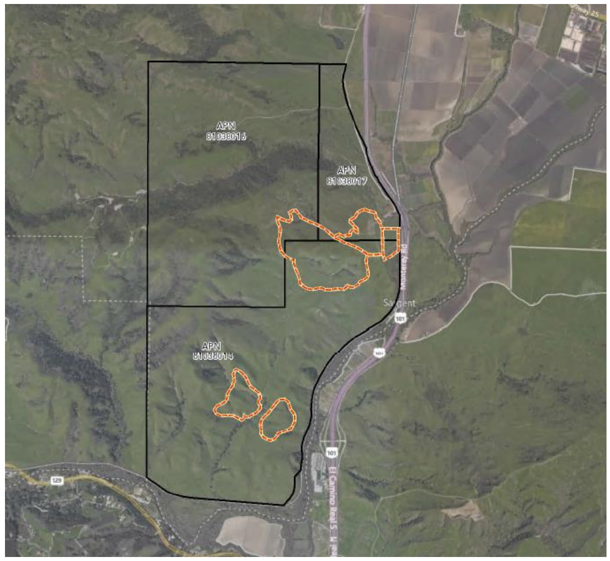
Appendix L
Fire Protection Plan

SARGENT RANCH QUARRY PROJECT
FIRE PROTECTION PLAN



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Acronyms and Abbreviations

Acronym	Definition
AMSL	Above Mean Sea Level
CAL FIRE	California Department of Forestry and Fire Protection
CBC	California Building Code
CFC	California Fire Code
CEQA	California Environmental Quality Act
CFR	Code of Federal Regulations
County	Santa Clara County
CSA	County Service Areas
FAHJ	Fire Authority Having Jurisdiction
FMZ	Fuel Modification Zone
FPP	Fire Protection Plan
FRAP	Fire and Resource Assessment Program
GFD	Gilroy Fire Department
GIS	Geographical Information System
HFHSZ	High Fire Hazard Severity Zone
IFC	International Fire Code
MFHSZ	Moderate Fire Hazard Severity Zone
NFPA	National Fire Protection Association
Project	Sargent Ranch Quarry Project
SRA	State Responsibility Area
SRQ	Sargent Ranch Quarry
SSCCFD	South Santa Clara County Fire District
WUI	Wildland Urban Interface

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Executive Summary

This Fire Protection Plan (FPP) is submitted pursuant to Title B, Division B7 – Fire Protection of the Santa Clara County Municipal Code and Chapter 49 of the California Fire Code (CFC) to address the potential adverse environmental effects that the proposed Sargent Ranch Quarry Project (Project) may have from a wildland fire within the southern portion of Santa Clara County. It provides analysis and documentation that the Project is consistent with the Santa Clara County (County) significance guidelines and does not exasperate the exposer of people or structures to a significant risk of loss, injury, or death involving wildland fires based on its conformance with applicable fire and building codes.

This FPP evaluates and identifies the potential fire risk associated with the Project's land uses and identifies requirements for water supply, fuel modification and defensible space, emergency access, building ignition and fire resistance, fire protection systems, and wildfire emergency pre-planning, among other pertinent fire protection criteria. The purpose of this plan is to generate and memorialize the fire safety requirements of the County of Santa Clara and the City of Gilroy along with Project-specific measures based on the site, its intended use, and its fire environment.

The Project proposes a sand and gravel mining operation, as well as construction and operation of aggregate processing facilities, on approximately 300 acres of the 6,400-acre Sargent Ranch property. Based on the County's concerns about potential slope instability in the mining area, an additional 120 acres surrounding the mining area would be reserved for use for slope stability grading in the event of instability within the mining area. Aggregates are materials (such as sand, gravel, and crushed rock) that, along with water and Portland cement, are an essential ingredient in concrete. The approximately 420-acre project area where mining and contingency slope stability activities would occur is located along the easternmost portion of the property and is currently used for cattle grazing. The remaining approximately 5,980 acres of the Sargent Ranch would not be affected by the project.

The Project Site is within a wildland urban interface (WUI) location that is in an area statutorily designated a State Responsibility Area (SRA) 'Moderate Fire Hazard Severity Zone' (MFHSZ) and 'High Fire Hazard Severity Zone' (HFHSZ) by the California Department of Forestry and Fire Protection (CAL FIRE). Fire hazard designations are based on topography, vegetation, and weather, amongst other factors with more hazardous sites including steep terrain, unmaintained fuels/vegetation, and WUI locations. The majority of the Project Site is currently undeveloped, though there are several buildings including a barn, storage building, and a residence located off Old Montgomery Road adjacent to U.S. 101. Additionally, several dirt roads from Old Montgomery Road provide access into the larger property. A portion of Sargent Ranch (to the north and west of the proposed quarry site) is engaged in oil production, and there are small pipelines and oil storage facilities on the property northwest of the proposed quarry. The nearest off-site residence to the project is located approximately 1,600 feet south of mining Phases I and II.

The proposed Project area is currently used for cattle grazing and some cultivation of dry-farmed, oat hay crops for cattle feed. Surrounding uses are also primarily agricultural-related. Freeman Quarry (a reclaimed aggregate quarry), is located about two miles to the north. Mining at Freeman Quarry has ceased, and the mining and processing areas of the quarry have been reclaimed.

Topography on site and within the vicinity of the Project is characterized by gently rolling to moderately steep hillsides with moderate to well incised drainages, with gradients reaching up to 16%. The area is subject to seasonal weather conditions that can heighten the likelihood of fire ignition and spread, and, considering the site's terrain and vegetation, may result in fast moving and low to moderate-intensity wildfire.

This FPP document provides an analysis of the Project site's fire environment, its potential impact on the Project, and the Project's potential impact on the existing fire protection services in the area. This document will be incorporated as a technical appendix of the Project's Environmental Impact Report. Requirements and recommendations herein are based on site-specific fire environment analysis and Project characteristics, and incorporate input from the County, local fire jurisdictions and personnel, area fire planning documents, site risk analysis, and standard principles of fire protection planning.

Fire protection in the Project area is provided by several agencies, with the Project site technically within the jurisdiction of the South Santa Clara County Fire District (SSCCFD) and CAL FIRE. However, due to the Project site's location and Mutual Aid Agreements, initial emergency response would be provided by the Gilroy Fire Department (GFD). The SSCCFD and CAL FIRE have the primary responsibility for wildfire protection within State Responsibility Areas. The closest SSCCFD station is Station 3 located in the Gilroy Gardens. Response to the front entrance of the Project from SSCCFD's Station 3 would be approximately 17 minutes. This response time to the Project's entrance from Station 3 would be within the acceptable time frame of 19 minutes and 30 seconds. Furthermore, initial response from Gilroy Fire Departments Chestnut Station could respond to the front entrance of the Project in approximately 6 minutes and 45 seconds.

The Project will consist of sand and gravel surface mining excavations, as well as the construction and operation of overburdened stockpiling, crushing, and processing facilities, access roads, administrative offices, and equipment storage areas. Quarry mining and processing operations would be conducted using bulldozers, excavators, graders, and front-end loaders; no blasting is proposed. It is anticipated that the Sargent Quarry would employ up to 15 employees at one time. Typical mining and processing plant operations would occur at the site Monday through Saturday between 7:00 a.m. and 4:30 p.m. The Project may incrementally increase potential ignition sources in the area during operations, but would reduce the available wildland fuels and would result in a higher level of fire monitoring and awareness due to Project safety measures. The Project would comply with the County Fire Standards as well as the CFC, as applicable, and would provide additional measures that enhance fire safety and protection.

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1 Introduction

This Fire Protection Plan (FPP) has been prepared for the proposed Sargent Ranch Quarry (SRQ) Project in Sargent, California, an unincorporated area of southern Santa Clara County. The purpose of this FPP is to assess the potential impacts resulting from wildland fire hazards and identify the measures necessary to adequately mitigate those impacts. As part of the assessment, this FPP has considered the fire risk presented by the site, including: property location and topography, geology (soils and slopes), combustible vegetation (fuel types), climatic conditions, fire history, and the proposed land use and configuration. This FPP addresses water supply, access, Project components, structural ignitability and ignition features, fire protection systems and equipment, impacts to existing emergency services, requirements for defensible space, and vegetation management. The FPP identifies and prioritizes areas for hazardous fuel reduction treatments and recommends the types and methods of treatment that would protect this Project and its essential infrastructure. The FPP recommends measures that the property owner, developer, builders, and employees will take to reduce the probability of ignition of equipment or structures throughout the area addressed by the plan.

The following tasks were performed in the completion of this plan:

- Gather site specific climate, terrain, and fuel data;
- Collect site photographs;
- Process and analyze the data using the latest GIS technology;
- Predict fire behavior using industry standard, scientifically based fire behavior models;
- Analyze and guide design of proposed infrastructure;
- Analyze the existing emergency response capabilities;
- Assess the risk associated with the Project and the Project Site; and
- Prepare this FPP detailing how fire risk will be mitigated.

Field observations were utilized to augment existing digital site data in generating the fire behavior models and formulating the recommendations presented in this FPP. Refer to Appendix A for site photographs of existing fuel types.

1.1 Sargent Ranch Quarry Project Summary

1.1.1 Location

As depicted in Figure 1, Project Location Map, the approximately 6,400-acre Sargent Ranch property is located within the foothills of the Coast Range Mountains in an unincorporated area of southern Santa Clara County, approximately four miles south of the City of Gilroy, California. Sargent Ranch is located adjacent to and west of U.S. 101, approximately one mile south of the U.S. 101 and Highway 25 interchange. The Project Site is bounded to the east by U.S. 101, to the south by the Pajaro River, and to the west and north by privately owned rangeland. Several creeks cross the Sargent Ranch property, including Sargent Creek and Tar Creek. Elevations range from approximately 150 feet above mean sea level (amsl) to over 800 feet amsl.

The approximately 420-acre project area where mining and slope stability activities would occur is located on the eastern portion of Sargent Ranch and consists of an irregularly shaped property consisting of Assessor's Parcel

Numbers: 810-38-014, -016, and -017. The Project area is accessed from U.S. 101 via Old Monterey Road and is located in Sections 5, 6, and 7, Township 12 South, Range 4 east on the U.S. Geographical Survey (USGS), 7.5-minute Santa Clara quadrangle map.

1.1.2 Applicable Codes and Existing Regulations

This FPP is consistent with the Santa Clara County Fire Code (Title B, Division B7 – Fire Protection of the Santa Clara County Municipal Code), which has adopted and amended the 2019 California Fire Code Chapter 49 (14 CCR, Part 9), and with the California Code of Regulations, Title 14, Fire Safe Regulations. Further, the Project is consistent with the County Building and Electrical Codes, including Chapter 7A of the 2019 California Building Code (CBC) and the 2019 California Electrical Code and would employ the Santa Clara Surface Mining Ordinance, including Sections 2.10.040 and 4.10.370 (County of Santa Clara Department of Planning and Development, 2020). Additionally, the County of Santa Clara Planning and Development Department is the lead agency of for the Surface Mine and Reclamation Act for all quarries located within the unincorporated portion of Santa Clara County and thus would employ the California Department of Conservation Mining Reclamation Statutes and Regulations (California Department of Conservation, January 2020).

The entirety of the Project lies within an area statutorily designated a SRA 'MFHSZ' and 'HFHSZ' by CAL FIRE. (Figure 2, Fire Hazard Zone Severity Map). Fire hazard designations are based on topography, vegetation, and weather, amongst other factors with more hazardous sites including steep terrain, unmaintained fuels/vegetation, and wildland urban interface (WUI) locations.

1.1.3 Project Description

1.1.3.1 Overview

The Sargent Quarry Ranch Project proposes a sand and gravel mining operation, as well as construction and operation of aggregate processing facilities, on approximately 300 acres of the 6,400-acre Sargent Ranch property. Based on the County's concerns about potential slope instability in the mining area, an additional 120 acres surrounding the mining area would be reserved for use for slope stability grading in the event of instability within the mining area. Aggregates are materials (such as sand, gravel, and crushed rock) that, along with water and Portland cement, are an essential ingredient in concrete. The approximately 420-acre project area where mining and contingency slope stability activities would occur is located along the easternmost portion of the property and is currently used for cattle grazing. The remaining approximately 5,980 acres of the Sargent Ranch would be maintained in their current conditions and would not be utilized for mining, processing, or reclamation activities.

Alluvial sand and gravel deposits (consisting of conglomerate, sandstone, and siltstones) would be mined at the Sargent Ranch Quarry, processed, and sold to companies for use at construction sites in the region. These deposits exist on hills at Sargent Ranch as a result of geologic plate-tectonic actions between the North American Plate and the Pacific Plate, as well as the San Andreas Fault and the Sargent Fault. Alluvial sand and gravel deposits have been uplifted from their original location along historic riverbeds at the valley floor to a height of approximately 600 feet above sea level. Sand and gravel deposits would be mined using an open-pit mining method to an approximate depth of 200 feet above sea level as part of the project. No underground mining would occur; rather, hillslopes within mining areas would be cut-back and mined over time, with the quarry floor no deeper than the base of the hillslopes, for an approximately 400-foot reduction in elevation when mining is complete. The open-pit mining area would include sidewalls and benches to provide for the stability of the quarry slopes, as well as contingency areas to accommodate potential slope failures within the mining area.

It is estimated that approximately 37 million cubic yards of material, including approximately 28 million cubic yards (40 million tons) of sand and gravel aggregate would be mined over the anticipated 30-year permit term of the quarry. Mined sand and gravel aggregate deposits would be sold locally for a variety of construction-related uses. Overburden[1] and/or material not sellable as concrete-grade aggregate would be stockpiled and sold as engineered fill or used in the final reclamation of quarry slopes at the conclusion of each mining phase, as described further below.

The Project requires issuance of a Conditional Use Permit by County of Santa Clara for the anticipated 30-year operational mining term of the quarry and approval of a site-specific Reclamation Plan. Mining activities and future implementation of the Reclamation Plan for the project would be required to satisfy requirements of the Surface Mining and Reclamation Act (SMARA) of 1975, Public Resources Code section 2710 *et seq*., as well as the County's Surface Mining requirements in Section 4.10.370 of the County of Santa Clara Ordinance Code. The County has primary discretionary authority over the project and serves as the Lead Agency under CEQA and SMARA.

The proposed Sargent Quarry would be an open pit quarry with mining occurring in four phases, as shown in Figure 3, Sargent Quarry Site Plan and Figure 4, Project Grading Plan. Estimated mining quantities for each phase of the project are shown in the following Table 1. The duration of each phase would be dependent on overall demand for sand and gravel materials.

Table 1. Estimated Mining Quantities (cubic yards)

Mining Phase	Product	Overburden	Excavation Total
Phase 1	9,600,000	3,325,000	12,925,000
Phase 2	11,900,00	4,100,000	16,000,000
Phase 3	2,565,000	900,000	3,465,000
Phase 4	3,400,000	1,500,000	4,900,000
Total	27,465,000	9,825,000	37,290,000

Source: Sargent Ranch Quarry. Site Plan. Dated August 17, 2017.

The primary market for the proposed Project is anticipated to be the construction industry operating in Santa Clara County (80 percent of production). The remainder of the production is anticipated to be distributed in San Benito County (10 percent) and Monterey County (10 percent).

1.1.3.2 Mining Plan

1.1.3.2.1 Grading and Site Clearing

Construction of Project structures, roads and related facilities would occur over a nine month period prior to mining activities. Project construction would include grading and site clearing for development of a processing plant area, roads, free-span bridge over Tar Creek, and materials conveyor system. The processing area would include

[1] Overburden is the material (e.g., soil and rock) that lies above the economically valuable mineral resources; in this case the mineral resources are sand and gravel suitable for use as concrete grade aggregate.

buildings, parking areas, processing areas, a process pond, and settling pond (described further in the sections that follow). All of the facilities within the processing area, including the aggregate processing plant, office/scale house, process water pond, and storm water basins, would be constructed. The access/maintenance roads would be constructed along with a bridge over Tar Creek and a crossing of Sargent Creek. A conveyer belt connecting Phases 3 and 4 to the processing area would also be constructed. A new groundwater well would be installed. A 40-foot-tall topsoil stockpile berm would be constructed for visual screening purposes. Berms would be constructed along tar creek for flood control.

Prior to the start of mining at each phase, the limits of excavation would be staked. The area to be excavated would be cleared of vegetation using a backhoe, excavator, and trucks. Topsoil and overburden would be removed and stockpiled adjacent to the processing area, and within several of the individual mining areas. A permanent overburden stockpile area would be placed between the processing plant and Phase 3 and Phase 4 mining areas. This area would receive materials during Phases 1, 3, and 4.

Typical mining methods would include excavation of an open pit with 2:1 slope side walls[2] and 10-foot-wide benches every 30 vertical feet on the side slopes. The mining process for Phase 1 through Phase 4 and associated facilities are described further in the following sections. Disturbance areas for each phase and associated facilities are summarized in Table 2.

Table 2. Estimated Disturbance Areas

Project Facility	Disturbance Area (acres)
Mining Phase 1	61.7
Mining Phase 2	90.57
Mining Phase 3	41.88
Mining Phase 4	28.8
Access Roads	0.4
Conveyor Belt and Maintenance Road	14.26
Processing Plant and Related Facilities	62.3
Geotechnical Setback Areas	120
Total	**420**

1.1.3.2.2 Mining Phases 1 and 2

Phase 1 and 2 operations would occur behind a vegetated, approximately 40-foot-tall screening berm constructed as part of Phase 1 and 2 activities (the berm is described further in the sections that follow).

Topsoil and overburden would be removed and stored. The Phase 1 and Phase 2 areas would be mined from west to east using mobile excavation equipment (similar to Phases 3 and 4). Material would be hauled in trucks to the

[2] Slopes are expressed in horizontal change:vertical change; in other words, a slope of 2:1 would represent an elevation change of one foot over a horizontal distance of two feet.

on-site processing plant. An unpaved approximately 0.30-mile-long, 30-foot-wide haul road would provide access from the Phase 1 and 2 mining areas to the processing plant.

Because work associated with Phase 2 would not begin until after Phase 1 mining activities have ceased, Phase 2 overburden would be placed in the Phase 1 pit and would also be placed on the northern, eastern, and western temporary (during mining) slopes of the Phase 1 mining area to create a permanent slope of 3:1, which would be maintained upon termination of mining activities. Mining at the Phase 1 and Phase 2 areas is anticipated to occur for 10 to 15 years, with roughly 28,925,000 cubic yards of material excavated (as shown previously in Table 1. Phase 2 will be the largest phase of the project with an excavation of approximately 16,000,000 cubic yards.

1.1.3.2.3 Mining Phases 3 and 4

Mining operations at the Phase 3 area would begin approximately 15 years after mining begins, with Phase 4 occurring after mining activities are completed for Phase 3. Phase 3 and Phase 4 mining areas are located on two hilltops on either side of Sargent Creek at the southeast portion of Sargent Ranch. Following topsoil and overburden removal (which would be stored), sand and gravel would be excavated from west to east using mobile equipment (e.g. scrapers, bulldozers, excavators, and front-end loaders). During mining Phases 3 and 4, interim (during active mining) quarry pit slopes would be maintained with slopes of 2:1 and 10-foot-wide benches every 30 vertical feet.

To transport mined material from the Phase 3 and Phase 4 mining areas to the processing plant, an approximately 1.6-mile-long diesel-powered conveyor belt would be constructed. The base of the conveyor would be elevated approximately four feet above grade to allow wildlife to pass under it. A 22-foot-wide dirt road would be constructed alongside the eight-foot-wide conveyor belt structure for access to the mining areas and conveyor belt maintenance purposes. Grading would be required to establish the maintenance road. The conveyor belt and maintenance road would generally follow the east side of the western ridge of the Sargent Valley.

Once sand and gravel excavation in Phase 3 is complete, operations would move into the Phase 4 area of the quarry and reclamation actions would begin in the Phase 3 area. Overburden from Phase 4 would be placed in the excavated area of Phase 3 to construct the permanent slope faces. At the end of Phase 4 mining operations, the conveyor belt would be removed, and its path regraded and revegetated. The maintenance road that runs parallel to the conveyor belt would be left in place to continue to provide access to the mined-out sites while reclamation activities are ongoing, then the maintenance road would be restored and revegetated. Mining in the Phase 3 and Phase 4 areas is anticipated to occur for 10 to 15 years each with roughly 8,365,000 cubic yards of material being excavated.

