/2019

PEAK HOURS	
AM	06:00 AM - 07:00 AM
NOON	NONE
PM	03:45 PM - 04:45 PM

COUNT PERIODS	
AM	05:00 AM - 07:00 AM
NOON	NONE
PM	03:00 PM - 05:00 PM

I-5 SB Ramps — SOUTHBOUND

AM	5	4	8	0	0	AM
NOON	0	0	0	0	0	NOON
PM	2	3	6	0	0	PM

EASTBOUND — Kamm Ave

AM	NOON	PM	
6	0	2	⇦
0	0	0	↶ 0
0	0	0	↱ 0
0	0	1	→ 0
4	0	1	↴ 0
AM	NOON	PM	

WESTBOUND — Kamm Ave

PM	NOON	AM	
0	0	0	↰ 0
0	0	1	← 0
9	0	4	↰ 0
0	0	0	↶ 0
7	0	8	⇨
PM	NOON	AM	

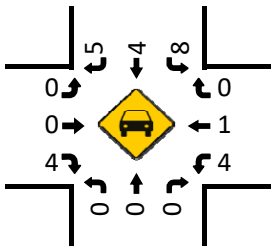
CONTROL: 1-Way Stop (SB)

TEV	26 AM	0 NOON	22 PM
PHF	0.72		0.92

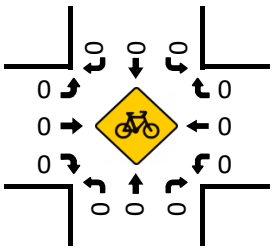
NORTHBOUND — I-5 SB Ramps

PM	13	0	0	0	0	PM
NOON	0	0	0	0	0	NOON
AM	12	0	0	0	0	AM

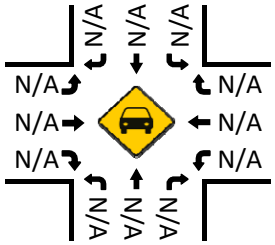
Total Vehicles (AM)



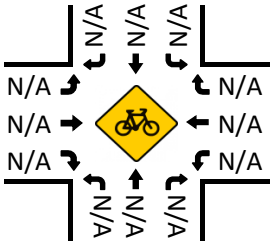
Bikes (AM)



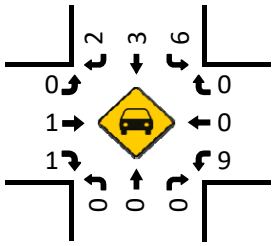
Total Vehicles (Noon)



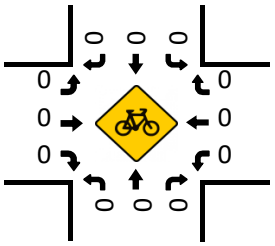
Bikes (NOON)



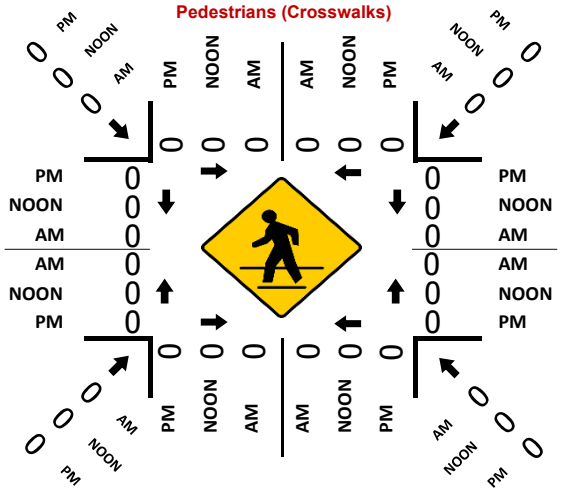
Total Vehicles (PM)



Bikes (PM)



Pedestrians (Crosswalks)



National Data & Surveying Services

Intersection Turning Movement Count

Location: I-5 SB Ramps & Kamm Ave
City: Cantua Creek
Control: 1-Way Stop (SB)

Project ID: 19-07356-001
Date: 10/1/2019

Total

NS/EW Streets:	I-5 SB Ramps				I-5 SB Ramps				Kamm Ave				Kamm Ave				
AM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
5:00 AM	0	0	0	0	0	4	0	0	0	0	0	0	1	0	0	0	5
5:15 AM	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	2
5:30 AM	0	0	0	0	1	2	1	0	0	0	0	0	1	0	0	0	5
5:45 AM	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
6:00 AM	0	0	0	0	3	2	1	0	0	0	1	0	2	0	0	0	9
6:15 AM	0	0	0	0	2	1	1	0	0	0	1	0	1	1	0	0	7
6:30 AM	0	0	0	0	2	1	2	0	0	0	1	0	0	0	0	0	6
6:45 AM	0	0	0	0	1	0	1	0	0	0	1	0	1	0	0	0	4
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	0	0	0	0	11	11	6	0	0	0	4	0	6	1	0	0	39
APPROACH %'s :					39.29%	39.29%	21.43%	0.00%	0.00%	0.00%	100.00%	0.00%	85.71%	14.29%	0.00%	0.00%	
PEAK HR :	06:00 AM - 07:00 AM																TOTAL
PEAK HR VOL :	0	0	0	0	8	4	5	0	0	0	4	0	4	1	0	0	26
PEAK HR FACTOR :	0.000	0.000	0.000	0.000	0.667	0.500	0.625	0.000	0.000	0.000	1.000	0.000	0.500	0.250	0.000	0.000	0.722
						0.708				1.000				0.625			

PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
3:00 PM	0	0	0	0	2	1	0	0	0	1	0	0	1	0	0	0	5
3:15 PM	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1
3:30 PM	0	0	0	0	1	2	0	0	0	0	0	0	0	0	0	0	3
3:45 PM	0	0	0	0	3	1	0	0	0	0	0	0	2	0	0	0	6
4:00 PM	0	0	0	0	1	1	0	0	0	0	0	0	4	0	0	0	6
4:15 PM	0	0	0	0	0	1	1	0	0	0	1	0	2	0	0	0	5
4:30 PM	0	0	0	0	2	0	1	0	0	1	0	0	1	0	0	0	5
4:45 PM	0	0	0	0	0	1	0	0	0	0	0	0	2	0	0	0	3
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	0	0	0	0	10	7	2	0	0	2	1	0	12	0	0	0	34
APPROACH %'s :					52.63%	36.84%	10.53%	0.00%	0.00%	66.67%	33.33%	0.00%	100.00%	0.00%	0.00%	0.00%	
PEAK HR :	03:45 PM - 04:45 PM																TOTAL
PEAK HR VOL :	0	0	0	0	6	3	2	0	0	1	1	0	9	0	0	0	22
PEAK HR FACTOR :	0.000	0.000	0.000	0.000	0.500	0.750	0.500	0.000	0.000	0.250	0.250	0.000	0.563	0.000	0.000	0.000	0.917
						0.688				0.500				0.563			

Prepared by National Data & Surveying Services

I-5 NB Ramps & Kamm Ave

Peak Hour Turning Movement Count

ID: 19-07356-002
City: Cantua Creek

Day: Tuesday
Date: 10/01/2019

PEAK HOURS

AM	06:00 AM - 07:00 AM
NOON	NONE
PM	03:45 PM - 04:45 PM

COUNT PERIODS

AM	05:00 AM - 07:00 AM
NOON	NONE
PM	03:00 PM - 05:00 PM

I-5 NB Ramps — SOUTHBOUND

AM	0	0	0	0	18	AM
NOON	0	0	0	0	0	NOON
PM	0	0	0	0	12	PM

Kamm Ave — EASTBOUND

AM	NOON	PM	
5	0	9	
0	0	0	0
1	0	1	0
7	0	6	0
0	0	0	0
AM	NOON	PM	

WESTBOUND — Kamm Ave

PM	NOON	AM	
8	0	10	0
9	0	5	0
0	0	0	0
0	0	0	0
8	0	20	
PM	NOON	AM	

CONTROL

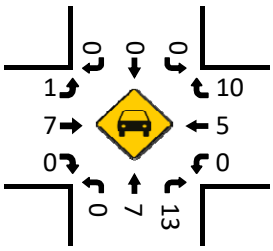
1-Way Stop (NB)

TEV	43	0	29
	AM	NOON	PM
PHF	0.90		0.81

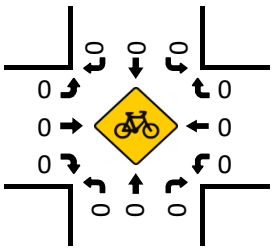
NORTHBOUND — I-5 NB Ramps

PM	0	0	0	3	2	PM
NOON	0	0	0	0	0	NOON
AM	0	0	0	7	13	AM

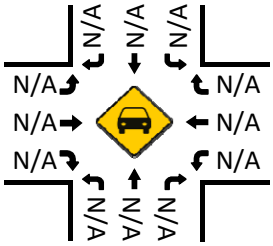
Total Vehicles (AM)



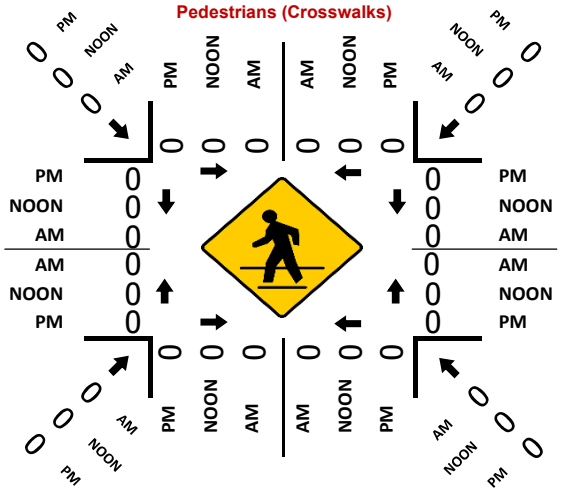
Bikes (AM)



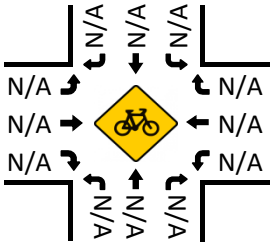
Total Vehicles (NOON)



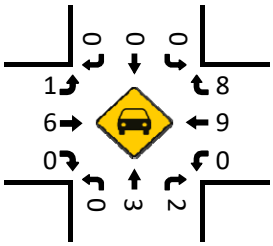
Pedestrians (Crosswalks)



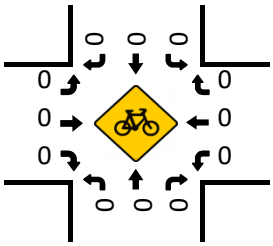
Bikes (NOON)



Total Vehicles (PM)



Bikes (PM)



National Data & Surveying Services

Intersection Turning Movement Count

Location: I-5 NB Ramps & Kamm Ave
City: Cantua Creek
Control: 1-Way Stop (NB)

Project ID: 19-07356-002
Date: 10/1/2019

Total

NS/EW Streets:	I-5 NB Ramps				I-5 NB Ramps				Kamm Ave				Kamm Ave				
AM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
5:00 AM	0	3	2	0	0	0	0	0	0	0	0	0	0	1	5	0	11
5:15 AM	0	1	2	0	0	0	0	0	0	2	0	0	0	0	1	0	6
5:30 AM	0	2	4	0	0	0	0	0	0	1	0	0	0	1	3	0	11
5:45 AM	0	1	1	0	0	0	0	0	0	0	0	0	0	0	2	0	4
6:00 AM	0	1	4	0	0	0	0	0	0	3	0	0	0	2	2	0	12
6:15 AM	0	2	2	0	0	0	0	0	1	1	0	0	0	2	2	0	10
6:30 AM	0	2	4	0	0	0	0	0	0	2	0	0	0	0	4	0	12
6:45 AM	0	2	3	0	0	0	0	0	0	1	0	0	0	1	2	0	9
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	0	14	22	0	0	0	0	0	1	10	0	0	0	7	21	0	75
APPROACH %'s :	0.00%	38.89%	61.11%	0.00%					9.09%	90.91%	0.00%	0.00%	0.00%	25.00%	75.00%	0.00%	
PEAK HR :	06:00 AM - 07:00 AM																TOTAL
PEAK HR VOL :	0	7	13	0	0	0	0	0	1	7	0	0	0	5	10	0	43
PEAK HR FACTOR :	0.000	0.875	0.813	0.000	0.000	0.000	0.000	0.000	0.250	0.583	0.000	0.000	0.000	0.625	0.625	0.000	0.896
		0.833								0.667				0.938			

PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
3:00 PM	0	2	1	0	0	0	0	0	0	3	0	0	0	0	1	0	7
3:15 PM	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	2
3:30 PM	0	0	3	0	0	0	0	0	0	1	0	0	0	0	0	0	4
3:45 PM	0	1	0	0	0	0	0	0	0	3	0	0	0	2	3	0	9
4:00 PM	0	1	1	0	0	0	0	0	1	0	0	0	0	4	1	0	8
4:15 PM	0	1	0	0	0	0	0	0	0	0	0	0	0	2	2	0	5
4:30 PM	0	0	1	0	0	0	0	0	0	3	0	0	0	1	2	0	7
4:45 PM	0	3	0	0	0	0	0	0	0	0	0	0	0	2	2	0	7
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	0	8	6	0	0	0	0	0	1	11	0	0	0	12	11	0	49
APPROACH %'s :	0.00%	57.14%	42.86%	0.00%					8.33%	91.67%	0.00%	0.00%	0.00%	52.17%	47.83%	0.00%	
PEAK HR :	03:45 PM - 04:45 PM																TOTAL
PEAK HR VOL :	0	3	2	0	0	0	0	0	1	6	0	0	0	9	8	0	29
PEAK HR FACTOR :	0.000	0.750	0.500	0.000	0.000	0.000	0.000	0.000	0.250	0.500	0.000	0.000	0.000	0.563	0.667	0.000	0.806
		0.625								0.583				0.850			

Prepared by National Data & Surveying Services

SR 33 & Kamm Ave

Peak Hour Turning Movement Count

ID: 19-07356-003
City: Cantua Creek

Day: Tuesday
Date: 10/01/2019

PEAK HOURS

AM: 05:30 AM - 06:30 AM
NOON: NONE
PM: 03:30 PM - 04:30 PM

COUNT PERIODS

AM: 05:00 AM - 07:00 AM
NOON: NONE
PM: 03:00 PM - 05:00 PM

SR 33

SOUTHBOUND

AM	22	186	0	0	46	AM
NOON	0	0	0	0	0	NOON
PM	4	65	0	0	170	PM

EASTBOUND (Kamm Ave)

AM	NOON	PM	
37	0	6	
0	0	0	0
2	0	27	0
0	0	0	0
1	0	16	0

WESTBOUND (Kamm Ave)

PM	NOON	AM	
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	

CONTROL

1-Way Stop (EB)

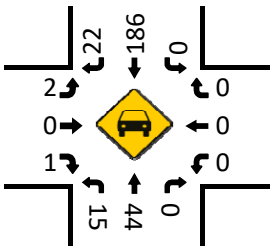
TEV	270	0	257
	AM	NOON	PM
PHF	0.79		0.87

PM	81	0	2	143	0	PM
NOON	0	0	0	0	0	NOON
AM	187	0	15	44	0	AM

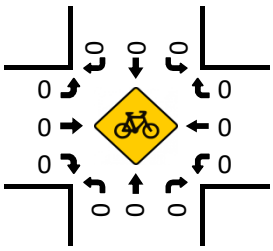
NORTHBOUND

SR 33

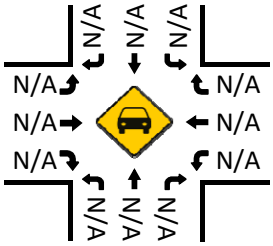
Total Vehicles (AM)



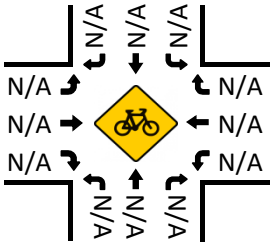
Bikes (AM)



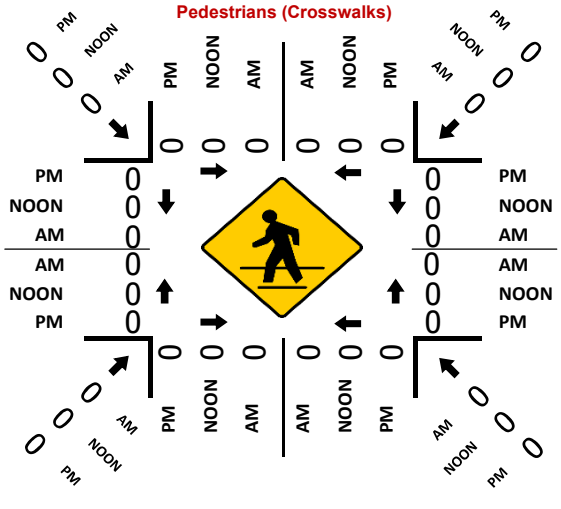
Total Vehicles (Noon)



Bikes (NOON)



Pedestrians (Crosswalks)


PM
NOON
AM
0
0
0
0
0
0
0
0
0
0
0

National Data & Surveying Services

Intersection Turning Movement Count

Location: SR 33 & Kamm Ave
City: Cantua Creek
Control: 1-Way Stop (EB)

Project ID: 19-07356-003
Date: 10/1/2019

Total

NS/EW Streets:	SR 33				SR 33				Kamm Ave				Kamm Ave				
AM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
5:00 AM	2	2	0	0	0	26	2	0	0	0	0	0	0	0	0	0	32
5:15 AM	2	10	0	0	0	30	0	0	0	0	1	0	0	0	0	0	43
5:30 AM	1	6	0	0	0	53	4	0	0	0	1	0	0	0	0	0	65
5:45 AM	3	13	0	0	0	67	2	0	0	0	0	0	0	0	0	0	85
6:00 AM	4	16	0	0	0	30	9	0	1	0	0	0	0	0	0	0	60
6:15 AM	7	9	0	0	0	36	7	0	1	0	0	0	0	0	0	0	60
6:30 AM	4	19	0	0	0	20	5	0	2	0	0	0	0	0	0	0	50
6:45 AM	1	19	0	0	0	13	1	0	0	0	1	0	0	0	0	0	35
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	24	94	0	0	0	275	30	0	4	0	3	0	0	0	0	0	430
APPROACH %'s :	20.34%	79.66%	0.00%	0.00%	0.00%	90.16%	9.84%	0.00%	57.14%	0.00%	42.86%	0.00%					
PEAK HR :	05:30 AM - 06:30 AM																TOTAL
PEAK HR VOL :	15	44	0	0	0	186	22	0	2	0	1	0	0	0	0	0	270
PEAK HR FACTOR :	0.536	0.688	0.000	0.000	0.000	0.694	0.611	0.000	0.500	0.000	0.250	0.000	0.000	0.000	0.000	0.000	0.794
	0.738				0.754				0.750								

PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
3:00 PM	2	18	0	0	0	13	1	0	2	0	3	0	0	0	0	0	39
3:15 PM	1	27	0	0	0	16	0	0	5	0	3	0	0	0	0	0	52
3:30 PM	0	31	0	0	0	12	1	0	13	0	10	0	0	0	0	0	67
3:45 PM	0	25	0	0	0	17	0	0	6	0	3	0	0	0	0	0	51
4:00 PM	0	45	0	0	0	21	2	0	4	0	2	0	0	0	0	0	74
4:15 PM	2	42	0	0	0	15	1	0	4	0	1	0	0	0	0	0	65
4:30 PM	0	31	0	0	0	13	0	0	5	0	0	0	0	0	0	0	49
4:45 PM	1	37	0	0	0	13	0	0	2	0	2	0	0	0	0	0	55
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	6	256	0	0	0	120	5	0	41	0	24	0	0	0	0	0	452
APPROACH %'s :	2.29%	97.71%	0.00%	0.00%	0.00%	96.00%	4.00%	0.00%	63.08%	0.00%	36.92%	0.00%					
PEAK HR :	03:30 PM - 04:30 PM																TOTAL
PEAK HR VOL :	2	143	0	0	0	65	4	0	27	0	16	0	0	0	0	0	257
PEAK HR FACTOR :	0.250	0.794	0.000	0.000	0.000	0.774	0.500	0.000	0.519	0.000	0.400	0.000	0.000	0.000	0.000	0.000	0.868
	0.806				0.750				0.467								

Prepared by National Data & Surveying Services

CLASSIFICATION

Kamm Ave Bet. I-5 Ramps & SR 33

Day: Tuesday
Date: 10/1/2019

City: Fresno County
Project #: CA19_7357_001e

East Bound

Time	# 1	# 2	# 3	# 4	# 5	# 6	# 7	# 8	# 9	# 10	# 11	# 12	# 13	Total
00:00 AM	0	1	1	0	0	0	0	0	0	0	1	0	0	3
01:00	0	0	0	0	0	0	0	0	0	0	1	0	0	1
02:00	0	0	0	0	0	0	0	0	0	0	2	0	0	2
03:00	0	1	0	0	1	0	0	0	0	0	1	0	0	3
04:00	0	1	1	0	3	0	0	0	0	0	1	0	0	6
05:00	0	1	1	0	0	0	0	1	0	0	2	0	0	5
06:00	0	2	9	0	1	0	0	2	0	0	1	1	0	16
07:00	0	0	4	0	1	0	0	0	0	0	1	1	0	7
08:00	0	1	8	0	4	0	0	0	0	0	5	0	0	18
09:00	0	1	9	0	4	0	0	0	0	0	3	0	0	17
10:00	0	0	2	0	3	0	0	1	0	0	1	0	0	7
11:00	0	0	4	0	1	0	0	0	0	0	1	0	0	6
12:00 PM	0	2	11	0	4	0	0	1	0	0	2	1	0	21
13:00	0	1	5	0	4	0	0	1	0	0	2	1	0	14
14:00	0	0	2	0	0	0	0	1	0	0	3	0	0	6
15:00	1	6	10	0	8	1	0	0	0	0	6	0	0	32
16:00	0	0	2	0	3	0	0	0	0	0	5	0	0	10
17:00	0	6	2	0	1	0	0	0	0	0	1	0	0	10
18:00	0	3	0	0	2	0	0	0	0	0	1	0	0	6
19:00	0	1	1	0	0	0	0	0	0	0	2	0	0	4
20:00	0	0	0	0	0	0	0	0	0	0	2	0	0	2
21:00	0	4	2	1	0	0	0	0	0	0	2	0	0	9
22:00	0	2	1	0	0	0	0	0	0	0	0	0	0	3
23:00	0	1	0	0	0	0	0	0	0	0	2	0	0	3
Totals	**1**	**34**	**75**	**1**	**40**	**1**		**7**			**48**	**4**		**211**
% of Totals	0%	16%	36%	0%	19%	0%		3%			23%	2%		100%

AM Volumes	0	8	39	0	18	0	0	4	0	0	20	2	0	91
% AM		4%	18%		9%			2%			9%	1%		43%
AM Peak Hour		06:00	06:00		08:00			06:00			08:00	06:00		08:00
Volume		2	9		4			2			5	1		18
PM Volumes	1	26	36	1	22	1	0	3	0	0	28	2	0	120
% PM	0%	12%	17%	0%	10%	0%		1%			13%	1%		57%
PM Peak Hour	15:00	15:00	12:00	21:00	15:00	15:00		12:00			15:00	12:00		15:00
Volume	1	6	11	1	8	1		1			6	1		32

Directional Peak Periods	**AM 7-9**			**NOON 12-2**			**PM 4-6**			**Off Peak Volumes**		
All Classes	Volume	⟷	%	Volume	⟷	%	Volume	⟷	%	Volume	⟷	%
	25		12%	35		17%	20		9%	131		62%

Classification Definitions

Motorcycles	**4** Buses	**7** > =4-Axle Single Units	**10** >=6-Axle Single Trailers	**13** >=7-Axle Multi-Trailers
Passenger Cars	**5** 2-Axle, 6-Tire Single Units	**8** <=4-Axle Single Trailers	**11** <=5-Axle Multi-Trailers	
3 2-Axle, 4-Tire Single Units	**6** 3-Axle Single Units	**9** 5-Axle Single Trailers	**12** 6-Axle Multi-Trailers	

Prepared by National Data & Surveying Services

CLASSIFICATION

Kamm Ave Bet. I-5 Ramps & SR 33

Day: Tuesday
Date: 10/1/2019

City: Fresno County
Project #: CA19_7357_001w

West Bound

Time	# 1	# 2	# 3	# 4	# 5	# 6	# 7	# 8	# 9	# 10	# 11	# 12	# 13	Total
00:00 AM	0	0	0	0	0	0	0	0	0	0	1	0	0	1
01:00	0	0	0	0	0	0	0	0	0	0	1	0	0	1
02:00	0	2	0	0	1	0	0	0	0	0	2	0	0	5
03:00	0	1	2	0	0	0	0	0	0	0	0	1	0	4
04:00	0	1	4	0	1	0	0	1	0	0	2	1	0	10
05:00	0	4	4	0	3	1	0	0	0	0	3	3	0	18
06:00	0	4	8	0	4	0	0	0	0	0	2	0	0	18
07:00	0	0	5	0	5	1	0	2	0	0	0	0	0	13
08:00	0	3	4	0	2	0	0	0	0	0	3	0	0	12
09:00	0	0	2	0	1	0	0	0	0	0	0	1	0	4
10:00	0	0	5	0	2	0	0	0	0	0	1	0	0	8
11:00	0	1	2	0	3	0	0	0	0	0	1	1	0	8
12:00 PM	0	1	9	0	4	0	0	0	0	0	1	0	0	15
13:00	0	2	5	0	4	0	0	0	0	0	3	1	0	15
14:00	0	0	3	0	2	0	0	0	0	0	2	1	0	8
15:00	0	0	5	0	4	0	0	0	0	0	1	0	0	10
16:00	0	1	3	0	4	0	0	0	0	0	1	1	0	10
17:00	0	1	1	0	1	0	0	0	0	0	1	0	0	4
18:00	0	0	0	0	1	0	0	0	0	0	2	0	0	3
19:00	0	1	0	0	0	0	0	0	0	0	1	0	0	2
20:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21:00	0	0	0	0	0	0	0	0	0	0	1	1	0	2
22:00	0	0	0	0	0	0	0	0	0	0	2	0	0	2
23:00	0	1	0	0	0	0	0	0	0	0	0	0	0	1
Totals		**23**	**62**		**42**	**2**		**3**			**31**	**11**		**174**
% of Totals		13%	36%		24%	1%		2%			18%	6%		100%

AM Volumes	0	16	36	0	22	2	0	3	0	0	16	7	0	102
% AM		9%	21%		13%	1%		2%			9%	4%		59%
AM Peak Hour		05:00	06:00		07:00	05:00		07:00			05:00	05:00		05:00
Volume		4	8		5	1		2			3	3		18
PM Volumes	0	7	26	0	20	0	0	0	0	0	15	4	0	72
% PM		4%	15%		11%						9%	2%		41%
PM Peak Hour		13:00	12:00		12:00						13:00	13:00		12:00
Volume		2	9		4						3	1		15

Directional Peak Periods	AM 7-9			NOON 12-2			PM 4-6			Off Peak Volumes		
All Classes	Volume	⟷	%	Volume	⟷	%	Volume	⟷	%	Volume	⟷	%
	25		14%	30		17%	14		8%	105		60%

Classification Definitions

1 Motorcycles
2 Passenger Cars
3 2-Axle, 4-Tire Single Units
4 Buses
5 2-Axle, 6-Tire Single Units
6 3-Axle Single Units
7 > =4-Axle Single Units
8 <=4-Axle Single Trailers
9 5-Axle Single Trailers
10 >=6-Axle Single Trailers
11 <=5-Axle Multi-Trailers
12 6-Axle Multi-Trailers
13 >=7-Axle Multi-Trailers

Prepared by National Data & Surveying Services

CLASSIFICATION

Kamm Ave Bet. I-5 Ramps & SR 33

Day: Tuesday
Date: 10/1/2019

City: Fresno County
Project #: CA19_7357_001

Summary

Time	# 1	# 2	# 3	# 4	# 5	# 6	# 7	# 8	# 9	# 10	# 11	# 12	# 13	Total
00:00 AM	0	1	1	0	0	0	0	0	0	0	2	0	0	4
01:00	0	0	0	0	0	0	0	0	0	0	2	0	0	2
02:00	0	2	0	0	1	0	0	0	0	0	4	0	0	7
03:00	0	2	2	0	1	0	0	0	0	0	1	1	0	7
04:00	0	2	5	0	4	0	0	1	0	0	3	1	0	16
05:00	0	5	5	0	3	1	0	1	0	0	5	3	0	23
06:00	0	6	17	0	5	0	0	2	0	0	3	1	0	34
07:00	0	0	9	0	6	1	0	2	0	0	1	1	0	20
08:00	0	4	12	0	6	0	0	0	0	0	8	0	0	30
09:00	0	1	11	0	5	0	0	0	0	0	3	1	0	21
10:00	0	0	7	0	5	0	0	1	0	0	2	0	0	15
11:00	0	1	6	0	4	0	0	0	0	0	2	1	0	14
12:00 PM	0	3	20	0	8	0	0	1	0	0	3	1	0	36
13:00	0	3	10	0	8	0	0	1	0	0	5	2	0	29
14:00	0	0	5	0	2	0	0	1	0	0	5	1	0	14
15:00	1	6	15	0	12	1	0	0	0	0	7	0	0	42
16:00	0	1	5	0	7	0	0	0	0	0	6	1	0	20
17:00	0	7	3	0	2	0	0	0	0	0	2	0	0	14
18:00	0	3	0	0	3	0	0	0	0	0	3	0	0	9
19:00	0	2	1	0	0	0	0	0	0	0	3	0	0	6
20:00	0	0	0	0	0	0	0	0	0	0	2	0	0	2
21:00	0	4	2	1	0	0	0	0	0	0	3	1	0	11
22:00	0	2	1	0	0	0	0	0	0	0	2	0	0	5
23:00	0	2	0	0	0	0	0	0	0	0	2	0	0	4
Totals	**1**	**57**	**137**	**1**	**82**	**3**		**10**			**79**	**15**		**385**
% of Totals	0%	15%	36%	0%	21%	1%		3%			21%	4%		100%