1.1.3.2.4 Geotechnical Contingency Setback Area

Because geotechnical information regarding the proposed cut slopes cannot be based on direct testing and observations of existing similar cut slopes, it is necessary to provide buffer areas around portions of the mining area in case of slope instability. These geotechnical contingency setback areas are not proposed for mining but may be used if slopes in the mining area need to be laid back at a more gradual angle to achieve stability. Slope instability may occur as a result of buried landslides, clay lenses, or perched water tables. The total acreage included in these geotechnical contingency setback areas is 120 acres.

1.1.3.2.5 Geotechnical Monitoring Frequency

A licensed geotechnical engineer (hired by the applicant) would inspect the mining area and monitor construction of the quarry cut slopes each time a new 30-foot bench has been excavated, and then at least once per year for three years after construction of that bench is completed. Inspections would occur on an as-needed basis after three years. Upon completion of each inspection, the engineer would submit a report to the County Geologist and quarry operator detailing any concerns regarding the stability of the cut slopes and would recommend remedial actions that should be taken by the quarry operator.

1.1.3.2.6 Mining Below the Groundwater Table

Groundwater, whether static or perched, may be encountered during the mining activities. If the groundwater is perched, efforts would be made to drain the water from the mining area using brow ditches, pumps, or other methods, though this water would remain within the larger pit. Once the mining area is drained and the area slopes stabilized, mining activities would proceed as planned.

Should static groundwater be encountered during mining, dewatering activities would be undertaken to pump out the water into stormwater retention ponds or other drainage areas within the pits. If the static groundwater level persists and the mining area cannot be pumped dry, then the operator would initiate wet mining (as described below).

Wet mining would occur using a dragline crane or long-reach excavator that can cast its bucket below the water surface and retrieve material. Sand and gravel harvested underwater would be placed in a stockpile area where the material can drain prior to transport back to the processing plant. Water draining from this stockpile would be channeled to drain back into the pit area. Dragline cranes would be used to harvest material to an elevation of approximately 45 feet below the water surface. Deadmen-pulley systems would be used to harvest to approximately 90 feet below the water surface, if necessary.

1.1.3.3 Processing Plant

An approximately 14-acre processing plant would be constructed in the northeastern portion of the site. The processing plant would include an office, shop, maintenance buildings, equipment storage yard, 17-space parking area, truck scales, and loading area. During mining operations, excavated sand and gravel would be hauled via truck (for Phases 1 and 2) and by the conveyor belt (for Phases 3 and 4) to the processing plant. A five-foot-tall berm would be constructed around the northern boundary of the processing plant site to provide flood protection.

Excavated material would be mechanically sized, washed, sorted into stockpiles, and prepared for shipping at the processing plant. Trucks would enter the processing plant area from the bridge constructed over Sargent Creek, be loaded with material by front end loaders, and exit via the same bridge in order to make their way to U.S. 101.

Some materials would also be crushed and sorted into stockpiles via radial stacker and conveyers. Materials would be kept wet to minimize dust emissions. Sprinklers and water trucks would be used to control dust at the processing plant and on stockpiles. The processing plant would also contain a process water pond, which would be used to retain water for reuse in aggregate processing. Groundwater would be pumped from a new on-site well to supply water to the process pond and for dust control as part of processing plant operations.

Surface runoff from areas disturbed by processing operations would be directed via drainage ditches and swales to a stormwater sediment basin. Stormwater in the settling pond would be allowed to percolate on-site or be reused for processing plant operations (e.g., dust control, washing aggregate materials). The stormwater sediment basin would also receive runoff from swales surrounding the adjacent overburden stockpiles, containing stormwater from disturbed area to the project area.

1.1.3.3.1 Screening Berm

An approximately 40-foot-tall visual screening berm would be constructed along the east side of the processing plant (adjacent to U.S. 101) utilizing overburden and topsoil mined as part of Phase 1. The Project proposes to grade the berm to resemble the form and shape of the surrounding hillslopes. The berm would be seeded so it would blend with its surroundings and screen views of the processing plant and mining operations associated with Phases 3 and 4 of the Project.

1.1.3.4 Site Access and Roadway Modifications

Access to the Project area would occur via southbound U.S. 101 and Old Monterey Road through a gated entrance to an existing private access road. Both Old Monterey Road and the private access road would be repaved to accommodate the two-way truck traffic associated with the Project.

Trucks leaving the site traveling to destinations south of the Sargent Ranch Quarry would exit onto Old Monterey Road and then onto southbound U.S. 101 via an existing acceleration lane.

Trucks traveling to destinations north of the quarry would use the Sargent Ranch undercrossing of U.S. 101. To facilitate truck access, an existing U.S. 101 entry lane east of Sargent Ranch would be improved to be a 12-foot-wide, 0.25-mile-long acceleration lane for trucks accessing northbound U.S. 101. This merging lane will require and encroachment permit from Caltrans and will be built according to Caltrans specifications. It will be similar to the existing merging lane built previously.

As described previously, a new unpaved approximately 0.30-mile-long, 30-foot-wide haul road would provide access from the Phase 1 and 2 mining areas to the processing plant.

1.1.3.5 Road and Bridge Access Improvements

The northerly portion of Old Monterey Road is approximately 20 to 24 feet in width. This section, which lies within a County right-of-way, would be improved as needed with new pavement overlaid on the existing roadway. Roadway shoulders (approximately three feet in width on both sides of the road) would be added as needed, avoiding cultural or biological resources. The southerly portion of the (private) roadway located on Sargent Ranch would be improved with a one-inch pavement overlay on the existing pavement, where needed. It is anticipated that Old Monterey Road, both within the County right-of-way and the private portions, would need to be repaired and maintained with additional pavement overlays and (potentially) removal and repair of roadway sections during the anticipated 30-year term of the mining operations.

A free-span, arch-culvert bridge is proposed over Tar Creek to provide truck access to the processing area, truck scales and office (see Figure 5). The arch-culvert bridge would span the banks of the creek and extend to a height of approximately five feet above the banks of Tar Creek. The bridge would be approximately 24 feet in width and

50 feet in length. Berms would be installed on both sides of the bridge to direct stormwater flows into Tar Creek and to elevate the bridge.

1.1.3.6 Erosion and Sediment Control

Initial grading for any project phases and at the processing plant area would be conducted during the dry season from approximately April 16 through October 14. Best management practices (BMPs) for sediment control would be utilized when work is undertaken during the wet season. BMPs would include, but are not limited to, the use of coir wattles, silt fences, sediment traps, and stilling basins in and adjacent to disturbed areas. A water truck would be used for wetting down work areas while the ground surface is being ripped or disked and while topsoil is being spread onto the reclaimed slopes, benches, and valley floor. Drainage ditches in loose soil would be lined with rock to reduce soil erosion.

Runoff from precipitation would generally drain into the quarry pits and sediment basins, with no stormwater within the active Sargent Quarry limits being diverted off-site. Sediment control would be implemented on-site through installation and maintenance of the proposed drainage and stormwater control facilities. Proposed erosion and sediment control measures include:

- Inactive slopes, not yet reclaimed, and topsoil stockpiles would be stabilized with erosion control seeding prior to the wet season;
- Use of temporary erosion control measures, such as placement of coir wattles on fill slopes every 20 vertical feet;
- Routine removal of debris from benches;
- Removal of accumulated sediment from drainage ditches and basins;
- Grading of unpaved access road;
- Clean-up of spilled rock or soil;
- Lining of open drainage ditches over loose, erodible soil with crushed rock;
- Sloping benches and roads for proper drainage;
- Placement of energy dissipaters in drainage ditches with downslope flows;
- Dust control and management of stockpiles at the processing plant, including use of coir wattles or silt fences.

The final reclamation slopes, benches, and valley floor would be revegetated to stabilize the ground surface. Jute matting, erosion control blankets, coir wattles, silt fences, and sediment traps would be used to mitigate areas where runoff is concentrated to reduce sediment levels. Rill erosion would be repaired whenever rills exceed ten square inches and five feet in length. Remaining sediment basins would be inspected annually for five years after mining ceases or two years after planting success criteria are met, whichever occurs later.

1.1.3.7 Quarry Operation and Employees

Mining of sand and gravel would be conducted using bulldozers, excavators, graders, and front-end loaders. No blasting is proposed. It is anticipated that the Sargent Quarry would employ up to 15 employees at any one time.

Mining operations are proposed to occur year-round. Mining and processing plant operations, including truck loadout, would typically occur at the site Monday through Saturday between 7:00 a.m. and 4:30 p.m. Per the County Zoning Ordinance (Section 4.10.370, Part II.A.1), commercial excavation is generally not allowed on Sundays or the following holidays: New Year’s Day, Independence Day, Labor Day, Thanksgiving, and Christmas Day) unless authorized by the Planning Commission or Planning Director. Occasional Sunday and holiday work is proposed to occur as part of special projects. Extended processing plant hours may be permitted to allow plant processing and truck load out operations to occur at night, providing the operator flexibility to respond to market conditions, nighttime public works projects, and emergency or special circumstances.

Mining would occur during the day and no lighting would be installed in the quarry pit areas. Lighting would be installed at the processing plant in accordance with Mine Safety and Health Administration (MSHA) regulations and County of Santa Clara requirements. Lights at the processing plant may be on in the early morning and later evening hours during the winter months if aggregate processing is authorized. Lighting would be shielded to prevent light overspill onto neighboring properties or modification of nighttime views from U.S. 101.

1.1.3.8 Reclamation

A draft Reclamation Plan for Sargent Quarry has been prepared and is included in the Project's EIR. SMARA requires that reclamation plans incorporate verifiable standards to assure adequate completion of final reclamation objectives. Subjects for which SMARA standards have been set that would apply to the proposed project include the following:

- Wildlife habitat
- Stream protection
- Drainage, diversion structures, waterways, and erosion control
- Building, structure, and equipment removal
- Backfilling, regrading, slope stability, and recontouring
- Topsoil salvage, maintenance, and redistribution
- Revegetation
- Mine waste management

1.1.3.8.1 Building and Structure Removal

Equipment, structures, and vehicles utilized during mining operations would be removed when the mining operation ceases. Some of the equipment (e.g., modular office space and scale) would be used as part of post-mining uses (cattle grazing). The water well would be retained for the duration of reclamation activities as a source of water for irrigation of plantings and for future grazing uses.

1.1.1.8.2 Recontouring

Reclamation would include utilization of overburden and topsoil to fill quarry pits to elevations to levels at or below the immediately surrounding grades, recontouring of the surface of mined and processing plant areas, installation of erosion and stormwater control features, and revegetation. Topsoil in the temporary screening berm would be redistributed over the processing plant area. The site topography would ultimately be contoured to create a safe condition for cattle grazing (which is intended to be resumed at the site upon completion of reclamation activities) with a maximum slope of 3:1. Finished site contours for each phase of mining.

1.1.3.8.3 Slope Stability

Final reclaimed slopes in mined areas would have slope gradients of 3:1 or flatter with one- to two-foot wide benches at 30-foot intervals. Overburden soil fines and top soil would be used to fill and re-soil each quarry pit, to construct reclaimed fill buttress slopes and benches, and to facilitate revegetation. Slopes would be seeded or planted with oaks and other vegetation as detailed in the section that follows. At the end of Phase 2 mining operations, the conveyor belt would be removed, and its footprint regraded and revegetated. The maintenance road that runs parallel to the conveyor belt would be left in place to continue to provide access to the Phase 1 and Phase 2 areas while reclamation activities are still ongoing. After reclamation of the Phase 1 and Phase 2 areas has been completed, the bridges/crossing of Sargent Creek would be removed and the area disturbed for the maintenance road would be revegetated. Reclamation activities at the Phase 3 and Phase 4 areas would occur simultaneously as those areas are being mined, in that fill slopes would be constructed against cut slopes to leave the area with a finished slope gradient of 3:1.

As part of recontouring activities, fill would be compacted to 90 percent density up to five feet below the surface and the upper five feet would be granular material with a layer of topsoil. The ground surface would be ripped prior to receiving the topsoil layer. A motor grader would be used to shape the final surface area and to spread the topsoil layer as part of establishing the final site contours. Once reclamation grading is complete, these areas would be revegetated (as described below).

1.1.3.8.4 Revegetation

Revegetation test plots would be set up at the beginning of Phase 1 mining activities and would be located near the processing plant in an area that would not be disturbed by mining activities. These test plots would be used to determine the water and soil amendment needs for the revegetation program for the proposed naturalized annual grassland and oak woodland communities that would be planted at the site as part of overall site reclamation.

Various noxious weeds can invade disturbed areas where they compete with native species. The biological survey conducted by Live Oak Associates, Inc. in 2015, found that yellow star thistle (*Centaurea solstitialis*) and Italian thistle (*Carduus pycnocephalus*) are present at the project area. These two noxious weeds are listed on the California Department of Food/Noxious Weeds List and are required, under SMARA regulations, to be eradicated from the reclaimed project area. A program of invasive and exotic weed abatement would be implemented to manage the Italian thistle and Yellow star thistle during operations or reclamation, as described below.

Weed removal will commence during each mining phase and ongoing weed removal will continue annually through the anticipated 30-year mining term. The ongoing program would identify the presence of the two noxious weed species during annual inspections of the quarry property. The findings of these inspections would be recorded on the Annual Noxious Weed Control Inspection form, which would be submitted to the County of Santa Clara for review. This form requires the date of removal of the noxious weed species to be noted on the form. Weed removal would continue until the end of the post-mining five-year maintenance period or when the planting success criteria have been achieved, whichever occurs last.

To prepare for revegetation, recoverable topsoil would be stockpiled during mining activities. The topsoil would be placed to enhance revegetation as final surfaces and quarry slopes are completed. The sediment basins would also be filled with the remaining soil material, contoured, and revegetated once all mining activities are complete.

Revegetation would include hydroseeding of slopes with a gradient of 3:1 or flatter, drilling or imprinting seeds on flatter slopes and benches, and planting oak tree masses in designated locations to integrate the reclaimed area with the surrounding undisturbed lands. Soil supplements and irrigation to revegetated areas would be provided if the test plot planting program determines that they would improve survival of the plantings.

Species to be planted would consist of native species that have a record of success on disturbed soils and are consistent with vegetation present generally in the area. Baseline data for oak tree density and plant species present on the site was collected and used to create a target oak density and planting palette. At the start of mining, monitoring of the planting test plots would begin. The findings from the test plots would be used to modify the planting program described below, as needed. An irrigation system would be installed to assist in the revegetation effort if the test plot monitoring program determines that supplemental water improves the growth and survival rate of the oak tree seedlings. If an irrigation system is needed, then the woody plants would be hand watered with a hose on a water truck for the first two years and then irrigated for the third year to facilitate plant establishment. Plant irrigation would be discontinued at the end of the third year or continued for an additional two years if replacement plants are installed due to losses of the initial plants. The objective is to meet the planting success criteria without ongoing irrigation.

Four different seed mixes would be used to revegetate the site. They would contain native grasses, and herbaceous plant materials, including yarrow (Achillea millefolium), fiddleneck (Amsinckia menziesii), soft chess (Bromus hordeaceus), and blue wildrye (Elymus glaucus). The different seed mixes would be used to replicate the different existing site conditions found at the quarry and the surrounding landscape; including the non-native/naturalized annual grasslands on the flat valley areas and lower and upper slopes, and oak woodland with annual grassland around the mid-elevation slopes. Plants that are more commonly found within these plant communities at the site would be replanted in the same general area. Species to be planted will consist of commercially available erosion-control native and naturalized plant species that have evidenced good success on disturbed soils and are consistent with vegetation used in the region. By revegetating with the same or similar plants that are growing in the area, the revegetated slopes will be visually compatible with the native landscape.

Oak trees would be planted at a density of approximately 20 oaks per acre and would include coast live oak (*Quercus agrifolia*) and blue oak (*Quercus douglasii*). Trees would be grown on-site or acquired from local commercial nursery stock and one-gallon and tub-stock-sized oaks would be planted between October and December. Trees would be planted randomly and in clusters to mirror the oak tree massing on surrounding hillsides.

Post-reclamation monitoring would be conducted to determine the effectiveness of the revegetation activities compared to benchmarks established in the Reclamation Plan. The revegetation success criteria include assessments of coverage, density, and species richness. Revegetation performance would be measured by a qualified biologist as described in the approved Reclamation Plan. Planting, maintenance, and monitoring work would be directed toward achieving the following minimum success criteria by the end of the first five years after each phase area is reclaimed.

1.1.3.8.5 Post-Mining Drainage, Erosion and Sediment Controls

Sediment basins in the processing plant area and at the mining pits are to be retained following the completion of mining will be inspected annually while the operator is maintaining the site. Inspections will occur each year for five years after mining ceases or two years after reclamation planting and after the planting success criteria have been met, whichever is later.

The final reclaimed fill benches and slopes, quarry floor, drainage facilities, and plantings (which provide erosion and sediment control) would be inspected prior to October 1 each year of the five-year post-mining reclamation maintenance and monitoring period. Maintenance and repair work each year would be completed prior to November 1.

1.1.3.9 Utilities

Existing electric power and telephone lines would be utilized for the Project. Sewage disposal for the processing plant would be provided by an on-site septic system, consisting of a septic tank, distribution box, and leach field. The septic system would be designed for a daily wastewater generation of 400 gallons per day.[3] No extensions of public utilities or alterations to existing utility service would be necessary to carry out mining, processing or reclamation activities associated with the Project.

1.1.3.10 Water Supply and Use

Once the Project is operational and the buildings within the Processing Plant area have been constructed, typical water usage will be for the buildings of the processing plant, drinking water, other maintenance usage, and firefighting purposes. Potable water will be provided by existing on-site wells.

The Project proposes one portable 10,000-gallon water tank, which will move with each of the mining phases. Water would be stored in the aboveground water tank complying with the Santa Clara County and SSCCFD requirements and with NFPA 22, Private Fire Protection Water Tanks. A procedure for ongoing inspection, maintenance, and filling of the tank would be in place. The tank and fire engine connections shall be located on the side of the fire access road(s). The width of the road at the water tank location shall be at least 18 feet (travel width), plus an additional 10-foot width, for a distance of 50 feet, to allow for fire engines to park and connect to the tank while leaving the road open. The tank shall be labeled "Fire Water: 10,000 gallons" using reflective paint.

The capacity of the water tank at the facility would be based upon the demand for hand lines, plus a reasonable allocation for water supply for fire engines to generate firefighting foam for 15 minutes at an application density of 0.16 gallons per minute per square foot from a hose line using a 3% Aqueous Film-Forming Foam concentrate, for use on an oil fire in transformer containment. A conceptual estimate at this point, prior to detailed design, is 250 gallons per minute for 15 minutes (3,750 gallons of water) plus 112.5 gallons of foam concentrate for oil firefighting.

The County would approve the final location of the tank and total number of gallons based on a tank location drawing to be prepared by a Fire Protection Engineer and submitted by the applicant. Drawings shall show tank locations, fire department connections, and roads, and shall include the tank standard drawing and notes

[3] Based on the Uniform Plumbing Code estimated wastewater generation of 25 gallons per day per employee.