AM Volumes	0	24	75	0	40	2	0	7	0	0	36	9	0	193
% AM		6%	19%		10%	1%		2%			9%	2%		50%
AM Peak Hour		06:00	06:00		07:00	05:00		06:00			08:00	05:00		06:00
Volume		6	17		6	1		2			8	3		34
PM Volumes	1	33	62	1	42	1	0	3	0	0	43	6	0	192
% PM	0%	9%	16%	0%	11%	0%		1%			11%	2%		50%
PM Peak Hour	15:00	17:00	12:00	21:00	15:00	15:00		12:00			15:00	13:00		15:00
Volume	1	7	20	1	12	1		1			7	2		42

Directional Peak Periods	**AM 7-9**			**NOON 12-2**			**PM 4-6**			**Off Peak Volumes**		
All Classes	Volume	⟷	%	Volume	⟷	%	Volume	⟷	%	Volume	⟷	%
	50		13%	65		17%	34		9%	236		61%

Classification Definitions

1 Motorcycles
2 Passenger Cars
3 2-Axle, 4-Tire Single Units
4 Buses
5 2-Axle, 6-Tire Single Units
6 3-Axle Single Units
7 > =4-Axle Single Units
8 <=4-Axle Single Trailers
9 5-Axle Single Trailers
10 >=6-Axle Single Trailers
11 <=5-Axle Multi-Trailers
12 6-Axle Multi-Trailers
13 >=7-Axle Multi-Trailers

Prepared by NDS/ATD

VOLUME

SR 33 North of Kamm Ave

Day: Tuesday
Date: 10/1/2019

City: Fresno County
Project #: CA19_7358_001n

DAILY TOTALS	NB	SB	EB	WB	Total
	1,251	1,264	0	0	2,515

AM Period	NB		SB		EB	WB	TOTAL		PM Period	NB		SB		EB	WB	TOTAL	
00:00	4		1		0	0	5		12:00	20		18		0	0	38	
00:15	5		3		0	0	8		12:15	13		14		0	0	27	
00:30	2		2		0	0	4		12:30	13		14		0	0	27	
00:45	1	12	4	10	0	0	5	22	12:45	13	59	15	61	0	0	28	120
01:00	4		1		0	0	5		13:00	18		15		0	0	33	
01:15	1		3		0	0	4		13:15	19		11		0	0	30	
01:30	2		3		0	0	5		13:30	15		11		0	0	26	
01:45	1	8	7	14	0	0	8	22	13:45	18	70	14	51	0	0	32	121
02:00	0		4		0	0	4		14:00	18		13		0	0	31	
02:15	4		2		0	0	6		14:15	20		17		0	0	37	
02:30	3		5		0	0	8		14:30	26		24		0	0	50	
02:45	2	9	2	13	0	0	4	22	14:45	17	81	19	73	0	0	36	154
03:00	4		4		0	0	8		15:00	14		14		0	0	28	
03:15	2		6		0	0	8		15:15	27		14		0	0	41	
03:30	7		5		0	0	12		15:30	38		12		0	0	50	
03:45	6	19	9	24	0	0	15	43	15:45	30	109	15	55	0	0	45	164
04:00	3		9		0	0	12		16:00	39		22		0	0	61	
04:15	6		7		0	0	13		16:15	44		16		0	0	60	
04:30	3		10		0	0	13		16:30	32		13		0	0	45	
04:45	6	18	6	32	0	0	12	50	16:45	30	145	13	64	0	0	43	209
05:00	2		28		0	0	30		17:00	25		18		0	0	43	
05:15	10		30		0	0	40		17:15	22		21		0	0	43	
05:30	7		65		0	0	72		17:30	10		26		0	0	36	
05:45	13	32	63	186	0	0	76	218	17:45	25	82	17	82	0	0	42	164
06:00	15		37		0	0	52		18:00	37		9		0	0	46	
06:15	10		43		0	0	53		18:15	37		17		0	0	54	
06:30	19		23		0	0	42		18:30	24		12		0	0	36	
06:45	21	65	17	120	0	0	38	185	18:45	15	113	9	47	0	0	24	160
07:00	11		18		0	0	29		19:00	13		17		0	0	30	
07:15	13		15		0	0	28		19:15	12		18		0	0	30	
07:30	16		13		0	0	29		19:30	10		13		0	0	23	
07:45	18	58	14	60	0	0	32	118	19:45	10	45	8	56	0	0	18	101
08:00	19		11		0	0	30		20:00	4		9		0	0	13	
08:15	9		19		0	0	28		20:15	11		11		0	0	22	
08:30	7		13		0	0	20		20:30	8		4		0	0	12	
08:45	13	48	15	58	0	0	28	106	20:45	7	30	8	32	0	0	15	62
09:00	17		9		0	0	26		21:00	4		5		0	0	9	
09:15	20		14		0	0	34		21:15	9		4		0	0	13	
09:30	14		14		0	0	28		21:30	7		5		0	0	12	
09:45	19	70	23	60	0	0	42	130	21:45	10	30	5	19	0	0	15	49
10:00	9		15		0	0	24		22:00	12		6		0	0	18	
10:15	15		20		0	0	35		22:15	3		6		0	0	9	
10:30	19		17		0	0	36		22:30	7		6		0	0	13	
10:45	18	61	15	67	0	0	33	128	22:45	3	25	4	22	0	0	7	47
11:00	9		12		0	0	21		23:00	1		4		0	0	5	
11:15	15		10		0	0	25		23:15	2		7		0	0	9	
11:30	8		10		0	0	18		23:30	4		2		0	0	6	
11:45	20	52	10	42	0	0	30	94	23:45	3	10	3	16	0	0	6	26
TOTALS		452		686				**1138**	**TOTALS**		799		578				**1377**
SPLIT %		39.7%		60.3%				**45.2%**	**SPLIT %**		58.0%		42.0%				**54.8%**

DAILY TOTALS	NB	SB	EB	WB	Total
	1,251	1,264	0	0	2,515

AM Peak Hour	09:00	05:30						**05:30**	**PM Peak Hour**	15:30	17:00							**15:30**
AM Pk Volume	70	208						**253**	**PM Pk Volume**	151	82							**216**
Pk Hr Factor	0.875	0.800						**0.832**	**Pk Hr Factor**	0.858	0.788							**0.885**
7 - 9 Volume	106	118	0	0				**224**	**4 - 6 Volume**	227	146	0	0					**373**
7 - 9 Peak Hour	07:15	07:00						**07:15**	**4 - 6 Peak Hour**	16:00	17:00							**16:00**
7 - 9 Pk Volume	66	60	0	0				**119**	**4 - 6 Pk Volume**	145	82	0	0					**209**
Pk Hr Factor	0.868	0.833	0.000	0.000				**0.930**	**Pk Hr Factor**	0.824	0.788	0.000	0.000					**0.857**

Appendix C: Traffic Modeling

July 16, 2020

Kai Han, TE
Council of Fresno County Governments
2035 Tulare Street, Suite 201
Fresno, CA 93721

Via E-mail Only: khan@fresnocog.org

Subject: ***Traffic Modeling Request for the Preparation of a Traffic Impact Analysis for the Kamm Avenue Pistachio Plant (KAPP) located in the County of Fresno (JLB Project 009-018)***

Dear Mr. Han,

JLB Traffic Engineering, Inc. (JLB) hereby requests traffic modeling for the preparation of a Traffic Impact Analysis (TIA) for the Kamm Avenue Pistachio Plant (Project) on approximately 315.8 acres in the County of Fresno. The Project proposes to build a pistachio plant on Kamm Avenue between Interstate 5 and State Route 33. An aerial of the Project site and Project Site Plan are shown in Exhibits A and Exhibit B, respectively.

The purpose of the TIA is to evaluate the potential on-site and off-site traffic impacts, identify short-term roadway and circulation needs, determine potential mitigation measures and identify any critical traffic issues that should be addressed in the on-going planning process.

Scenarios:

The following scenarios are requested:

1. Base Year 2019 (with Link and TAZ modifications)
2. Cumulative Year 2035 plus Project Select Zone (with Link and TAZ modifications)
3. Differences between model runs 2 and 1 above

Changes and/or additions to the Model Network or TAZ's

JLB reviewed the Fresno COG model network for the Base Year 2019 and Cumulative Year 2035. Based on this review, JLB requests the following link and TAZ network modifications. Details on the requested Link and TAZ modifications for Base Year 2019 and Cumulative Year 2035 are illustrated in Exhibit C.

LINK and TAZ MODIFICATIONS (For Cumulative Year 2035 plus Project Select Zone Scenario Only):

1. Create TAZ A located approximately 6,500 feet west of State Route 33 and 2,000 feet south of Kamm Avenue. TAZ A shall have a TAZ connector to Kamm Avenue.

TAZ A (Project) Trip Generation

Table I presents the Trip Generation for the proposed Project which has been based on information contained within the project operational statement and communication with the project proponent. At build-out, TAZ A is estimated to generate a maximum of 274 daily trips, 90 AM peak hour trips and 8 PM peak hour trips.

Table I: TAZ A (Project) Trip Generation

Land Use (ITE Code)	*Size*	*Unit*	*Daily*		*AM Peak Hour (5:30-6:30)*						*PM Peak Hour (3:30-4:30)*					
			Rate	*Total*	*Trip Rate*	*In %*	*Out %*	*In*	*Out*	*Total*	*Trip Rate*	*In %*	*Out %*	*In*	*Out*	*Total*
Employees	120	ea.	2.00	240	0.75	67	33	60	30	90	0.00	0	0	0	0	0
Visitors	2	ea.	2.00	4	0.00	0	0	0	0	0	1.00	50	50	1	1	2
Delivery Vehicles	2	ea.	2.00	4	0.00	0	0	0	0	0	1.00	50	50	1	1	2
Maintenance Vehicles	2	ea.	2.00	4	0.00	0	0	0	0	0	1.00	50	50	1	1	2
Recycled Waste	2	ea.	2.00	4	0.00	0	0	0	0	0	0.24	0	0	0	0	0
Solid Waste	9	ea.	2.00	18	0.00	0	0	0	0	0	0.24	50	50	1	1	2
Total Project Trips				**274**				**60**	**30**	**90**				**4**	**4**	**8**

Note: ea. = each

TAZ B (Project) Trip Generation

Table II presents the Trip Generation for the proposed Project which has been based on information contained within the project operational statement and communication with the project proponent. At build-out, TAZ B is estimated to generate a maximum of 316 daily trips, 13 AM peak hour trips and 15 PM peak hour trips.

Table II: TAZ B (Project) Trip Generation

Land Use (ITE Code)	*Size*	*Unit*	*Daily*		*AM Peak Hour (5:30-6:30)*						*PM Peak Hour (3:30-4:30)*					
			Rate	*Total*	*Trip Rate*	*In %*	*Out %*	*In*	*Out*	*Total*	*Trip Rate*	*In %*	*Out %*	*In*	*Out*	*Total*
Harvest Trucks	150	ea.	2.00	300	0.084	52	48	7	6	13	0.084	48	52	6	7	13
Shipping Trucks	8	ea.	2.00	16	0.00	0	0	0	0	0	0.24	40	60	1	1	2
Total Project Trips				**316**				**7**	**6**	**13**				**7**	**8**	**15**

Note: ea. = each

Vehicle Miles Traveled

JLB would like to request to be provided with each of the Project's Tour Based VMT as well as the average trip length in excel format.

If you have any questions or require additional information, please do not hesitate to contact me by phone at (559) 664-3159 or by e-mail at jgarcia@JLBtraffic.com.

Sincerely,

Jesus Garcia

Jesus Garcia
Engineer I/II

cc: Santosh Bhattarai, Fresno Council of Governments
Jose Benavides, JLB Traffic Engineering, Inc.

JLB TRAFFIC ENGINEERING, INC.
www.JLBtraffic.com
info@JLBtraffic.com
516 W. Shaw Ave., Ste. 103
Fresno, CA 93704
(559) 570-8991

Exhibit A – Project Site Aerial

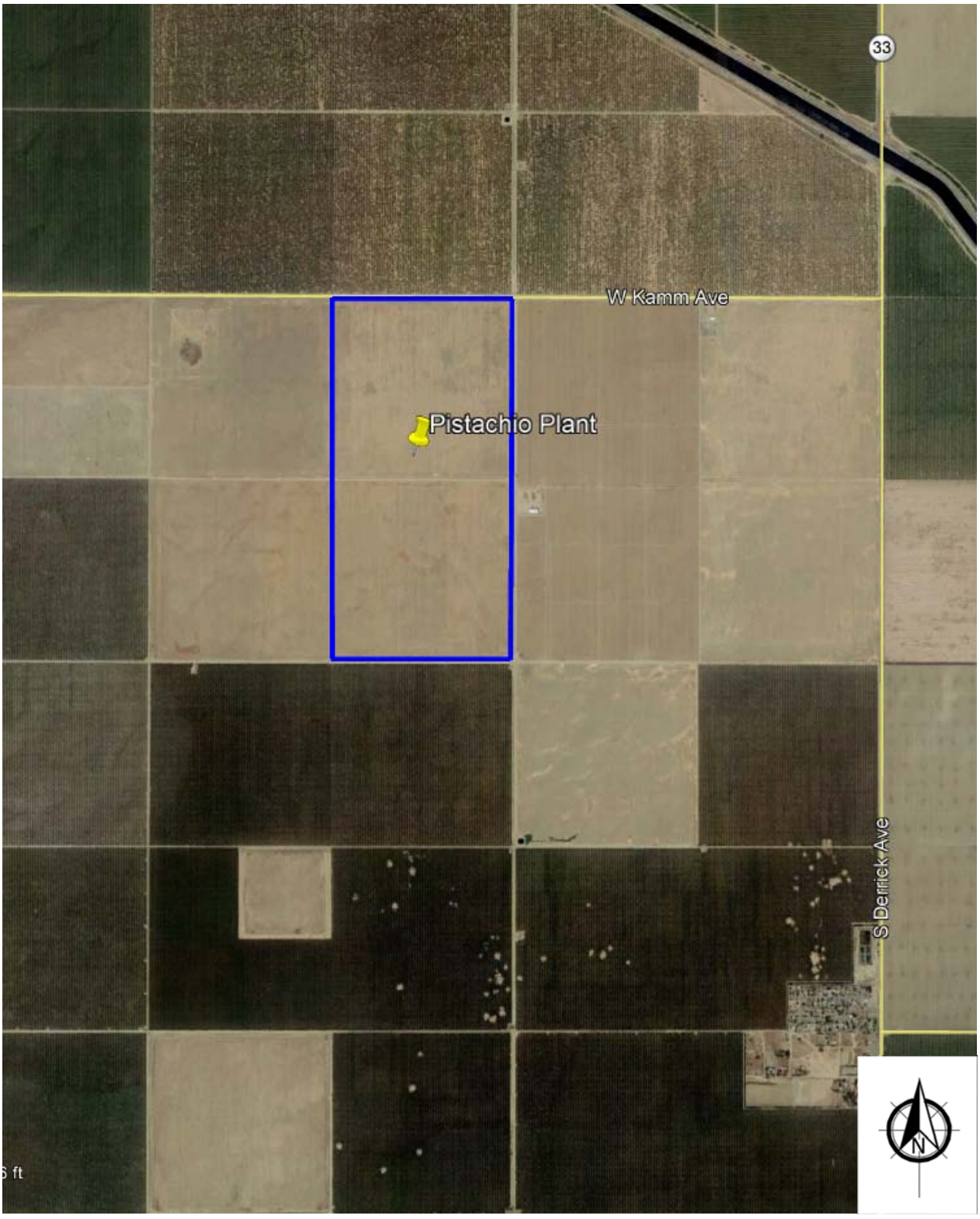


Exhibit B – Project Site Plan

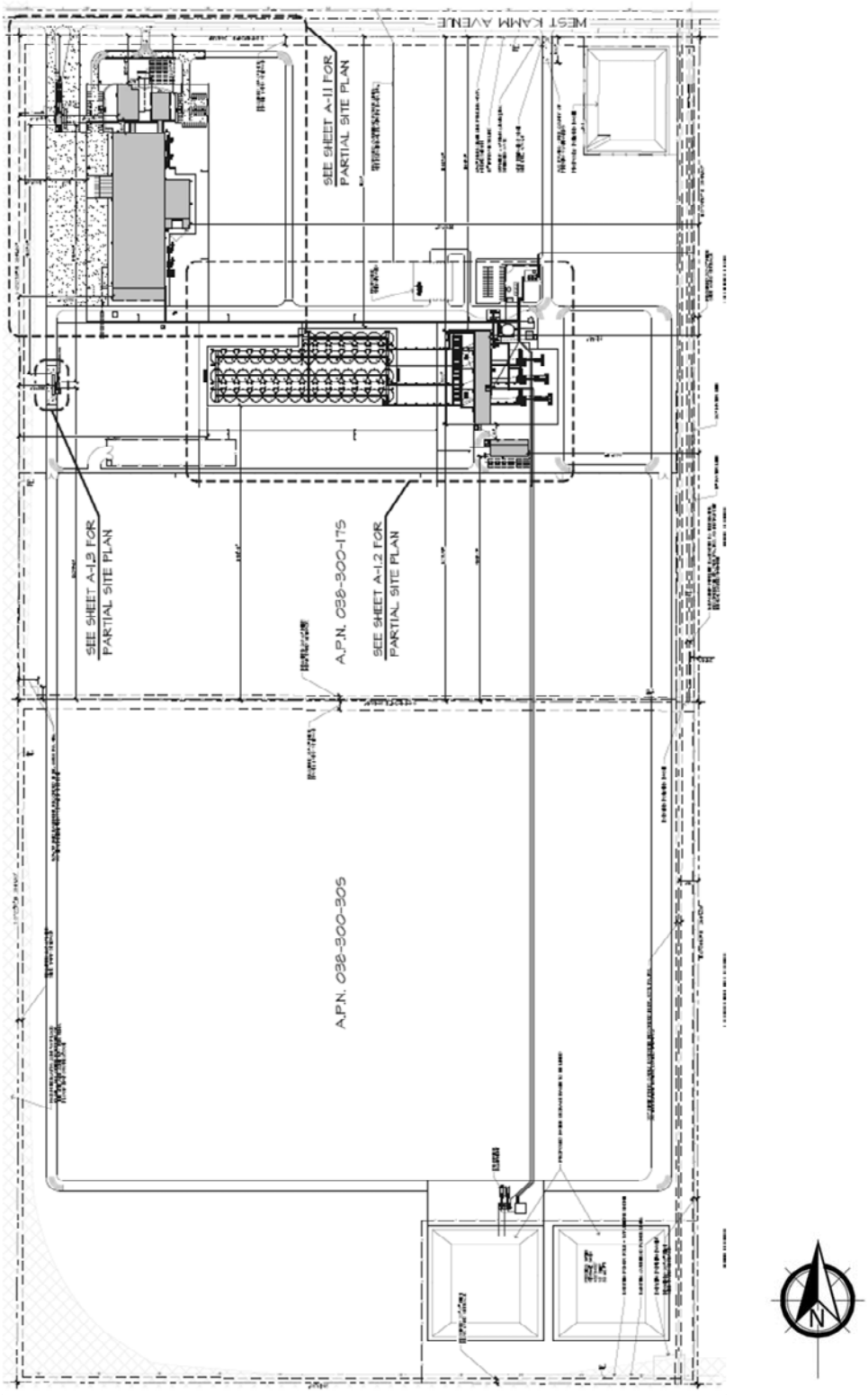
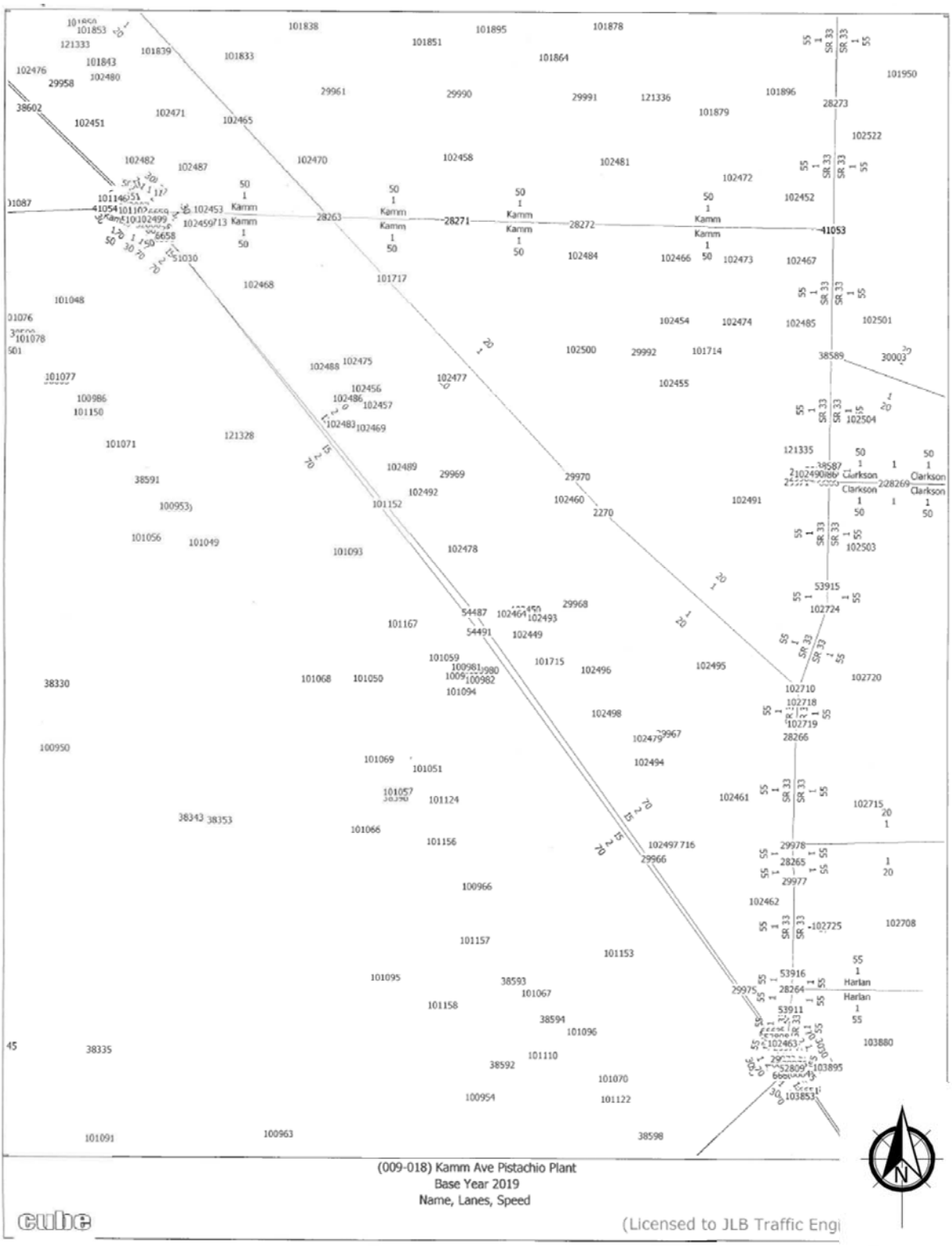
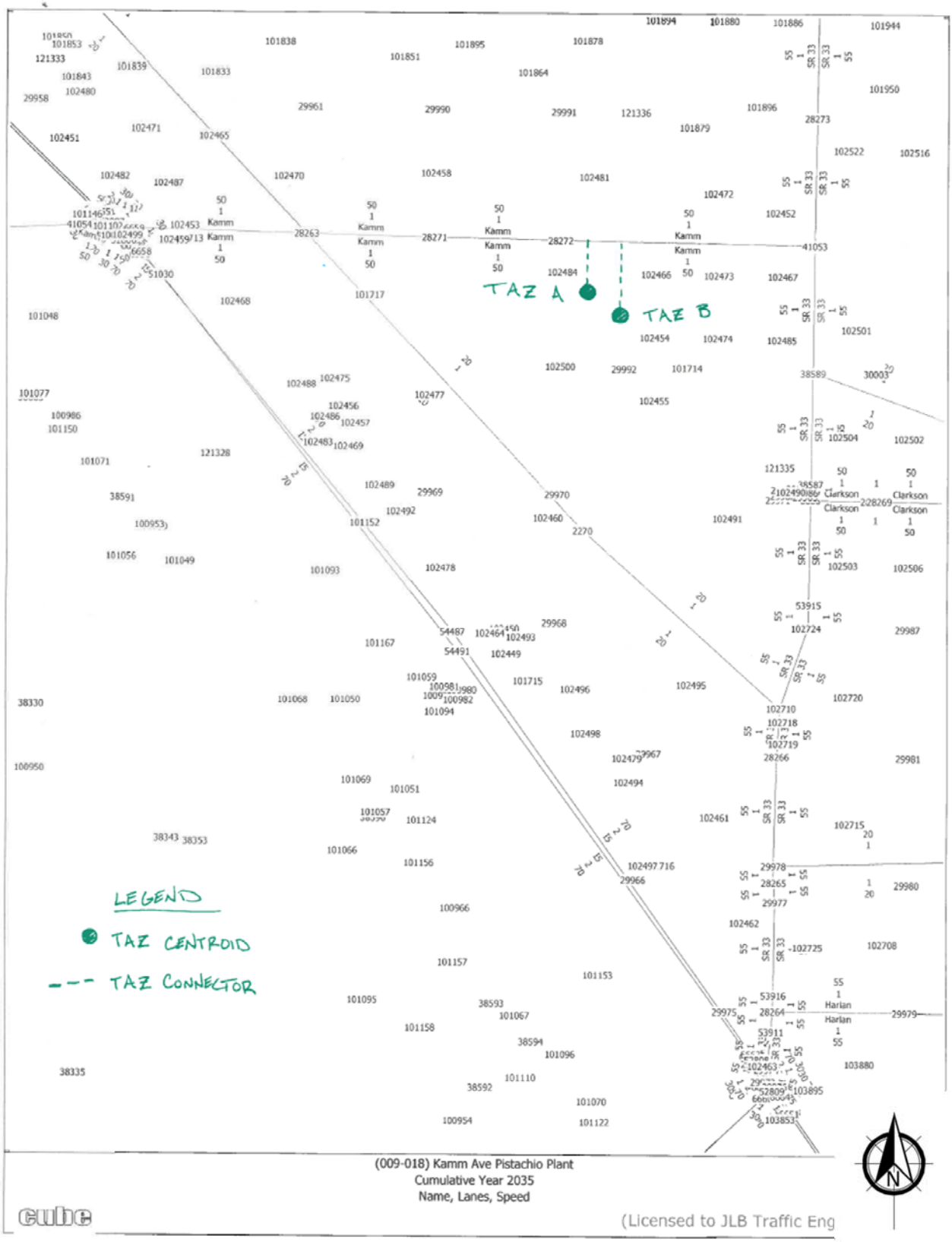