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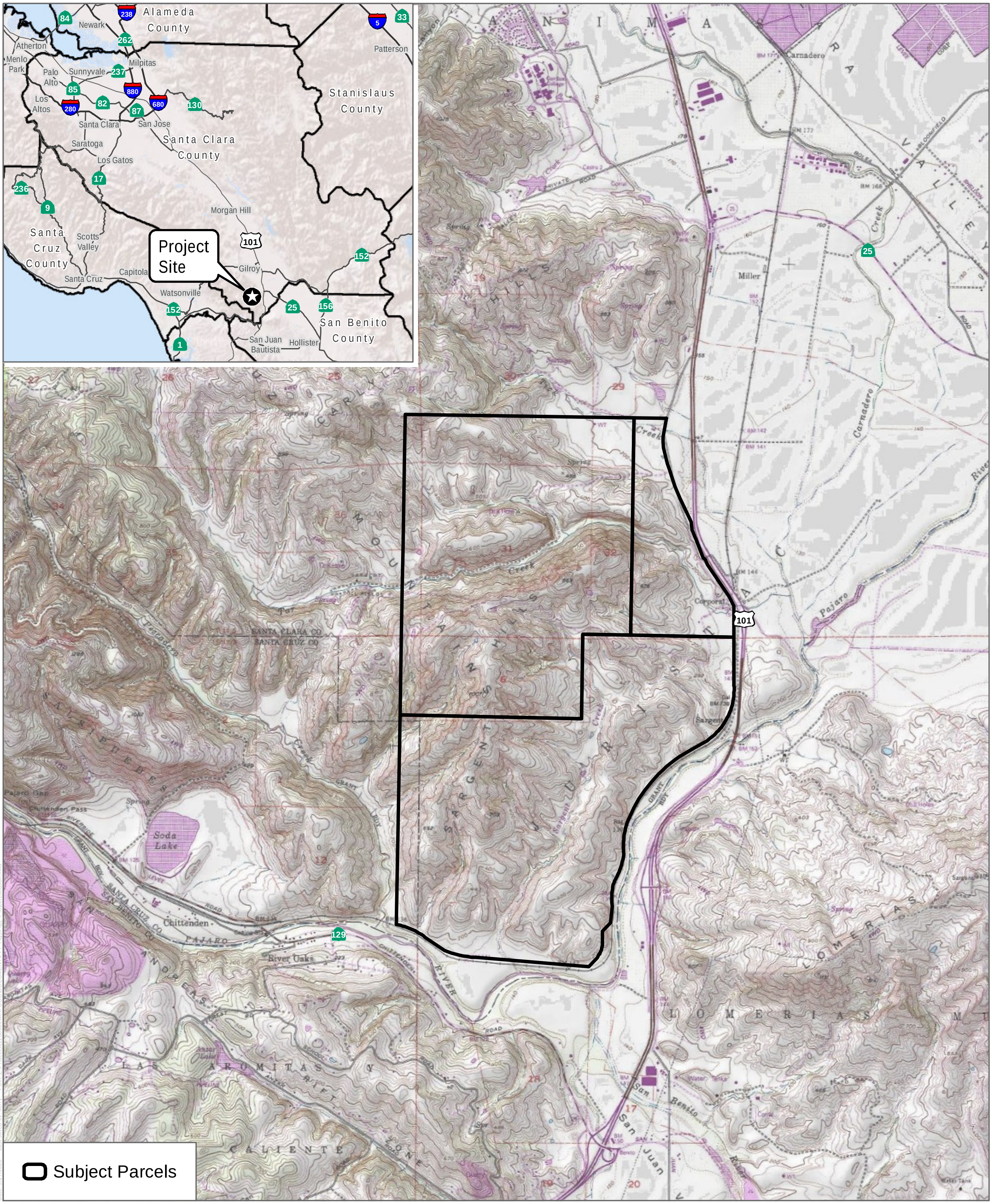

SOURCE: USGS 7.5-Minute Series, Chittenden Quadrangle

0 2,000 4,000 Feet
0 550 1,100 Meters
1:48,000

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FIGURE 1

Project Location

Fire Protection Plan for the Sargent Quarry Project

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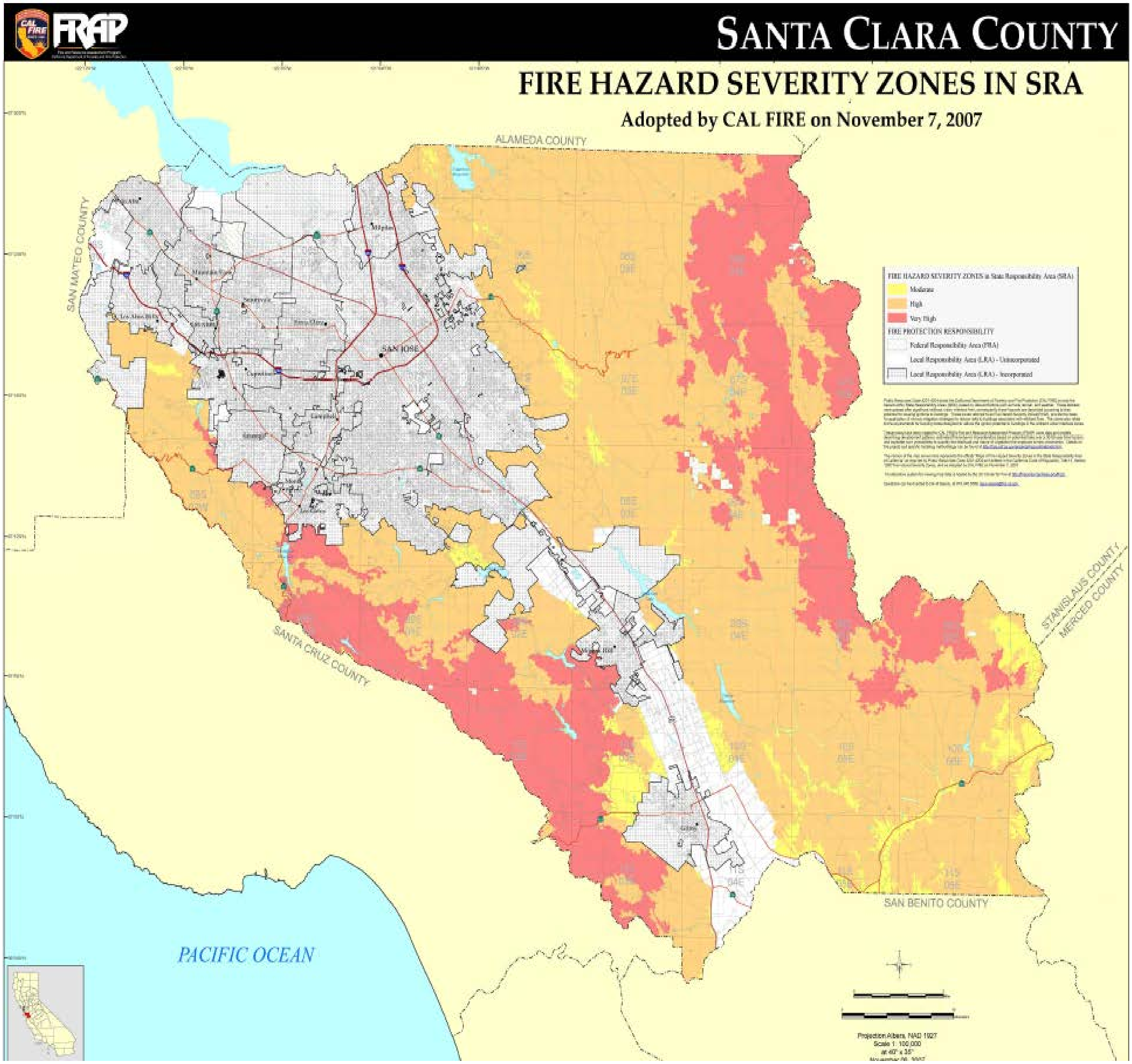

SOURCE: CAL FIRE, 2020

FIGURE **2**

Santa Clara County Fire Hazard Severity Zone Map

Fire Protection Plan for the Sargent Quarry Project

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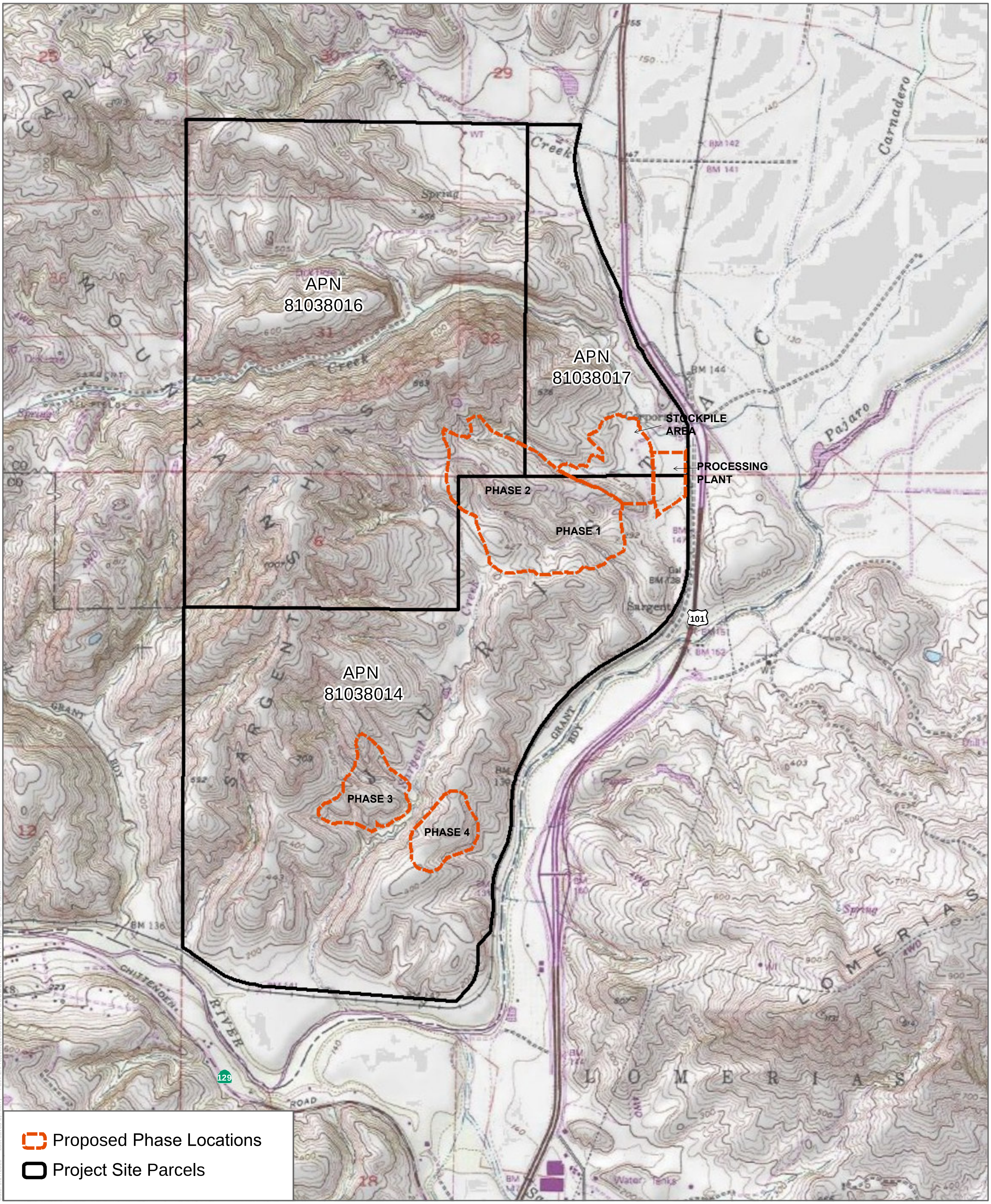

SOURCE: AERIAL-BING MAPPING SERVICE; Triad/Holmes and Associates Development Footprint, 2020

0 1,250 2,500 Feet
0 350 700 Meters
1:30,000

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FIGURE 3
Proposed Site Plan
Fire Protection Plan for the Sargent Quarry Project

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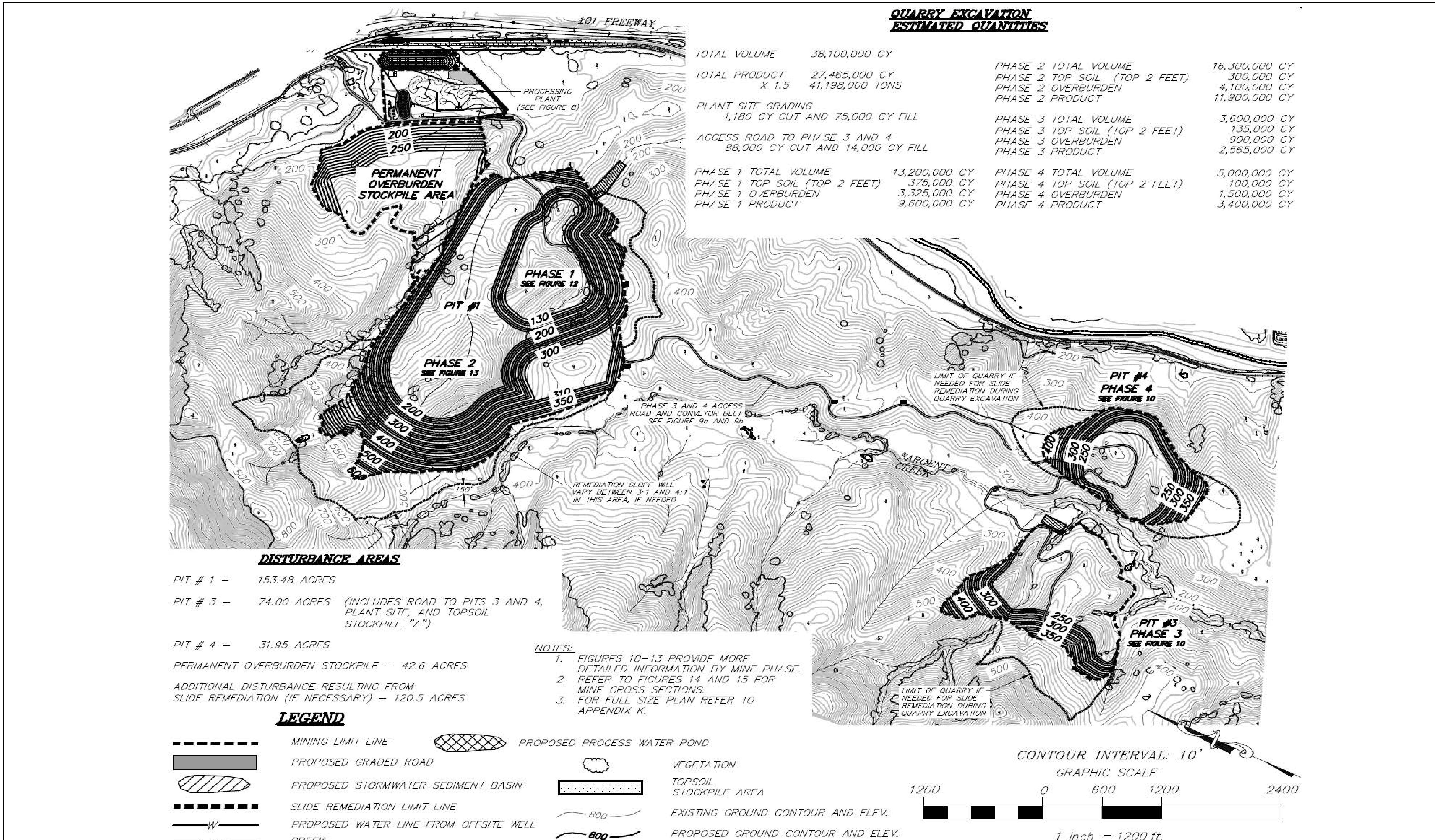

SOURCE: Triad/Holmes and Associates, 2020

FIGURE 4

Proposed Grading Plan

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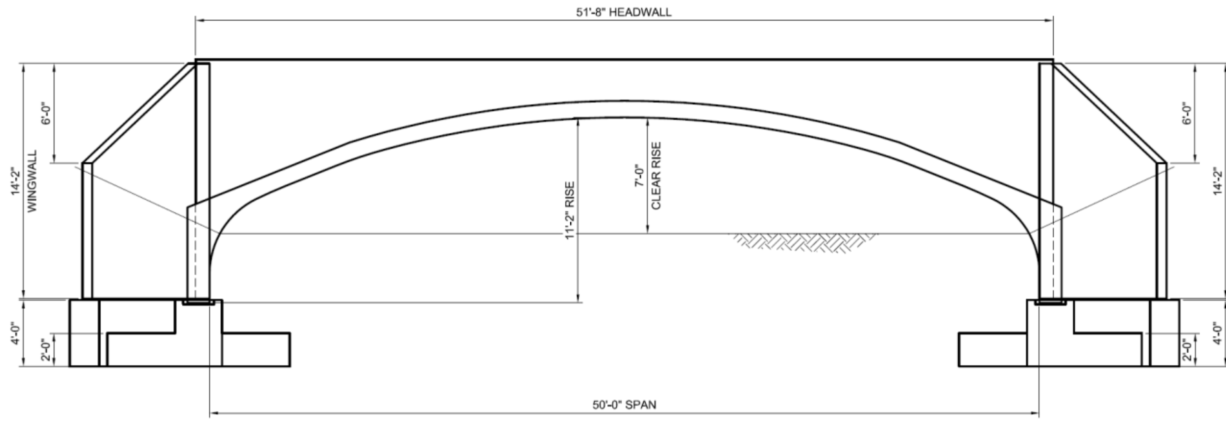
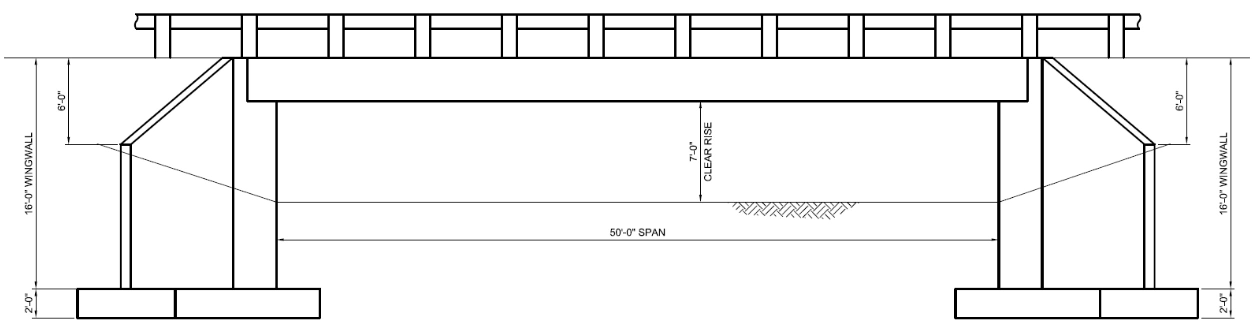


END ELEVATION – OPTION 2

Option 3:
Steel I-Beam Girder Bridge on CIP Concrete Abutments
50’-0” span x 30’-0” wide Steel I-Beam Girder with Precast Concrete Retaining Walls

While the steel beam offered a minimal material supply cost for the bridge superstructure, the total construction cost represented the highest cost option. The cost of the abutments is the greatest contributing factor, and the need for approach slabs was unique to this structure type as compared to the two buried options. It should be noted that the cost of a shorter H-pile-supported abutment was also evaluated and found to require a higher budget.



END ELEVATION – OPTION 3

X. Construction Timing

A preliminary timeline of the construction of each option is listed below. This timeline includes all bridge-related construction but does not include any bid or contract scheduling, grading, soil improvements, material lead times, or the construction of the roadway over the structure. It was assumed that no road closures or traffic control are needed to build this new access road.

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2 Proposed Project Site Risk Analysis

2.1 Environmental Setting and Field Assessment

Dudek conducted a field assessment of the Project site on July 30, 2020, in order to acquire site information, document existing site conditions, and to determine potential actions for addressing the protection of the Proposed Project's components. While on the site, Dudek's Fire Protection Planner assessed the area's topography, natural vegetation and fuel loading, surrounding land use and general susceptibility to wildfire. Among the field tasks that were completed included:

- Topography evaluation
- Vegetation/fuel assessments
- Confirmation/verification of hazard assumptions
- Photograph documentation of the existing condition
- Off-site, adjacent property fuel and topography conditions
- Surrounding land use confirmations
- Necessary fire behavior modeling data collection
- Ingress/egress documentation
- Nearby Fire Station reconnaissance.

Field observations were utilized to augment existing site data in generating the fire behavior models and formulating the requirements and recommendations detailed in this FPP report. Appendix A provides representative photographs of the Project site in its current condition.

2.2 Site Characteristics and Fire Environment

Fire environments are dynamic systems and include many types of environmental factors and site characteristics. Fires can occur in any environment where conditions are conducive to ignition and fire movement. Areas of naturally vegetated open space are typically comprised of conditions that may be favorable to wildfire spread. The three major components of fire environment are topography, vegetation (fuels), and climate. The state of each of these components and their interactions with each other determines the potential characteristics and behavior of a fire at any given moment. Understanding the existing wildland vegetation and surrounding fuel conditions on and adjacent to the site is necessary to understand the potential for fire within and around the Project site. The following sections discuss the characteristics of the Project Area at a regional scale. Evaluating conditions at this micro-scale provides a better understanding of the regional fire environment, which represents the fuel bed for wildfires that may ignite in the vicinity of and burn toward the Project site.

2.2.1 Topography

Topography influences fire risk by affecting fire spread rates. Typically, steep terrain results in faster fire spread up-slope and slower spread down-slope. Terrain that forms a funneling effect, such as chimneys, chutes, and saddles on the landscape can result in especially intense fire behavior. Conversely, flat terrain tends to have little effect on fire spread, resulting in fires that are driven by vegetation and wind.