Exhibit C – Model TAZ Modifications




TAZ A
TAZ B
LEGEND
TAZ CENTROID
TAZ CONNECTOR
(009-018) Kamm Ave Pistachio Plant
Cumulative Year 2035
Name, Lanes, Speed
cube
(Licensed to JLB Traffic Eng
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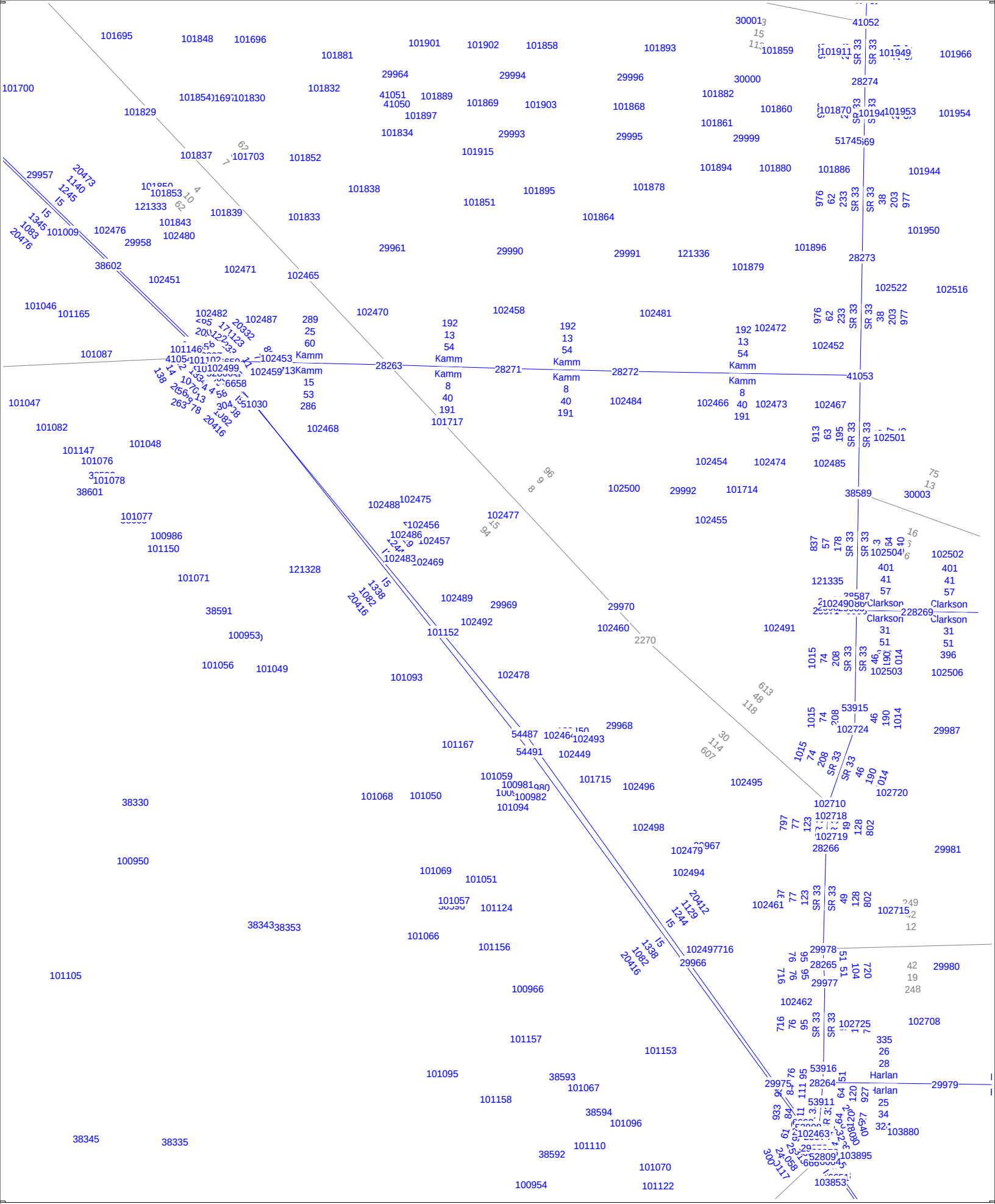
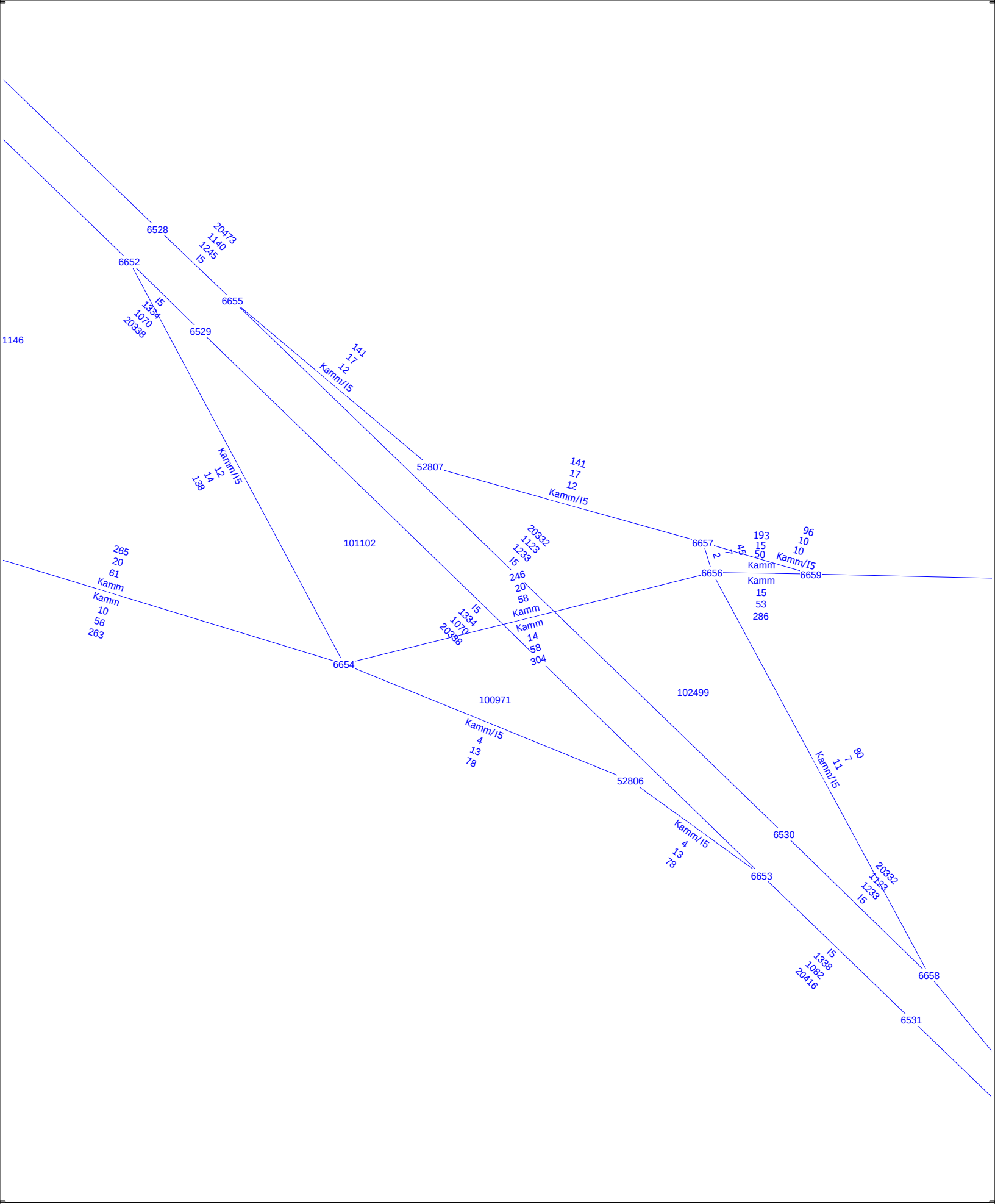


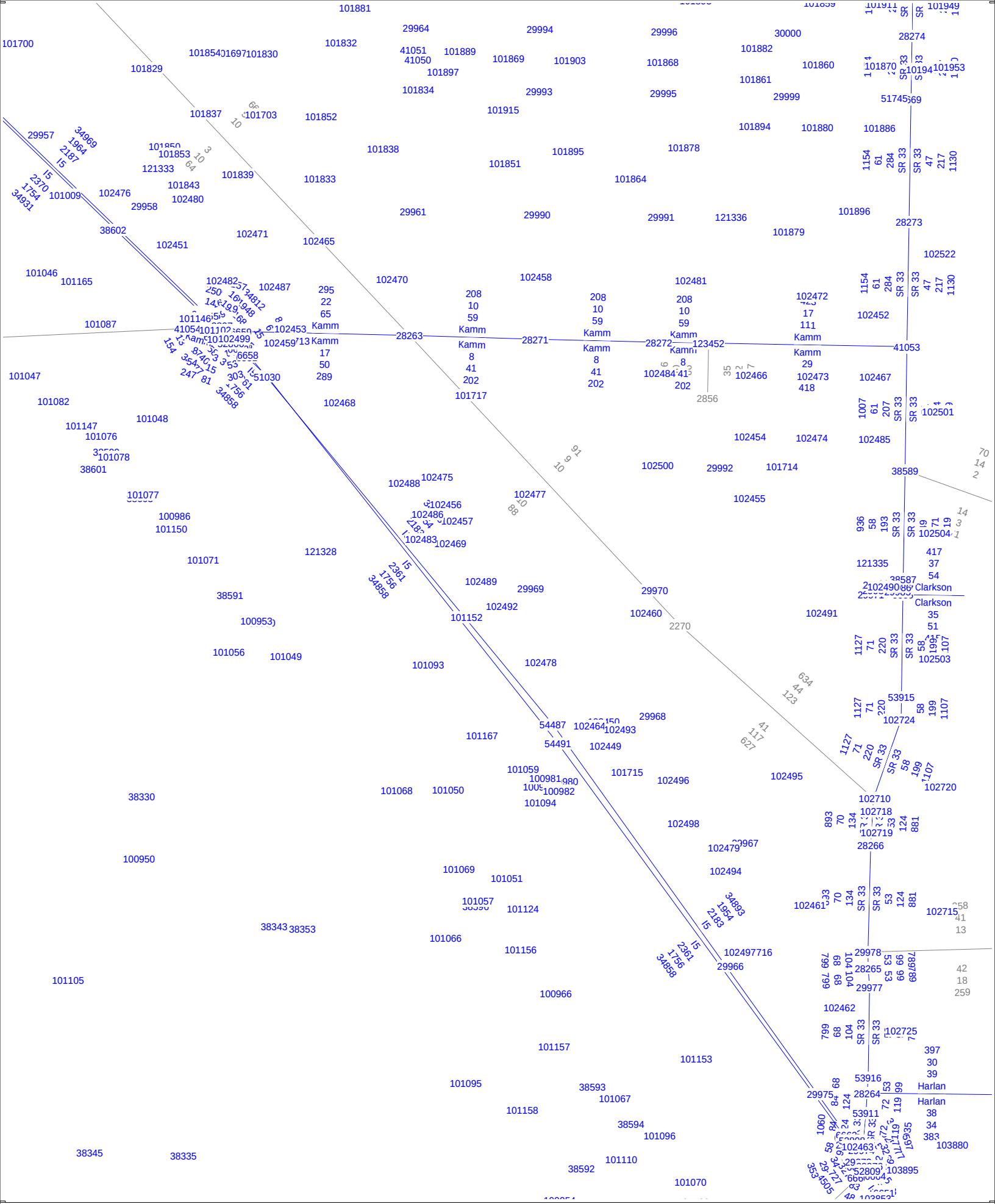
(009-018) Kamm Avenue Pistachio Plant TIA
Base Year 2019
AM, PM, Daily Volumes

cube
(Licensed to JLB Traffic Engineering Inc)



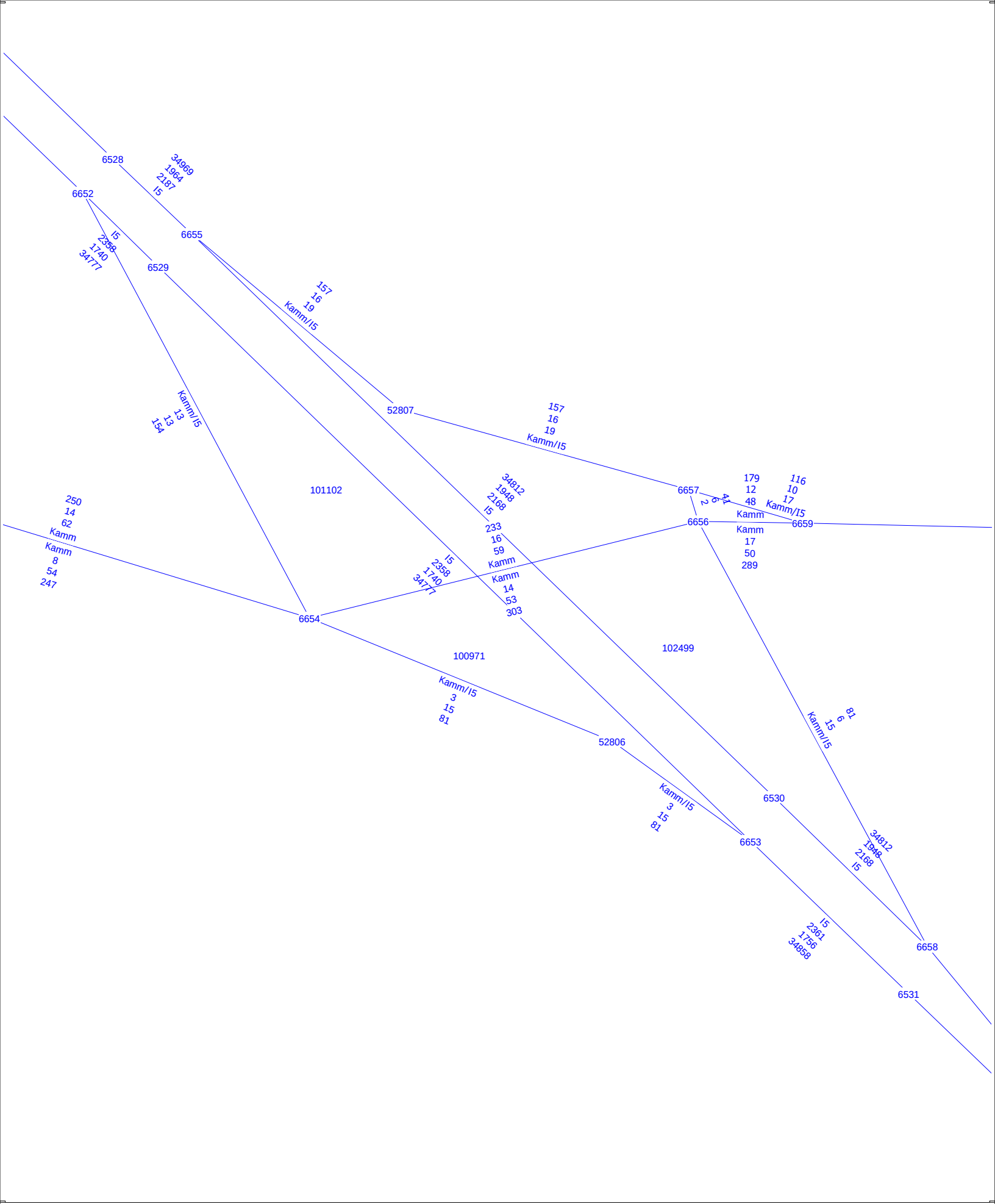
(009-018) Kamm Avenue Pistachio Plant TIA
Base Year 2019
AM, PM, Daily Volumes

cube
(Licensed to JLB Traffic Engineering Inc)



(009-018) Kamm Avenue Pistachio Plant TIA
Cumulative Year 2035
AM, PM, Daily Volumes

cube
(Licensed to JLB Traffic Engineering Inc)



(009-018) Kamm Avenue Pistachio Plant TIA
Cumulative Year 2035
AM, PM, Daily Volumes

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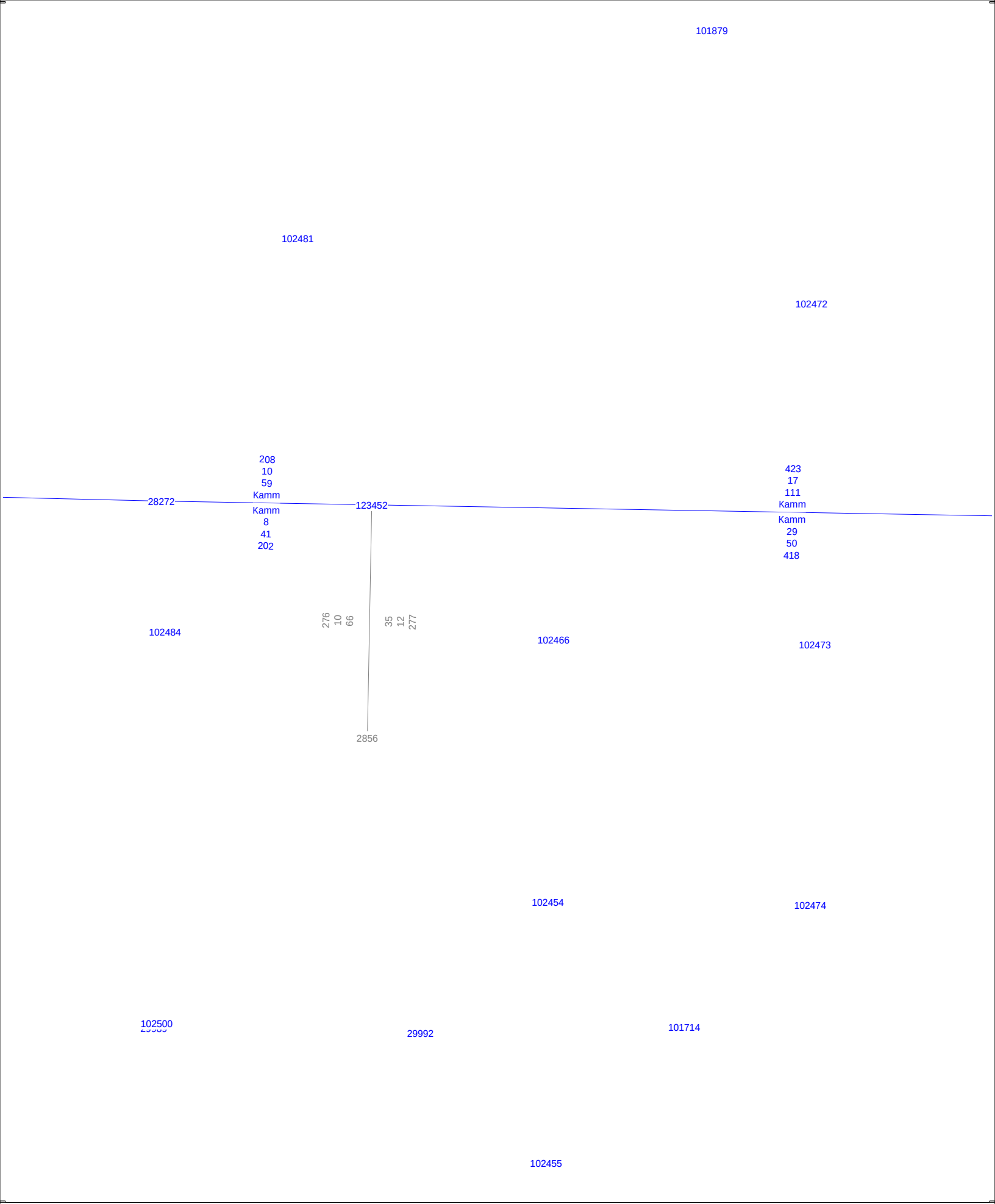

(009-018) Kamm Avenue Pistachio Plant TIA
Cumulative Year 2035
AM, PM, Daily Volumes

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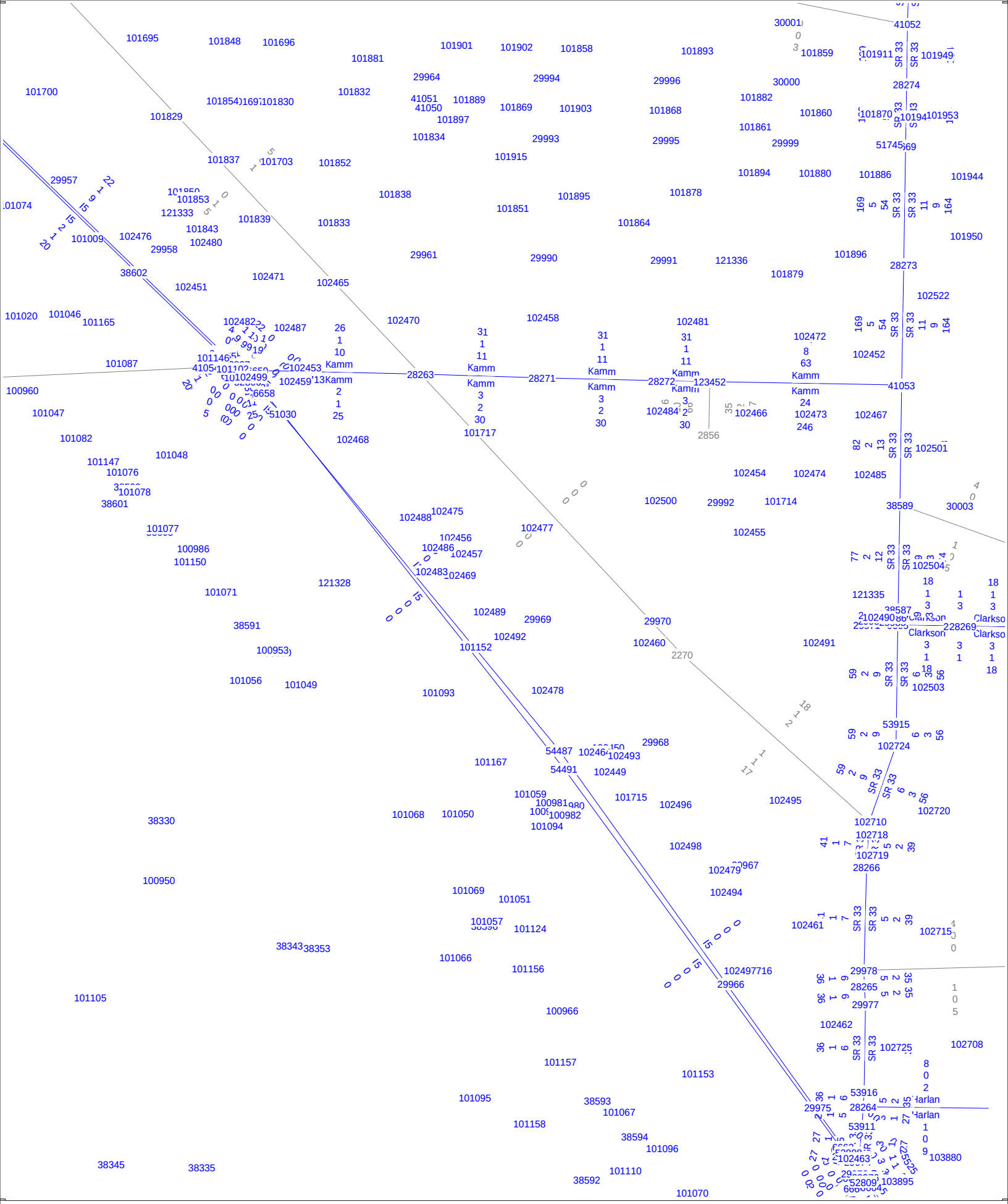
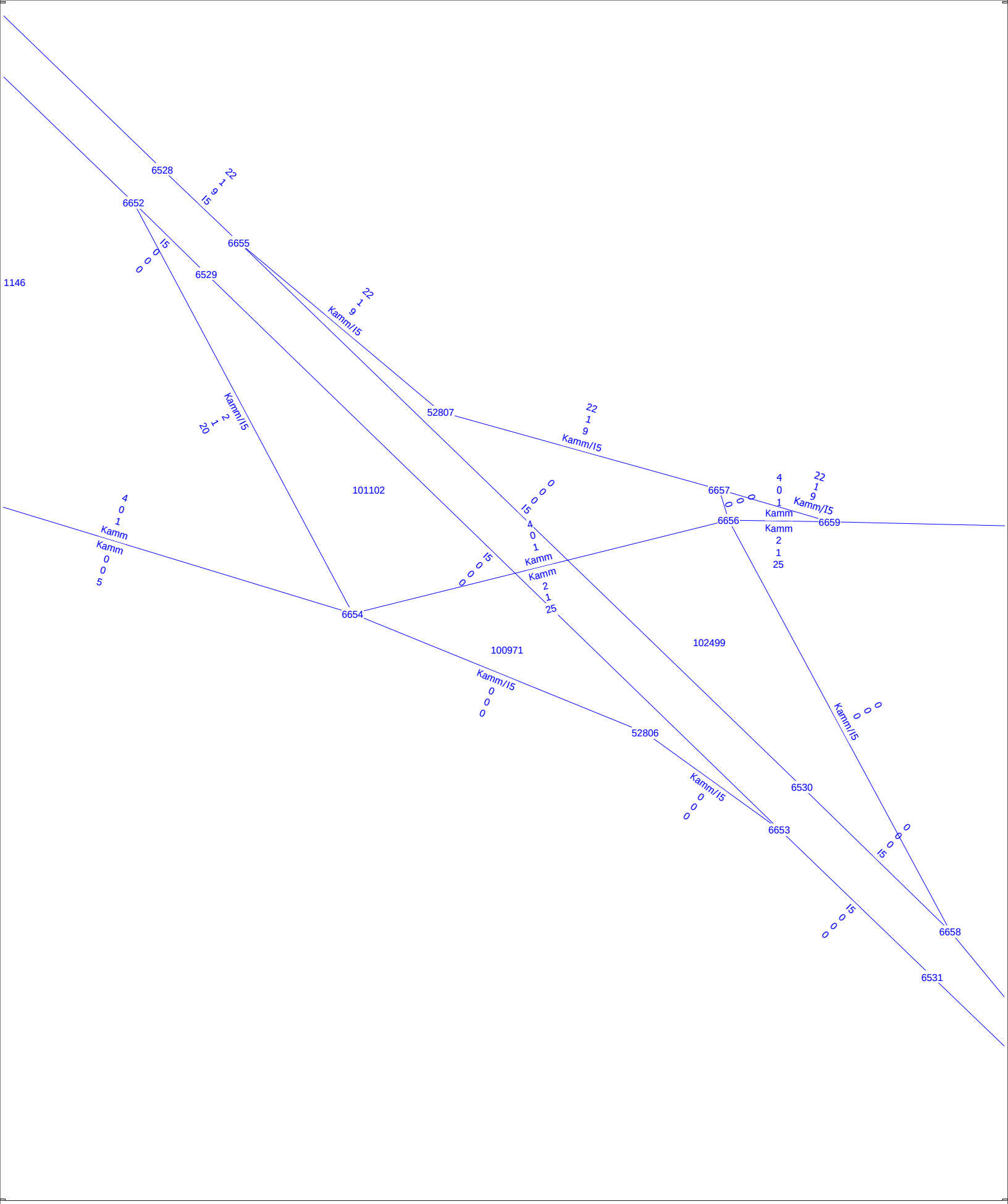


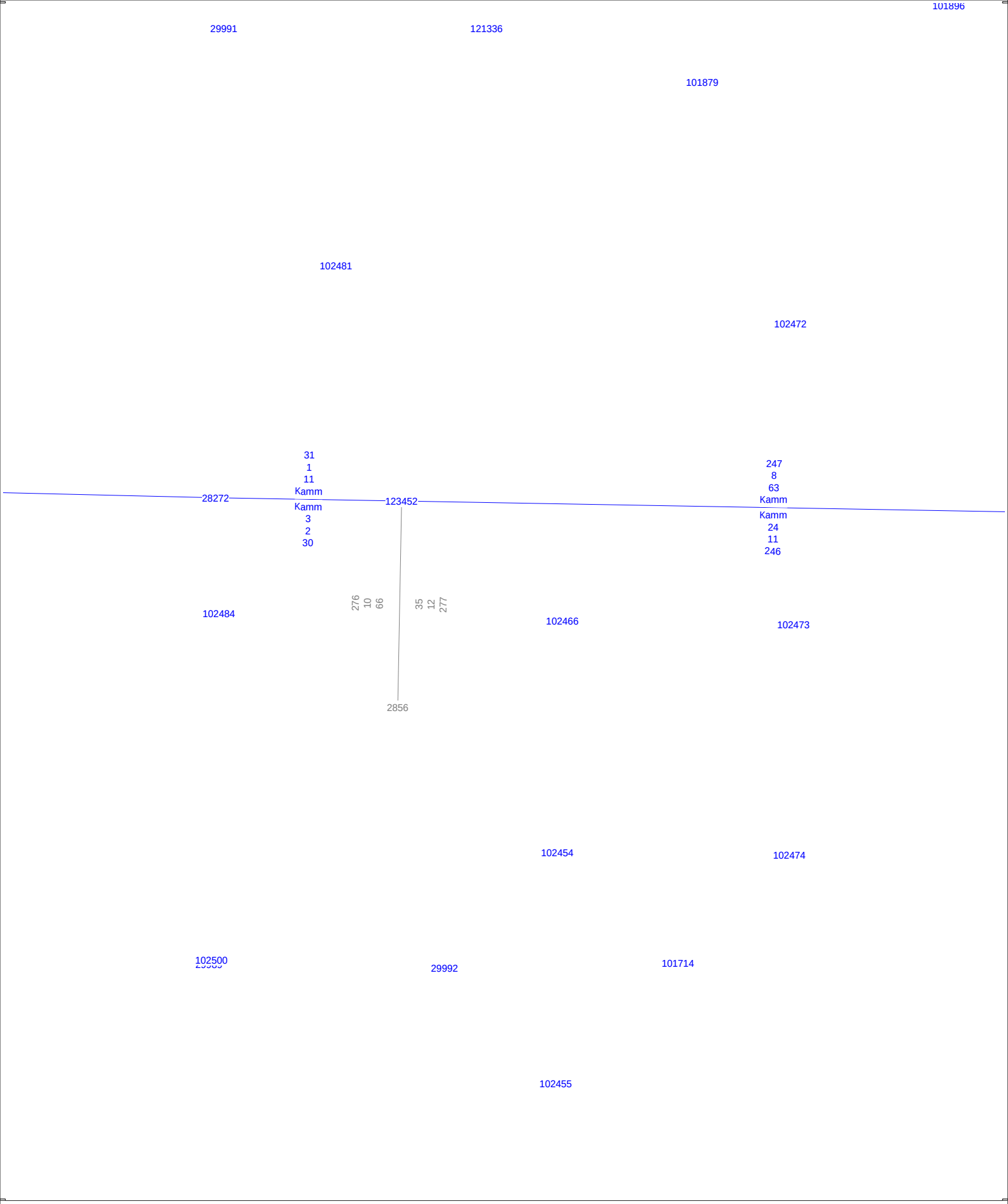
(009-018) Kamm Avenue Pistachio Plant TIA
Cumulative Year 2035
Project Select Zone
AM, PM, Daily Volumes

cube
(Licensed to JLB Traffic Engineering Inc)



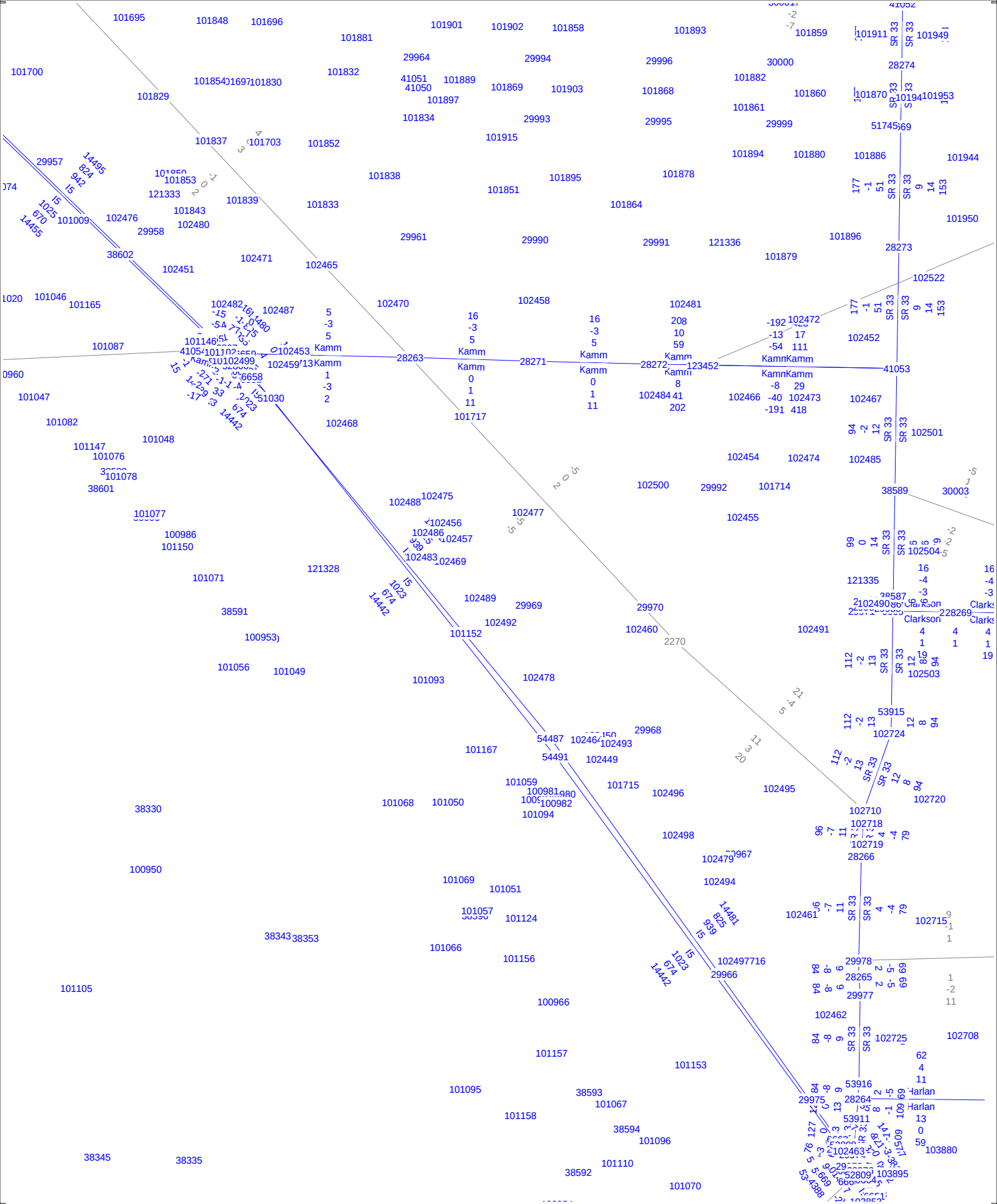
(009-018) Kamm Avenue Pistachio Plant TIA
Cumulative Year 2035
Project Select Zone
AM, PM, Daily Volumes

cube
(Licensed to JLB Traffic Engineering Inc)



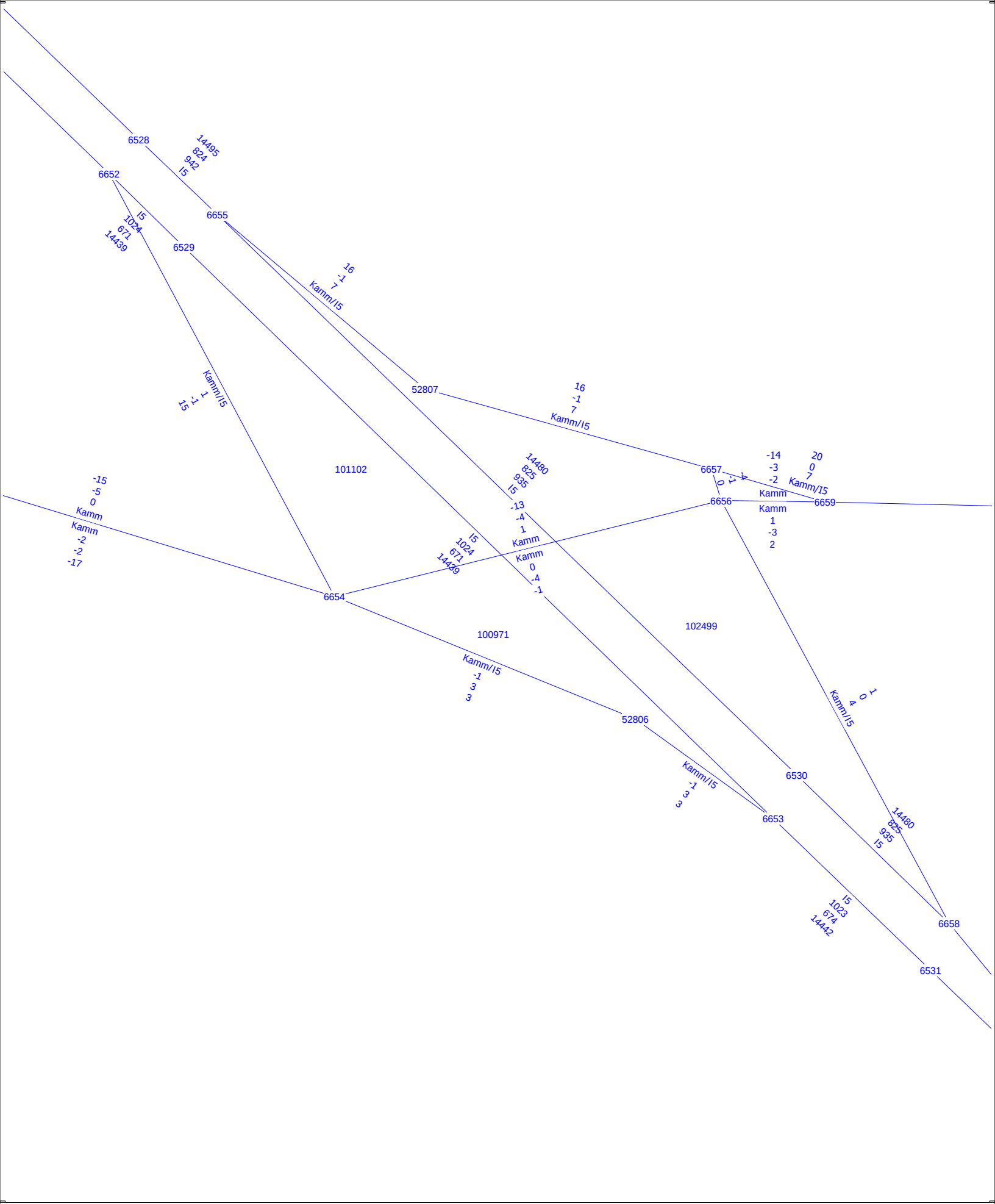
(009-018) Kamm Avenue Pistachio Plant TIA
Cumulative Year 2035
Project Select Zone
AM, PM, Daily Volumes

cube
(Licensed to JLB Traffic Engineering Inc)



(009-018) Kamm Avenue Pistachio Plant TIA
Cumulative Year 2035 Increment
AM, PM, Daily Volumes

cube
(Licensed to JLB Traffic Engineering Inc)



(009-018) Kamm Avenue Pistachio Plant TIA
Cumulative Year 2035 Increment
AM, PM, Daily Volumes

cube
(Licensed to JLB Traffic Engineering Inc)

Appendix D: Methodology

Levels of Service Methodology

The description and procedures for calculating capacity and level of service (LOS) are found in the Transportation Research Board, Highway Capacity Manual (HCM). The HCM 2010 represents the research on capacity and quality of service for transportation facilities.

Quality of service requires quantitative measures to characterize operational conditions within a traffic stream. Level of service is a quality measure describing operational conditions within a traffic stream, generally in terms of such service measures as speed and travel time, freedom to maneuver, traffic interruptions, comfort and convenience.

Six levels of service are defined for each type of facility that has analysis procedures available. Letters designate each level of service (LOS), from A to F, with LOS A representing the best operating conditions and LOS F the worst. Each LOS represents a range of operating conditions and the driver's perception of these conditions. Safety is not included in the measures that establish a LOS.

Urban Streets (Automobile Mode)

The term "urban streets" refers to urban arterials and collectors, including those in downtown areas. Arterial streets are roads that primarily serve longer through trips. However, providing access to abutting commercial and residential land uses is also an important function of arterials. Collector streets provide both land access and traffic circulation within residential, commercial and industrial areas. Their access function is more important than that of arterials, and unlike arterials their operation is not always dominated by traffic signals. Downtown streets are signalized facilities that often resemble arterials. They not only move through traffic but also provide access to local businesses for passenger cars, transit buses, and trucks. Pedestrian conflicts and lane obstructions created by stopping or standing taxicabs, buses, trucks and parking vehicles that cause turbulence in the traffic flow are typical of downtown streets.

Flow Characteristics

The speed of vehicles on urban streets is influenced by three main factors, street environment, interaction among vehicles and traffic control.

The street environment includes the geometric characteristics of the facility, the character of roadside activity, and adjacent land uses. Thus, the environment reflects the number and width of lanes, type of median, driveway/access point density, spacing between signalized intersections, existence of parking, level of pedestrian and bicyclist activity and speed limit.

The interaction among vehicles is determined by traffic density, the proportion of trucks and buses, and turning movements. This interaction affects the operation of vehicles at intersections and, to a lesser extent, between signals.

Traffic controls (including signals and signs) forces a portion of all vehicles to slow or stop. The delays and speed changes caused by traffic control devices reduce vehicle speeds; however, such controls are needed to establish right-of-way.

Levels of Service (automobile Mode)

The average travel speed for through vehicles along an urban street is the determinant of the operating level of service (LOS). The travel speed along a segment, section or entire length of an urban street is dependent on the running speed between signalized intersections and the amount of control delay incurred at signalized intersections.

LOS A describes primarily free-flow operation. Vehicles are completely unimpeded in their ability to maneuver within the traffic stream. Control delay at signalized intersections is minimal. Travel speeds exceed 85 of the base free flow speed (FFS).

LOS B describes reasonably unimpeded operation. The ability to maneuver within the traffic stream is only slightly restricted and control delay at the boundary intersections is not significant. The travel speed is between 67 and 85 percent of the base FFS.

LOS C describes stable operations. The ability to maneuver and change lanes in midblock location may be more restricted than at LOS B. Longer queues at the boundary intersections may contribute to lower travel speeds. The travel speed is between 50 and 67 percent of the base FFS.

LOS D indicates a less stable condition in which small increases in flow may cause substantial increases in delay and decreases in travel speed. This operation may be due to adverse signal progression, high volumes, inappropriate signal timing, at the boundary intersections. The travel speed is between 40 and 50 percent of the base FFS.

LOS E is characterized unstable operation and significant delay. Such operations may be due to some combination of adverse progression, high volume, and inappropriate signal timing at the boundary intersections. The travel speed is between 30 and 40 percent of the base FFS.

LOS F is characterized by street flow at extremely low speed. Congestion is likely occurring at the boundary intersections, as indicated by high delay and extensive queuing. The travel speed is 30 percent or less of the base FFS.

Table A-1: Urban Street Levels of Service (Automobile Mode)

Travel Speed as a Percentage of Base Free-Flow Speed (%)	LOS by Critical Volume-to-Capacity Ratio[a]	
	≤1.0	>1.0
>85	A	F
>67 to 85	B	F
>50 to 67	C	F
>40 to 50	D	F
>30 to 40	E	F
≤30	F	F

a = The Critical volume-to-capacity ratio is based on consideration of the through movement-to-capacity ratio at each boundary intersection in the subject direction of travel. The critical volume-to-capacity ratio is the largest ratio of those considered.
Source: Highway Capacity Manual 2010, Exhibit 16-4. Urban Street LOS Criteria (Automobile Mode)

Intersection Levels of Service

One of the more important elements limiting, and often interrupting the flow of traffic on a highway is the intersection. Flow on an interrupted facility is usually dominated by points of fixed operation such as traffic signals, stop and yield signs.

Signalized Intersections – Performance Measures

For signalized intersections the performance measures include automobile volume-to-capacity ratio, automobile delay, queue storage length, ratio of pedestrian delay, pedestrian circulation area, pedestrian perception score, bicycle delay, and bicycle perception score. LOS is also considered a performance measure. For the automobile mode average control delay per vehicle per approach is determined for the peak hour. A weighted average of control delay per vehicle is then determined for the intersection. A LOS designation is given to the weighted average control delay to better describe the level of operation. A description of LOS for signalized intersections is found in Table A-2.

Table A-2: Signalized Intersection Level of Service Description (Automobile Mode)

Level of Service	Description	Average Control Delay (seconds per vehicle)
A	Operations with a control delay of 10 seconds/vehicle or less and a volume-to-capacity ratio no greater than 1.0. This level is typically assigned when volume-to-capacity ratio is and either progression is exceptionally favorable or the cycle length is very short. If it's due to favorable progression, most vehicles arrive during the green indication and travel through the intersection without stopping.	≤10
B	Operations with control delay between 10.1 to 20.0 seconds/vehicle and a volume-to-capacity ratio no greater than 1.0. This level is typically assigned when the volume-to-capacity ratio is low and either progression is highly favorable or the cycle length is short. More vehicles stop than with LOS A.	>10.0 to 20.0
C	Operations with average control delays between 20.1 to 35.0 seconds/vehicle and a volume-to-capacity ratio no greater than 1.0. This level is typically assigned when the volume-to-capacity ratio no greater than 1.0. This level is typically assigned when progression is favorable or the cycle length is moderate. Individual cycle failures (i.e., one or more queued vehicles are not able to depart as a result of insufficient capacity during the cycle) may begin to appear at this level. The number of vehicles stopping is significant, although many vehicles still pass through the intersection without stopping.	>20 to 35
D	Operations with control delay between 35.1 to 55.0 seconds/vehicle and a volume-to-capacity ratio no greater than 1.0. This level is typically assigned when the volume-to-capacity ratio is high and either progression is ineffective or the cycle length is long. Many vehicles stop, and i ndividual cycle failures are noticeable.	>35 to 55
E	Operations with control delay between 55.1 to 80.0 seconds/vehicle and a volume-to-capacity ratio no greater than 1.0. This level is typically assigned when the volume-to-capacity ratio is high, progression is unfavorable, and the cycle length is long. Individual cycle failures are frequent.	>55 to 80
F	Operations with unacceptable control delay exceeding 80.0 seconds/vehicle and a volume-to-capacity ratio greater than 1.0. This level is typically assigned when the volume-to-capacity ratio is very high, progression is very poor, and the cycle length is long. Most cycles fail to clear the queue.	>80

Source: Highway Capacity Manual 2010

Unsignalized Intersections

The HCM 2010 procedures use control delay as a measure of effectiveness to determine level of service. Delay is a measure of driver discomfort, frustration, fuel consumption, and increased travel time. The delay experienced by a motorist is made up of a number of factors that relate to control, traffic and incidents. Total delay is the difference between the travel time actually experienced and the reference travel time that would result during base conditions, i. e., in the absence of traffic control, geometric delay, any incidents, and any other vehicles. Control delay is the increased time of travel for a vehicle approaching and passing through an unsignalized intersection, compared with a free-flow vehicle if it were not required to slow or stop at the intersection.

All-Way Stop Controlled Intersections

All-way stop controlled intersections is a form of traffic controls in which all approaches to an intersection are required to stop. Similar to signalized intersections, at all-way stop controlled intersections the average control delay per vehicle per approach is determined for the peak hour. A weighted average of control delay per vehicle is then determined for the intersection as a whole. In other words the delay measured for all-way stop controlled intersections is a measure of the average delay for all vehicles passing through the intersection during the peak hour. A LOS designation is given to the weighted average control delay to better describe the level of operation.

Two-Way Stop Controlled Intersections

Two-way stop controlled (TWSC) intersections in which stop signs are used to assign the right-of-way, are the most prevalent type of intersection in the United States. At TWSC intersections the stop-controlled approaches are referred as the minor street approaches and can be either public streets or private driveways. The approaches that are not controlled by stop signs are referred to as the major street approaches.

The capacity of movements subject to delay are determined using the "critical gap" method of capacity analysis. Expected average control delay based on movement volume and movement capacity is calculated. A LOS for TWSC intersection is determined by the computed or measured control delay for each minor movement. LOS is not defined for the intersection as a whole for three main reasons: (a) major-street through vehicles are assumed to experience zero delay; (b) the disproportionate number of major-street through vehicles at the typical TWSC intersection skews the weighted average of all movements, resulting in a very low overall average delay from all vehicles; and (c) the resulting low delay can mask important LOS deficiencies for minor movements. Table A-3 provides a description of LOS at unsignalized intersections.

Table A-3: Unsignalized Intersection Level of Service Description (Automobile Mode)

Control Delay (seconds per vehicle)	LOS by Volume-to-Capacity Ratio	
	v/c ≤ 1.0	**v/c > 1.0**
≤10	A	F
>10 to 15	B	F
>15 to 25	C	F
>25 to 35	D	F
>35 to 50	E	F
>50	F	F

Source: HCM 2010 Exhibit 19-1.

Appendix E: Traffic Index

ADT Vehicle Classification Counts

Kamm Avenue between Interstate 5 and Main Project Access

Existing Classification Count - 10/01/2019

Vehicle Types	Eastbound	Westbound	Totals
Passenger Cars	94	72	166
2-axle trucks	36	36	72
3-axle trucks	1	1	2
4-axle trucks	6	3	9
5-axle trucks	44	36	80
	181	148	329

Existing Traffic Conditions
20 Year Traffic Index

Kamm Avenue between Interstate 5 and Main Project Access					
				Total estimated average daily traffic (ADT) =	329
		Eastbound	***Westbound***	***Eastbound***	***Westbound***
	ESAL 20 Year	***Expanded Average***	***Expanded Average***	***Total 20 Year***	***Total 20 Year***
Vehicle Type	***Constants***	***Daily Trucks***	***Daily Trucks***	***ESAL***	***ESAL***
2-axle trucks	1,380	36	36	49,680	49,680
3-axle trucks	3,680	1	1	3,680	3,680
4-axle trucks	5,880	6	3	35,280	17,640
5-axle trucks (or more)	13,780	44	36	606,320	496,080
Totals				694,960	567,080
Traffic Index (TI) for 20 year design				**8.5**	**8.5**

Obtain TI for 20 Year Design from Table 613.3c, Caltrans Design Manual

ADT Vehicle Classification Counts

Kamm Avenue between Main Project Access and State Route 33

Existing Classification Count - 10/01/2019

Vehicle Types	Eastbound	Westbound	Totals
Passenger Cars	94	72	166
2-axle trucks	36	36	72
3-axle trucks	1	1	2
4-axle trucks	6	3	9
5-axle trucks	44	36	80
	181	148	329

Existing Traffic Conditions
20 Year Traffic Index

Kamm Avenue between Main Project Access and State Route 33					
				Total estimated average daily traffic (ADT) =	329
		Eastbound	***Westbound***	***Eastbound***	***Westbound***
	ESAL 20 Year	***Expanded Average***	***Expanded Average***	***Total 20 Year***	***Total 20 Year***
Vehicle Type	***Constants***	***Daily Trucks***	***Daily Trucks***	***ESAL***	***ESAL***
2-axle trucks	1,380	36	36	49,680	49,680
3-axle trucks	3,680	1	1	3,680	3,680
4-axle trucks	5,880	6	3	35,280	17,640
5-axle trucks (or more)	13,780	44	36	606,320	496,080
Totals				694,960	567,080
Traffic Index (TI) for 20 year design				**8.5**	**8.5**

Obtain TI for 20 Year Design from Table 613.3c, Caltrans Design Manual

Kamm Avenue between Interstate 5 and Main Project Access

Existing plus Project Traffic - Peak Season

Vehicle Types	Eastbound	Westbound	Totals
Passenger Cars	109	87	196
2-axle trucks	36	36	72
3-axle trucks	1	1	2
4-axle trucks	6	3	9
5-axle trucks	107	99	206
	259	226	485

Existing plus Project Traffic Conditions - Peak Season

20 Year Traffic Index

Kamm Avenue between Interstate 5 and Main Project Access					
				Total estimated average daily traffic (ADT) =	485
		Eastbound	***Westbound***	***Eastbound***	***Westbound***
	ESAL 20 Year	***Expanded Average***	***Expanded Average***	***Total 20 Year***	***Total 20 Year***
Vehicle Type	***Constants***	***Daily Trucks***	***Daily Trucks***	***ESAL***	***ESAL***
2-axle trucks	1,380	36	36	49,680	49,680
3-axle trucks	3,680	1	1	3,680	3,680
4-axle trucks	5,880	6	3	35,280	17,640
5-axle trucks (or more)	13,780	107	99	1,474,460	1,364,220
Totals				1,563,100	1,435,220
Traffic Index (TI) for 20 year design				**9.5**	**9.5**

Obtain TI for 20 Year Design from Table 613.3c, Caltrans Design Manual

Kamm Avenue between Main Project Access and State Route 33

Existing plus Project Traffic - Peak Season

Vehicle Types	Eastbound	Westbound	Totals
Passenger Cars	203	181	384
2-axle trucks	36	36	72
3-axle trucks	14	14	28
4-axle trucks	6	3	9
5-axle trucks	139	131	270
	398	365	763

Existing plus Project Traffic Conditions - Peak Season
20 Year Traffic Index

Kamm Avenue between Main Project Access and State Route 33					
				Total estimated average daily traffic (ADT) =	763
		Eastbound	***Westbound***	***Eastbound***	***Westbound***
	ESAL 20 Year	***Expanded Average***	***Expanded Average***	***Total 20 Year***	***Total 20 Year***
Vehicle Type	***Constants***	***Daily Trucks***	***Daily Trucks***	***ESAL***	***ESAL***
2-axle trucks	1,380	36	36	49,680	49,680
3-axle trucks	3,680	14	14	51,520	51,520
4-axle trucks	5,880	6	3	35,280	17,640
5-axle trucks (or more)	13,780	139	131	1,915,420	1,805,180
Totals				2,051,900	1,924,020
Traffic Index (TI) for 20 year design				**10.0**	**9.5**

Obtain TI for 20 Year Design from Table 613.3c, Caltrans Design Manual

Kamm Avenue between Interstate 5 and Main Project Access

Existing plus Project Traffic - Average

Vehicle Types	Eastbound	Westbound	Totals
Passenger Cars	103	81	184
2-axle trucks	36	36	72
3-axle trucks	1	1	2
4-axle trucks	6	3	9
5-axle trucks	54	46	100
	200	167	367

Existing plus Project Traffic Conditions - Average
20 Year Traffic Index

Kamm Avenue between Interstate 5 and Main Project Access					
				Total estimated average daily traffic (ADT) =	367
		Eastbound	***Westbound***	***Eastbound***	***Westbound***
	ESAL 20 Year	***Expanded Average***	***Expanded Average***	***Total 20 Year***	***Total 20 Year***
Vehicle Type	***Constants***	***Daily Trucks***	***Daily Trucks***	***ESAL***	***ESAL***
2-axle trucks	1,380	36	36	49,680	49,680
3-axle trucks	3,680	1	1	3,680	3,680
4-axle trucks	5,880	6	3	35,280	17,640
5-axle trucks (or more)	13,780	54	46	744,120	633,880
Totals				832,760	704,880
Traffic Index (TI) for 20 year design				**9.0**	**8.5**

Obtain TI for 20 Year Design from Table 613.3c, Caltrans Design Manual

Kamm Avenue between Main Project Access and State Route 33

Existing plus Project Traffic - Average

Vehicle Types	Eastbound	Westbound	Totals
Passenger Cars	157	135	292
2-axle trucks	36	36	72
3-axle trucks	5	5	10
4-axle trucks	6	3	9
5-axle trucks	52	44	96
	256	223	479

Existing plus Project Traffic Conditions - Average
20 Year Traffic Index

Kamm Avenue between Main Project Access and State Route 33					
				Total estimated average daily traffic (ADT) =	479
		Eastbound	***Westbound***	***Eastbound***	***Westbound***
	ESAL 20 Year	***Expanded Average***	***Expanded Average***	***Total 20 Year***	***Total 20 Year***
Vehicle Type	***Constants***	***Daily Trucks***	***Daily Trucks***	***ESAL***	***ESAL***
2-axle trucks	1,380	36	36	49,680	49,680
3-axle trucks	3,680	5	5	18,400	18,400
4-axle trucks	5,880	6	3	35,280	17,640
5-axle trucks (or more)	13,780	52	44	716,560	606,320
Totals				819,920	692,040
Traffic Index (TI) for 20 year design				**9.0**	**8.5**

Obtain TI for 20 Year Design from Table 613.3c, Caltrans Design Manual

Kamm Avenue between Interstate 5 and Main Project Access

Near Term 2025 plus Project Traffic - Peak Season

Vehicle Types	Eastbound	Westbound	Totals
Passenger Cars	121	97	218
2-axle trucks	41	41	82
3-axle trucks	1	1	2
4-axle trucks	7	3	10
5-axle trucks	113	104	217
	283	246	529

Near Term Year 2025 plus Project Traffic Conditions - Peak Season
20 Year Traffic Index

Kamm Avenue between Interstate 5 and Main Project Access					
				Total estimated average daily traffic (ADT) =	529
		Eastbound	*Westbound*	*Eastbound*	*Westbound*
	ESAL 20 Year	*Expanded Average*	*Expanded Average*	*Total 20 Year*	*Total 20 Year*
Vehicle Type	*Constants*	*Daily Trucks*	*Daily Trucks*	*ESAL*	*ESAL*
2-axle trucks	1,380	41	41	56,580	56,580
3-axle trucks	3,680	1	1	3,680	3,680
4-axle trucks	5,880	7	3	41,160	17,640
5-axle trucks (or more)	13,780	113	104	1,557,140	1,433,120
Totals				1,658,560	1,511,020
Traffic Index (TI) for 20 year design				**9.5**	**9.5**

Obtain TI for 20 Year Design from Table 613.3c, Caltrans Design Manual

Kamm Avenue between Main Project Access and State Route 33

Near Term Year 2025 plus Project Traffic - Peak Season

Vehicle Types	Eastbound	Westbound	Totals
Passenger Cars	215	191	406
2-axle trucks	41	41	82
3-axle trucks	14	14	28
4-axle trucks	7	3	10
5-axle trucks	145	136	281
	422	385	807

Near Term Year 2025 plus Project Traffic Conditions - Peak Season
20 Year Traffic Index

Kamm Avenue between Main Project Access and State Route 33					
				Total estimated average daily traffic (ADT) =	807
		Eastbound	***Westbound***	***Eastbound***	***Westbound***
	ESAL 20 Year	***Expanded Average***	***Expanded Average***	***Total 20 Year***	***Total 20 Year***
Vehicle Type	***Constants***	***Daily Trucks***	***Daily Trucks***	***ESAL***	***ESAL***
2-axle trucks	1,380	41	41	56,580	56,580
3-axle trucks	3,680	14	14	51,520	51,520
4-axle trucks	5,880	7	3	41,160	17,640
5-axle trucks (or more)	13,780	145	136	1,998,100	1,874,080
Totals				2,147,360	1,999,820
Traffic Index (TI) for 20 year design				**10.0**	**10.0**

Obtain TI for 20 Year Design from Table 613.3c, Caltrans Design Manual

Kamm Avenue between Interstate 5 and Main Project Access

Near Term 2025 plus Project Traffic - Average

Vehicle Types	Eastbound	Westbound	Totals
Passenger Cars	115	91	206
2-axle trucks	41	41	82
3-axle trucks	1	1	2
4-axle trucks	7	3	10
5-axle trucks	60	51	111
	224	187	411

Near Term Year 2025 plus Project Traffic Conditions - Average
20 Year Traffic Index