Topography of the Project site is characterized by gently rolling to moderately steep hillsides with moderate to well incised drainages, with gradients reaching up to 16%. The area is subject to seasonal weather conditions that can heighten the likelihood of fire ignition and spread, and, considering the site's terrain and vegetation, may result in fast moving and low-to-moderate intensity wildfire. Elevations range from approximately 150 feet amsl in the northeastern portion of the Project site to over 800 feet amsl on the western portion of the Project site. In general, topography in the western portions of the Project moderately slopes to the east and southeast.

Topographic features that may present a fire spread facilitator are the slopes and canyon alignments, which may serve to funnel or channel winds, thus increasing their velocity and potential for influencing wildfire behavior.

2.2.2 Existing/Vicinity Land Use

The Project site is located in a rural area within the foothills of the Coast Range Mountains in an unincorporated area of southern Santa Clara County. The majority of the Project Site is currently undeveloped, though there are several buildings including a barn, storage building, and a residence located off Old Montgomery Road adjacent to U.S. 101. Additionally, several dirt roads from Old Montgomery Road provide access into the larger property. A portion of Sargent Ranch (to the north and west of the proposed quarry site) is engaged in oil production, and there are small pipelines and oil storage facilities on the property northwest of the proposed quarry. The nearest off-site residence to the project is located approximately 1,600 feet south of mining Phases I and II. The proposed Project area is currently used for cattle grazing and some cultivation of dry-farmed, oat hay crops for cattle feed. Surrounding uses are also primarily agricultural-related. Freeman Quarry (a reclaimed aggregate quarry), is located about two miles to the north. Mining at Freeman Quarry has ceased, and the mining and processing areas of the quarry have been reclaimed.

2.2.3 Climate

The Project site, like much of northern California, climate has a large influence on fire risk. The climate of Santa Clara County is typical of a Mediterranean area, with relatively warm, dry summers and cool, wet winters. Analysis of long-term precipitation records indicate that wetter and drier cycles, lasting several years each, are common in the region.

The Project site enjoys a relatively mild climate year-round. The climate is slightly warmer than coastal areas of Monterey and northern Santa Clara County; it is however, more temperate than areas further inland. The average highs range from 60° F to 88° F and the lows between 37° F to 55° F year-round. The Project usually enjoys a later summer with August and September, on average, being the warmest months. January and December, on average, are the coldest months[4].

Precipitation typically occurs between November and March with average rainfall of 20.53 inches[5]. The prevailing wind is an on-shore flow from the Pacific Ocean with fall Santa Ana winds from the east/northeast that may gust up to 50 miles per hour (mph) or higher. Drying vegetation (fuel moisture of less than 5% for 1-hour fuels is possible) during the summer months becomes fuel available to advancing flames should an ignition occur.

Typically, the highest fire danger in northern California coincides with Santa Ana winds. The Santa Ana wind conditions are a reversal of the prevailing southwesterly winds that usually occur on a region-wide basis near the

[4] https://www.usclimatedata.com/climate/gilroy/california/united-states/usca0420

end of fire season during late summer and early fall. They are dry, warm winds that flow from the higher desert elevations in the east through the mountain passes and canyons. As they converge through the canyons, their velocities increase. Consequently, peak velocities are highest at the mouths of canyons and dissipate as they spread across valley floors. Localized wind patterns on the Project site are strongly affected by both regional and local topography.

The prevailing wind pattern is from the west (on-shore), but the presence of the Pacific Ocean causes a diurnal wind pattern known as the land/sea breeze system. During the day, winds are from the west–southwest (sea) and at night winds are from the northeast (land), averaging 5 miles per hour (mph). During the summer season, the diurnal winds may average slightly higher (approximately 19 mph) than the winds during the winter season due to greater pressure gradient forces. Surface winds can also be influenced locally by topography and slope variations. The highest wind velocities are associated with downslope, canyon, and Santa Ana winds. The Project site includes topography that would create unusual weather conditions, thus, the site is subject to periodic extreme fire weather conditions that occur throughout Santa Clara County.

2.2.4 Vegetation (Fuels)

The Project area is generally open grasslands that supports a limited range of habitats and biological communities. Extensive vegetation type mapping is useful for fire planning, because it enables each vegetation community to be assigned a fuel model, which is used in a software program to predict fire behavior characteristics, as discussed in Section 3.1, Fire Behavior Modeling. Based on Dudek's site fire risk assessment and sustained by the Project's vegetation mapping and biological assessment of the Project area (Live Oak Associates, Inc, 2015), there are four vegetation communities and/or land cover types within the Project area. The vegetation communities include California Annual Grasslands, Coast Live Oak Forest and Woodlands, Grain, Row-crop, Hay and Pasture, Disked/Short-term Fellowed, and a Pond. The acreage of each of these vegetation communities and land covers are provided in Table 3 and their spatial distribution on the site is illustrated in Figure 6. As indicated, California Annual Grasslands make up the majority of the Project area's vegetation communities and/or land cover types. The California Annual Grasses represent the fuels that would likely create a fast moving but low intensity wildfire toward or away from the Project.

Table 3. Sargent Ranch Quarry Vegetation Communities and Land Covers

Vegetation Community/Land Cover	Acres[1]	Percentage Cover
California Annual Grasslands	248.42	82.69%
Coast Live Oak Forest and Woodland	33.09	11.02%
Grain, Row-crop, Hay & Pastures, Disked/Short-term Fellowed	18.81	6.26%
Pond	0.1	0.03%
Totals	300.42	100.00%

1. Acreages include the areas of Phase 1 through 4.

2.2.5 Vegetation Dynamics

The vegetation described above translates to fuel models used for fire behavior modeling, discussed in Chapter 3 of this FPP. Variations in vegetative cover type and species composition have a direct effect on fire behavior. Some plant communities and their associated plant species have increased flammability based on plant physiology (resin content), biological function (flowering, retention of dead plant material), physical structure (bark thickness, leaf size, branching patterns), and overall fuel loading. For example, native and non-native grass dominated plant communities become seasonally prone to ignition and produce lower intensity, higher spread rate fires. In comparison, California sagebrush scrub can produce higher heat intensity and higher flame lengths under strong, dry wind patterns, but does not typically ignite or spread as quickly as light, flashy grass fuels. The corresponding fuel models for each of these vegetation types are designed to capture these differences. Additionally, vegetative cover influences fire suppression efforts through its effect on fire behavior. For example, while fires burning in grasslands may exhibit lower flame lengths and heat outputs than those burning in native shrub habitats, fire spread rates in grasslands are often more rapid.

As described, vegetation plays a significant role in fire behavior, and is an important component to the fire behavior models discussed in this report. A critical factor to consider is the dynamic nature of vegetation communities. Fire presence and absence at varying cycles or regimes disrupts plant succession, setting plant communities to an earlier state where less fuel is present for a period of time as the plant community begins its succession again. In summary, high-frequency fires tend to convert shrublands to grasslands or maintain grasslands, and fire exclusion tends to convert grasslands to shrublands over time as shrubs sprout back or establish and are not disturbed by repeated fires. In general, biomass and associated fuel loading will increase over time, assuming that disturbance (e.g., fire, grazing, or farming) or fuel reduction efforts are not diligently implemented. It is possible to alter successional pathways for varying plant communities through manual alteration. This concept is a key component in the overall establishment and maintenance of the proposed FMZs for the Project Site. The FMZs will consist of maintained landscapes, thinned fuel zones, gravel, and/or cleared firebreaks that will be subject to regular "disturbance" in the form of maintenance and will not be allowed to accumulate excessive biomass over time, which result in reduced fire ignition, spread rate, and intensity.

2.2.6 Fire History

Fire history is an important component of FPPs. Fire history information can provide an understanding of fire frequency, fire type, most vulnerable areas, and significant ignition sources, amongst others. Fire frequency, behavior, and ignition sources are important for fire response and planning purposes. One important use for this information is as a tool for pre-planning. It is advantageous to know which areas may have burned recently and, therefore, may provide a tactical defense position, what type of fire burned on the Project site, and how a fire may spread. Appendix B, Fire History Map provides a graphical representation of the quantity of times the landscape has burned in the area. As presented on the fire history exhibit, there have been 10 wildfires recorded by California Department of Forestry and Fire Protection (CAL FIRE) in their Fire and Resource Assessment Program (FRAP) database (CAL FIRE FRAP 2019)[5] within five miles of the property. Recorded wildfires within five miles range from 12 acres to 1,867 acres (1981 Herbert Fire) and the average fire size is approximately 343 acres (not including fires smaller than 10 acres). The Bally Fire (109 acres) is the most recent significant fire, which occurred approximately 4 miles north of the Project Site. The South Santa Clara Fire Districts (SSCFD) or the Gilroy Fire Department (GFD) may have data regarding smaller fires (less than 10 acres) that have occurred on the site that have not been included herein. It should be noted that there have not been any fires that have burned onto the Project site. Table 4 summarizes the fire history for the area within five miles of the site. CAL FIRE FRAP summarizes fire perimeter data dating to the late 1800s but is incomplete due to the fact that it only includes fires over 10 acres in size and has incomplete perimeter data, especially for the first half of the 20th century (Syphard and Keeley

5 Based on polygon Geographical Information System (GIS) data from CAL FIRE's Fire and Resource FRAP, which includes data from CAL FIRE, USDA Forest Service Region 5, Bureau of Land Management, National Park Service, contract counties and other agencies. The data set is a comprehensive fire perimeter GIS layer for public and private lands throughout the state and covers fires 10 acres and greater between 1914–2019.

2016). However, the data does provide a summary of recorded fires and can be used to show whether large fires have occurred in the Project area, which indicates whether they may be possible in the future.

Table 4. Fire History within Five Miles of the Sargent Quarry Project Site

Fire Year*	Fire Name	Interval (years)	Total Area Burned (acres)
1981	Herbert	N/A	1,867
1984	Rocha VMP Escape #2	3	1,240
2002	Merrill	18	64
2005	156 Fire	3	16
2007	Avenida	2	34
2010	Salinas	3	12
2011	Red Barn	1	22
2011	Rocks	0	13
2015	Betabel	4	56
2017	Bally	2	109

1 *CAL FIRE FRAP 2020

Based on an analysis of this fire history data set, specifically the years in which the fires burned, the average interval between wildfires in the area was calculated to be approximately four years with intervals ranging between 0 (multiple fires in the same year) to 18 years. Based on this analysis, it is expected that wildfire that could impact the Sargent Ranch Quarry may occur, if weather conditions coincide, roughly every three years with the realistic possibility of shorter interval occurrences, as observed in the fire history record. Further, the large expanses of open space surrounding the Boulder Brush Boundary and potential ignition sources along I-8 and nearby off-road vehicle trails, contribute to increased potential risk and wildfire hazard in the area.

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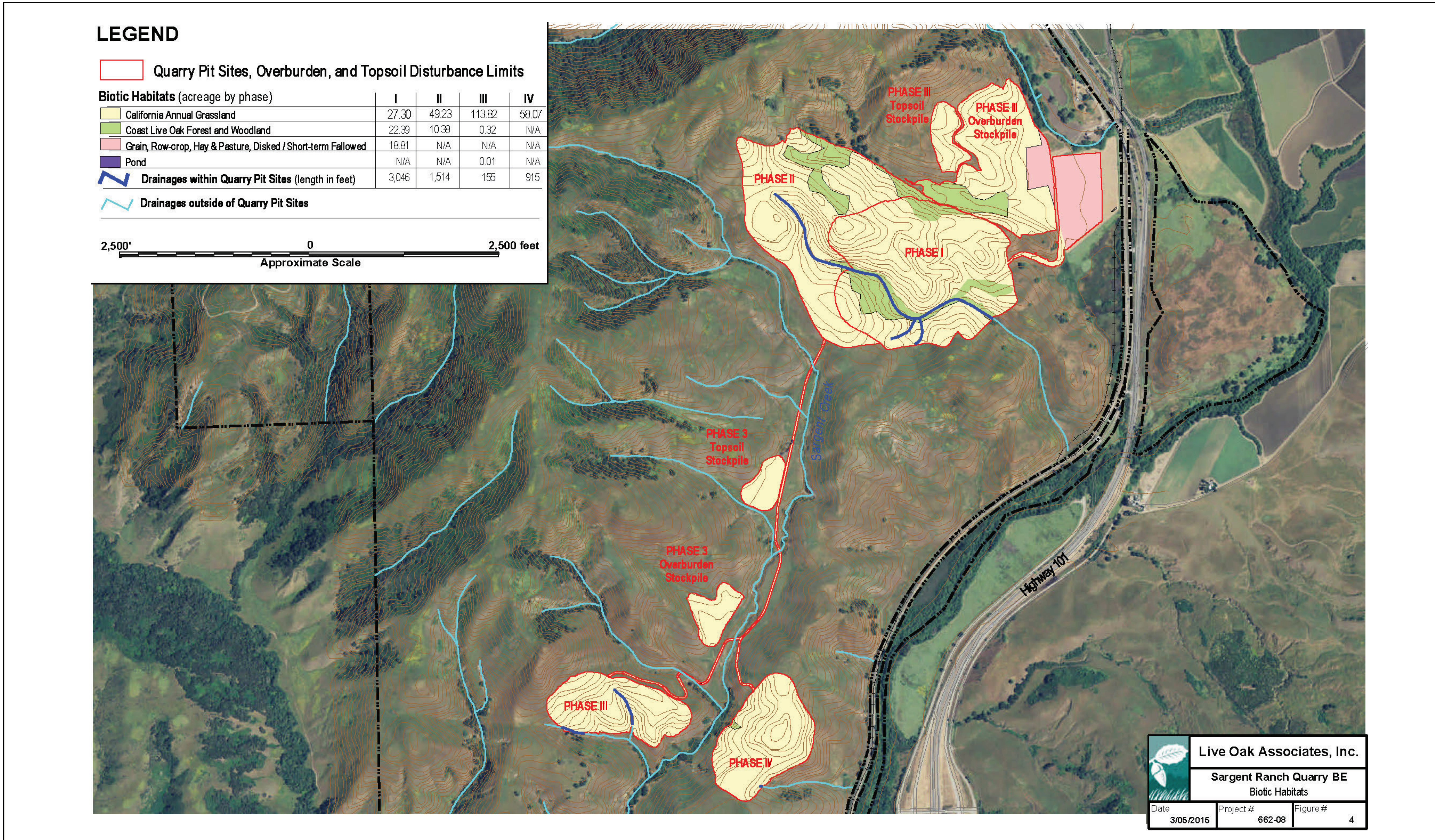

SOURCE: LIVE OAK ASSOCIATES, INC. 2015

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FIGURE 6

Vegetation Communities

Fire Protection Plan for the Sargent Quarry Project

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3 Anticipated Fire Behavior

3.1 Fire Behavior Modeling

Following field data collection efforts and available data analysis, fire behavior modeling was conducted to document the type and intensity of fire that would be expected on and adjacent to the Project Site given characteristic site features such as topography, vegetation, and weather. BehavePlus software package version 6.0 (Andres, Bevins, and Seli 2008), which is the industry standard, was utilized to analyze potential fire behavior for the northern, eastern, southern, and western edges of the proposed Project site with assumptions made for pre- and post-project slope and fuels conditions. Results are provided below and a more detailed presentation of the BehavePlus analysis, including fuel moisture and weather input variables, is provided in Appendix C.

3.2 BehavePlus Fire Behavior Modeling Analysis

An analysis utilizing the BehavePlus software package was conducted to evaluate fire behavior variables and to objectively predict flame lengths (feet), fireline intensities (BTU/feet/second), rate of spread (feet/minute), and spotting distance (miles) for four modeling scenarios. These fire scenarios incorporated observed fuel types representing the dominant on-site and off-site vegetation on vacant land to the north, east, south and west, in addition to measured slope gradients, and wind and fuel moisture values derived from Remote Automated Weather Stations (RAWs) weather data sets (Hollister Station, ID No. 044406) for both the 50th percentile weather (summer, on-shore winds) and the 97th percentile weather (fall, off-shore extreme winds). Modeling scenario locations were selected to better understand different fire behavior that may be experienced on or adjacent the site.

Vegetation types, which were derived from the field assessment for the Project site, were classified into a fuel model. Fuel Models are simply tools to help fire experts realistically estimate fire behavior for a vegetation type. Fuel models are selected by their vegetation type; fuel stratum most likely to carry the fire; and depth and compactness of the fuels. Fire behavior modeling was conducted for vegetative types that surround the proposed development sites. Fuel models were selected from *Standard Fire Behavior Fuel Models: A Comprehensive Set for Use with Rothermel's Surface Fire Spread Model* (Scott and Burgan 2005). Based on the existing vegetation conditions, three different fuel models were used in the fire behavior modeling effort presented herein. Fuel model attributes are summarized in Table 5.

Table 5. Fuel Model Characteristics

Fuel Model	Description	Location	Fuel Bed Depth (Feet)
Gr2	Low Load, Dry Climate Grasses	Throughout the property	>2.0 ft.
Gr4	Moderate Load, Dry Climate Grasses	Throughout the property	>4.0 ft.
Sh4	Low load, humid climate timber-shrub	Coast live oak woodland to the north/northwest	>8.0 ft.

The results of fire behavior modeling analysis are presented in Table 6. Identification of modeling run (fire scenarios) locations is presented graphically in Figure 7, BehavePlus Fire Behavior Analysis exhibit.

Table 6. BehavePlus Fire Behavior Modeling Results - Existing Conditions

Fire Scenario	Flame Length[1] (feet)	Spread Rate[1] (mph[4])	Fireline Intensity[1] (Btu/ft/s)	Spot Fire[5] (miles)	Surface Fire to Tree Crown Fire	Tree Crown Fire Rate of Spread (mph)	Crown Fire Flame Length (feet)
Scenario 1: 7% slope; Fall Off-shore Extreme Wind (97th percentile) – Pre-BMZ (North of Project site)							
Low load, humid climate timber-shrub (Sh4)[2]	12.1 (23.1)[6]	1.0 (4.1)	1,291 (5,237)	0.5 (1.5)	Crowning [3]	1.0 (4.1)	48.4 (124.5)
Low load, Dry Climate Grasses (Gr2)	9.1 (14.1)	1.6 (4.2)	685 (1,791)	0.4 (1.1)	Crowning [3]	1.0 (4.1)	40.9 (105.1)
Moderate load, Dry Climate Grasses (Gr4)	17.0 (33.3)	3.2 (14.0)	2,669 (11,575)	0.6 (2.0)	Crowning [3]	1.0 (4.1)	44.5 (114.4)
Scenario 2: 16% slope; Fall Off-shore Extreme Wind (97th percentile) – Pre-BMZ (Southeast of Project site)							
Low load, Dry Climate Grasses (Gr2)	9.0 (14.1)	1.6 (4.2)	667 (1,791)	0.4 (1.1)	N/A	N/A	N/A
Moderate load, Dry Climate Grasses (Gr4)	16.7 (33.2)	3.1 (13.9)	2,598 (11,503)	0.6 (2.0)	N/A	N/A	N/A
Scenario 3: 15% slope; Summer On-shore, Summer Winds (50th percentile) – Pre-BMZ (Southwest of Project site)							
Low load, Dry Climate Grasses (Gr2)	6.6	1.0	345	0.4	N/A	N/A	N/A
Moderate load, Dry Climate Grasses (Gr4)	12.4	2.0	1,349	0.5	N/A	N/A	N/A
Scenario 4: 16% slope; Summer, On-shore Winds (50th percentile) – Pre-BMZ (Northwest of Project site)							
Low load, humid climate timber-shrub (Sh4)[2]	7.3	0.5	424	0.4	Crowning [3]	0.6	33.2
Low load, Dry Climate Grasses (Gr2)	6.6	1.0	341	0.3	Crowning [3]	0.6	29.9
Moderate load, Dry Climate Grasses (Gr4)	12.3	1.9	1,334	0.5	Crowning [3]	0.6	32.2

Notes:

1. [1]
2. Wind-driven surface fire.
3. Coast live oak overstory torching increases fire intensity. Modeling included canopy fuel over Sh4, which represents surface fuels beneath the tree canopies.
4. Crowing = fire is spreading through the overstory crowns.
5. MPH = miles per hour
6. Spotting distance from a wind driven surface fire
7. It should be noted that the wind MPH in parenthesis represents peak gusts of 50 MPH.

The following describes the fire behavior variables (Heisch and Andrews 2010) as presented in Table 6:

Surface Fire:

- Flame Length (feet): The flame length of a spreading surface fire within the flaming front is measured from midway in the active flaming combustion zone to the average tip of the flames.