Kamm Avenue between Interstate 5 and Main Project Access					
				Total estimated average daily traffic (ADT) =	411
		Eastbound	***Westbound***	***Eastbound***	***Westbound***
	ESAL 20 Year	***Expanded Average***	***Expanded Average***	***Total 20 Year***	***Total 20 Year***
Vehicle Type	***Constants***	***Daily Trucks***	***Daily Trucks***	***ESAL***	***ESAL***
2-axle trucks	1,380	41	41	56,580	56,580
3-axle trucks	3,680	1	1	3,680	3,680
4-axle trucks	5,880	7	3	41,160	17,640
5-axle trucks (or more)	13,780	60	51	826,800	702,780
Totals				928,220	780,680
Traffic Index (TI) for 20 year design				**9.0**	**8.5**

Obtain TI for 20 Year Design from Table 613.3c, Caltrans Design Manual

Kamm Avenue between Main Project Access and State Route 33

Near Term Year 2025 plus Project Traffic - Average

Vehicle Types	Eastbound	Westbound	Totals
Passenger Cars	169	145	314
2-axle trucks	41	41	82
3-axle trucks	5	5	10
4-axle trucks	7	3	10
5-axle trucks	58	49	107
	280	243	523

Near Term Year 2025 plus Project Traffic Conditions - Average
20 Year Traffic Index

Kamm Avenue between Main Project Access and State Route 33					
				Total estimated average daily traffic (ADT) =	523
		Eastbound	***Westbound***	***Eastbound***	***Westbound***
	ESAL 20 Year	***Expanded Average***	***Expanded Average***	***Total 20 Year***	***Total 20 Year***
Vehicle Type	***Constants***	***Daily Trucks***	***Daily Trucks***	***ESAL***	***ESAL***
2-axle trucks	1,380	41	41	56,580	56,580
3-axle trucks	3,680	5	5	18,400	18,400
4-axle trucks	5,880	7	3	41,160	17,640
5-axle trucks (or more)	13,780	58	49	799,240	675,220
Totals				915,380	767,840
Traffic Index (TI) for 20 year design				**9.0**	**8.5**

Obtain TI for 20 Year Design from Table 613.3c, Caltrans Design Manual

Kamm Avenue between Interstate 5 and Main Project Access

Cumulative Year 2040 No Project Traffic

Vehicle Types	Eastbound	Westbound	Totals
Passenger Cars	145	111	256
2-axle trucks	55	55	110
3-axle trucks	2	2	4
4-axle trucks	9	5	14
5-axle trucks	68	56	124
	279	229	508

Cumulative Year 2040 No Project Traffic Conditions
20 Year Traffic Index

Kamm Avenue between Interstate 5 and Main Project Access					
				Total estimated average daily traffic (ADT) =	508
		Eastbound	***Westbound***	***Eastbound***	***Westbound***
	ESAL 20 Year	***Expanded Average***	***Expanded Average***	***Total 20 Year***	***Total 20 Year***
Vehicle Type	***Constants***	***Daily Trucks***	***Daily Trucks***	***ESAL***	***ESAL***
2-axle trucks	1,380	55	55	75,900	75,900
3-axle trucks	3,680	2	2	7,360	7,360
4-axle trucks	5,880	9	5	52,920	29,400
5-axle trucks (or more)	13,780	68	56	937,040	771,680
Totals				1,073,220	884,340
Traffic Index (TI) for 20 year design				**9.0**	**9.0**

Obtain TI for 20 Year Design from Table 613.3c, Caltrans Design Manual

Kamm Avenue between Main Project Access and State Route 33

Cumulative Year 2040 No Project Traffic

Vehicle Types	Eastbound	Westbound	Totals
Passenger Cars	145	111	256
2-axle trucks	55	55	110
3-axle trucks	2	2	4
4-axle trucks	9	5	14
5-axle trucks	68	56	124
	279	229	508

Cumulative Year 2040 No Project Traffic Conditions
20 Year Traffic Index

Kamm Avenue between Main Project Access and State Route 33					
				Total estimated average daily traffic (ADT) =	508
		Eastbound	***Westbound***	***Eastbound***	***Westbound***
	ESAL 20 Year	***Expanded Average***	***Expanded Average***	***Total 20 Year***	***Total 20 Year***
Vehicle Type	***Constants***	***Daily Trucks***	***Daily Trucks***	***ESAL***	***ESAL***
2-axle trucks	1,380	55	55	75,900	75,900
3-axle trucks	3,680	2	2	7,360	7,360
4-axle trucks	5,880	9	5	52,920	29,400
5-axle trucks (or more)	13,780	68	56	937,040	771,680
Totals				1,073,220	884,340
Traffic Index (TI) for 20 year design				**9.0**	**9.0**

Obtain TI for 20 Year Design from Table 613.3c, Caltrans Design Manual

Kamm Avenue between Interstate 5 and Main Project Access

Cumulative Year 2040 plus Project Traffic - Peak Season

Vehicle Types	Eastbound	Westbound	Totals
Passenger Cars	160	126	286
2-axle trucks	55	55	110
3-axle trucks	2	2	4
4-axle trucks	9	5	14
5-axle trucks	131	119	250
	357	307	664

Cumulative Year 2040 plus Project Traffic Conditions - Peak Season
20 Year Traffic Index

Kamm Avenue between Interstate 5 and Main Project Access					
				Total estimated average daily traffic (ADT) =	664
		Eastbound	***Westbound***	***Eastbound***	***Westbound***
	ESAL 20 Year	***Expanded Average***	***Expanded Average***	***Total 20 Year***	***Total 20 Year***
Vehicle Type	***Constants***	***Daily Trucks***	***Daily Trucks***	***ESAL***	***ESAL***
2-axle trucks	1,380	55	55	75,900	75,900
3-axle trucks	3,680	2	2	7,360	7,360
4-axle trucks	5,880	9	5	52,920	29,400
5-axle trucks (or more)	13,780	131	119	1,805,180	1,639,820
Totals				1,941,360	1,752,480
Traffic Index (TI) for 20 year design				**9.5**	**9.5**

Obtain TI for 20 Year Design from Table 613.3c, Caltrans Design Manual

Kamm Avenue between Main Project Access and State Route 33

Cumulative Year 2040 plus Project Traffic - Peak Season

Vehicle Types	Eastbound	Westbound	Totals
Passenger Cars	254	220	474
2-axle trucks	55	55	110
3-axle trucks	15	15	30
4-axle trucks	9	5	14
5-axle trucks	163	151	314
	496	446	942

Cumulative Year 2040 plus Project Traffic Conditions - Peak Season
20 Year Traffic Index

Kamm Avenue between Main Project Access and State Route 33					
				Total estimated average daily traffic (ADT) =	942
		Eastbound	***Westbound***	***Eastbound***	***Westbound***
	ESAL 20 Year	***Expanded Average***	***Expanded Average***	***Total 20 Year***	***Total 20 Year***
Vehicle Type	***Constants***	***Daily Trucks***	***Daily Trucks***	***ESAL***	***ESAL***
2-axle trucks	1,380	55	55	75,900	75,900
3-axle trucks	3,680	15	15	55,200	55,200
4-axle trucks	5,880	9	5	52,920	29,400
5-axle trucks (or more)	13,780	163	151	2,246,140	2,080,780
Totals				2,430,160	2,241,280
Traffic Index (TI) for 20 year design				**10.0**	**10.0**

Obtain TI for 20 Year Design from Table 613.3c, Caltrans Design Manual

Kamm Avenue between Interstate 5 and Main Project Access

Cumulative Year 2040 plus Project Traffic - Average

Vehicle Types	Eastbound	Westbound	Totals
Passenger Cars	154	120	274
2-axle trucks	55	55	110
3-axle trucks	2	2	4
4-axle trucks	9	5	14
5-axle trucks	78	66	144
	298	248	546

Cumulative Year 2040 plus Project Traffic Conditions - Average
20 Year Traffic Index

Kamm Avenue between Interstate 5 and Main Project Access					
				Total estimated average daily traffic (ADT) =	546
		Eastbound	***Westbound***	***Eastbound***	***Westbound***
	ESAL 20 Year	***Expanded Average***	***Expanded Average***	***Total 20 Year***	***Total 20 Year***
Vehicle Type	***Constants***	***Daily Trucks***	***Daily Trucks***	***ESAL***	***ESAL***
2-axle trucks	1,380	55	55	75,900	75,900
3-axle trucks	3,680	2	2	7,360	7,360
4-axle trucks	5,880	9	5	52,920	29,400
5-axle trucks (or more)	13,780	78	66	1,074,840	909,480
Totals				1,211,020	1,022,140
Traffic Index (TI) for 20 year design				**9.0**	**9.0**

Obtain TI for 20 Year Design from Table 613.3c, Caltrans Design Manual

Kamm Avenue between Main Project Access and State Route 33

Cumulative Year 2040 plus Project Traffic - Average

Vehicle Types	Eastbound	Westbound	Totals
Passenger Cars	208	174	382
2-axle trucks	55	55	110
3-axle trucks	6	6	12
4-axle trucks	9	5	14
5-axle trucks	76	64	140
	354	304	658

Cumulative Year 2040 plus Project Traffic Conditions - Average
20 Year Traffic Index

Kamm Avenue between Main Project Access and State Route 33					
				Total estimated average daily traffic (ADT) =	658
		Eastbound	***Westbound***	***Eastbound***	***Westbound***
	ESAL 20 Year	***Expanded Average***	***Expanded Average***	***Total 20 Year***	***Total 20 Year***
Vehicle Type	***Constants***	***Daily Trucks***	***Daily Trucks***	***ESAL***	***ESAL***
2-axle trucks	1,380	55	55	75,900	75,900
3-axle trucks	3,680	6	6	22,080	22,080
4-axle trucks	5,880	9	5	52,920	29,400
5-axle trucks (or more)	13,780	76	64	1,047,280	881,920
Totals				1,198,180	1,009,300
Traffic Index (TI) for 20 year design				**9.0**	**9.0**

Obtain TI for 20 Year Design from Table 613.3c, Caltrans Design Manual

Appendix F: Existing Traffic Conditions

Intersection	
Int Delay, s/veh	6.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	3	3	1	0	0	0	0	7	3	4
Future Vol, veh/h	0	0	3	3	1	0	0	0	0	7	3	4
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	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	16974	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	72	72	72	72	72	72	72	72	72	72	72	72
Heavy Vehicles, %	0	38	38	38	38	0	0	0	0	8	8	8
Mvmt Flow	0	0	4	4	1	0	0	0	0	10	4	6

Major/Minor	Major1			Major2			Minor2		
Conflicting Flow All	-	0	0	4	0	0	11	13	1
Stage 1	-	-	-	-	-	-	9	9	-
Stage 2	-	-	-	-	-	-	2	4	-
Critical Hdwy	-	-	-	4.48	-	-	6.48	6.58	6.28
Critical Hdwy Stg 1	-	-	-	-	-	-	5.48	5.58	-
Critical Hdwy Stg 2	-	-	-	-	-	-	5.48	5.58	-
Follow-up Hdwy	-	-	-	2.542	-	-	3.572	4.072	3.372
Pot Cap-1 Maneuver	0	-	-	1411	-	0	993	870	1066
Stage 1	0	-	-	-	-	0	999	876	-
Stage 2	0	-	-	-	-	0	1006	881	-
Platoon blocked, %		-	-		-				
Mov Cap-1 Maneuver	-	-	-	1411	-	-	990	0	1066
Mov Cap-2 Maneuver	-	-	-	-	-	-	990	0	-
Stage 1	-	-	-	-	-	-	999	0	-
Stage 2	-	-	-	-	-	-	1003	0	-

Approach	EB	WB	SB
HCM Control Delay, s	0	5.7	8.6
HCM LOS			A

Minor Lane/Major Mvmt	EBT	EBR	WBL	WBT	SBLn1
Capacity (veh/h)	-	-	1411	-	1016
HCM Lane V/C Ratio	-	-	0.003	-	0.019
HCM Control Delay (s)	-	-	7.6	0	8.6
HCM Lane LOS	-	-	A	A	A
HCM 95th %tile Q(veh)	-	-	0	-	0.1

Intersection	
Int Delay, s/veh	5.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	1	6	0	0	4	0	0	6	11	0	0	0
Future Vol, veh/h	1	6	0	0	4	0	0	6	11	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	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	16965	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	38	38	0	0	38	0	8	8	8	0	0	0
Mvmt Flow	1	7	0	0	4	0	0	7	12	0	0	0

Major/Minor	Major1			Major2			Minor1		
Conflicting Flow All	4	0	-	-	-	0	13	13	7
Stage 1	-	-	-	-	-	-	9	9	-
Stage 2	-	-	-	-	-	-	4	4	-
Critical Hdwy	4.48	-	-	-	-	-	6.48	6.58	6.28
Critical Hdwy Stg 1	-	-	-	-	-	-	5.48	5.58	-
Critical Hdwy Stg 2	-	-	-	-	-	-	5.48	5.58	-
Follow-up Hdwy	2.542	-	-	-	-	-	3.572	4.072	3.372
Pot Cap-1 Maneuver	1411	-	0	0	-	0	991	870	1058
Stage 1	-	-	0	0	-	0	999	876	-
Stage 2	-	-	0	0	-	0	1004	881	-
Platoon blocked, %		-			-				
Mov Cap-1 Maneuver	1411	-	-	-	-	-	990	0	1058
Mov Cap-2 Maneuver	-	-	-	-	-	-	990	0	-
Stage 1	-	-	-	-	-	-	998	0	-
Stage 2	-	-	-	-	-	-	1004	0	-

Approach	EB	WB	NB
HCM Control Delay, s	1.1	0	8.5
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	WBT
Capacity (veh/h)	1058	1411	-	-
HCM Lane V/C Ratio	0.018	0.001	-	-
HCM Control Delay (s)	8.5	7.6	0	-
HCM Lane LOS	A	A	A	-
HCM 95th %tile Q(veh)	0.1	0	-	-

Intersection	
Int Delay, s/veh	0.6

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	2	1	13	38	159	19
Future Vol, veh/h	2	1	13	38	159	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	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	79	79	79	79	79	79
Heavy Vehicles, %	38	38	26	26	26	26
Mvmt Flow	3	1	16	48	201	24

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	293	213	225	0	-	0
Stage 1	213	-	-	-	-	-
Stage 2	80	-	-	-	-	-
Critical Hdwy	6.78	6.58	4.36	-	-	-
Critical Hdwy Stg 1	5.78	-	-	-	-	-
Critical Hdwy Stg 2	5.78	-	-	-	-	-
Follow-up Hdwy	3.842	3.642	2.434	-	-	-
Pot Cap-1 Maneuver	628	744	1214	-	-	-
Stage 1	744	-	-	-	-	-
Stage 2	860	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	619	744	1214	-	-	-
Mov Cap-2 Maneuver	619	-	-	-	-	-
Stage 1	734	-	-	-	-	-
Stage 2	860	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	10.5	2	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1214	-	656	-	-
HCM Lane V/C Ratio	0.014	-	0.006	-	-
HCM Control Delay (s)	8	0	10.5	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0	-	-

Intersection	
Int Delay, s/veh	3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	1	1	8	0	0	0	0	0	5	3	2
Future Vol, veh/h	0	1	1	8	0	0	0	0	0	5	3	2
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	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	16974	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	0	38	38	38	38	0	0	0	0	8	8	8
Mvmt Flow	0	1	1	9	0	0	0	0	0	5	3	2

Major/Minor	Major1			Major2					Minor2		
Conflicting Flow All	-	0	0	2	0	0			20	20	0
Stage 1	-	-	-	-	-	-			18	18	-
Stage 2	-	-	-	-	-	-			2	2	-
Critical Hdwy	-	-	-	4.48	-	-			6.48	6.58	6.28
Critical Hdwy Stg 1	-	-	-	-	-	-			5.48	5.58	-
Critical Hdwy Stg 2	-	-	-	-	-	-			5.48	5.58	-
Follow-up Hdwy	-	-	-	2.542	-	-			3.572	4.072	3.372
Pot Cap-1 Maneuver	0	-	-	1414	-	0			982	862	-
Stage 1	0	-	-	-	-	0			989	869	-
Stage 2	0	-	-	-	-	0			1006	882	-
Platoon blocked, %		-	-		-						
Mov Cap-1 Maneuver	-	-	-	1414	-	-			976	0	-
Mov Cap-2 Maneuver	-	-	-	-	-	-			976	0	-
Stage 1	-	-	-	-	-	-			989	0	-
Stage 2	-	-	-	-	-	-			1000	0	-

Approach	EB	WB	SB
HCM Control Delay, s	0	7.6	
HCM LOS			-

Minor Lane/Major Mvmt	EBT	EBR	WBL	WBT	SBLn1
Capacity (veh/h)	-	-	1414	-	-
HCM Lane V/C Ratio	-	-	0.006	-	-
HCM Control Delay (s)	-	-	7.6	0	-
HCM Lane LOS	-	-	A	A	-
HCM 95th %tile Q(veh)	-	-	0	-	-

Intersection	
Int Delay, s/veh	2.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	1	5	0	0	8	0	0	3	2	0	0	0
Future Vol, veh/h	1	5	0	0	8	0	0	3	2	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	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	16965	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	81	81	81	81	81	81	81	81	81	81	81	81
Heavy Vehicles, %	38	38	0	0	38	0	8	8	8	0	0	0
Mvmt Flow	1	6	0	0	10	0	0	4	2	0	0	0

Major/Minor	Major1			Major2			Minor1		
Conflicting Flow All	10	0	-	-	-	0	18	18	6
Stage 1	-	-	-	-	-	-	8	8	-
Stage 2	-	-	-	-	-	-	10	10	-
Critical Hdwy	4.48	-	-	-	-	-	6.48	6.58	6.28
Critical Hdwy Stg 1	-	-	-	-	-	-	5.48	5.58	-
Critical Hdwy Stg 2	-	-	-	-	-	-	5.48	5.58	-
Follow-up Hdwy	2.542	-	-	-	-	-	3.572	4.072	3.372
Pot Cap-1 Maneuver	1404	-	0	0	-	0	984	864	1059
Stage 1	-	-	0	0	-	0	1000	877	-
Stage 2	-	-	0	0	-	0	998	875	-
Platoon blocked, %		-			-				
Mov Cap-1 Maneuver	1404	-	-	-	-	-	983	0	1059
Mov Cap-2 Maneuver	-	-	-	-	-	-	983	0	-
Stage 1	-	-	-	-	-	-	999	0	-
Stage 2	-	-	-	-	-	-	998	0	-

Approach	EB	WB	NB
HCM Control Delay, s	1.3	0	8.4
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	WBT
Capacity (veh/h)	1059	1404	-	-
HCM Lane V/C Ratio	0.006	0.001	-	-
HCM Control Delay (s)	8.4	7.6	0	-
HCM Lane LOS	A	A	A	-
HCM 95th %tile Q(veh)	0	0	-	-

Intersection	
Int Delay, s/veh	1.7

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	23	14	2	122	56	3
Future Vol, veh/h	23	14	2	122	56	3
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, %	38	38	26	26	26	26
Mvmt Flow	26	16	2	140	64	3

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	210	66	67	0	-	0
Stage 1	66	-	-	-	-	-
Stage 2	144	-	-	-	-	-
Critical Hdwy	6.78	6.58	4.36	-	-	-
Critical Hdwy Stg 1	5.78	-	-	-	-	-
Critical Hdwy Stg 2	5.78	-	-	-	-	-
Follow-up Hdwy	3.842	3.642	2.434	-	-	-
Pot Cap-1 Maneuver	704	906	1395	-	-	-
Stage 1	873	-	-	-	-	-
Stage 2	802	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	703	906	1395	-	-	-
Mov Cap-2 Maneuver	703	-	-	-	-	-
Stage 1	871	-	-	-	-	-
Stage 2	802	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	10	0.1	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1395	-	768	-	-
HCM Lane V/C Ratio	0.002	-	0.055	-	-
HCM Control Delay (s)	7.6	0	10	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0.2	-	-

Intersection: 1: I-5 SB Ramps & Kamm Avenue

Movement	SB
Directions Served	LTR
Maximum Queue (ft)	60
Average Queue (ft)	13
95th Queue (ft)	43
Link Distance (ft)	988
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 2: I-5 NB Ramps & Kamm Avenue

Movement	NB
Directions Served	LTR
Maximum Queue (ft)	29
Average Queue (ft)	8
95th Queue (ft)	28
Link Distance (ft)	960
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 4: SR 33 & Kamm Avenue

Movement	EB
Directions Served	LR
Maximum Queue (ft)	60
Average Queue (ft)	3
95th Queue (ft)	22
Link Distance (ft)	6567
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Zone Summary

Zone wide Queuing Penalty: 0

Intersection: 1: I-5 SB Ramps & Kamm Avenue

Movement	SB
Directions Served	LTR
Maximum Queue (ft)	28
Average Queue (ft)	6
95th Queue (ft)	23
Link Distance (ft)	988
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 2: I-5 NB Ramps & Kamm Avenue

Movement	NB
Directions Served	LTR
Maximum Queue (ft)	26
Average Queue (ft)	3
95th Queue (ft)	16
Link Distance (ft)	960
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 4: SR 33 & Kamm Avenue

Movement	EB
Directions Served	LR
Maximum Queue (ft)	144
Average Queue (ft)	42
95th Queue (ft)	94
Link Distance (ft)	6567
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Zone Summary

Zone wide Queuing Penalty: 0

Appendix G: Existing plus Project Traffic Conditions

Intersection	
Int Delay, s/veh	7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	3	3	1	0	0	0	0	9	3	4
Future Vol, veh/h	0	0	3	3	1	0	0	0	0	9	3	4
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	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	16974	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	72	72	72	72	72	72	72	72	72	72	72	72
Heavy Vehicles, %	0	38	38	38	38	0	0	0	0	11	8	8
Mvmt Flow	0	0	4	4	1	0	0	0	0	13	4	6

Major/Minor	Major1			Major2			Minor2		
Conflicting Flow All	-	0	0	4	0	0	11	13	1
Stage 1	-	-	-	-	-	-	9	9	-
Stage 2	-	-	-	-	-	-	2	4	-
Critical Hdwy	-	-	-	4.48	-	-	6.51	6.58	6.28
Critical Hdwy Stg 1	-	-	-	-	-	-	5.51	5.58	-
Critical Hdwy Stg 2	-	-	-	-	-	-	5.51	5.58	-
Follow-up Hdwy	-	-	-	2.542	-	-	3.599	4.072	3.372
Pot Cap-1 Maneuver	0	-	-	1411	-	0	986	870	1066
Stage 1	0	-	-	-	-	0	991	876	-
Stage 2	0	-	-	-	-	0	998	881	-
Platoon blocked, %		-	-		-				
Mov Cap-1 Maneuver	-	-	-	1411	-	-	983	0	1066
Mov Cap-2 Maneuver	-	-	-	-	-	-	983	0	-
Stage 1	-	-	-	-	-	-	991	0	-
Stage 2	-	-	-	-	-	-	995	0	-

Approach	EB	WB	SB
HCM Control Delay, s	0	5.7	8.7
HCM LOS			A

Minor Lane/Major Mvmt	EBT	EBR	WBL	WBT	SBLn1
Capacity (veh/h)	-	-	1411	-	1007
HCM Lane V/C Ratio	-	-	0.003	-	0.022
HCM Control Delay (s)	-	-	7.6	0	8.7
HCM Lane LOS	-	-	A	A	A
HCM 95th %tile Q(veh)	-	-	0	-	0.1

Intersection	
Int Delay, s/veh	5.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	1	8	0	0	4	0	0	6	11	0	0	0
Future Vol, veh/h	1	8	0	0	4	0	0	6	11	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	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	16965	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	38	38	0	0	38	0	8	8	8	0	0	0
Mvmt Flow	1	9	0	0	4	0	0	7	12	0	0	0

Major/Minor	Major1			Major2			Minor1		
Conflicting Flow All	4	0	-	-	-	0	15	15	9
Stage 1	-	-	-	-	-	-	11	11	-
Stage 2	-	-	-	-	-	-	4	4	-
Critical Hdwy	4.48	-	-	-	-	-	6.48	6.58	6.28
Critical Hdwy Stg 1	-	-	-	-	-	-	5.48	5.58	-
Critical Hdwy Stg 2	-	-	-	-	-	-	5.48	5.58	-
Follow-up Hdwy	2.542	-	-	-	-	-	3.572	4.072	3.372
Pot Cap-1 Maneuver	1411	-	0	0	-	0	988	867	1055
Stage 1	-	-	0	0	-	0	997	875	-
Stage 2	-	-	0	0	-	0	1004	881	-
Platoon blocked, %		-			-				
Mov Cap-1 Maneuver	1411	-	-	-	-	-	987	0	1055
Mov Cap-2 Maneuver	-	-	-	-	-	-	987	0	-
Stage 1	-	-	-	-	-	-	996	0	-
Stage 2	-	-	-	-	-	-	1004	0	-

Approach	EB	WB	NB
HCM Control Delay, s	0.8	0	8.5
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	WBT
Capacity (veh/h)	1055	1411	-	-
HCM Lane V/C Ratio	0.018	0.001	-	-
HCM Control Delay (s)	8.5	7.6	0	-
HCM Lane LOS	A	A	A	-
HCM 95th %tile Q(veh)	0.1	0	-	-

Intersection	
Int Delay, s/veh	0.7

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	8	2	5	38	0	0
Future Vol, veh/h	8	2	5	38	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	88	88	88	88	88	88
Heavy Vehicles, %	38	100	100	38	100	100
Mvmt Flow	9	2	6	43	0	0

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	11	0	65	10
Stage 1	-	-	-	-	10	-
Stage 2	-	-	-	-	55	-
Critical Hdwy	-	-	5.1	-	7.4	7.2
Critical Hdwy Stg 1	-	-	-	-	6.4	-
Critical Hdwy Stg 2	-	-	-	-	6.4	-
Follow-up Hdwy	-	-	3.1	-	4.4	4.2
Pot Cap-1 Maneuver	-	-	1149	-	745	845
Stage 1	-	-	-	-	809	-
Stage 2	-	-	-	-	767	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1149	-	741	845
Mov Cap-2 Maneuver	-	-	-	-	741	-
Stage 1	-	-	-	-	809	-
Stage 2	-	-	-	-	763	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.9	0
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	-	-	-	1149	-
HCM Lane V/C Ratio	-	-	-	0.005	-
HCM Control Delay (s)	0	-	-	8.1	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	-	-	-	0	-

Intersection	
Int Delay, s/veh	1.5

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	12	15	25	38	159	70
Future Vol, veh/h	12	15	25	38	159	70
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	79	79	79	79	79	79
Heavy Vehicles, %	8	20	28	26	26	9
Mvmt Flow	15	19	32	48	201	89

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	358	246	290	0	-	0
Stage 1	246	-	-	-	-	-
Stage 2	112	-	-	-	-	-
Critical Hdwy	6.48	6.4	4.38	-	-	-
Critical Hdwy Stg 1	5.48	-	-	-	-	-
Critical Hdwy Stg 2	5.48	-	-	-	-	-
Follow-up Hdwy	3.572	3.48	2.452	-	-	-
Pot Cap-1 Maneuver	629	751	1137	-	-	-
Stage 1	781	-	-	-	-	-
Stage 2	898	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	611	751	1137	-	-	-
Mov Cap-2 Maneuver	611	-	-	-	-	-
Stage 1	758	-	-	-	-	-
Stage 2	898	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	10.6	3.3	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1137	-	682	-	-
HCM Lane V/C Ratio	0.028	-	0.05	-	-
HCM Control Delay (s)	8.3	0	10.6	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0.1	-	0.2	-	-

Intersection	
Int Delay, s/veh	2.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	1	1	8	0	0	0	0	0	6	3	2
Future Vol, veh/h	0	1	1	8	0	0	0	0	0	6	3	2
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	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	16974	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	0	38	38	38	38	0	0	0	0	17	8	8
Mvmt Flow	0	1	1	9	0	0	0	0	0	7	3	2

Major/Minor	Major1			Major2					Minor2		
Conflicting Flow All	-	0	0	2	0	0			20	20	0
Stage 1	-	-	-	-	-	-			18	18	-
Stage 2	-	-	-	-	-	-			2	2	-
Critical Hdwy	-	-	-	4.48	-	-			6.57	6.58	6.28
Critical Hdwy Stg 1	-	-	-	-	-	-			5.57	5.58	-
Critical Hdwy Stg 2	-	-	-	-	-	-			5.57	5.58	-
Follow-up Hdwy	-	-	-	2.542	-	-			3.653	4.072	3.372
Pot Cap-1 Maneuver	0	-	-	1414	-	0			960	862	-
Stage 1	0	-	-	-	-	0			967	869	-
Stage 2	0	-	-	-	-	0			983	882	-
Platoon blocked, %		-	-		-						
Mov Cap-1 Maneuver	-	-	-	1414	-	-			954	0	-
Mov Cap-2 Maneuver	-	-	-	-	-	-			954	0	-
Stage 1	-	-	-	-	-	-			967	0	-
Stage 2	-	-	-	-	-	-			977	0	-

Approach	EB	WB	SB
HCM Control Delay, s	0	7.6	
HCM LOS			-

Minor Lane/Major Mvmt	EBT	EBR	WBL	WBT	SBLn1
Capacity (veh/h)	-	-	1414	-	-
HCM Lane V/C Ratio	-	-	0.006	-	-
HCM Control Delay (s)	-	-	7.6	0	-
HCM Lane LOS	-	-	A	A	-
HCM 95th %tile Q(veh)	-	-	0	-	-

Intersection	
Int Delay, s/veh	2.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	1	6	0	0	8	0	0	3	2	0	0	0
Future Vol, veh/h	1	6	0	0	8	0	0	3	2	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	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	16965	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	81	81	81	81	81	81	81	81	81	81	81	81
Heavy Vehicles, %	38	50	0	0	38	0	8	8	8	0	0	0
Mvmt Flow	1	7	0	0	10	0	0	4	2	0	0	0

Major/Minor	Major1			Major2			Minor1		
Conflicting Flow All	10	0	-	-	-	0	19	19	7
Stage 1	-	-	-	-	-	-	9	9	-
Stage 2	-	-	-	-	-	-	10	10	-
Critical Hdwy	4.48	-	-	-	-	-	6.48	6.58	6.28
Critical Hdwy Stg 1	-	-	-	-	-	-	5.48	5.58	-
Critical Hdwy Stg 2	-	-	-	-	-	-	5.48	5.58	-
Follow-up Hdwy	2.542	-	-	-	-	-	3.572	4.072	3.372
Pot Cap-1 Maneuver	1404	-	0	0	-	0	983	863	1058
Stage 1	-	-	0	0	-	0	999	876	-
Stage 2	-	-	0	0	-	0	998	875	-
Platoon blocked, %		-			-				
Mov Cap-1 Maneuver	1404	-	-	-	-	-	982	0	1058
Mov Cap-2 Maneuver	-	-	-	-	-	-	982	0	-
Stage 1	-	-	-	-	-	-	998	0	-
Stage 2	-	-	-	-	-	-	998	0	-

Approach	EB	WB	NB
HCM Control Delay, s	1.1	0	8.4
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	WBT
Capacity (veh/h)	1058	1404	-	-
HCM Lane V/C Ratio	0.006	0.001	-	-
HCM Control Delay (s)	8.4	7.6	0	-
HCM Lane LOS	A	A	A	-
HCM 95th %tile Q(veh)	0	0	-	-

Intersection	
Int Delay, s/veh	0.9

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	30	4	4	10	1	0
Future Vol, veh/h	30	4	4	10	1	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	88	88	88	88	88	88
Heavy Vehicles, %	38	100	100	50	100	100
Mvmt Flow	34	5	5	11	1	0

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	39	0	58	37
Stage 1	-	-	-	-	37	-
Stage 2	-	-	-	-	21	-
Critical Hdwy	-	-	5.1	-	7.4	7.2
Critical Hdwy Stg 1	-	-	-	-	6.4	-
Critical Hdwy Stg 2	-	-	-	-	6.4	-
Follow-up Hdwy	-	-	3.1	-	4.4	4.2
Pot Cap-1 Maneuver	-	-	1117	-	752	813
Stage 1	-	-	-	-	784	-
Stage 2	-	-	-	-	798	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1117	-	748	813
Mov Cap-2 Maneuver	-	-	-	-	748	-
Stage 1	-	-	-	-	784	-
Stage 2	-	-	-	-	794	-

Approach	EB	WB	NB
HCM Control Delay, s	0	2.4	9.8
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	748	-	-	1117	-
HCM Lane V/C Ratio	0.002	-	-	0.004	-
HCM Control Delay (s)	9.8	-	-	8.2	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0	-	-	0	-

Intersection	
Int Delay, s/veh	2.2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	27	19	6	122	56	6
Future Vol, veh/h	27	19	6	122	56	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	87	87	87	87	87	87
Heavy Vehicles, %	43	50	80	26	26	43
Mvmt Flow	31	22	7	140	64	7

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	222	68	71	0	-	0
Stage 1	68	-	-	-	-	-
Stage 2	154	-	-	-	-	-
Critical Hdwy	6.83	6.7	4.9	-	-	-
Critical Hdwy Stg 1	5.83	-	-	-	-	-
Critical Hdwy Stg 2	5.83	-	-	-	-	-
Follow-up Hdwy	3.887	3.75	2.92	-	-	-
Pot Cap-1 Maneuver	684	876	1152	-	-	-
Stage 1	860	-	-	-	-	-
Stage 2	783	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	679	876	1152	-	-	-
Mov Cap-2 Maneuver	679	-	-	-	-	-
Stage 1	854	-	-	-	-	-
Stage 2	783	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	10.2	0.4	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1152	-	749	-	-
HCM Lane V/C Ratio	0.006	-	0.071	-	-
HCM Control Delay (s)	8.1	0	10.2	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0.2	-	-

Intersection: 1: I-5 SB Ramps & Kamm Avenue

Movement	SB
Directions Served	LTR
Maximum Queue (ft)	46
Average Queue (ft)	11
95th Queue (ft)	32
Link Distance (ft)	988
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 2: I-5 NB Ramps & Kamm Avenue

Movement	NB
Directions Served	LTR
Maximum Queue (ft)	48
Average Queue (ft)	11
95th Queue (ft)	34
Link Distance (ft)	960
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 3: Main Project Access & Kamm Avenue

Movement
Directions Served
Maximum Queue (ft)
Average Queue (ft)
95th Queue (ft)
Link Distance (ft)
Upstream Blk Time (%)
Queuing Penalty (veh)
Storage Bay Dist (ft)
Storage Blk Time (%)
Queuing Penalty (veh)

Intersection: 4: SR 33 & Kamm Avenue

Movement	EB	NB
Directions Served	LR	LT
Maximum Queue (ft)	51	50
Average Queue (ft)	18	11
95th Queue (ft)	45	37
Link Distance (ft)	7421	5310
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Zone Summary

Zone wide Queuing Penalty: 0

Intersection: 1: I-5 SB Ramps & Kamm Avenue

Movement	SB
Directions Served	LTR
Maximum Queue (ft)	48
Average Queue (ft)	11
95th Queue (ft)	36
Link Distance (ft)	988
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 2: I-5 NB Ramps & Kamm Avenue

Movement	NB
Directions Served	LTR
Maximum Queue (ft)	31
Average Queue (ft)	4
95th Queue (ft)	20
Link Distance (ft)	960
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 3: Main Project Access & Kamm Avenue

Movement
Directions Served
Maximum Queue (ft)
Average Queue (ft)
95th Queue (ft)
Link Distance (ft)
Upstream Blk Time (%)
Queuing Penalty (veh)
Storage Bay Dist (ft)
Storage Blk Time (%)
Queuing Penalty (veh)

Intersection: 4: SR 33 & Kamm Avenue

Movement	EB	NB
Directions Served	LR	LT
Maximum Queue (ft)	90	44
Average Queue (ft)	39	1
95th Queue (ft)	75	14
Link Distance (ft)	7421	5310
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Zone Summary

Zone wide Queuing Penalty: 0

Appendix H: Near Term Year 2025 plus Project Traffic Conditions

Intersection	
Int Delay, s/veh	6.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	4	4	2	0	0	0	0	10	4	5
Future Vol, veh/h	0	0	4	4	2	0	0	0	0	10	4	5
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	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	16974	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	72	72	72	72	72	72	72	72	72	72	72	72
Heavy Vehicles, %	0	38	38	38	38	0	0	0	0	11	8	8
Mvmt Flow	0	0	6	6	3	0	0	0	0	14	6	7

Major/Minor	Major1			Major2			Minor2		
Conflicting Flow All	-	0	0	6	0	0	18	21	3
Stage 1	-	-	-	-	-	-	15	15	-
Stage 2	-	-	-	-	-	-	3	6	-
Critical Hdwy	-	-	-	4.48	-	-	6.51	6.58	6.28
Critical Hdwy Stg 1	-	-	-	-	-	-	5.51	5.58	-
Critical Hdwy Stg 2	-	-	-	-	-	-	5.51	5.58	-
Follow-up Hdwy	-	-	-	2.542	-	-	3.599	4.072	3.372
Pot Cap-1 Maneuver	0	-	-	1409	-	0	977	861	1064
Stage 1	0	-	-	-	-	0	985	871	-
Stage 2	0	-	-	-	-	0	997	879	-
Platoon blocked, %		-	-		-				
Mov Cap-1 Maneuver	-	-	-	1409	-	-	973	0	1064
Mov Cap-2 Maneuver	-	-	-	-	-	-	973	0	-
Stage 1	-	-	-	-	-	-	985	0	-
Stage 2	-	-	-	-	-	-	993	0	-

Approach	EB	WB	SB
HCM Control Delay, s	0	5	8.7
HCM LOS			A

Minor Lane/Major Mvmt	EBT	EBR	WBL	WBT	SBLn1
Capacity (veh/h)	-	-	1409	-	1002
HCM Lane V/C Ratio	-	-	0.004	-	0.026
HCM Control Delay (s)	-	-	7.6	0	8.7
HCM Lane LOS	-	-	A	A	A
HCM 95th %tile Q(veh)	-	-	0	-	0.1

Intersection	
Int Delay, s/veh	5.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	2	9	0	0	5	0	0	7	13	0	0	0
Future Vol, veh/h	2	9	0	0	5	0	0	7	13	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	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	16965	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	38	38	0	0	38	0	8	8	8	0	0	0
Mvmt Flow	2	10	0	0	6	0	0	8	14	0	0	0

Major/Minor	Major1			Major2			Minor1		
Conflicting Flow All	6	0	-	-	-	0	20	20	10
Stage 1	-	-	-	-	-	-	14	14	-
Stage 2	-	-	-	-	-	-	6	6	-
Critical Hdwy	4.48	-	-	-	-	-	6.48	6.58	6.28
Critical Hdwy Stg 1	-	-	-	-	-	-	5.48	5.58	-
Critical Hdwy Stg 2	-	-	-	-	-	-	5.48	5.58	-
Follow-up Hdwy	2.542	-	-	-	-	-	3.572	4.072	3.372
Pot Cap-1 Maneuver	1409	-	0	0	-	0	982	862	1054
Stage 1	-	-	0	0	-	0	993	872	-
Stage 2	-	-	0	0	-	0	1002	879	-
Platoon blocked, %		-			-				
Mov Cap-1 Maneuver	1409	-	-	-	-	-	981	0	1054
Mov Cap-2 Maneuver	-	-	-	-	-	-	981	0	-
Stage 1	-	-	-	-	-	-	992	0	-
Stage 2	-	-	-	-	-	-	1002	0	-

Approach	EB	WB	NB
HCM Control Delay, s	1.4	0	8.5
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	WBT
Capacity (veh/h)	1054	1409	-	-
HCM Lane V/C Ratio	0.021	0.002	-	-
HCM Control Delay (s)	8.5	7.6	0	-
HCM Lane LOS	A	A	A	-
HCM 95th %tile Q(veh)	0.1	0	-	-

Intersection	
Int Delay, s/veh	0.7

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	9	2	5	42	0	0
Future Vol, veh/h	9	2	5	42	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	88	88	88	88	88	88
Heavy Vehicles, %	38	100	100	38	100	100
Mvmt Flow	10	2	6	48	0	0

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	12	0	71	11
Stage 1	-	-	-	-	11	-
Stage 2	-	-	-	-	60	-
Critical Hdwy	-	-	5.1	-	7.4	7.2
Critical Hdwy Stg 1	-	-	-	-	6.4	-
Critical Hdwy Stg 2	-	-	-	-	6.4	-
Follow-up Hdwy	-	-	3.1	-	4.4	4.2
Pot Cap-1 Maneuver	-	-	1148	-	738	844
Stage 1	-	-	-	-	808	-
Stage 2	-	-	-	-	763	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1148	-	734	844
Mov Cap-2 Maneuver	-	-	-	-	734	-
Stage 1	-	-	-	-	808	-
Stage 2	-	-	-	-	759	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.9	0
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	-	-	-	1148	-
HCM Lane V/C Ratio	-	-	-	0.005	-
HCM Control Delay (s)	0	-	-	8.2	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	-	-	-	0	-

Intersection	
Int Delay, s/veh	1.5

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	13	16	27	44	181	73
Future Vol, veh/h	13	16	27	44	181	73
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	79	79	79	79	79	79
Heavy Vehicles, %	8	20	28	26	26	9
Mvmt Flow	16	20	34	56	229	92

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	399	275	321	0	-	0
Stage 1	275	-	-	-	-	-
Stage 2	124	-	-	-	-	-
Critical Hdwy	6.48	6.4	4.38	-	-	-
Critical Hdwy Stg 1	5.48	-	-	-	-	-
Critical Hdwy Stg 2	5.48	-	-	-	-	-
Follow-up Hdwy	3.572	3.48	2.452	-	-	-
Pot Cap-1 Maneuver	595	723	1106	-	-	-
Stage 1	758	-	-	-	-	-
Stage 2	887	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	576	723	1106	-	-	-
Mov Cap-2 Maneuver	576	-	-	-	-	-
Stage 1	734	-	-	-	-	-
Stage 2	887	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	10.9	3.2	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1106	-	649	-	-
HCM Lane V/C Ratio	0.031	-	0.057	-	-
HCM Control Delay (s)	8.4	0	10.9	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0.1	-	0.2	-	-

Intersection	
Int Delay, s/veh	2.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	2	2	10	0	0	0	0	0	7	4	3
Future Vol, veh/h	0	2	2	10	0	0	0	0	0	7	4	3
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	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	16974	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	0	38	38	38	38	0	0	0	0	17	8	8
Mvmt Flow	0	2	2	11	0	0	0	0	0	8	4	3

Major/Minor	Major1			Major2					Minor2		
Conflicting Flow All	-	0	0	4	0	0			25	26	0
Stage 1	-	-	-	-	-	-			22	22	-
Stage 2	-	-	-	-	-	-			3	4	-
Critical Hdwy	-	-	-	4.48	-	-			6.57	6.58	6.28
Critical Hdwy Stg 1	-	-	-	-	-	-			5.57	5.58	-
Critical Hdwy Stg 2	-	-	-	-	-	-			5.57	5.58	-
Follow-up Hdwy	-	-	-	2.542	-	-			3.653	4.072	3.372
Pot Cap-1 Maneuver	0	-	-	1411	-	0			954	856	-
Stage 1	0	-	-	-	-	0			963	865	-
Stage 2	0	-	-	-	-	0			982	881	-
Platoon blocked, %		-	-		-						
Mov Cap-1 Maneuver	-	-	-	1411	-	-			946	0	-
Mov Cap-2 Maneuver	-	-	-	-	-	-			946	0	-
Stage 1	-	-	-	-	-	-			963	0	-
Stage 2	-	-	-	-	-	-			974	0	-

Approach	EB	WB	SB
HCM Control Delay, s	0	7.6	
HCM LOS			-

Minor Lane/Major Mvmt	EBT	EBR	WBL	WBT	SBLn1
Capacity (veh/h)	-	-	1411	-	-
HCM Lane V/C Ratio	-	-	0.008	-	-
HCM Control Delay (s)	-	-	7.6	0	-
HCM Lane LOS	-	-	A	A	-
HCM 95th %tile Q(veh)	-	-	0	-	-

Intersection	
Int Delay, s/veh	2.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	2	7	0	0	10	0	0	4	3	0	0	0
Future Vol, veh/h	2	7	0	0	10	0	0	4	3	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	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	16965	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	81	81	81	81	81	81	81	81	81	81	81	81
Heavy Vehicles, %	38	50	0	0	38	0	8	8	8	0	0	0
Mvmt Flow	2	9	0	0	12	0	0	5	4	0	0	0

Major/Minor	Major1			Major2			Minor1		
Conflicting Flow All	12	0	-	-	-	0	25	25	9
Stage 1	-	-	-	-	-	-	13	13	-
Stage 2	-	-	-	-	-	-	12	12	-
Critical Hdwy	4.48	-	-	-	-	-	6.48	6.58	6.28
Critical Hdwy Stg 1	-	-	-	-	-	-	5.48	5.58	-
Critical Hdwy Stg 2	-	-	-	-	-	-	5.48	5.58	-
Follow-up Hdwy	2.542	-	-	-	-	-	3.572	4.072	3.372
Pot Cap-1 Maneuver	1401	-	0	0	-	0	975	857	1055
Stage 1	-	-	0	0	-	0	994	873	-
Stage 2	-	-	0	0	-	0	995	874	-
Platoon blocked, %		-			-				
Mov Cap-1 Maneuver	1401	-	-	-	-	-	974	0	1055
Mov Cap-2 Maneuver	-	-	-	-	-	-	974	0	-
Stage 1	-	-	-	-	-	-	993	0	-
Stage 2	-	-	-	-	-	-	995	0	-

Approach	EB	WB	NB
HCM Control Delay, s	1.7	0	8.4
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	WBT
Capacity (veh/h)	1055	1401	-	-
HCM Lane V/C Ratio	0.008	0.002	-	-
HCM Control Delay (s)	8.4	7.6	0	-
HCM Lane LOS	A	A	A	-
HCM 95th %tile Q(veh)	0	0	-	-

Intersection	
Int Delay, s/veh	0.8

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	34	4	4	12	1	0
Future Vol, veh/h	34	4	4	12	1	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	88	88	88	88	88	88
Heavy Vehicles, %	38	100	100	50	100	100
Mvmt Flow	39	5	5	14	1	0

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	44	0	66	42
Stage 1	-	-	-	-	42	-
Stage 2	-	-	-	-	24	-
Critical Hdwy	-	-	5.1	-	7.4	7.2
Critical Hdwy Stg 1	-	-	-	-	6.4	-
Critical Hdwy Stg 2	-	-	-	-	6.4	-
Follow-up Hdwy	-	-	3.1	-	4.4	4.2
Pot Cap-1 Maneuver	-	-	1112	-	744	808
Stage 1	-	-	-	-	779	-
Stage 2	-	-	-	-	796	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1112	-	740	808
Mov Cap-2 Maneuver	-	-	-	-	740	-
Stage 1	-	-	-	-	779	-
Stage 2	-	-	-	-	792	-

Approach	EB	WB	NB
HCM Control Delay, s	0	2.1	9.9
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	740	-	-	1112	-
HCM Lane V/C Ratio	0.002	-	-	0.004	-
HCM Control Delay (s)	9.9	-	-	8.3	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0	-	-	0	-

Intersection	
Int Delay, s/veh	2.2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	31	21	7	139	64	7
Future Vol, veh/h	31	21	7	139	64	7
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, %	43	50	80	26	26	43
Mvmt Flow	36	24	8	160	74	8

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	254	78	82	0	-	0
Stage 1	78	-	-	-	-	-
Stage 2	176	-	-	-	-	-
Critical Hdwy	6.83	6.7	4.9	-	-	-
Critical Hdwy Stg 1	5.83	-	-	-	-	-
Critical Hdwy Stg 2	5.83	-	-	-	-	-
Follow-up Hdwy	3.887	3.75	2.92	-	-	-
Pot Cap-1 Maneuver	654	864	1140	-	-	-
Stage 1	851	-	-	-	-	-
Stage 2	765	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	649	864	1140	-	-	-
Mov Cap-2 Maneuver	649	-	-	-	-	-
Stage 1	844	-	-	-	-	-
Stage 2	765	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	10.4	0.4	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1140	-	722	-	-
HCM Lane V/C Ratio	0.007	-	0.083	-	-
HCM Control Delay (s)	8.2	0	10.4	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0.3	-	-

Intersection: 1: I-5 SB Ramps & Kamm Avenue

Movement	SB
Directions Served	LTR
Maximum Queue (ft)	41
Average Queue (ft)	12
95th Queue (ft)	34
Link Distance (ft)	988
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 2: I-5 NB Ramps & Kamm Avenue

Movement	NB
Directions Served	LTR
Maximum Queue (ft)	72
Average Queue (ft)	17
95th Queue (ft)	48
Link Distance (ft)	960
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 3: Main Project Access & Kamm Avenue

Movement
Directions Served
Maximum Queue (ft)
Average Queue (ft)
95th Queue (ft)
Link Distance (ft)
Upstream Blk Time (%)
Queuing Penalty (veh)
Storage Bay Dist (ft)
Storage Blk Time (%)
Queuing Penalty (veh)

Intersection: 4: SR 33 & Kamm Avenue

Movement	EB	NB
Directions Served	LR	LT
Maximum Queue (ft)	79	73
Average Queue (ft)	18	7
95th Queue (ft)	53	36
Link Distance (ft)	7421	5310
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Zone Summary

Zone wide Queuing Penalty: 0

Intersection: 1: I-5 SB Ramps & Kamm Avenue

Movement	SB
Directions Served	LTR
Maximum Queue (ft)	47
Average Queue (ft)	9
95th Queue (ft)	34
Link Distance (ft)	988
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 2: I-5 NB Ramps & Kamm Avenue

Movement	NB
Directions Served	LTR
Maximum Queue (ft)	24
Average Queue (ft)	1
95th Queue (ft)	8
Link Distance (ft)	960
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 3: Main Project Access & Kamm Avenue

Movement	NB
Directions Served	LR
Maximum Queue (ft)	50
Average Queue (ft)	2
95th Queue (ft)	17
Link Distance (ft)	2750
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 4: SR 33 & Kamm Avenue

Movement	EB
Directions Served	LR
Maximum Queue (ft)	94
Average Queue (ft)	36
95th Queue (ft)	75
Link Distance (ft)	7421
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Zone Summary

Zone wide Queuing Penalty: 0

Appendix I: Cumulative Year 2040 No Project Traffic Conditions

Intersection	
Int Delay, s/veh	6.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	5	5	2	0	0	0	0	11	5	7
Future Vol, veh/h	0	0	5	5	2	0	0	0	0	11	5	7
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	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	16974	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	72	72	72	72	72	72	72	72	72	72	72	72
Heavy Vehicles, %	0	38	38	38	38	0	0	0	0	8	8	8
Mvmt Flow	0	0	7	7	3	0	0	0	0	15	7	10

Major/Minor	Major1			Major2			Minor2		
Conflicting Flow All	-	0	0	7	0	0	21	24	3
Stage 1	-	-	-	-	-	-	17	17	-
Stage 2	-	-	-	-	-	-	4	7	-
Critical Hdwy	-	-	-	4.48	-	-	6.48	6.58	6.28
Critical Hdwy Stg 1	-	-	-	-	-	-	5.48	5.58	-
Critical Hdwy Stg 2	-	-	-	-	-	-	5.48	5.58	-
Follow-up Hdwy	-	-	-	2.542	-	-	3.572	4.072	3.372
Pot Cap-1 Maneuver	0	-	-	1407	-	0	981	858	1064
Stage 1	0	-	-	-	-	0	990	869	-
Stage 2	0	-	-	-	-	0	1004	878	-
Platoon blocked, %		-	-		-				
Mov Cap-1 Maneuver	-	-	-	1407	-	-	976	0	1064
Mov Cap-2 Maneuver	-	-	-	-	-	-	976	0	-
Stage 1	-	-	-	-	-	-	990	0	-
Stage 2	-	-	-	-	-	-	999	0	-

Approach	EB	WB	SB
HCM Control Delay, s	0	5.4	8.7
HCM LOS			A

Minor Lane/Major Mvmt	EBT	EBR	WBL	WBT	SBLn1
Capacity (veh/h)	-	-	1407	-	1008
HCM Lane V/C Ratio	-	-	0.005	-	0.032
HCM Control Delay (s)	-	-	7.6	0	8.7
HCM Lane LOS	-	-	A	A	A
HCM 95th %tile Q(veh)	-	-	0	-	0.1

Intersection	
Int Delay, s/veh	5.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	2	10	0	0	7	0	0	10	18	0	0	0
Future Vol, veh/h	2	10	0	0	7	0	0	10	18	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	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	16965	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	38	38	0	0	38	0	8	8	8	0	0	0
Mvmt Flow	2	11	0	0	8	0	0	11	20	0	0	0

Major/Minor	Major1			Major2			Minor1		
Conflicting Flow All	8	0	-	-	-	0	23	23	11
Stage 1	-	-	-	-	-	-	15	15	-
Stage 2	-	-	-	-	-	-	8	8	-
Critical Hdwy	4.48	-	-	-	-	-	6.48	6.58	6.28
Critical Hdwy Stg 1	-	-	-	-	-	-	5.48	5.58	-
Critical Hdwy Stg 2	-	-	-	-	-	-	5.48	5.58	-
Follow-up Hdwy	2.542	-	-	-	-	-	3.572	4.072	3.372
Pot Cap-1 Maneuver	1406	-	0	0	-	0	978	859	1053
Stage 1	-	-	0	0	-	0	992	871	-
Stage 2	-	-	0	0	-	0	1000	877	-
Platoon blocked, %		-			-				
Mov Cap-1 Maneuver	1406	-	-	-	-	-	977	0	1053
Mov Cap-2 Maneuver	-	-	-	-	-	-	977	0	-
Stage 1	-	-	-	-	-	-	991	0	-
Stage 2	-	-	-	-	-	-	1000	0	-

Approach	EB	WB	NB
HCM Control Delay, s	1.3	0	8.5
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	WBT
Capacity (veh/h)	1053	1406	-	-
HCM Lane V/C Ratio	0.03	0.002	-	-
HCM Control Delay (s)	8.5	7.6	0	-
HCM Lane LOS	A	A	A	-
HCM 95th %tile Q(veh)	0.1	0	-	-

Intersection	
Int Delay, s/veh	0.7

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	4	2	21	59	247	30
Future Vol, veh/h	4	2	21	59	247	30
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	79	79	79	79	79	79
Heavy Vehicles, %	38	38	26	26	26	26
Mvmt Flow	5	3	27	75	313	38

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	461	332	351	0	-	0
Stage 1	332	-	-	-	-	-
Stage 2	129	-	-	-	-	-
Critical Hdwy	6.78	6.58	4.36	-	-	-
Critical Hdwy Stg 1	5.78	-	-	-	-	-
Critical Hdwy Stg 2	5.78	-	-	-	-	-
Follow-up Hdwy	3.842	3.642	2.434	-	-	-
Pot Cap-1 Maneuver	498	634	1086	-	-	-
Stage 1	653	-	-	-	-	-
Stage 2	815	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	485	634	1086	-	-	-
Mov Cap-2 Maneuver	485	-	-	-	-	-
Stage 1	636	-	-	-	-	-
Stage 2	815	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	11.9	2.2	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1086	-	526	-	-
HCM Lane V/C Ratio	0.024	-	0.014	-	-
HCM Control Delay (s)	8.4	0	11.9	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0.1	-	0	-	-

Intersection	
Int Delay, s/veh	2.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	2	2	13	0	0	0	0	0	8	5	4
Future Vol, veh/h	0	2	2	13	0	0	0	0	0	8	5	4
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	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	16974	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	0	38	38	38	38	0	0	0	0	8	8	8
Mvmt Flow	0	2	2	14	0	0	0	0	0	9	5	4

Major/Minor	Major1			Major2					Minor2		
Conflicting Flow All	-	0	0	4	0	0			31	32	0
Stage 1	-	-	-	-	-	-			28	28	-
Stage 2	-	-	-	-	-	-			3	4	-
Critical Hdwy	-	-	-	4.48	-	-			6.48	6.58	6.28
Critical Hdwy Stg 1	-	-	-	-	-	-			5.48	5.58	-
Critical Hdwy Stg 2	-	-	-	-	-	-			5.48	5.58	-
Follow-up Hdwy	-	-	-	2.542	-	-			3.572	4.072	3.372
Pot Cap-1 Maneuver	0	-	-	1411	-	0			968	849	-
Stage 1	0	-	-	-	-	0			979	860	-
Stage 2	0	-	-	-	-	0			1005	881	-
Platoon blocked, %		-	-		-						
Mov Cap-1 Maneuver	-	-	-	1411	-	-			958	0	-
Mov Cap-2 Maneuver	-	-	-	-	-	-			958	0	-
Stage 1	-	-	-	-	-	-			979	0	-
Stage 2	-	-	-	-	-	-			995	0	-

Approach	EB	WB	SB
HCM Control Delay, s	0	7.6	
HCM LOS			-

Minor Lane/Major Mvmt	EBT	EBR	WBL	WBT	SBLn1
Capacity (veh/h)	-	-	1411	-	-
HCM Lane V/C Ratio	-	-	0.01	-	-
HCM Control Delay (s)	-	-	7.6	0	-
HCM Lane LOS	-	-	A	A	-
HCM 95th %tile Q(veh)	-	-	0	-	-

Intersection	
Int Delay, s/veh	2.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	2	8	0	0	13	0	0	5	4	0	0	0
Future Vol, veh/h	2	8	0	0	13	0	0	5	4	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	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	16965	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	81	81	81	81	81	81	81	81	81	81	81	81
Heavy Vehicles, %	38	38	0	0	38	0	8	8	8	0	0	0
Mvmt Flow	2	10	0	0	16	0	0	6	5	0	0	0

Major/Minor	Major1			Major2			Minor1		
Conflicting Flow All	16	0	-	-	-	0	30	30	10
Stage 1	-	-	-	-	-	-	14	14	-
Stage 2	-	-	-	-	-	-	16	16	-
Critical Hdwy	4.48	-	-	-	-	-	6.48	6.58	6.28
Critical Hdwy Stg 1	-	-	-	-	-	-	5.48	5.58	-
Critical Hdwy Stg 2	-	-	-	-	-	-	5.48	5.58	-
Follow-up Hdwy	2.542	-	-	-	-	-	3.572	4.072	3.372
Pot Cap-1 Maneuver	1396	-	0	0	-	0	969	851	1054
Stage 1	-	-	0	0	-	0	993	872	-
Stage 2	-	-	0	0	-	0	991	870	-
Platoon blocked, %		-			-				
Mov Cap-1 Maneuver	1396	-	-	-	-	-	968	0	1054
Mov Cap-2 Maneuver	-	-	-	-	-	-	968	0	-
Stage 1	-	-	-	-	-	-	992	0	-
Stage 2	-	-	-	-	-	-	991	0	-