- Fireline Intensity (Btu/ft/s): Fireline intensity is the heat energy release per unit time from a one-foot wide section of the fuel bed extending from the front to the rear of the flaming zone. Fireline intensity is a function of rate of spread and heat per unit area and is directly related to flame length. Fireline intensity and the flame length are related to the heat felt by a person standing next to the flames.

- Surface Rate of Spread (mph): Surface rate of spread is the "speed" the fire travels through the surface fuels. Surface fuels include the litter, grass, brush and other dead and live vegetation within about 6 feet of the ground.

Crown Fire:

- Transition to Crown Fire: Indicates whether conditions for transition from surface to crown fire are likely. Calculation depends on the transition ratio. If the transition ratio is greater than or equal to 1, then transition to crown fire is Yes. If the transition ratio is less than 1, then transition to crown fire is No.

- Crown Fire Rate of Spread (mph): The forward spread rate of a crown fire. It is the overall spread for a sustained run over several hours. The spread rate includes the effects of spotting. It is calculated from 20-ft. wind speed and surface fuel moisture values. It does not consider a description of the overstory.

Fire Type:

Fire type is one of the following four types: surface (understory fire), torching (passive crown fire; surface fire with occasional torching trees), conditional crown (active crown fire possible if the fire transitions to the overstory), and crowning (active crown fire; fire spreading through the overstory crowns). Dependent on the variables: transition to crown fire and active crown fire.

3.3 Fire Modeling Summary

As presented in Table 6, wildfire behavior in non-maintained grasslands, modeled as Gr2 and Gr4 fuel models being fanned by 19 mile per hour (mph) sustained, on-shore winds (fire scenarios 3 and 4) would result in a fire spreading in the non-maintained grasslands between 1.0 and 2.0 mph with 6.6 to 12.4 foot high flame lengths.

A worst-case fire under gusty Santa Ana winds and low fuel moistures (fire scenarios 1 and 2) is expected to be a fast-moving fire with spread rates between 4.1 and 14.0 mph. Surface flame length values with intense radiant heat could reach between approximately 14.1 and 33.3 feet for grassland fuels burning in specific portions off and on site. Spotting is projected to occur less than 1.0 mile during a fire influenced by on-shore winds and up to approximately 2.0 miles during a fire fanned by off-shore, gusty winds.

It should be noted that the results presented in Table 6 depict values based on inputs to the BehavePlus software. Changes in slopes, weather, or pockets of different fuel types are not accounted for in this analysis, but models provide a worst-case wildfire condition as part of a conservative approach. Further, this modeling analysis assumes a correlation between the Project site vegetation and fuel model characteristics. For planning purposes, the averaged worst-case fire behavior is the most useful information for conservative fuel modeling design. Model results should be used as a basis for planning only, as actual fire behavior for a given location will be affected by many factors, including unique weather patterns, small-scale topographic variations, or changing vegetation patterns.

3.4 On-site Wildland Fire Risk Assessment

Wildland fires are a common natural hazard throughout California with a long and extensive history. Northern California landscapes include a diverse range of plant communities, including vast tracts of grasslands and riparian habitats, like those found on and adjacent to the Project site. Wildfire in this Mediterranean-type ecosystem ultimately affects the structure and functions of vegetation communities (Keeley 1984) and will continue to have a substantial and recurring role (Keeley and Fotheringham 2003). Supporting this are the facts that 1) native landscapes, from forest to grasslands, become highly flammable each fall; and 2) the climates throughout California have been characterized by fire climatologists as the worst fire climate in the United States (Keeley 2004) with high winds (Santa Ana) occurring during autumn after a six-month drought period each year; and 3) homes embedded in natural and managed landscape vegetation in what may be accurately described as a wildland urban intermix. Based on this research, it can be anticipated that periodic wildfires will occur in the designated open space areas adjacent to portions of the property site.

Wildfires have occurred within five miles of the site. As such, wildlands near the Project are expected to be vulnerable to recurring wildfire ignition and spread and may be subject to nearby wildfire that could, under worst case conditions, spread through the non-maintained grassland covered hillsides within the Project's open space areas outside of the fuel modification zones.

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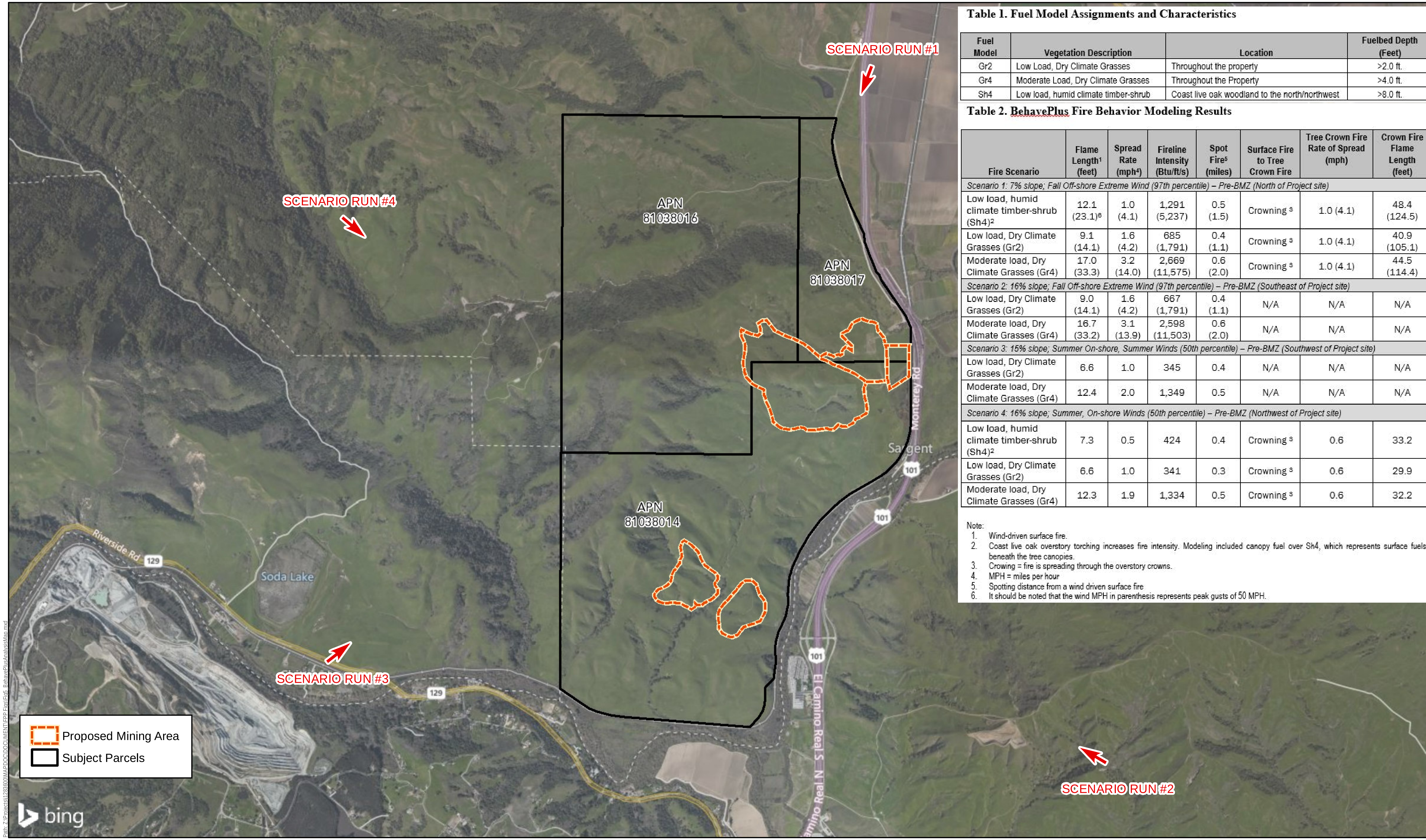

Table 1. Fuel Model Assignments and Characteristics

Fuel Model	Vegetation Description	Location	Fuelbed Depth (Feet)
Gr2	Low Load, Dry Climate Grasses	Throughout the property	>2.0 ft.
Gr4	Moderate Load, Dry Climate Grasses	Throughout the Property	>4.0 ft.
Sh4	Low load, humid climate timber-shrub	Coast live oak woodland to the north/northwest	>8.0 ft.

Table 2. BehavePlus Fire Behavior Modeling Results

Fire Scenario	Flame Length[1] (feet)	Spread Rate (mph[4])	Fireline Intensity (Btu/ft/s)	Spot Fire[5] (miles)	Surface Fire to Tree Crown Fire	Tree Crown Fire Rate of Spread (mph)	Crown Fire Flame Length (feet)
Scenario 1: 7% slope; Fall Off-shore Extreme Wind (97th percentile) – Pre-BMZ (North of Project site)							
Low load, humid climate timber-shrub (Sh4)[2]	12.1 (23.1)[6]	1.0 (4.1)	1,291 (5,237)	0.5 (1.5)	Crowning [3]	1.0 (4.1)	48.4 (124.5)
Low load, Dry Climate Grasses (Gr2)	9.1 (14.1)	1.6 (4.2)	685 (1,791)	0.4 (1.1)	Crowning [3]	1.0 (4.1)	40.9 (105.1)
Moderate load, Dry Climate Grasses (Gr4)	17.0 (33.3)	3.2 (14.0)	2,669 (11,575)	0.6 (2.0)	Crowning [3]	1.0 (4.1)	44.5 (114.4)
Scenario 2: 16% slope; Fall Off-shore Extreme Wind (97th percentile) – Pre-BMZ (Southeast of Project site)							
Low load, Dry Climate Grasses (Gr2)	9.0 (14.1)	1.6 (4.2)	667 (1,791)	0.4 (1.1)	N/A	N/A	N/A
Moderate load, Dry Climate Grasses (Gr4)	16.7 (33.2)	3.1 (13.9)	2,598 (11,503)	0.6 (2.0)	N/A	N/A	N/A
Scenario 3: 15% slope; Summer On-shore, Summer Winds (50th percentile) – Pre-BMZ (Southwest of Project site)							
Low load, Dry Climate Grasses (Gr2)	6.6	1.0	345	0.4	N/A	N/A	N/A
Moderate load, Dry Climate Grasses (Gr4)	12.4	2.0	1,349	0.5	N/A	N/A	N/A
Scenario 4: 16% slope; Summer, On-shore Winds (50th percentile) – Pre-BMZ (Northwest of Project site)							
Low load, humid climate timber-shrub (Sh4)[2]	7.3	0.5	424	0.4	Crowning [3]	0.6	33.2
Low load, Dry Climate Grasses (Gr2)	6.6	1.0	341	0.3	Crowning [3]	0.6	29.9
Moderate load, Dry Climate Grasses (Gr4)	12.3	1.9	1,334	0.5	Crowning [3]	0.6	32.2

Note:
1. Wind-driven surface fire.
2. Coast live oak overstory torching increases fire intensity. Modeling included canopy fuel over Sh4, which represents surface fuels beneath the tree canopies.
3. Crowing = fire is spreading through the overstory crowns.
4. MPH = miles per hour
5. Spotting distance from a wind driven surface fire
6. It should be noted that the wind MPH in parenthesis represents peak gusts of 50 MPH.

SOURCE: AERIAL-BING MAPPING SERVICE

DUDEK

0 250 500 1,000 Feet

FIGURE 7

BehavePlus Analysis Map

Fire Protection Plan for the Sargent Quarry Project

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4 Emergency Response and Service

The following sections analyze the Project in terms of current Fire Service capabilities and resources to provide Fire Protection and Emergency Services. The analysis that follows examines the ability of the closest existing fire jurisdictions and their closest fire stations to adequately serve the Project site area. Response times were evaluated using Project build-out conditions

4.1 Emergency Response

The Project site is located within the South Santa Clara County Fire District (SSCCFD) jurisdictional response area, however, due to long standing mutual- and automatic-aid agreements with the Gilroy Fire Department (GFD), they eliminate existing geopolitical boundaries in the interest of increased efficient and a fully recognized fire-based emergency response mode. In 2016, the SSCCFD made an effort to further eliminate geopolitical boundaries and streamline delivery of service by consolidating previous agreements with a newly revised boundary drop and operational agreement that includes both Gilroy and Morgan Hill Fire Departments (SSCCFD 2016 Annual Report)[6]. With the boundary drop agreement the closest available SSCCFD, Morgan Hill, or Gilroy resource responds to emergencies, regardless of the geographic jurisdiction. The SSCCFD is a dependent district of the County of Santa Clara and services approximately 432 square miles of unincorporated areas of Santa Clara County, including Gilroy, Morgan Hill, and San Martin with a population of approximately 40,300 (Cities of Gilroy and Morgan Hill and the South Santa Clara County Fire District – Standard of Coverage Assessment, 2019)[7]. The GFD provides service to approximately 16 square miles with a 2017 population of just over 54,000 (City of GFD – 2019 Master Plan Update)[8].

The SSCCFD contracts with the California Department of Forestry and Fire Protection (CAL FIRE) to staff three Type-1 fire engines from three SSCCFD fire stations. The SSCCFD provides all-risk fire, rescue, and Advance Life Support (ALS) pre-hospital emergency medical services with a staff of approximately 26 personnel, including a daily response force of nine fulltime fire personnel and one Battalion Chief from the three fire stations, a shared CAL FIRE Assistant Chief, one CAL FIRE Battalion Chief, a shared Battalion Chief/Fire Marshal, one Office Technician, and a shared Staff Services Analyst. Additionally, the GFD provides all-risk fire, rescue, and ALS pre-hospital emergency medical services with a staff of 42 personnel, including a daily response force of nine fulltime fire personnel staffing three Type-1 structural fire engines and one Division Chief from the City's three fire stations, a Fire Chief, the Division Chiefs, an Administrative Fire Captain, a Management Analyst, and an Office Assistant (Cities of Gilroy and Morgan Hill and the South Santa Clara County Fire District – Standard of Coverage Assessment, 2019).

Based on current SSCCFD and GFD fire station distribution, two of the six Fire Stations (three SSCCFD and three GFD fire stations) are analyzed herein due to their proximity to the Project site; SSCCFD Gilroy Gardens Fire Station 3 and the GFD Chestnut Station are most likely to provide initial response. However, all stations within the SSCCFD and GFD are available to service the Project site, if necessary and could respond to an incident at the Project site. Table 7 presents a summary of the location, equipment, staffing levels, maximum travel distance, and estimated travel time for the two closest stations responding to the Project site.

6 http://www.ssccfd.com/wp-content/uploads/2014/02/2016-SSCCFD-Annual-Report-FINAL.pdf
7 http://www.ssccfd.com/wp-content/uploads/2019/11/Vol-1-So-Santa-Clara-County-FDs-SOC-Study-Report-Final-11-14-19.pdf
8 http://www.cityofgilroy.org/DocumentCenter/View/9720/Vol-1---Gilroy-FD-Master-Plan-Update-Report---Final-11-14-19?bidId=

As depicted in Table 7, the GFD Chestnut Fire Station, located at 7070 Chestnut Street, Gilroy, California is the closest station that services the Project site. This Station is covered by three shifts, each of which is staffed by three fulltime fire personnel, including a Captain, a Firefighter Engineer, and a Firefighter/Paramedic. The Chestnut Station is equipped with a Type 1 Paramedic Fire Engine, a 75-foot ladder truck, a rescue ambulance (Medic 47), and a type 6 engine. The GFD Chestnut Station is located approximately 5.5 miles from the entrance of the Project site and approximately 7.9 miles from the most remote portions of the Quarry and could respond to an incident within approximately 12 minutes and 10 seconds travel time. SSCCFD Gilroy Gardens Fire Station 3, which is located at 3050 Hecker Pass Highway, Gilroy, California, is the next closest station that could respond to the site. SSCCFD Station 3 is located approximately 9.9 miles from the entrance of the Project site and approximately 12.3 miles from the most remote portion of the Project site and houses one Type 1 Fire Engine (E69), one fulltime ALS Paramedic Engine, one Reserve Engine (E169), one Utility Vehicle, and one Technical Rescue Trailer.

Emergency travel time for first arriving engines from each station to the Project Site are provided in Table 7. Travel distances are derived from Google road data while travel times are calculated using response speeds of 35 mph on local roads and 65 mph on US-101, consistent with nationally recognized National Fire Protection Association (NFPA) 1710 and Insurance Services Office (ISO) Public Protection Classification Program's Response Time Standard formula (Time=0.65 + 1.7(Distance). The ISO response travel time formula discounts speed for intersections, vehicle deceleration and acceleration, and does not include turnout time. Automatic and/or Mutual Aid agreements with surrounding fire departments are in place and would potentially result in additional resources that are not analyzed in this FPP.

Table 7. SSCCFD and GFD Emergency Response Analysis for the Proposed Project Site

SSCCFD and GFD Fire Stations	Travel Distance to Entrance[1]	Estimated Response Travel Time[3]	Maximum Travel Distance[q]	Estimated Response Travel Time[3]	Firefighting Resources
GFD Chestnut Station	5.5	6 minutes 22 seconds	7.9 miles	12 minutes 10 seconds	- (1) Type 1 Paramedic Fire Engine - (1) 75-foot Ladder Truck - (1) Rescue Ambulance - (1) Type 6 Engine *(4 personnel/shift)*
SSCCFD Station 3	9.9	16 minutes 55 seconds	12.3 miles	20 minutes 59 seconds	- (1) Type 1 Paramedic Fire Engine - (1) Reserve Engine - (1) Utility Vehicle - (1) Technical Rescue Trailer *(3 personnel/shift)*

Notes:

1. Distance to the entrance of the Project site.
2. Distance measured to most remote portion of Project site.
3. Table 7 presents results of response travel time utilized the travel distances derived from Google road data while travel times are calculated using response speeds at an average of 35 mph and 65 mph on Us-101, consistent with nationally recognized National Fire Protection Association (NFPA) 1710 and does not include turnout times.

The GFD response time standard for all priority Level One or Emergency type calls is 7 minutes and 30 seconds 90 percent of the time, while the SSCCFD has a policy for EMS to arrive in urban and suburban areas in 7 minutes and 59 seconds or less, and in rural areas in 11 minutes and 59 seconds or less 95 percent of the time. As indicated in Table 7, the Project site location in relation to the existing closest stations, travel time for the first arriving engine from the GFD Chestnut Station is approximately 6 minutes and 22 seconds to the Project entrance and approximately 12 minutes and 10 seconds to the most remote portion of the Project site. Secondary response from the SSCCFD Station 3 would arrive in less than 21 minutes to the remote portion of the Project site.

4.2 Emergency Service Level

Determining the potential impact associated with the Project's estimated population increase is required in order to compare how many additional calls may be realized and determine what effects they may have on the available response resources. The estimated incident call volume of the Project is based on a conservatively calculated estimate from the maximum potential number of additional persons that would be expected on site. Emergency call volumes related to typical projects can be reliably estimated based on the historical per-capita call volume from a particular fire jurisdiction.

During 2018, GFD documented a response to 5,067 total service demand and the SSCCFD documented a response to 2,942 total service demand calls (Cities of Gilroy and Morgan Hill and the SSCCFD – Standards of Coverage Assessment, 2019)[4] that were generated by a combined service area total population of approximately 94,300 persons. The combined service area's per capita annual call volume is approximately 85 calls per 1,000 persons. The resulting per capita call volume is 0.085.

As previously described, the Project site anticipates that the Sargent Ranch Quarry would employ up to 15 employees at one time during daylight hours, which would generate roughly 2 calls per year. The estimated incident call volume is likely a conservative estimate of the maximum potential number of persons on site at any given time (considered a "worst case" scenario).

Service level requirements are not expected to be significantly impacted with the increase of approximately 2 calls per year, which for the GFD Chestnut Station that currently responds to roughly 5 calls per day (approximately 1,689 calls in 2018) in its primary service area and for the SSCCFD Station 3 that currently responds to roughly 3 calls per day (approximately 981 total calls in 2018) in its overall service area. For perspective, a typical station averages five calls per day and a busy station responds to about ten calls per day. The currently low call volume at SSCCFD Station 3 and average call volume at the GFD Chestnut station, the additional calls associated with the Project can be absorbed and still result in acceptable emergency response coverage. Therefore, the Project is not expected to cause a decline in the GFD's or SSCCFD's emergency response times.

4.3 Cumulative Impacts on Fire Response

The available firefighting and emergency medical resources in the vicinity of the Project site include an assortment of fire apparatus and equipment considered capable of responding to the type of fires and emergency medical services potentially occurring within the Project site. The Project, which includes and its anticipated employment of up to 15 employees at one time, results in an increase in potential service demand of approximately 2 calls per year, well within the capacity of the existing Fire Stations that will service the Sargent Ranch Quarry Project. Other future projects in the vicinity of the Project are not known at the time of this FPPs preparation, but when considered cumulatively, the potential impact of multiple projects is considered less than significant, mitigated by increased funding available from each project to the SSCCFD and GFD through property taxes and other fees associated with each project, including the Sargent Ranch Quarry Project. This funding would be utilized to maintain or enhance fire response capabilities.

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5 Buildings, Infrastructure, and Defensible Space

The Santa Clara County Municipal Code, including the adoption of Chapter 49 of the CFC and Chapter 7A of the CBC (Refer to Section 1.1 of this FPP for code references), addresses the potential adverse environmental effects that the proposed Project may have from wildland fire and governs the building, infrastructure, and defensible space requirements detailed in this FPP. The Project will meet applicable codes prior to their implementation, and while these standards will provide a high level of protection for those working within and around the Project site, there is no guarantee that compliance with these standards will prevent wildfire from occurring on the site.

5.1 Site Fire Access

5.1.1 Fire and Maintenance Access Roads for Sargent Quarry

Access to the Project area would occur via southbound U.S. 101 and Old Monterey Road through a gated entrance to an existing private access road. Both Old Monterey Road and the private access road would be repaved to accommodate the two-way truck traffic associated with the Project. Trucks leaving the site traveling to destinations south of the Sargent Ranch Quarry would exit onto Old Monterey Road and then onto southbound U.S. 101 via an existing acceleration lane. Trucks traveling to destinations north of the quarry would use the Sargent Ranch undercrossing of U.S. 101. To facilitate truck access, an existing U.S. 101 entry lane east of Sargent Ranch would be improved to be a 12-foot-wide, 0.25-mile-long acceleration lane for trucks accessing northbound U.S. 101. This merging lane will require and encroachment permit from Caltrans and will be built according to Caltrans specifications.

The northerly portion of Old Monterey Road is approximately 20 to 24 feet in width. This section, which lies within a County right-of-way, would be improved as needed with new pavement overlaid on the existing roadway. Roadway shoulders (approximately three feet in width on both sides of the road) would be added as needed, The interior on-site private access roadway within Sargent Ranch would be improved to a minimum width of 20 feet and would be upgraded with an asphalt, concrete, or other approved driving surface capable of supporting the imposed load of fire apparatus weighting at least 75,000 pounds or as other determined by the Fire Code official, and would be designed and maintained to provide all-weather driving capabilities. It is anticipated that Old Montgomery Road, both within the County right-of-way and the private portions, would need to be repaired and maintained with additional pavement overlays and (potentially) removal and repair of roadway sections during the anticipated 30-year term of the mining operations.

Secondary access is required for development projects that include an increase in the number of people beyond a threshold that could impact the ability to evacuate those people while providing suitable ingress for emergency personnel. This Project, once operational, will include, up to 15 people on site at any given time and will include no overnight accommodations, so no staff will be sleeping at the site.

A free-span, arch-culvert bridge is proposed over Tar Creek to provide truck access to the processing area, truck scales and office. The arch-culvert bridge would span the banks of the creek and extend to a height of approximately five feet above the banks of Tar Creek. The bridge would be approximately 24 feet in width and 50 feet in length. Berms would be installed on both sides of the bridge to direct stormwater flows into Tar Creek and to elevate the bridge.

Vertical Clearance:

Minimum vertical clearance over required vehicular access roads and driveways shall be 15 feet for SRA and County designated Ranchlands and a minimum 13 feet 6-inches for all other areas.

Grade:

Road grades shall not exceed 15%, complying with the County of Santa Clara Standards for Fire Department Vehicle Access.

Surface:

Fire apparatus access roads (including bridges and culverts) shall be constructed with an asphalt, concrete, or other approved driving surface capable of supporting the imposed load of fire apparatus weighing at least 75,000 pounds, or otherwise determined by the fire code official.

Gates:

No gate may be installed across a required fire department access road or driveway without prior approval from the local fire agency. A detailed plan shall be submitted for review and approval prior to commencing any work.

a. Security gates equipped with electronic control devices shall have an approved fire department override key switch, and shall allow operation of the gate during power outages. Forms for ordering fire department approved key switches and padlocks can be obtained from the local fire agency.

b. Manual locking mechanisms (e.g., padlocks) shall be approved by the Fire Code official and shall be installed in an approved manner. Installations which are designed to prohibit the cutting of a padlock, such as case-hardened or shielded locks, shall not be used unless a key and an approved Fire Department Lock Box is provided.

c. All manually operated gates shall be designed to remain in the open position when left unattended. Activation of an approved key switch for an electronically controlled gate shall open the gate and cause it to remain in the open position until reset by emergency response personnel.

d. When open, gates shall not obstruct any portion of the required width of the driveway or access road, shall be adequately supported to prevent dragging, and shall be operable by one person. Sliding gates shall slide parallel to the security fence. Swing-style gates shall open a full 90 degrees (minimum) and may swing in either direction. Contact your local fire agency for setback distance.

e. Within SRA and areas designated by the County as Ranchlands, gate entrance width shall be at least two feet wider than the width of the traffic lane serving the gate.

f. Gate components shall be maintained in operable condition at all times and be replaced or repaired when defective.

Premise Identification:

Identification of roads and structures will comply with the CFC Fire Code, Section 505.

5.1.2 Ignition Resistant Construction

The construction of the aggregate processing facility structures will be constructed to the County Fire Code standards, which has adopted the 2019 CFC. All proposed structural buildings will comply with the enhanced ignition-resistant construction standards of the 2019 CBC (Chapter 7A) and Chapter 5 of the Urban-Wildland Interface code. These requirements address roofs, eaves, exterior walls, vents, appendages, windows, and doors and result in hardened structures that have been proven to perform at high levels (resist ignition) during the typically short duration of exposure to burning vegetation from wildfires. While these standards will provide a high level of protection to structures in this development and should reduce the potential for ordering evacuations in a wildfire, there is no guarantee that compliance with these standards will prevent damage or destruction of structures by fire in all cases.

There are two primary concerns for structure ignition: 1) radiant and/or convective heat and 2) burning embers (NFPA 1144 2008, Ventura County Fire Protection District 2011, IBHS 2008, and others). Burning embers have been a focus of building code updates for at least the last decade, and new structures in the WUI built to these codes have proven to be very ignition resistant. Likewise, radiant and convective heat impacts on structures have been minimized through the Chapter 7A exterior fire ratings for walls, windows and doors. Additionally, provisions for modified fuel areas separating wildland fuels from structures have reduced the number of fuel-related structure losses. As such, most of the primary components of the layered fire protection system provided the project are required by the fire authority having jurisdiction (Santa Clara County Municipal Code, Title B, Division B7) and state codes, but are worth listing because they have been proven effective for minimizing structural vulnerability to wildfire and, with the inclusion of required interior sprinklers (required in the 2016 Building/Fire Code update), of extinguishing interior fires, should embers succeed in entering a structure. Even though these measures are now required by the latest Building and Fire Codes, at one time, they were used as mitigation measures for buildings in WUI areas, because they were known to reduce structure vulnerability to wildfire. These measures performed so well, they were adopted into the code.

5.2 Fire Protection Systems

5.2.1 Water Supply

Once the Project is operational and the buildings within the Processing Plant area have been constructed, typical water usage will be for the buildings of the processing plant, drinking water, other maintenance usage, and firefighting purposes. Potable water will be provided by existing on-site wells.

The Project proposes one portable 10,000-gallon water tank, which will move with each of the mining phases. Water would be stored in the aboveground water tank complying with the Santa Clara County and SSCCFD requirements and with NFPA 22, Private Fire Protection Water Tanks. A procedure for ongoing inspection, maintenance, and filling of the tank would be in place. The tank and fire engine connections shall be located on the side of the fire access road(s). The width of the road at the water tank location shall be at least 18 feet (travel width), plus an additional

10-foot width, for a distance of 50 feet, to allow for fire engines to park and connect to the tank while leaving the road open. The tank shall be labeled “Fire Water: 10,000 gallons” using reflective paint.

The capacity of the water tank at the facility would be based upon the demand for hand lines, plus a reasonable allocation for water supply for fire engines to generate firefighting foam for 15 minutes at an application density of 0.16 gallons per minute per square foot from a hose line using a 3% Aqueous Film-Forming Foam concentrate, for use on an oil fire in transformer containment. A conceptual estimate at this point, prior to detailed design, is 250 gallons per minute for 15 minutes (3,750 gallons of water) plus 112.5 gallons of foam concentrate for oil firefighting.

The County would approve the final location of the tank and total number of gallons based on a tank location drawings to be prepared by a Fire Protection Engineer and submitted by the applicant. Drawings shall show tank locations, fire department connections, and roads, and shall include the tank standard drawing and notes.

5.2.2 Fire Sprinkler System

Each of the buildings within the proposed 14-acre processing plant area is required to have an interior NFPA 13 Fire Sprinkler System be installed to NFPA installation standards. A supervised fire alarm system will also be installed pursuant to NFPA 72 and SSCCFD standards and smoke detectors shall be installed at the ceiling in every room.

5.2.3 On-Going Building and Infrastructure Maintenance

The property owner shall be responsible for long term funding and maintenance of private roads and fire protection systems, including fire sprinklers and private water facilities.

5.2.4 Pre-Construction Requirements

Prior to bringing combustible materials onto the site, all utilities and site improvements within the Project area shall be in place, water tank and water wells operational, an approved all-weather roadway in place, and fuel modification zones established and approved.

5.3 Defensible Space and Vegetation Management

The Sargent Quarry Project would be provided defensible space by a Fuel Modification Zone (FMZ) buffer around each building and structure within the proposed 14-acres processing plant area, which would be constructed in the northeastern portion of the site. The processing plant would include an office, shop, and maintenance buildings. Additionally, FMZs would be provided around the equipment storage yard, 17-space parking area, truck scales, and loading area, as well as along each side of the fire department access roads leading to each Phase of the Project. Prescribed defensible space (site-wide fuel modification zones) would be maintained on at least an annual basis or more often, as needed. None of the plants on the Prohibited Plant list (Appendix E) shall be allowed on site. Planting, if applicable, used in the defensible space would consist of low growing ground cover selected from the Approved Plant List (Appendix D) and a plant list with appropriate spacing shall be submitted to be reviewed and approved by the SSCCFD Fire Marshal (or other authorized fire jurisdiction Fire Marshal).

5.3.1 Fuel Modification

The Sargent Quarry Project would include a minimum contiguous FMZ of 100 feet around each of the buildings and structures within the proposed 14-acre processing plant area, including an office, shop, and maintenance buildings. The 100 feet of FMZ starts from the exterior wall of each of the buildings and extends outward. Onsite fire apparatus access roads shall have 20 feet of maintained FMZ from each side of the roads and the water tanks will be provided 10 feet of clearance in all directions.

5.3.1.1 Fuel Modification Requirements

The following recommendations are provided for fuel modification zones, which are proposed to occur throughout the Project site, including around all buildings and structures within the 14-acre processing plant area and along all fire department sire access roads (see Figures 8a and 8b, Project Fire Safety Plans). There would be no fuel modification zone markers in the field.

The site's fuel modification is applicable throughout the developed portions of the Project site. The area where the Project site's equipment is located would be free of vegetation. As such, the existing vegetation would be removed, and in certain areas, replanting with low-growing, desirable ground cover could occur in FMZs. The following specifications apply to the FMZs:

- Non-combustible surfaces (gravel, dirt, etc.) is applicable, or:
- The area must be cleared of all existing native vegetation or prohibited plants (Appendix E) and replaced with drought tolerant native species. These areas will be maintained to 6 inches of less.
- Ground cover less than 6 inches high.
- Refer to Appendix D, which provides a customized fuel modification plant list, for potential plants that may be suitable for the site-wide low-flammability zone.

5.3.1.2 Other Vegetation Management

1. **Roadway-Adjacent Defensible Space**

   An area of 20 feet from each side of the access roads shall be maintained clear of vegetation. This area shall be maintained by the Sargent Quarry Developer. Vertical clearance of 13 feet 6-inches shall also be maintained along the access roads.

2. **Pre-Construction Vegetation Management**

   - Fuel modification must be maintained on the perimeter throughout construction to achieve 100 feet of fuel modification around all buildings and structures.
   - Perimeter fuel modification zones must be implemented prior to commencement of construction utilizing combustible materials.

3. **Undesirable Plants**

   Certain plants are considered to be undesirable in the landscape due to characteristics that make them highly flammable. These characteristics can be physical or chemical. The plants included in the

Undesirable Plant List (Appendix E) are unacceptable from a fire safety standpoint and shall not be planted on the site. Trees and flammable plants shall be removed and any subsequent sprouting or volunteering of trees or undesirable plant materials will be removed on an annual basis.

5.3.1.3 Fuel Modification Area Vegetation Maintenance

All fuel modification area vegetation management shall be completed annually by May 15 of each year and more often as needed for fire safety, as determined by the County. Project applicant or current owner shall be responsible for all vegetation management throughout the facility and Project site, in compliance with the requirements detailed herein. The Project applicant or current owner shall be responsible for ensuring long-term funding and ongoing compliance with all provisions of this FPP, including vegetation planting, fuel modification, vegetation management, and maintenance requirements throughout the Project site.

Fuel modification maintenance work may be provided by mowing, trimming, masticating, managed goat grazing, or other methods that result in the desired low-fuel conditions detailed herein.

As a further means of ensuring the fuel modification area is maintained per this FPP, the Project owner shall obtain an inspection and report from a County-authorized Wildland Fire Safety Inspector by June 1st of each year, certifying that vegetation management activities throughout the project site have been performed pursuant to this plan. This effort further ensures vegetation maintenance and compliance with no impact on the County.

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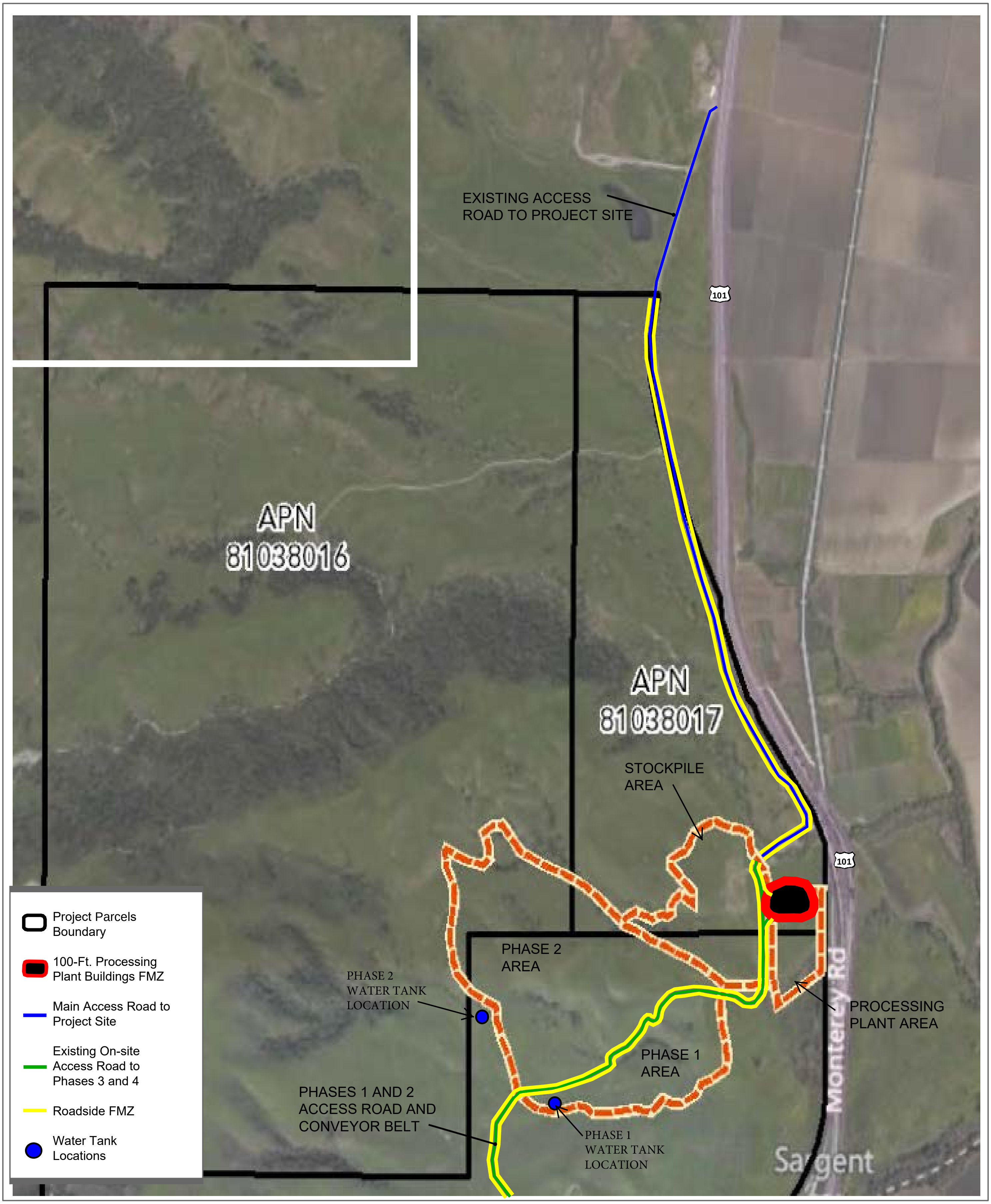

SOURCE: USGS 7.5-Minute Series, Chittenden Quadrangle

DUDEK

0 600 1,200 Feet

FIGURE 8a

Site Fire Safety Plan - Phases 1 and 2

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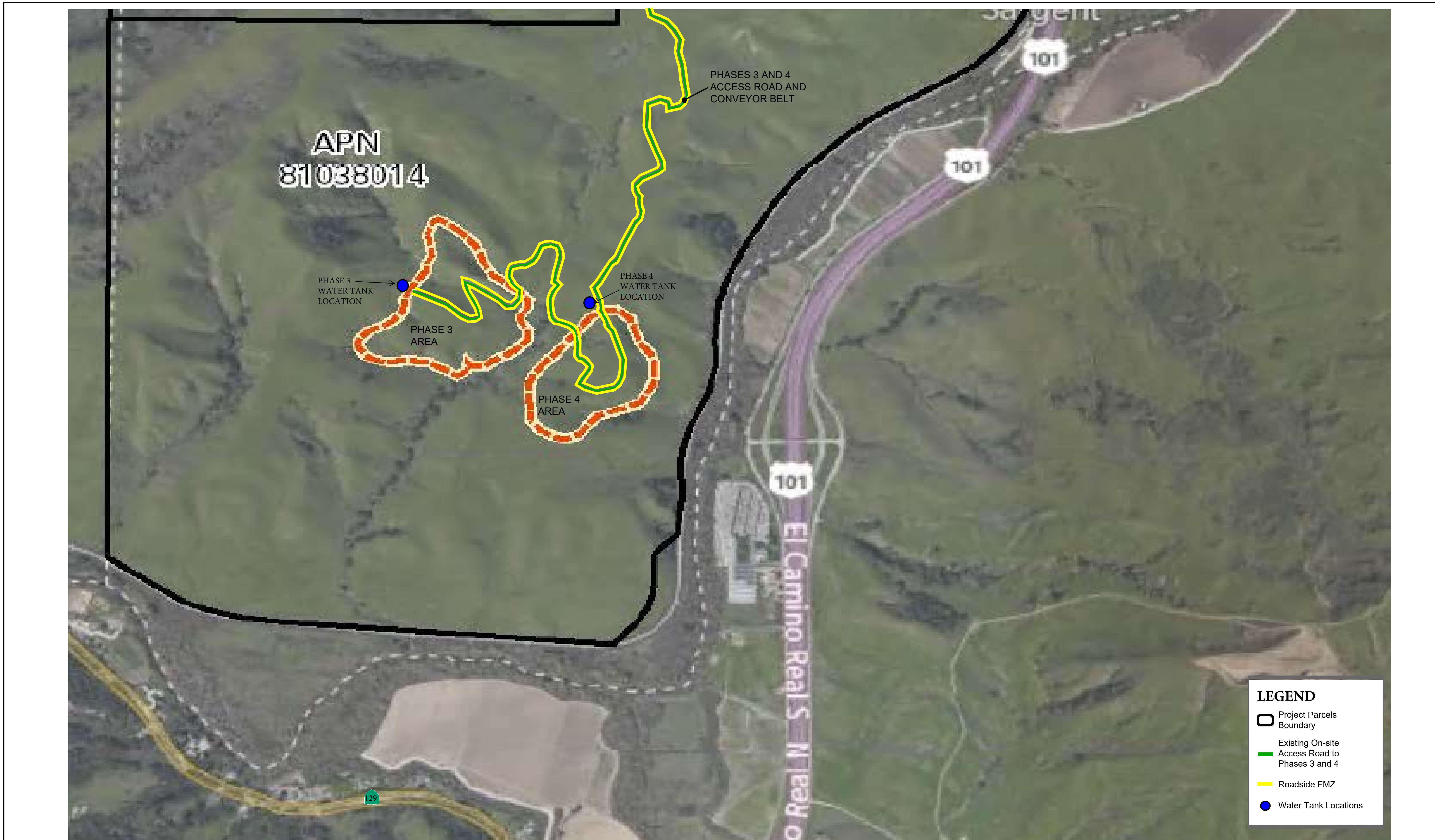

SOURCE: Triad/Holmes and Associates, 2020

DUDEK

FIGURE 8b

Site Fire Safety Plan - Phases 3 and 4

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6 Project Specific Risk Summary

6.1 Fire Risk

Fire risks are assessed based on the potential frequency (probability of an incident occurring) and consequence (potential damage should an event occur). The evaluation of fire risks must take into account the frequency and severity of fires and other significant incidents. This includes common risk types and heightened sources of risk.