Approach	EB	WB	NB
HCM Control Delay, s	1.5	0	8.5
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	WBT
Capacity (veh/h)	1054	1396	-	-
HCM Lane V/C Ratio	0.011	0.002	-	-
HCM Control Delay (s)	8.5	7.6	0	-
HCM Lane LOS	A	A	A	-
HCM 95th %tile Q(veh)	0	0	-	-

Intersection	
Int Delay, s/veh	2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	36	22	4	189	87	5
Future Vol, veh/h	36	22	4	189	87	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, %	38	38	26	26	26	26
Mvmt Flow	41	25	5	217	100	6

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	330	103	106	0	-	0
Stage 1	103	-	-	-	-	-
Stage 2	227	-	-	-	-	-
Critical Hdwy	6.78	6.58	4.36	-	-	-
Critical Hdwy Stg 1	5.78	-	-	-	-	-
Critical Hdwy Stg 2	5.78	-	-	-	-	-
Follow-up Hdwy	3.842	3.642	2.434	-	-	-
Pot Cap-1 Maneuver	597	862	1348	-	-	-
Stage 1	839	-	-	-	-	-
Stage 2	733	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	595	862	1348	-	-	-
Mov Cap-2 Maneuver	595	-	-	-	-	-
Stage 1	836	-	-	-	-	-
Stage 2	733	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	10.9	0.2	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1348	-	674	-	-
HCM Lane V/C Ratio	0.003	-	0.099	-	-
HCM Control Delay (s)	7.7	0	10.9	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0.3	-	-

Intersection: 1: I-5 SB Ramps & Kamm Avenue

Movement	SB
Directions Served	LTR
Maximum Queue (ft)	73
Average Queue (ft)	18
95th Queue (ft)	51
Link Distance (ft)	988
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 2: I-5 NB Ramps & Kamm Avenue

Movement	NB
Directions Served	LTR
Maximum Queue (ft)	61
Average Queue (ft)	16
95th Queue (ft)	44
Link Distance (ft)	960
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 4: SR 33 & Kamm Avenue

Movement	EB	NB
Directions Served	LR	LT
Maximum Queue (ft)	48	25
Average Queue (ft)	8	5
95th Queue (ft)	35	21
Link Distance (ft)	6567	5310
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Zone Summary

Zone wide Queuing Penalty: 0

Intersection: 1: I-5 SB Ramps & Kamm Avenue

Movement	SB
Directions Served	LTR
Maximum Queue (ft)	42
Average Queue (ft)	11
95th Queue (ft)	32
Link Distance (ft)	988
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 2: I-5 NB Ramps & Kamm Avenue

Movement	NB
Directions Served	LTR
Maximum Queue (ft)	28
Average Queue (ft)	8
95th Queue (ft)	27
Link Distance (ft)	960
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 4: SR 33 & Kamm Avenue

Movement	EB
Directions Served	LR
Maximum Queue (ft)	90
Average Queue (ft)	34
95th Queue (ft)	64
Link Distance (ft)	6567
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Zone Summary

Zone wide Queuing Penalty: 0

Appendix J: Cumulative Year 2040 plus Project Traffic Conditions

Intersection	
Int Delay, s/veh	6.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	5	5	2	0	0	0	0	13	5	7
Future Vol, veh/h	0	0	5	5	2	0	0	0	0	13	5	7
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	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	16974	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	72	72	72	72	72	72	72	72	72	72	72	72
Heavy Vehicles, %	0	38	38	38	38	0	0	0	0	11	8	8
Mvmt Flow	0	0	7	7	3	0	0	0	0	18	7	10

Major/Minor	Major1			Major2					Minor2		
Conflicting Flow All	-	0	0	7	0	0			21	24	3
Stage 1	-	-	-	-	-	-			17	17	-
Stage 2	-	-	-	-	-	-			4	7	-
Critical Hdwy	-	-	-	4.48	-	-			6.51	6.58	6.28
Critical Hdwy Stg 1	-	-	-	-	-	-			5.51	5.58	-
Critical Hdwy Stg 2	-	-	-	-	-	-			5.51	5.58	-
Follow-up Hdwy	-	-	-	2.542	-	-			3.599	4.072	3.372
Pot Cap-1 Maneuver	0	-	-	1407	-	0			973	858	1064
Stage 1	0	-	-	-	-	0			983	869	-
Stage 2	0	-	-	-	-	0			996	878	-
Platoon blocked, %		-	-		-						
Mov Cap-1 Maneuver	-	-	-	1407	-	-			968	0	1064
Mov Cap-2 Maneuver	-	-	-	-	-	-			968	0	-
Stage 1	-	-	-	-	-	-			983	0	-
Stage 2	-	-	-	-	-	-			991	0	-

Approach	EB	WB	SB
HCM Control Delay, s	0	5.4	8.7
HCM LOS			A

Minor Lane/Major Mvmt	EBT	EBR	WBL	WBT	SBLn1
Capacity (veh/h)	-	-	1407	-	1000
HCM Lane V/C Ratio	-	-	0.005	-	0.035
HCM Control Delay (s)	-	-	7.6	0	8.7
HCM Lane LOS	-	-	A	A	A
HCM 95th %tile Q(veh)	-	-	0	-	0.1

Intersection	
Int Delay, s/veh	5.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	2	12	0	0	7	0	0	10	18	0	0	0
Future Vol, veh/h	2	12	0	0	7	0	0	10	18	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	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	16965	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	38	38	0	0	38	0	8	8	8	0	0	0
Mvmt Flow	2	13	0	0	8	0	0	11	20	0	0	0

Major/Minor	Major1			Major2			Minor1		
Conflicting Flow All	8	0	-	-	-	0	25	25	13
Stage 1	-	-	-	-	-	-	17	17	-
Stage 2	-	-	-	-	-	-	8	8	-
Critical Hdwy	4.48	-	-	-	-	-	6.48	6.58	6.28
Critical Hdwy Stg 1	-	-	-	-	-	-	5.48	5.58	-
Critical Hdwy Stg 2	-	-	-	-	-	-	5.48	5.58	-
Follow-up Hdwy	2.542	-	-	-	-	-	3.572	4.072	3.372
Pot Cap-1 Maneuver	1406	-	0	0	-	0	975	857	1050
Stage 1	-	-	0	0	-	0	990	869	-
Stage 2	-	-	0	0	-	0	1000	877	-
Platoon blocked, %		-			-				
Mov Cap-1 Maneuver	1406	-	-	-	-	-	974	0	1050
Mov Cap-2 Maneuver	-	-	-	-	-	-	974	0	-
Stage 1	-	-	-	-	-	-	989	0	-
Stage 2	-	-	-	-	-	-	1000	0	-

Approach	EB	WB	NB
HCM Control Delay, s	1.1	0	8.5
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	WBT
Capacity (veh/h)	1050	1406	-	-
HCM Lane V/C Ratio	0.03	0.002	-	-
HCM Control Delay (s)	8.5	7.6	0	-
HCM Lane LOS	A	A	A	-
HCM 95th %tile Q(veh)	0.1	0	-	-

Intersection	
Int Delay, s/veh	0.6

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	12	2	5	53	0	0
Future Vol, veh/h	12	2	5	53	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	88	88	88	88	88	88
Heavy Vehicles, %	38	100	100	38	100	100
Mvmt Flow	14	2	6	60	0	0

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	16	0	87	15
Stage 1	-	-	-	-	15	-
Stage 2	-	-	-	-	72	-
Critical Hdwy	-	-	5.1	-	7.4	7.2
Critical Hdwy Stg 1	-	-	-	-	6.4	-
Critical Hdwy Stg 2	-	-	-	-	6.4	-
Follow-up Hdwy	-	-	3.1	-	4.4	4.2
Pot Cap-1 Maneuver	-	-	1143	-	721	839
Stage 1	-	-	-	-	804	-
Stage 2	-	-	-	-	752	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1143	-	717	839
Mov Cap-2 Maneuver	-	-	-	-	717	-
Stage 1	-	-	-	-	804	-
Stage 2	-	-	-	-	748	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.7	0
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	-	-	-	1143	-
HCM Lane V/C Ratio	-	-	-	0.005	-
HCM Control Delay (s)	0	-	-	8.2	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	-	-	-	0	-

Intersection	
Int Delay, s/veh	1.4

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	14	16	33	59	247	81
Future Vol, veh/h	14	16	33	59	247	81
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	79	79	79	79	79	79
Heavy Vehicles, %	8	20	28	26	26	9
Mvmt Flow	18	20	42	75	313	103

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	524	365	416	0	-	0
Stage 1	365	-	-	-	-	-
Stage 2	159	-	-	-	-	-
Critical Hdwy	6.48	6.4	4.38	-	-	-
Critical Hdwy Stg 1	5.48	-	-	-	-	-
Critical Hdwy Stg 2	5.48	-	-	-	-	-
Follow-up Hdwy	3.572	3.48	2.452	-	-	-
Pot Cap-1 Maneuver	503	642	1016	-	-	-
Stage 1	689	-	-	-	-	-
Stage 2	855	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	481	642	1016	-	-	-
Mov Cap-2 Maneuver	481	-	-	-	-	-
Stage 1	659	-	-	-	-	-
Stage 2	855	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	12	3.1	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1016	-	555	-	-
HCM Lane V/C Ratio	0.041	-	0.068	-	-
HCM Control Delay (s)	8.7	0	12	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0.1	-	0.2	-	-

Intersection	
Int Delay, s/veh	2.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	2	2	13	0	0	0	0	0	9	5	4
Future Vol, veh/h	0	2	2	13	0	0	0	0	0	9	5	4
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	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	16974	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	0	38	38	38	38	0	0	0	0	17	8	8
Mvmt Flow	0	2	2	14	0	0	0	0	0	10	5	4

Major/Minor	Major1			Major2					Minor2		
Conflicting Flow All	-	0	0	4	0	0			31	32	0
Stage 1	-	-	-	-	-	-			28	28	-
Stage 2	-	-	-	-	-	-			3	4	-
Critical Hdwy	-	-	-	4.48	-	-			6.57	6.58	6.28
Critical Hdwy Stg 1	-	-	-	-	-	-			5.57	5.58	-
Critical Hdwy Stg 2	-	-	-	-	-	-			5.57	5.58	-
Follow-up Hdwy	-	-	-	2.542	-	-			3.653	4.072	3.372
Pot Cap-1 Maneuver	0	-	-	1411	-	0			946	849	-
Stage 1	0	-	-	-	-	0			957	860	-
Stage 2	0	-	-	-	-	0			982	881	-
Platoon blocked, %		-	-		-						
Mov Cap-1 Maneuver	-	-	-	1411	-	-			937	0	-
Mov Cap-2 Maneuver	-	-	-	-	-	-			937	0	-
Stage 1	-	-	-	-	-	-			957	0	-
Stage 2	-	-	-	-	-	-			972	0	-

Approach	EB	WB	SB
HCM Control Delay, s	0	7.6	
HCM LOS			-

Minor Lane/Major Mvmt	EBT	EBR	WBL	WBT	SBLn1
Capacity (veh/h)	-	-	1411	-	-
HCM Lane V/C Ratio	-	-	0.01	-	-
HCM Control Delay (s)	-	-	7.6	0	-
HCM Lane LOS	-	-	A	A	-
HCM 95th %tile Q(veh)	-	-	0	-	-

Intersection	
Int Delay, s/veh	2.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	2	9	0	0	13	0	0	5	4	0	0	0
Future Vol, veh/h	2	9	0	0	13	0	0	5	4	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	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	16965	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	81	81	81	81	81	81	81	81	81	81	81	81
Heavy Vehicles, %	38	50	0	0	38	0	8	8	8	0	0	0
Mvmt Flow	2	11	0	0	16	0	0	6	5	0	0	0

Major/Minor	Major1			Major2			Minor1		
Conflicting Flow All	16	0	-	-	-	0	31	31	11
Stage 1	-	-	-	-	-	-	15	15	-
Stage 2	-	-	-	-	-	-	16	16	-
Critical Hdwy	4.48	-	-	-	-	-	6.48	6.58	6.28
Critical Hdwy Stg 1	-	-	-	-	-	-	5.48	5.58	-
Critical Hdwy Stg 2	-	-	-	-	-	-	5.48	5.58	-
Follow-up Hdwy	2.542	-	-	-	-	-	3.572	4.072	3.372
Pot Cap-1 Maneuver	1396	-	0	0	-	0	968	850	1053
Stage 1	-	-	0	0	-	0	992	871	-
Stage 2	-	-	0	0	-	0	991	870	-
Platoon blocked, %		-			-				
Mov Cap-1 Maneuver	1396	-	-	-	-	-	967	0	1053
Mov Cap-2 Maneuver	-	-	-	-	-	-	967	0	-
Stage 1	-	-	-	-	-	-	991	0	-
Stage 2	-	-	-	-	-	-	991	0	-

Approach	EB	WB	NB
HCM Control Delay, s	1.4	0	8.5
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	WBT
Capacity (veh/h)	1053	1396	-	-
HCM Lane V/C Ratio	0.011	0.002	-	-
HCM Control Delay (s)	8.5	7.6	0	-
HCM Lane LOS	A	A	A	-
HCM 95th %tile Q(veh)	0	0	-	-

Intersection	
Int Delay, s/veh	0.6

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	47	4	4	15	1	0
Future Vol, veh/h	47	4	4	15	1	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	88	88	88	88	88	88
Heavy Vehicles, %	38	100	100	50	100	100
Mvmt Flow	53	5	5	17	1	0

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	58	0	83	56
Stage 1	-	-	-	-	56	-
Stage 2	-	-	-	-	27	-
Critical Hdwy	-	-	5.1	-	7.4	7.2
Critical Hdwy Stg 1	-	-	-	-	6.4	-
Critical Hdwy Stg 2	-	-	-	-	6.4	-
Follow-up Hdwy	-	-	3.1	-	4.4	4.2
Pot Cap-1 Maneuver	-	-	1097	-	725	792
Stage 1	-	-	-	-	766	-
Stage 2	-	-	-	-	793	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1097	-	721	792
Mov Cap-2 Maneuver	-	-	-	-	721	-
Stage 1	-	-	-	-	766	-
Stage 2	-	-	-	-	789	-

Approach	EB	WB	NB
HCM Control Delay, s	0	1.7	10
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	721	-	-	1097	-
HCM Lane V/C Ratio	0.002	-	-	0.004	-
HCM Control Delay (s)	10	-	-	8.3	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0	-	-	0	-

Intersection	
Int Delay, s/veh	2.3

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	40	27	8	189	87	8
Future Vol, veh/h	40	27	8	189	87	8
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, %	43	50	80	26	26	43
Mvmt Flow	46	31	9	217	100	9

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	340	105	109	0	-	0
Stage 1	105	-	-	-	-	-
Stage 2	235	-	-	-	-	-
Critical Hdwy	6.83	6.7	4.9	-	-	-
Critical Hdwy Stg 1	5.83	-	-	-	-	-
Critical Hdwy Stg 2	5.83	-	-	-	-	-
Follow-up Hdwy	3.887	3.75	2.92	-	-	-
Pot Cap-1 Maneuver	581	834	1111	-	-	-
Stage 1	826	-	-	-	-	-
Stage 2	717	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	576	834	1111	-	-	-
Mov Cap-2 Maneuver	576	-	-	-	-	-
Stage 1	819	-	-	-	-	-
Stage 2	717	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	11.2	0.3	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1111	-	658	-	-
HCM Lane V/C Ratio	0.008	-	0.117	-	-
HCM Control Delay (s)	8.3	0	11.2	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0.4	-	-

Intersection: 1: I-5 SB Ramps & Kamm Avenue

Movement	SB
Directions Served	LTR
Maximum Queue (ft)	59
Average Queue (ft)	19
95th Queue (ft)	41
Link Distance (ft)	988
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 2: I-5 NB Ramps & Kamm Avenue

Movement	NB
Directions Served	LTR
Maximum Queue (ft)	72
Average Queue (ft)	22
95th Queue (ft)	58
Link Distance (ft)	960
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 3: Main Project Access & Kamm Avenue

Movement
Directions Served
Maximum Queue (ft)
Average Queue (ft)
95th Queue (ft)
Link Distance (ft)
Upstream Blk Time (%)
Queuing Penalty (veh)
Storage Bay Dist (ft)
Storage Blk Time (%)
Queuing Penalty (veh)

Intersection: 4: SR 33 & Kamm Avenue

Movement	EB	NB
Directions Served	LR	LT
Maximum Queue (ft)	48	31
Average Queue (ft)	15	6
95th Queue (ft)	40	23
Link Distance (ft)	7421	5310
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Zone Summary

Zone wide Queuing Penalty: 0

Intersection: 1: I-5 SB Ramps & Kamm Avenue

Movement	SB
Directions Served	LTR
Maximum Queue (ft)	48
Average Queue (ft)	14
95th Queue (ft)	36
Link Distance (ft)	988
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 2: I-5 NB Ramps & Kamm Avenue

Movement	NB
Directions Served	LTR
Maximum Queue (ft)	29
Average Queue (ft)	6
95th Queue (ft)	24
Link Distance (ft)	960
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 3: Main Project Access & Kamm Avenue

Movement	NB
Directions Served	LR
Maximum Queue (ft)	55
Average Queue (ft)	4
95th Queue (ft)	25
Link Distance (ft)	2750
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 4: SR 33 & Kamm Avenue

Movement	EB	NB
Directions Served	LR	LT
Maximum Queue (ft)	111	43
Average Queue (ft)	43	1
95th Queue (ft)	91	14
Link Distance (ft)	7421	5310
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Zone Summary

Zone wide Queuing Penalty: 0

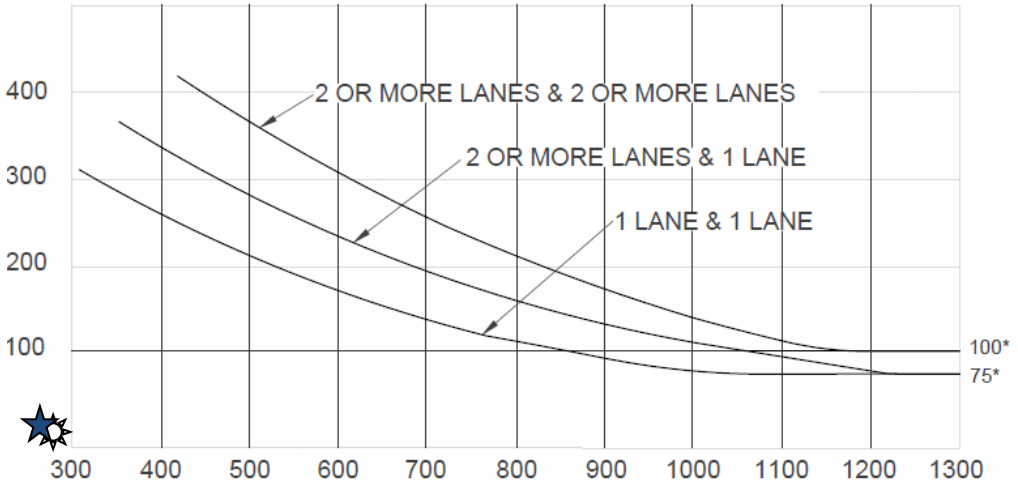
Appendix K: Traffic Signal Warrants

Warrant 3: Peak Hour (Rural)

Existing Traffic Conditions
1. I-5 SB Ramps/ Kamm Avenue
AM (PM) Peak Hour

(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 40 MPH ON MAJOR STREET)

Kamm Avenue Highest Approach Volume = 4 (8) VPH



I-5 SB Ramps Total of Both Approaches =

14 (10) VPH

*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor street approach with one lane.

AM Peak Hour – Signal Warrant is Not Met

PM Peak Hour – Signal Warrant is Not Met

Source: California Manual of Uniform Traffic Control Devices (CA MUTCD 2014 Edition)
Chapter 4C: Traffic Control Signal Needs Studies
Part 4: Highway Traffic Signals
November 7, 2014

JLB TRAFFIC ENGINEERING, INC.

www.JLBtraffic.com

info@JLBtraffic.com

516 W. Shaw Ave., Ste. 103

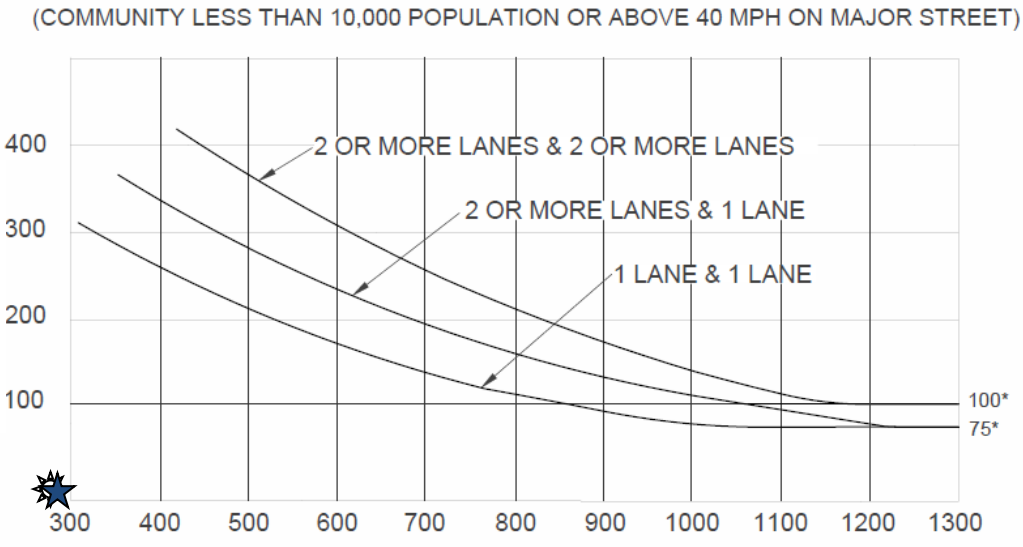
Fresno, CA 93704

(559) 570-8991

Warrant 3: Peak Hour (Rural)

Existing Traffic Conditions
2. I-5 NB Ramps/ Kamm Avenue
AM (PM) Peak Hour

I-5 NB Ramps
Highest Approach Volume =
12 (4) VPH



Kamm Avenue Total of Both Approaches =

20 (21) VPH

*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor street approach with one lane.

AM Peak Hour – Signal Warrant is Not Met

PM Peak Hour – Signal Warrant is Not Met

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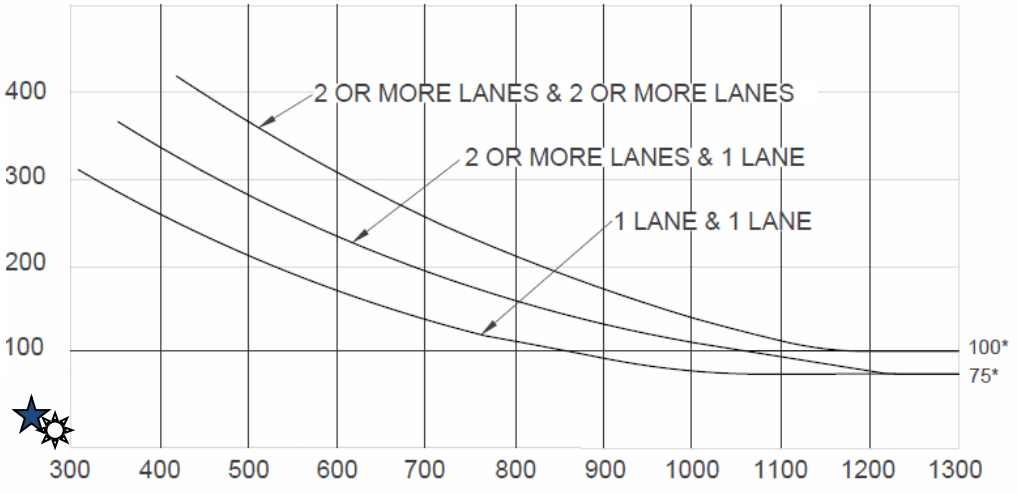
Warrant 3: Peak Hour (Rural)

Existing Traffic Conditions
4. State Route 33/ Kamm Avenue
AM (PM) Peak Hour

(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 40 MPH ON MAJOR STREET)

Kamm Avenue Highest Approach Volume =

3 (30) VPH



State Route 33 Total of Both Approaches =

229 (183) VPH

*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor street approach with one lane.

AM Peak Hour – Signal Warrant is Not Met

PM Peak Hour – Signal Warrant is Not Met

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Fresno, CA 93704

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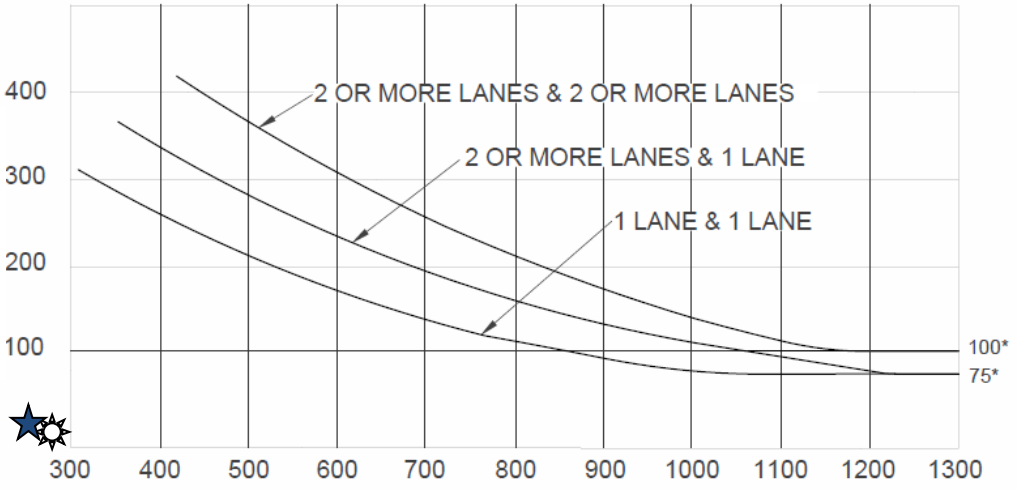
Warrant 3: Peak Hour (Rural)

Existing Plus Project Traffic Conditions
1. I-5 SB Ramps/ Kamm Avenue
AM (PM) Peak Hour

(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 40 MPH ON MAJOR STREET)

Kamm Avenue Highest Approach Volume = 4 (8) VPH



I-5 SB Ramps Total of Both Approaches =

16 (11) VPH

*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor street approach with one lane.

AM Peak Hour – Signal Warrant is Not Met

PM Peak Hour – Signal Warrant is Not Met

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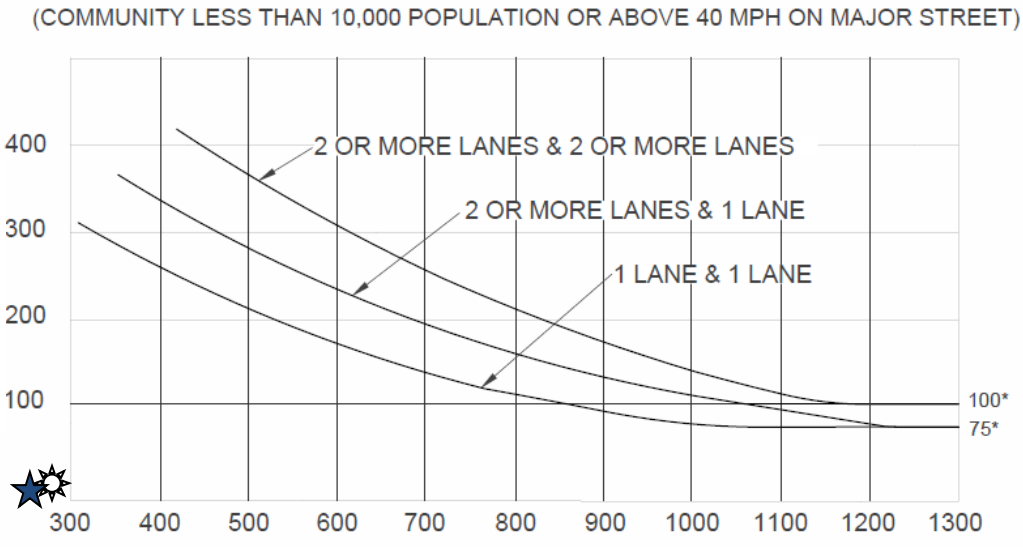
Existing Plus Project Traffic Conditions
2. I-5 NB Ramps/ Kamm Avenue
AM (PM) Peak Hour

I-5 NB Ramps

Highest Approach Volume =

12 (4) VPH



Kamm Avenue Total of Both Approaches =

31 (23) VPH

*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor street approach with one lane.