Common risks that result in emergency calls include accidental injuries (residential, vehicle, other); medical-related incidents, including heart attacks, strokes, and other serious conditions and illnesses; accidental vegetation fires; and occasional structure fires. The study area also includes a major transportation corridor risk category to assess the impacts of vehicle-related incidents along the U.S. 101 freeway. Roadside fires are also a significant risk with spread into the adjacent wildlands possible.

Among the listed potential causes of fire incidents resulting from installation, operation, and maintenance of the Project are operations and activities associated with the facilities that could elevate the probability of ignition. These potential sources of fire risk could include the following:

- Explosion/arcs, arc flashing, electrical shorts, sparking, motor or other machinery fire, wiring and harnessing fire, overheated junction boxes, and rodents chewing on wires and causing arcing;
- Vegetation clearing for access roads and electrical pole locations;
- Off-road vehicle use could cause an ignition (e.g., catalytic converter, faulty brakes, etc.);
- Idling or parked vehicles and equipment in areas of grass and other vegetation;
- Hot work[9] activities conducted during a Red Flag Warning[10];
- Construction waste that has accumulated on site associated with electrical equipment could create a fire hazard and shall be contained within metal containers;
- Operation of generators, pumps, or other equipment capable of producing sparks or exhaust heat to cause ignition;
- Trash cans, smoking areas, and other combustible storage around the Facilities;
- Illegal target practice or other vandalism or arson in a rural area; and
- Switchgear and cable fire.

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9 ‘Hot work” is defined in Section 6.5 below.

10 The National Weather Service may issue Red Flag Warnings (RFW) at any time when humidity and wind conditions meet pre-determined thresholds that would promote fire ignition and spread. Because the majority of acreage burned in California occurs during RFW weather conditions, certain construction activities, such as hot work, would be limited to low fire hazard, non-hot work, until the RFW has been lifted.

The Project's fire risks are associated with the following listed in Section 6.1.1.

6.1.1 Construction and Decommissioning Phase Risks

The following list includes construction and decommissioning phase risks for the Project:

- **Earth-moving equipment** – Create sparks, heat sources, and fuel or hydraulic leaks
- **Chainsaws** – May result in vegetation ignition from overheating, spark, and fuel leak
- **Vehicles** – Heated exhausts/catalytic converters in contact with vegetation may result in ignition
- **Welders** – Open heat source that may result in metallic sparks coming into contact with vegetation
- **Wood chippers** – Include flammable fuels and hydraulic fluid that may leak or spray onto vegetation with a hose failure
- **Compost piles** – Large piles that are allowed to dry and are left on site for extended periods that may result in combustion and potential for embers landing in adjacent vegetation
- **Grinders** – Sparks from grinding metal components that may land on a receptive fuel bed
- **Torches** – Heat source, open flame, and resulting heated metal shards that may come in contact with vegetation
- **Other human-caused accidental ignitions** – Ignitions related to discarded cigarettes, matches, temporary electrical connections, inappropriately placed generators, poor maintenance of equipment, and other factors

Fire Prevention Measures for Construction Activities

The following measures shall be implemented to prevent fire during construction activities:

- Minimize combustible and flammable materials storage on site.
- Store any combustible or flammable materials that need to be on site away from ignition sources.
- Clear parking areas and fuel or oil storage areas of grass and brush by a distance of at least 30 feet.
- Keep evacuation routes free of obstructions.
- Label all containers of potentially hazardous materials with their contents and store in the same location as flammable or combustible liquids.
- Perform "hot work" according to fire safety practices in a controlled environment and with fire suppression equipment at the job site. A fire watch person (Fire Patrol), with extinguishing capability (e.g. fire extinguishers), should be in place for all 'Hot Work" activities during construction. Ensure hot work adheres to the guidelines provided.
- Dispose of combustible waste promptly and according to applicable laws and regulations.
- Report and repair fuel leaks without delay.

- Do not overload circuits or rely on extension cords where other options would be safer.
- Turn off and unplug electrical equipment when not in use.
- Direct contractors on site to restrict use of chainsaws, chippers, vegetation masticators, grinders, drill rigs, tractors, torches, and explosives during Red Flag Warnings. When the above tools are used, a water truck (4,000 gallon) equipped with hoses, shovels, Pulaskis, and McLeods shall easily be accessible to personnel.
- Equip all construction-related vehicles with a 10lb 4A:80BC dry chemical fire extinguisher, a 5-gallon backpack pump fire extinguisher, a 46-inch round-point shovel, and a first aid kit.
- When an evacuation has been called, site employees gather at the designated assembly area and the site safety officer (SSO) would account for personnel. Once all personnel are accounted for, the vehicles would safely convoy from the Project site to safe zones, which are generally areas off site and away from the threat.

6.1.2 Operation and Maintenance Phase Risks

Ignition risks are anticipated to drop considerably following the Project's active construction phase. Operation and maintenance activities occur within a defined Project footprint where the adjacent fuels have been removed or converted to fuel modification–consistent vegetation. Ongoing potential sources of fires include the following:

- **Transformers** – Transformers are subject to occasional failure, sending sparks and hot materials out in any direction; fire in a transformer may result in ignition of the oil.
- **Capacitors** – Capacitors may overheat, fail, and cause a spark, which may result in combustion of flammable materials, such as vegetation, if nearby.
- **Electrical lines** – Energized lines may arc from adjacent vegetation (trees) or, if tower/pole fails, may arc on the ground, causing ignition of vegetation.
- **Vehicles** – Heated exhausts in contact with vegetation may result in ignition.
- **Hot Work Equipment** – Small hand tools either gas or electric powered that may result in sparks, flames, or excessive heat may result in vegetation ignition.

6.1.3 Consultants and Contractor On-Site Risk

Consultants and contractors should know how to prevent and respond to fires and are responsible for adhering to the Project's policies regarding fire emergencies. These general fire prevention measures should help in the efforts to prevent a fire from occurring while on site.

Fire Prevention Measures for Consultants/Contractors

The following list includes fire prevention measures for consultants/contractors:

- Vehicles shall be equipped with the following fire prevention equipment:
  - 10 pound, 4A:80BC dry chemical fire extinguisher

  - 46-inch round-point shovel
  - 5 gallons of water or a 5-gallon water backpack
  - First aid kit
- No driving (cars, trucks, all-terrain vehicles, or similar) over unmaintained dry vegetation shall occur.
- Vehicles can be parked a minimum of 10 feet from any vegetation as long as the vehicle is parked in an area devoid of any vegetation.
- Site activities shall be restricted during Red Flag Warning weather periods; stay alert to fire and weather conditions and evacuate employees, if safe to do so.
- Consultants/contractors shall conduct operations safely to limit the risk of fire.
- Hot work shall adhere to the guidelines provided below in Section 6.5.
- During significant emergency situations, an evacuation notice may be issued by the site manager/supervisor or SSO. When an evacuation has been called, consultant or contractor employees shall gather at the designated assembly area, and the SSO shall account for personnel. Once personnel are accounted for, the vehicles shall safely convoy from the Project site to safe zones, which are generally areas off site and away from the threat.

6.2 Project Risk Rating

The estimated risk associated with the Project site is considered to be low to moderate during construction and decommissioning and low during operation, based on the successful application of the FPP fire risk–reducing requirements. The risk of fires associated with rock quarry facilities is low. There have been very few rock quarry fire ignitions in California.

The active construction phase results in higher potential for fires. Hot work, vegetation clearing, and other activities that may result in flame or heat sources can ignite vegetation, especially if non-native grasses have established and cured. Although there would be a potential for structural/equipment fires and wildfires, the risk is considered manageable as indicated by the low historic fire occurrence in existing rock quarry facilities.

6.3 Risk Reduction Measures

The following measures would be employed, as appropriate, during each phase of the Project (construction, operation and maintenance, and decommissioning) to reduce the risk of ignitions. These measures would be enforced by the SSO and through ongoing worker safety training:

- Fire rules shall be posted on the Project bulletin board at the contractor's field office or permanent operations and maintenance building in areas visible to employees. This shall include the field offices of all contractors and subcontractors if more than one.
- Internal combustion engines used at the Project site shall be equipped with spark arrestors that are in good working order.

- Once initial two-track roads have been cut and initial fencing has been completed, light-duty trucks and cars shall be used only on roads where the roadway is cleared of vegetation. Mufflers on cars and light-duty trucks shall be maintained in good working order.
- During construction, the project site will have at a minimum two pick-up trucks outfitted with Type-6 Skid-Mounted Units, including fire pump, hose, and nozzle, that are staffed with personnel properly trained to use the equipment.
- A cache of shovels, Mcleods, and Pulaskis shall be available at staging sites. The amount of equipment shall be determined by consultation between SSO and GFD/SSCCFD/CAL FIRE. Additionally, on-site pickup trucks would be equipped with first aid kits, fire extinguishers, and shovels. Contractor vehicles would be required to include the same basic equipment.
- Equipment parking areas and small stationary engine sites shall be cleared of extraneous flammable materials and provided with a gravel surface.
- The on-site contractor or Project staff shall restrict use of chainsaws, chippers, vegetation masticators, grinders, drill rigs, tractors, torches, and explosives during Red Flag Warnings. When the above tools are used, water tanks equipped with hoses, fire rakes, and axes shall be easily accessible to personnel.
- A fire watch (person responsible for monitoring for ignitions) shall be provided during hot work and shall monitor for a minimum of 30 minutes following completion of the hot work activities.
- Smoking shall not be in wildland areas and within 50 feet of combustible materials storage and shall be limited to paved areas or areas cleared of vegetation.
- Each Project construction site (if construction occurs simultaneously at various locations) shall be equipped with fire extinguishers and firefighting equipment sufficient to extinguish small fires.
- The on-site contractor or Project staff shall coordinate with GFD/SSCCFD/CAL FIRE to create a training component for emergency first responders to prepare for specialized emergency incidents that may occur on the Project site.
- Construction workers, rock quarry personnel, and maintenance workers visiting the rock quarry areas to perform maintenance activities shall receive training on the evacuation plans and routes, proper use of firefighting equipment and procedures to be followed in the event of a fire. Training records shall be maintained and be available for review by the GFD/SSCCFD/CAL FIRE.
- Vegetation near all facility equipment, the conveyor belt, water tanks, and access roads shall be controlled through periodic cutting and spraying of weeds. Vegetation shall be controlled through implementing weed management practices. A minimum of 100 feet of fuel modification shall be around each of the buildings and structures within the proposed 14-acre processing plant area, including an office, shop, and maintenance buildings. The 100 feet of FMZ starts from the exterior wall of each of the buildings and extends outward. Onsite fire apparatus access roads shall have 20 feet of maintained FMZ from each side of the roads and the water tanks will be provided 10 feet of clearance in all directions.

- On-site employees shall participate in annual fire prevention and response training exercises with GFD/SSCCFD/CAL FIRE.
- The Project shall implement ongoing fire patrols during RFW periods. The SSO shall be assigned as fire patrol to monitor work activities when an activity risk exists for fire compliance. The SSO shall verify proper tools and equipment are on site, assess any fire agency work restrictions, and serve as a lookout for fire starts, including staying behind (e.g., a fire watch) to make certain no residual fire exists. The SSO shall perform routine patrols of the Project site during the fire season equipped with a portable fire extinguisher and communications equipment. The Project staff shall notify GFD/SSCCFD/CAL FIRE of the name and contact information of the SSO in the event of any change.
- Remote monitoring of major electrical equipment (transformers and inverters) shall screen for unusual operating conditions. Higher than nominal temperatures, for example, could be compared with other operational factors to indicate the potential for overheating which, under certain conditions, could precipitate a fire. Units could then be shut down or generation could be curtailed remotely until corrective actions are taken.
- Fires ignited on site shall be immediately reported to GFD and SSCCFD/CAL FIRE.
- The engineering, procurement, and construction contracts for the Project shall clearly state the fire safety requirements that are the responsibility of any person who enters the Project site, as described in this FPP.
- Upon completion of constructing the internal roadway network and initial fencing completed, light trucks and cars shall be used only on roads where the roadway is cleared of vegetation. Roads are to be kept free of ruts, drainages, wash boarding, and maintained in a hard-compacted state to support fire engines.

6.4 Daily Fire Prevention Measures

To limit the risk of fires, site staff, employees, and contractors shall take the following precautions:

- Fire safety shall be a component of daily tailgate meetings. Foremen shall remind employees of fire safety, prevention, and emergency protocols on a daily basis.
- No smoking shall be allowed on site except in designated safe smoking areas that include cleared areas with no combustible vegetation or materials and approved cigarette butt receptacles (noncombustible containment of cigarette butts). Smoking inside closed vehicles at the Project site may be allowed in designated areas away from vegetation, at the discretion of the SSO.
- Combustible materials shall be stored in areas away from native vegetation. Whenever combustibles are being stored in the open air, the SSO shall be informed of the situation.
- Evacuation routes shall be maintained and free of obstructions. Unavoidable evacuation route blockages shall be coordinated such that a secondary route is identified and available.
- Disposal of combustible waste in accordance with applicable laws and regulations shall be required.
- Use and storage of flammable materials in areas away from ignition sources shall be required.

- Proper storage of all chemicals such that incompatible (i.e., chemically reactive) substances would be separated appropriately shall be required.
- Performance of hot work (i.e., welding or working with an open flame or other ignition sources) in controlled areas under the supervision of a fire watch shall be required. Hot work permits are required and shall be reviewed and granted by the SSO for all hot work.
- Equipment shall be kept in good working order by inspecting electrical wiring and appliances regularly and maintaining motors and tools free of excessive dust and grease.
- Ensuring that heating units are safeguarded shall be required.
- Immediate reporting of fuel or petroleum leaks shall be required. The site mechanic shall ensure that leaks are repaired immediately upon notification.
- Immediate repair and cleanup of flammable liquid leaks shall be required.
- Extension cords shall not be relied on if wiring improvements are needed, and overloading of circuits with multiple pieces of equipment shall be prohibited.
- Turning off and unplugging electrical equipment when not in use.

6.4.1 Fire Prevention/Protection System Maintenance

The Site Safety Officer (or trained specialist, when necessary) would ensure that fire suppression and related equipment is maintained according to manufacturer specifications. National Fire Protection Association guidelines would be implemented for specific equipment.

The following equipment is subject to ongoing maintenance, inspection, and testing procedures:

- Portable fire extinguishers
- Fire suppression systems
- “Type-6” skid-mounted units on pick-up trucks during construction
- Fire alarm systems
- Water trucks and associated equipment
- Emergency backup generators/systems and the equipment they support

6.5 Hot Work

These requirements are primarily from California Fire Code (CFC) Chapter 26, Welding and other Hot Work, and National Fire Protection Association 51-B, Fire Prevention During Welding, Cutting and other Hot Work. Hot work is defined in the CFC as operations involving cutting, welding, thermite welding, brazing, soldering, grinding, thermal spraying, thawing pipe, or other similar operations. Hot work areas are defined as the areas exposed to sparks, hot slag, radiant heat, or convective heat because of the hot work.

A Hot Work Permit for all hot work regardless of location would be obtained from the SSO, following guidelines from the fire agencies. The SSO would require hot work to be done in compliance with the requirements of National Fire Protection Association 51-B and the Fire Code, Chapter 26.

Hot work would only be done in fire safe areas designated by the SSO and would comply with the following:

- All personnel involved in hot work would be trained in safe operation of the equipment by the SSO. This would include providing training at "tailgate safety meetings." Personnel would also be made aware of the risks involved and emergency procedures, such as how to transmit an alarm and who is responsible to call 9-1-1.
- Signage required in areas where workers may enter indicating "Caution: Hot Work in Progress; Stay Clear" would be posted on site.
- Hot work would not be done on any containers that contain or have contained flammable liquids, gases, or solids until containers have been thoroughly cleaned, purged, or inserted.
- A dry chemical fire extinguisher with a minimum rating of 4A-80BC, a 5-gallon backpack pump fire extinguisher, and a 46-inch round point shovel would be readily accessible within 25 feet of a hot work area.
- The safety manager would inspect the hot work area before issuing a permit and would then make daily inspections.
- Welding and cutting would comply with 2019 CFC Chapter 35 – Welding and Hot Work.
- Electric arc hot work would comply with 2019 CFC Chapter 35 – Welding and Hot Work.
- Piping manifolds and hose systems for fuel gases and oxygen would comply with 2019 CFC Section 3509.
- Cylinder use and storage would comply with 2019 CFC Chapter 53, Compressed Gases.
- Equipment would be approved by a fire agency, including torches, manifolds, regulators, or pressure-reducing valves, and any acetylene generators.
- Personal protective clothing would be selected to minimize the potential for ignition, burning, trapping hot sparks, and electric shock.
- A fire watch will be in place for a minimum of 30 minutes, or longer as considered necessary by the SSO, following any hot work.
- Any ignitions would be immediately extinguished (as possible) by site personnel, and the fire department would be notified of the incident.

The SSO would have the responsibility to assure safe hot work operations and would have the authority to modify hot work activities associated with construction and/or maintenance activities and to exceed the requirements in National Fire Protection Association 51-B and 2019 CFC to the degree necessary to prevent fire ignition. Workers must be trained on the hot work information and criteria in this FPP.

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7 Red Flag Warning Protocol

Red Flag Warnings are issued by the National Weather Service and indicate that conditions are such (low humidity, high winds) that wildfire ignitions and spread may be facilitated. To ensure compliance with Red Flag Warnings restrictions, the National Weather Service website would be monitored at the site (http://www.srh.noaa.gov/ridge2/fire/briefing.php). During Red Flag Warnings, construction activities would be limited and precautions may be taken on site during periods of a Red Flag Warning, when conditions such as low humidity and high winds are present. Upon announcement of a Red Flag Warning, red flags will be prominently displayed at the entrance gate and main office, indicating to employees and contractors that restrictions are in place. Any "hot work" (work that could result in ignition sources or increase fire risk), grading, or any other work that could result in heat, flame, sparks, or may cause an ignition to vegetation would be prohibited during Red Flag Warning conditions. Areas may be evacuated where personnel may be exposed to higher risks. If vehicles are required to be used during Red Flag Warning conditions, vehicles shall remain only on designated access roads on the site.

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8 Cumulative Impact Analysis

For emergency response, the cumulative Project area would be the SSCCFD and/or CAL FIRE jurisdictional boundaries. However, due to the location of the Project and long standing mutual- and automatic-aid agreements with the GFD, initial response may come from the GFD. This and other projects may have a cumulative impact on the ability of local agencies to protect residents from wildfires. This project and other development in the area will increase the population and/or activities and ignition sources in the South Santa Clara County area, which may increase the chances of a wildfire and increase the number of people and structures exposed to risk of loss, injury or death.

The potential cumulative impacts from multiple projects in a specific area can cause fire response service decline and must be analyzed for each project. The Sargent Quarry Project along with other mining or agricultural projects in the greater South Santa Clara region represent an increase in potential service demand along with challenges regarding rescue or firefighting within or adjacent to Project area.