AM Peak Hour – Signal Warrant is Not Met

PM Peak Hour – Signal Warrant is Not Met

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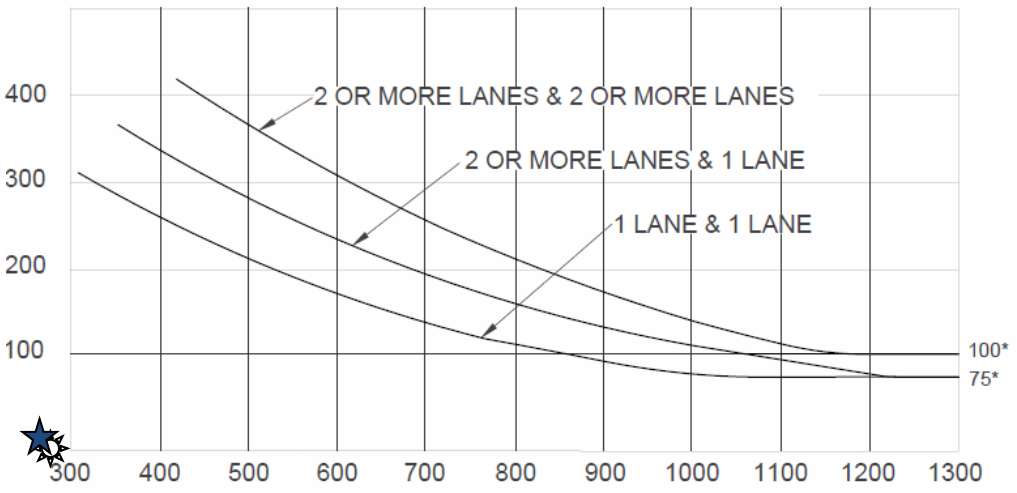
Warrant 3: Peak Hour (Rural)

Existing Plus Project Traffic Conditions
3. Main Project Access/ Kamm Avenue
AM (PM) Peak Hour

(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 40 MPH ON MAJOR STREET)

Main Project Access Highest Approach Volume = 0 (1) VPH



Kamm Avenue Total of Both Approaches = 53 (48) VPH

*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor street approach with one lane.

AM Peak Hour – Signal Warrant is Not Met
PM Peak Hour – Signal Warrant is Not Met

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info@JLBtraffic.com

516 W. Shaw Ave., Ste. 103
Fresno, CA 93704
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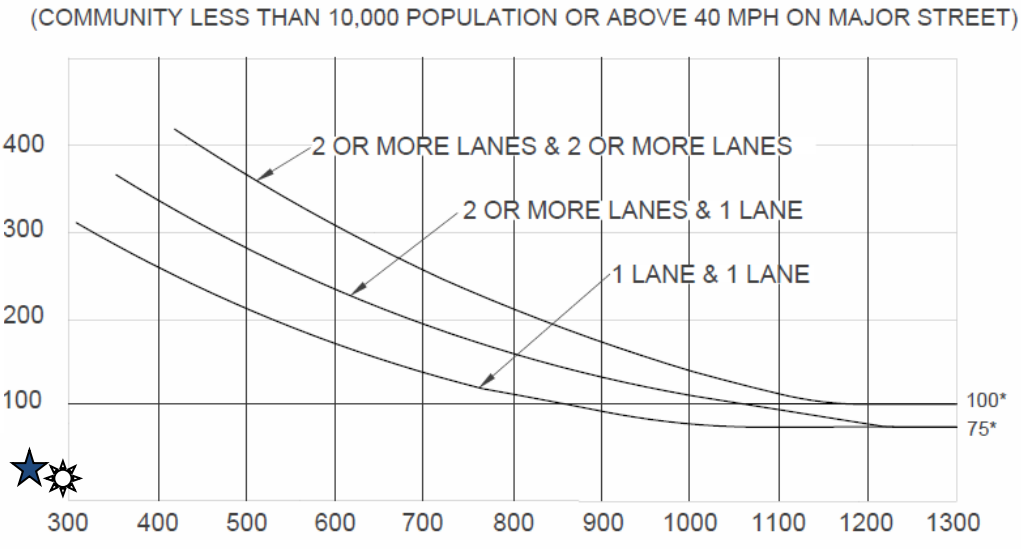
Warrant 3: Peak Hour (Rural)

Existing Plus Project Traffic Conditions
4. State Route 33/ Kamm Avenue
AM (PM) Peak Hour

Kamm Avenue Highest Approach Volume = 20 (37) VPH



State Route 33 Total of Both Approaches =

292 (190) VPH

*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor street approach with one lane.

AM Peak Hour – Signal Warrant is Not Met

PM Peak Hour – Signal Warrant is Not Met

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Fresno, CA 93704

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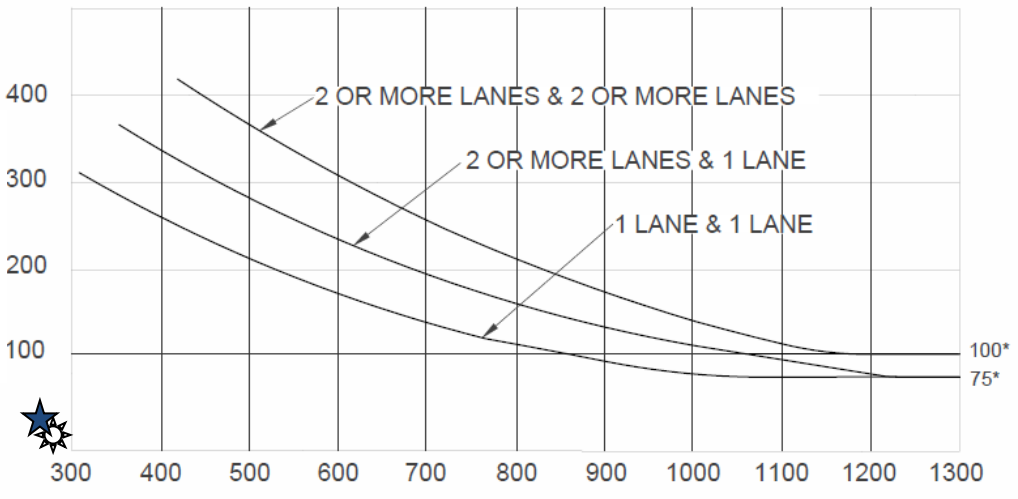
Warrant 3: Peak Hour (Rural)

Near Term Year 2025 plus Project Traffic Conditions
1. I-5 SB Ramps/ Kamm Avenue
AM (PM) Peak Hour

(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 40 MPH ON MAJOR STREET)

Kamm Avenue Highest Approach Volume = 6 (13) VPH



I-5 SB Ramps Total of Both Approaches =

19 (14) VPH

*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor street approach with one lane.

AM Peak Hour – Signal Warrant is Not Met

PM Peak Hour – Signal Warrant is Not Met

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516 W. Shaw Ave., Ste. 103
Fresno, CA 93704
(559) 570-8991

Warrant 3: Peak Hour (Rural)

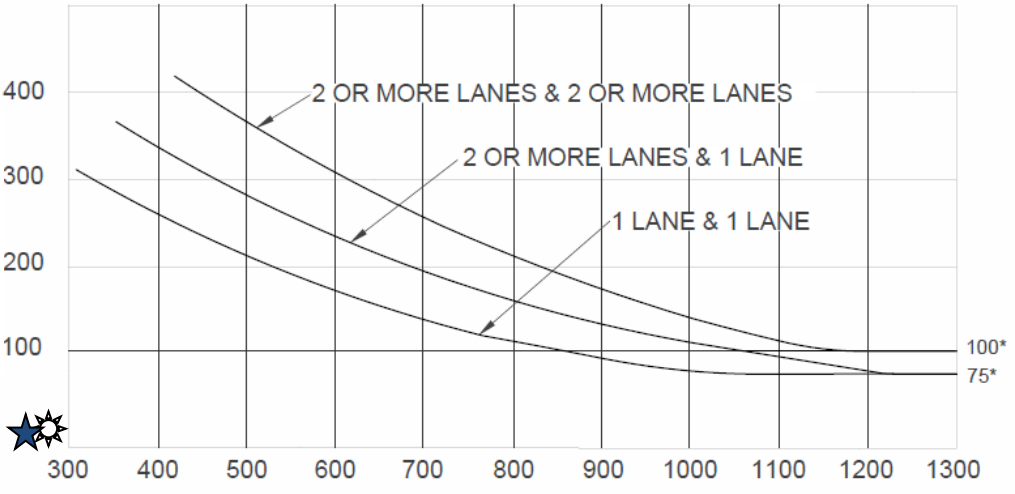
Near Term Year 2025 plus Project Traffic Conditions
2. I-5 NB Ramps/ Kamm Avenue
AM (PM) Peak Hour

(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 40 MPH ON MAJOR STREET)

I-5 NB Ramps

Highest Approach Volume =

14 (6) VPH



Kamm Avenue Total of Both Approaches =

36 (28) VPH

*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor street approach with one lane.

AM Peak Hour – Signal Warrant is Not Met

PM Peak Hour – Signal Warrant is Not Met

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www.JLBtraffic.com

info@JLBtraffic.com

516 W. Shaw Ave., Ste. 103

Fresno, CA 93704

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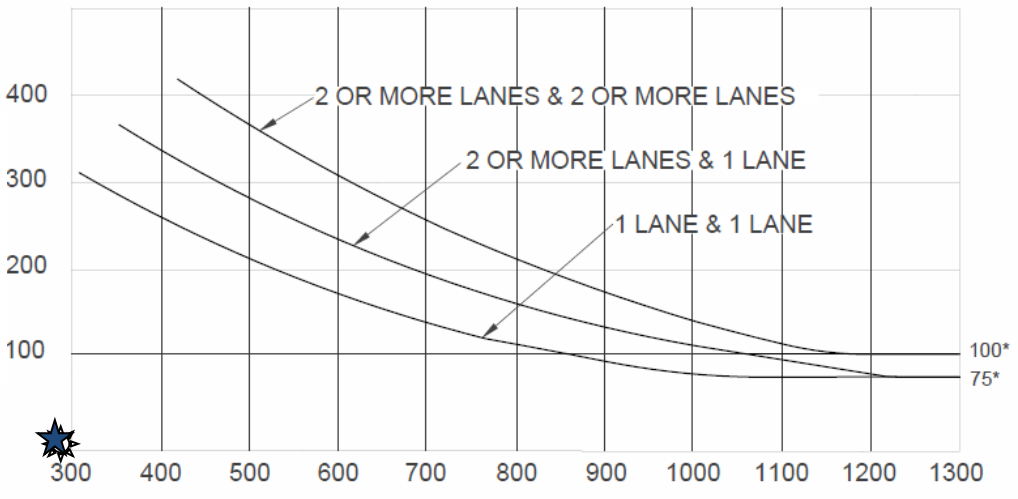
Warrant 3: Peak Hour (Rural)

Near Term Year 2025 plus Project Traffic Conditions
3. Main Project Access/ Kamm Avenue
AM (PM) Peak Hour

(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 40 MPH ON MAJOR STREET)

Main Project Access Highest Approach Volume =

0 (1) VPH



Kamm Avenue Total of Both Approaches =

58 (54) VPH

*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor street approach with one lane.

AM Peak Hour – Signal Warrant is Not Met

PM Peak Hour – Signal Warrant is Not Met

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Fresno, CA 93704

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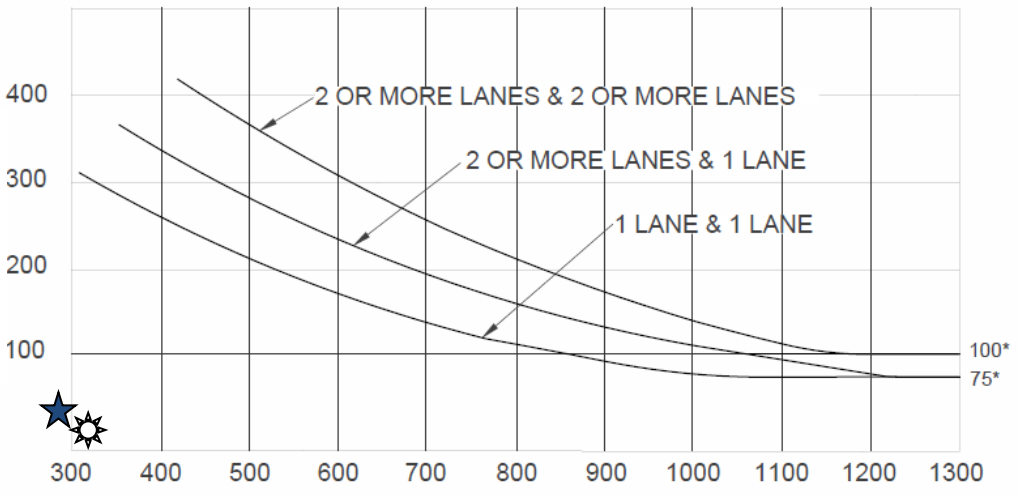
Warrant 3: Peak Hour (Rural)

Near Term Year 2025 plus Project Traffic Conditions
4. State Route 33/ Kamm Avenue
AM (PM) Peak Hour

(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 40 MPH ON MAJOR STREET)

Kamm Avenue Highest Approach Volume =

21 (42) VPH



State Route 33 Total of Both Approaches =

325 (217) VPH

*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor street approach with one lane.

AM Peak Hour – Signal Warrant is Not Met

PM Peak Hour – Signal Warrant is Not Met

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516 W. Shaw Ave., Ste. 103

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Fresno, CA 93704

info@JLBtraffic.com

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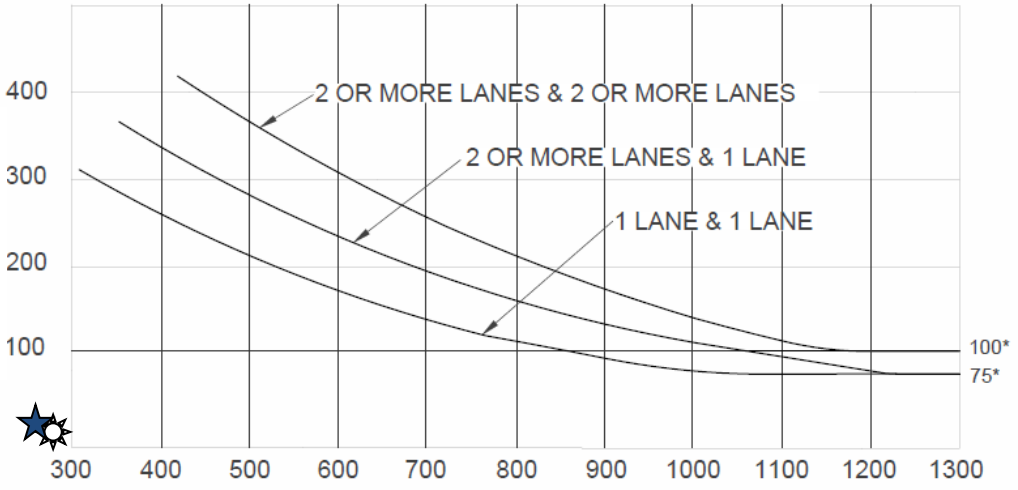
Warrant 3: Peak Hour (Rural)

Cumulative Year 2040 No Project Traffic Conditions
1. I-5 SB Ramps/ Kamm Avenue
AM (PM) Peak Hour

(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 40 MPH ON MAJOR STREET)

Kamm Avenue Highest Approach Volume = 7 (13) VPH



I-5 SB Ramps Total of Both Approaches =

23 (17) VPH

*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor street approach with one lane.

AM Peak Hour – Signal Warrant is Not Met

PM Peak Hour – Signal Warrant is Not Met

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www.JLBtraffic.com

info@JLBtraffic.com

516 W. Shaw Ave., Ste. 103

Fresno, CA 93704

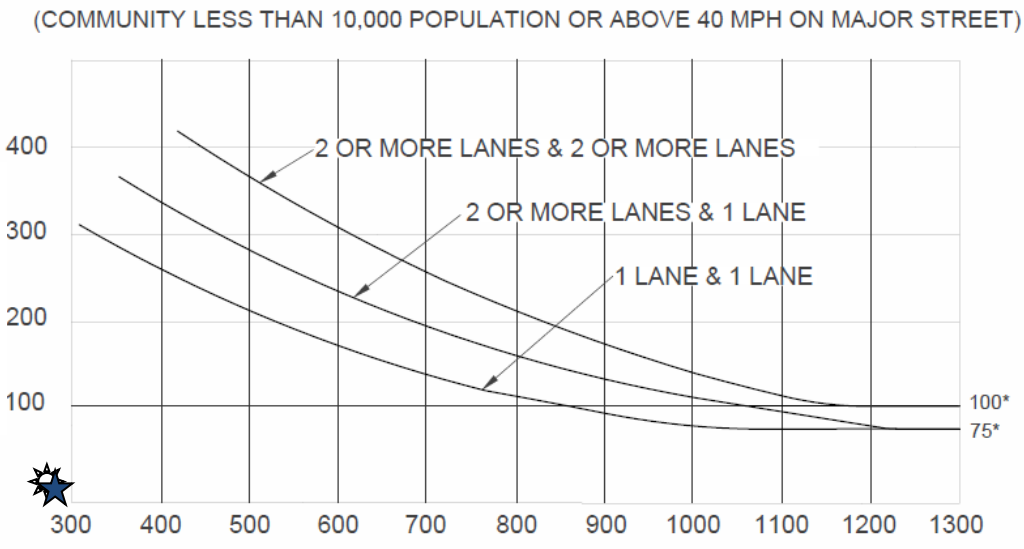
(559) 570-8991

Warrant 3: Peak Hour (Rural)

Cumulative Year 2040 No Project Traffic Conditions
2. I-5 NB Ramps/ Kamm Avenue
AM (PM) Peak Hour

I-5 NB Ramps Highest Approach Volume =

19 (7) VPH



Kamm Avenue Total of Both Approaches =

33 (34) VPH

*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor street approach with one lane.

AM Peak Hour – Signal Warrant is Not Met

PM Peak Hour – Signal Warrant is Not Met

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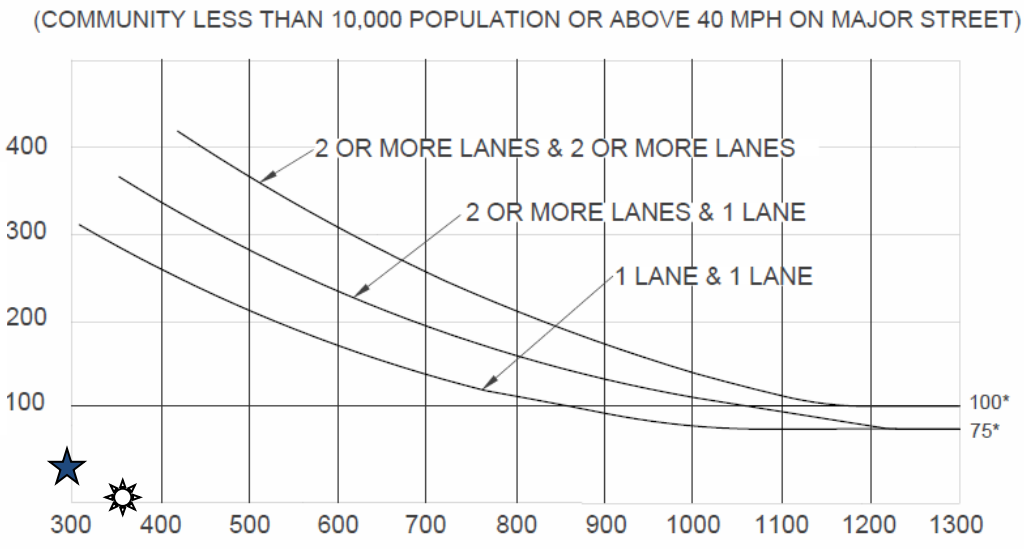
(559) 570-8991

Warrant 3: Peak Hour (Rural)

Cumulative Year 2040 No Project Traffic Conditions
4. State Route 33/ Kamm Avenue
AM (PM) Peak Hour

Kamm Avenue Highest Approach Volume =

5 (47) VPH



State Route 33 Total of Both Approaches =

357 (285) VPH

*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor street approach with one lane.

AM Peak Hour – Signal Warrant is Not Met

PM Peak Hour – Signal Warrant is Not Met

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Fresno, CA 93704

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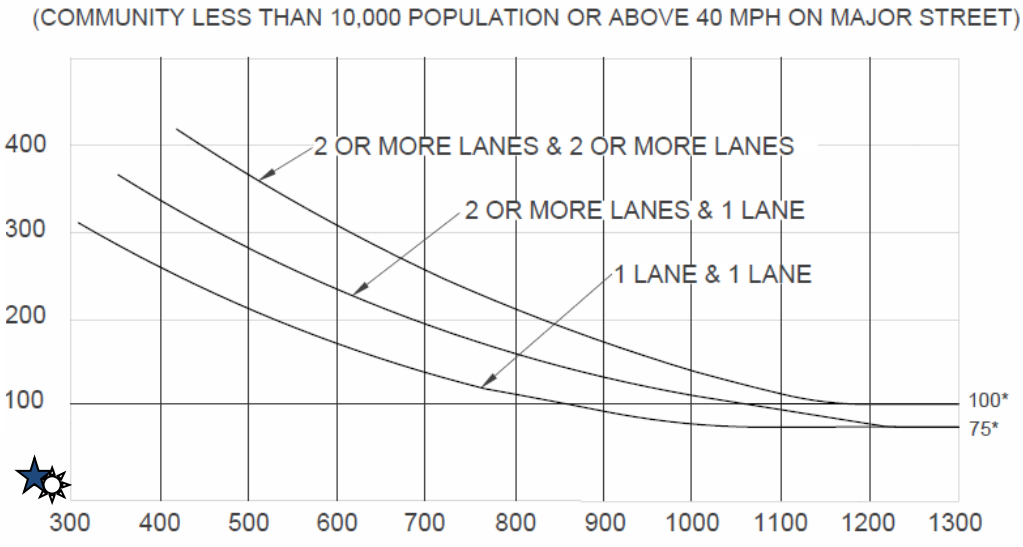
Warrant 3: Peak Hour (Rural)

Cumulative Year 2040 plus Project Traffic Conditions
1. I-5 SB Ramps/ Kamm Avenue
AM (PM) Peak Hour

Kamm Avenue Highest Approach Volume = 7 (13) VPH



I-5 SB Ramps Total of Both Approaches =

25 (18) VPH

*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor street approach with one lane.

AM Peak Hour – Signal Warrant is Not Met

PM Peak Hour – Signal Warrant is Not Met

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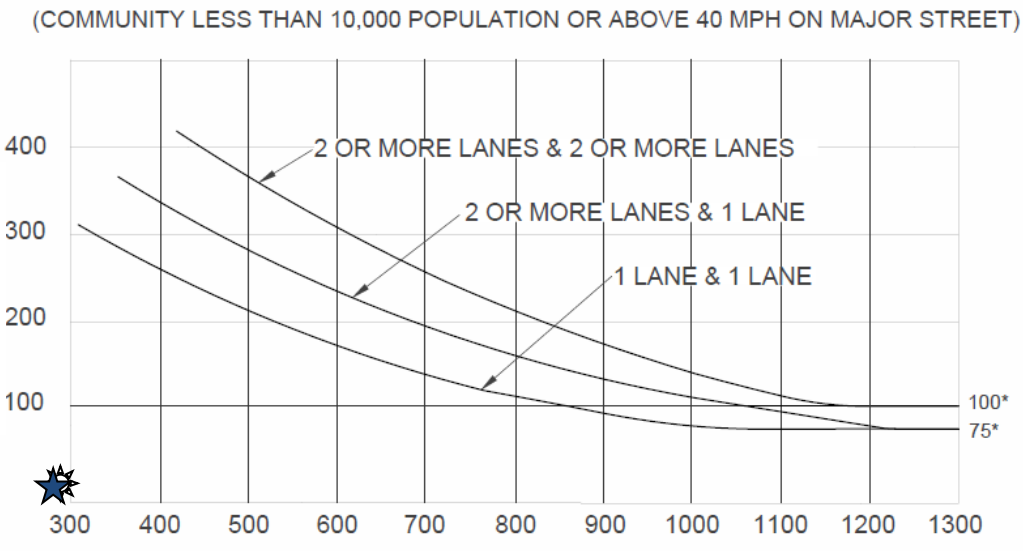
Warrant 3: Peak Hour (Rural)

Cumulative Year 2040 plus Project Traffic Conditions
2. I-5 NB Ramps/ Kamm Avenue
AM (PM) Peak Hour

I-5 NB Ramps Highest Approach Volume =

19 (7) VPH



Kamm Avenue Total of Both Approaches =

44 (36) VPH

*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor street approach with one lane.

AM Peak Hour – Signal Warrant is Not Met

PM Peak Hour – Signal Warrant is Not Met

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info@JLBtraffic.com

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Fresno, CA 93704

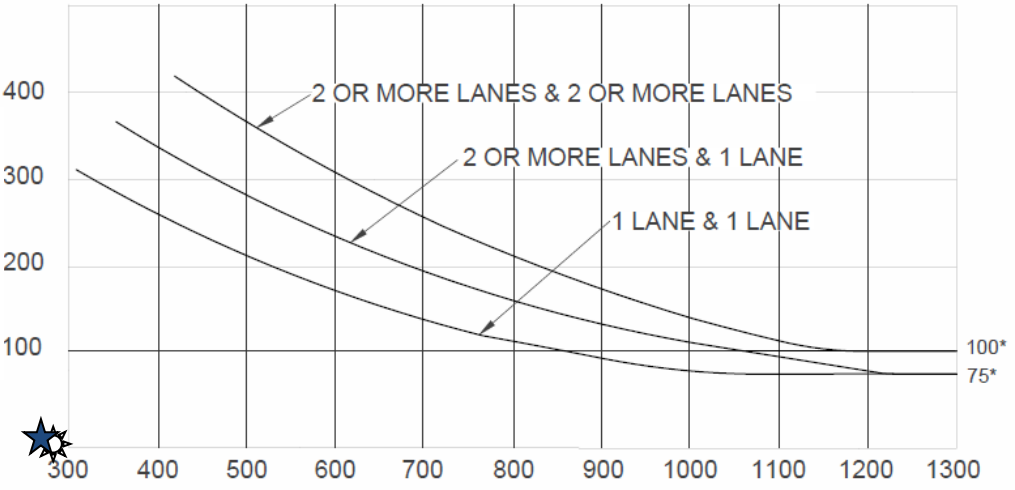
(559) 570-8991

Warrant 3: Peak Hour (Rural)

Cumulative Year 2040 plus Project Traffic Conditions
3. Main Project Access/ Kamm Avenue
AM (PM) Peak Hour

(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 40 MPH ON MAJOR STREET)

Main Project Access Highest Approach Volume = 0 (1) VPH



Kamm Avenue Total of Both Approaches = 72 (70) VPH

*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor street approach with one lane.

AM Peak Hour – Signal Warrant is Not Met
PM Peak Hour – Signal Warrant is Not Met

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info@JLBtraffic.com

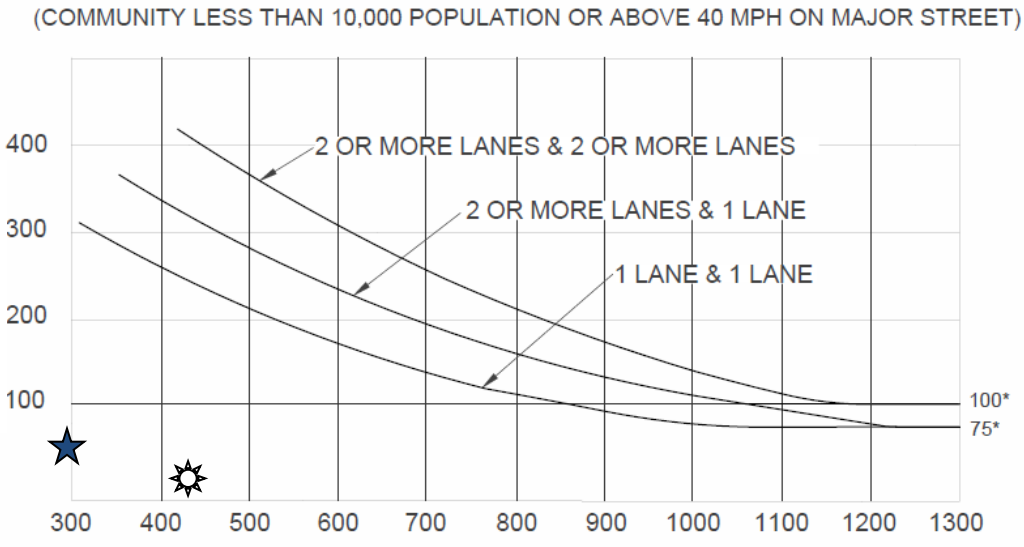
516 W. Shaw Ave., Ste. 103
Fresno, CA 93704
(559) 570-8991

Warrant 3: Peak Hour (Rural)

Cumulative Year 2040 plus Project Traffic Conditions
4. State Route 33/ Kamm Avenue
AM (PM) Peak Hour

Kamm Avenue Highest Approach Volume =

22 (54) VPH



State Route 33 Total of Both Approaches =

420 (292) VPH

*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor street approach with one lane.

AM Peak Hour – Signal Warrant is Not Met

PM Peak Hour – Signal Warrant is Not Met

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info@JLBtraffic.com

516 W. Shaw Ave., Ste. 103

Fresno, CA 93704

(559) 570-8991

www.candbplanning.com