Despite the generally low calculated increase in number of calls per year anticipated from the Project, the project contributes to the cumulative impact on fire services, when considered with other anticipated projects in the area. The cumulative impact results in a situation where response capabilities may erode, and service levels may decline. In response, the Project will participate in the County's Fire Services Agreement, paying fair share funding toward fire services. Funding provided by the project results in capital that can be used toward firefighting and emergency response augments, improvements, and additions so that the County area firefighting agencies will be able to perform their mission into the future at levels consistent with the General Plan.

The requirements described in this FPP, including ignition-resistive construction, fire protection systems, pre-planning, education and training, and fuel modification/vegetation management, are designed to aid firefighting personnel such that the Project is defensible and on-site personnel are protected and potential cumulative impacts to the fire authority are mitigated.

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9 Mitigation Measures and Design Considerations

As presented in this FPP, the Project provides customized measures that address the identified potential fire hazards on the site. The measures are independently established, but will work together to result in reduced fire threat and heightened fire protection. Figures 8a and 8b provide a Site Fire Safety Plan for Phase 1 and 2 and 3 and 4, indicating the locations of important site safety features including roads, an on-site water storage tank, fire access roadways, and fuel modification areas. The provided measures include both required and Project-volunteered items, as follows:

1. Fuel Modification throughout the Project site for buildings and structures within the proposed 14-acre processing plant area and all on-site access roads.
2. Minimum 20-foot wide perimeter fire apparatus access roads and primary access.
3. Project funded annual fuel modification inspections to ensure compliance with this FPP.
4. One portable 10,000-gallon water tank will be dedicated for on-site operations and firefighting purposes, which will be transported from Phase to Phase after the completion of a phase.
5. Sargent Quarry Project contact information with local fire agencies/stations to assist responding firefighters during an emergency.
6. Committed on-going maintenance of all facility components for the life of the project.

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10 Conclusion

This FPP is submitted in support of an application for Project entitlement of the Project and as required in compliance with the County's conditions for FPP content. The requirements in this document meet the intent and purpose of the Code for fire safety, building design elements, fuel management/modification, and landscaping requirements of Sant Clara County. This FPP documents required fire safety features required by applicable codes and recommends additional mitigation measures that will enhance fire safety and have reduced the significance level to "less than significant" in accordance with the stated Significance Guidelines, without lessening health, life, or fire safety.

The Sargent Ranch Quarry Project provide fire access, on-site water, structures built to ignition resistant standards, fuel modification and vegetation management, and measures for fire protection during construction. The FMZs identified for the Sargent Ranch Quarry Project are based on fire behavior modeling representing the fire environment and the type of fire that would be anticipated within the Project area. The FMZs would be maintained by removing all dead and dying materials, maintaining appropriate horizontal and vertical spacing, and would be inspected annually by a SSCCFD-approved, Sargent Ranch Quarry-funded wildland fire inspector. In addition, plants that establish or are introduced to the FMZs that are on the prohibited plant list would be removed.

Ultimately, it is the intent of this FPP to guide, through code and fire mitigating requirements, the construction of quarry mining areas and on-site processing plant facilities that are defensible from wildfire and, in turn, do not represent significant threats of ignition sources for the adjacent native habitat. It must be noted that during extreme fire conditions, there are no guarantees that a given structure will not burn. Precautions and design features identified in this FPP are designed to reduce the likelihood that fire would impinge upon the structures within the Sargent Ranch Quarry processing plant areas. There are no guarantees that fire would not occur in the area, nor would fire not damage property or cause harm to persons or their property. Implementation of the required enhanced construction features provided by the applicable codes and the fuel modification requirements provided in this FPP will accomplish the goal of this FPP to assist firefighters in their efforts to defend all facilities within the Project site.

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11 List of Preparers

Project Manager

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Senior Fire Protection Planner; San Diego County California Environmental Quality Act Consultant List
Dudek

Fire Behavior Modeling and Fire Protection Plan Preparer

Noah Stamm
Fire Protection Planner
Dudek

GIS and Graphics Preparer

Lesley Terry
CADD Specialist
Dudek

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Appendix A

Representative Site Photographs

Photo log

Sargent Ranch Quarry

Photograph 1. View facing southwest towards the entrance into the rock quarry site, standing along access road exiting existing Sargent Ranch property.

Photograph 2. View facing west towards the entrance into the rock quarry site, standing along access road exiting existing Sargent Ranch property.

Photograph 3. View facing northwest towards existing vegetation near entrance into the rock quarry site, standing along access road exiting existing Sargent Ranch property.

Photograph 4. View facing east towards U.S. 101 and the proposed location of the processing plant and other building facilities near the entrance into the rock quarry site.

Photograph 5. View facing west towards natural vegetation standing near the entrance gate into the rock quarry site.

Photograph 6. View facing north towards natural vegetation standing at the entrance gate into the rock quarry site

Photograph 7. View facing south/southeast towards natural vegetation in east/southeast portion of the Project site.

Photograph 8. View looking west/northwest towards natural vegetation in the center/northern portion of the site.

Photograph 9. View looking east back towards Phases 3 and 4 of the Project, standing near the western/center portion of the Project site.

Photograph 10. View looking west towards proposed locations of Phases 1 and 2 of the Project, standing near the western/center portion of the Project site.

Photograph 11. View looking north towards natural vegetation in the northern portion of the site, standing near the western/center portion of the Project site.

Photograph 12. View looking west/southwest towards proposed locations of Phase 1 and 2 of the Project, standing near the western/center portion of the Project site.

Photograph 13. View looking east towards entrance into existing Sargent Ranch, leaving the Project site.

Photograph 14. View looking east towards barn house on existing Sargent Ranch, leaving the Project site.

Photograph 15. Photograph taken of existing vegetation along western side existing Old Montgomery Road. Photograph taken facing north/northwest.

Photograph 16. Photograph taken of surrounding environment on eastern side of existing Old Montgomery Road. Photograph taken facing north/northeast.

Photograph 17. Photograph of existing vegetation on both sides of existing Old Montgomery Road. Photograph taken facing north.

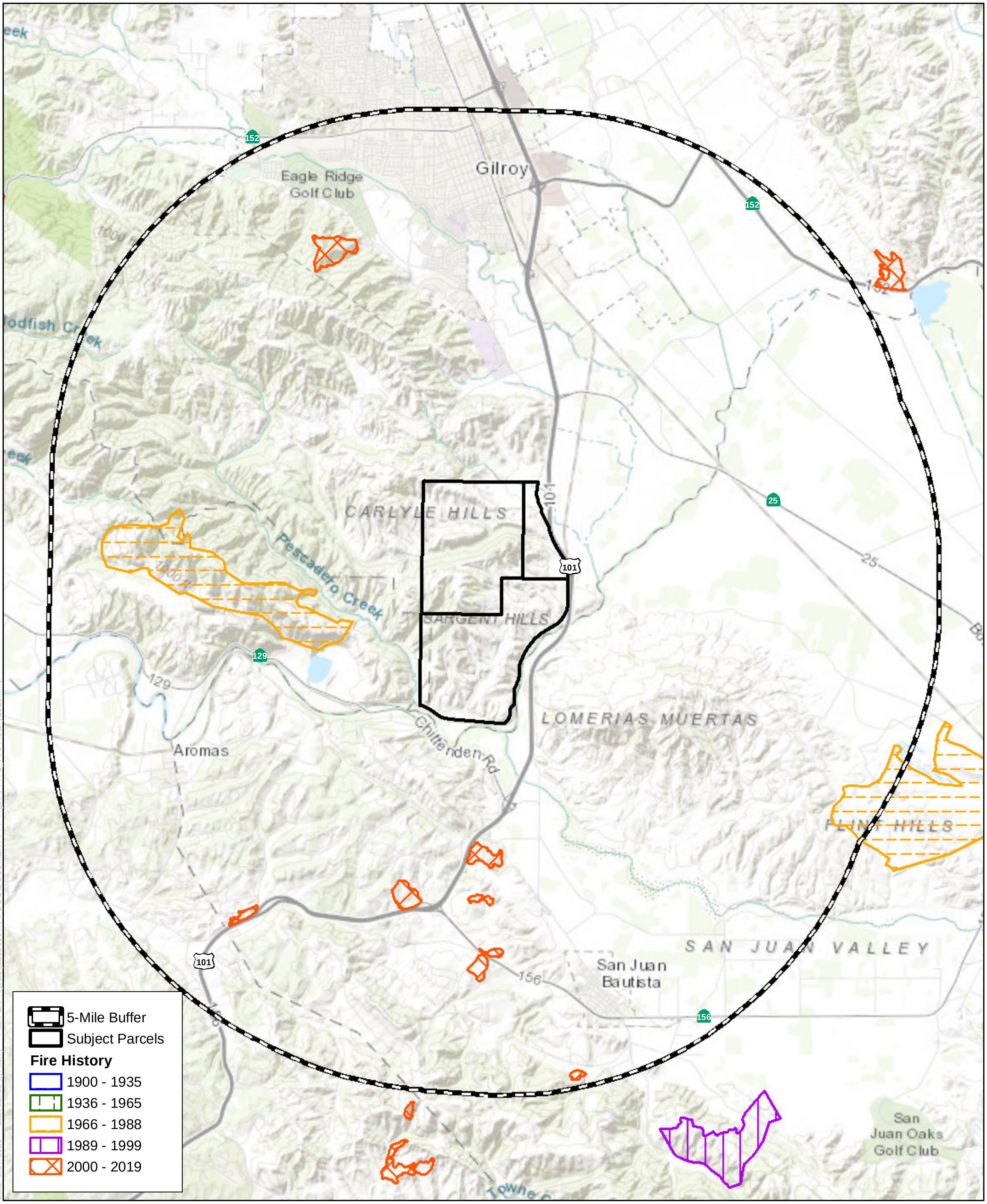
Photograph 18. Photograph of entrance from U.S. 101 onto existing Old Montgomery Road. Photograph taken facing north.

Photograph 19. Photograph of south U.S. 101 exit onto existing Old Montgomery Road. Photograph taken facing northeast.

Photograph 20. Photograph of south U.S. 101 entrance from existing Old Montgomery Road. Photograph taken facing east.

Appendix B

Fire History Map



SOURCE: BASE MAP- ESRI; FIRE DATA-CALFIRE 2019

DUDEK

0 1 2 Miles

APPENDIX B

Fire History Map

Fire Protection Plan for the Sargent Quarry Project

Appendix C

BehavePlus Fire Behavior Analysis

APPENDIX C
BehavePlus Fire Behavior Modeling Analysis
Sargent Ranch Quarry Project

BEHAVEPLUS FIRE BEHAVIOR MODELING

Fire behavior modeling has been used by researchers for approximately 50+ years to predict how a fire will move through a given landscape (Linn 2003). The models have had varied complexities and applications throughout the years. One model has become the most widely used as the industry standard for predicting fire behavior on a given landscape. That model, known as "BEHAVE", was developed by the U. S. Government (USDA Forest Service, Rocky Mountain Research Station) and has been in use since 1984. Since that time, it has undergone continued research, improvements, and refinement. The current version of BehavePlus software, includes the latest updates incorporating years of research and testing. Numerous studies have been completed testing the validity of the fire behavior models' ability to predict fire behavior given site specific inputs. One of the most successful ways the model has been improved has been through post-wildfire modeling (Brown 1972, Lawson 1972, Sneeuwjagt and Frandsen 1977, Andrews 1980, Brown 1982, Rothermel and Rinehart 1983, Bushey 1985, McAlpine and Xanthopoulos 1989, Grabner, et. al. 1994, Marsden-Smedley and Catchpole 1995, Grabner 1996, Alexander 1998, Grabner et al. 2001). In this type of study, Behave is used to model fire behavior based on pre-fire conditions in an area that recently burned. Real-world fire behavior, documented during the wildfire, can then be compared to the prediction results of Behave and refinements to the fuel models incorporated, retested, and so on.

Fire behavior modeling includes a high level of analysis and information detail to arrive at reasonably accurate representations of how wildfire would move through available fuels on a given site. Fire behavior calculations are based on site-specific fuel characteristics supported by fire science research that analyzes heat transfer related to specific fire behavior. To objectively predict flame lengths (feet), spread rates (feet/minute), fireline intensities (BTU/feet/second), and spot fire distance (miles), the BehavePlus fire behavior modeling system was applied using predominant fuel characteristics, slope percentages, and two representative fuel models observed on site.

Predicting wildland fire behavior is not an exact science. As such, the movement of a fire will likely never be fully predictable, especially considering the variations in weather and the limits of weather forecasting. Nevertheless, practiced and experienced judgment, coupled with a validated fire behavior modeling system, results in useful and accurate fire prevention planning information.

To be used effectively, the basic assumptions and limitations of BehavePlus must be understood.

- First, it must be realized that the fire model describes fire behavior only in the flaming front. The primary driving force in the predictive calculations is dead fuels less than one-quarter inch in diameter. These are the fine fuels that carry fire. Fuels greater than one inch have little effect while fuels greater than three inches have no effect on fire behavior.

- Second, the model bases calculations and descriptions on a wildfire spreading through surface fuels that are within six feet of the ground and contiguous to the ground. Surface fuels are often classified as grass, brush, litter, or slash.
- Third, the software assumes that weather and topography are uniform. However, because wildfires almost always burn under non-uniform conditions, length of projection period and choice of fuel model must be carefully considered to obtain useful predictions.
- Fourth, the BehavePlus fire behavior computer modeling system was not intended for determining sufficient fuel modification zone widths. However, it does provide the average length of the flames, which is a key element for determining “defensible space” distances for minimizing structure ignition.

Although BehavePlus has some limitations, it can still provide valuable fire behavior predictions which can be used as a tool in the decision-making process. In order to make reliable estimates of fire behavior, one must understand the relationship of fuels to the fire environment and be able to recognize the variations in these fuels. Natural fuels are made up of the various components of vegetation, both live and dead, that occur on a site. The type and quantity will depend upon the soil, climate, geographic features, and the fire history of the site. The major fuel groups of grass, shrub, trees, and slash are defined by their constituent types and quantities of litter and duff layers, dead woody material, grasses and forbs, shrubs, regeneration, and trees. Fire behavior can be predicted largely by analyzing the characteristics of these fuels. Fire behavior is affected by seven principal fuel characteristics: fuel loading, size and shape, compactness, horizontal continuity, vertical arrangement, moisture content, and chemical properties.

The seven fuel characteristics help define the 13 standard fire behavior fuel models (Anderson 1982) and the five custom fuel models developed for Southern California (Weise 1997). According to the model classifications, fuel models used in BehavePlus have been classified into four groups, based upon fuel loading (tons/acre), fuel height, and surface to volume ratio. Observation of the fuels in the field (on site) determines which fuel models should be applied in BehavePlus. The following describes the distribution of fuel models among general vegetation types for the standard 13 fuel models and the custom Southern California fuel models:

- Grasses — Fuel Models 1 through 3
- Brush — Fuel Models 4 through 7, SCAL 14 through 18
- Timber — Fuel Models 8 through 10
- Logging Slash — Fuel Models 11 through 13

In addition, the aforementioned fuel characteristics were utilized in the recent development of 40 new fire behavior fuel models (Scott and Burgan 2005) developed for use in BehavePlus modeling efforts. These new models attempt to improve the accuracy of the standard 13 fuel models outside of severe fire season conditions, and to allow for the simulation of fuel treatment prescriptions. The following describes the distribution of fuel models among general vegetation types for the new 40 fuel models:

- Grass Models GR1 through GR9
- Grass-shrub Models GS1 through GS4
- Shrub Models SH1 through SH9
- Timber-understory Models TU1 through TU5
- Timber litter Models TL1 through TL9
- Slash blowdown Models SB1 through SB4

BehavePlus software was used in the development of the Sargent Ranch Quarry Project Fire Protection Plan (FPP) in order to evaluate potential fire behavior for the Project site. Existing site conditions were evaluated, and local weather data was incorporated into the BehavePlus modeling runs.

BEHAVEPLUS FUEL MODEL INPUTS

Dudek utilized BehavePlus version 6.0 software to evaluate fire behavior potential for the Project site. Four fire scenarios were evaluated, including two summer (on-shore winds, 50^{th} percentile) weather conditions and two more extreme fall (off-shore winds, 97^{th} percentile) weather conditions. BehavePlus software requires site-specific variables for surface fire spread analysis, including fuel type, fuel moisture, wind speed, and slope data. The output variables used in this analysis include flame length (feet), rate of spread (feet/minute), fireline intensity (BTU/feet/second), and spotting distance (miles). The following provides a description of the input variables used in processing the BehavePlus models for the Project site. In addition, data sources are cited and any assumptions made during the modeling process are described.

Vegetation/Fuel Models

To support the fire behavior modeling efforts conducted for this FPP, Dudek Fire Protection Planners analyzed the different vegetation types observed on and adjacent to the site. Vegetation types were derived from vegetation mapping surveys for the Project. As is customary for this type of analysis, the terrain and fuels directly adjacent to the Project site and fuel modification zones (FMZ) are used for determining flame lengths and fire spread. Fuel beds, including the non-native grasslands and coast live oak woodlands, adjacent to the proposed Project site. These fuel types can produce flying embers that may affect the Project, but defenses have been built into the structure(s) to prevent ember penetration. Table 1 provides a description of the three fuel models observed in the vicinity of the site that were subsequently used in the analysis for this project. Modeled areas include low and moderate load grassland ground fuels (Fuel Models: Gr2, and Gr4) that are found throughout the Project site, along with coast live oak woodlands (Fuel Model Sh4) found in the northern and northwestern portions of the site. A total of four fire modeling scenarios were completed for the Project area. These sites were selected based on the strong likelihood of fire approaching from these directions during a Santa Ana wind driven fire event (fire scenarios 1 and 2) and an on-shore weather pattern (fire scenarios 3 and 4). Fuel modification includes establishment of thinned zones on the periphery of the processing plant building(s), around the 10,000-gallon water tank, and along both sides of the site access roads as well as interior landscape requirements.

Table 1. Fuel Model Assignments and Characteristics

Fuel Model	Vegetation Description	Location	Fuelbed Depth (Feet)
Gr2	Low Load, Dry Climate Grasses	Throughout the property	>2.0 ft.
Gr4	Moderate Load, Dry Climate Grasses	Throughout the Property	>4.0 ft.
Sh4	Low load, humid climate timber-shrub	Coast live oak woodland to the north/northwest	>8.0 ft.

Topography

Slope is a measure of angle in degrees from horizontal and can be presented in units of degrees or percent. Slope is important in fire behavior analysis as it affects the exposure of fuelbeds. Additionally, fire burning uphill spreads faster than those burning on flat terrain or downhill as uphill vegetation is pre-heated and dried in advance of the flaming front, resulting in faster ignition rates. Slope values ranging from 7% to 16% were measured for this site from U.S. Geological Survey (USGS) topographic maps.

Weather Analysis

Historical weather data for the southern Santa Clara region was utilized in determining appropriate fire behavior modeling inputs for the Project area. 50^{th} and 97^{th} percentile moisture values were derived from Remote Automated Weather Stations (RAWS) and utilized in the fire behavior modeling efforts conducted in support of this report. Weather data sets from the Hollister RAWS Station (ID number 044406) were utilized in the fire modeling runs.

RAWS fuel moisture and wind speed data were processed utilizing the Fire Family Plus software package to determine atypical (97^{th} percentile) and typical (50^{th} percentile) weather conditions. Data from the RAWS was evaluated between June 1 to November 31 for each year between 1981 and 2019 (extent of available data record).

Following analysis in Fire Family Plus, fuel moisture information was incorporated into the Initial Fuel Moisture file used as an input in BehavePlus. Wind speed data resulted from the Fire Family Plus analysis was also determined. Initial wind direction and wind speed values for the four BehavePlus runs were manually entered during the data input phase. The input wind speed and direction is roughly an average surface wind at 20 feet above the vegetation over the analysis area. Table 2 summarizes the wind and weather input variables used in the Fire BehavePlus modeling efforts.

Table 2. Variables Used for Fire Behavior Modeling Efforts

Variable	Summer Weather Conditions (On-shore Winds)	Peak Weather Condition (Off-shore Winds)
Fuel Models	Gr2, Gr4, and Sh4	Gr2, Gr4, and Sh4
1h Moisture	6%	2%
10h Moisture	8%	4%
100h Moisture	12%	8%
Live Herbaceous Moisture	48%	30%
Live Woody Moisture	96%	60%
20-foot Wind Speed (upslope/downslope)	19 mph (sustained winds)	18 mph (sustained winds); 50 mph (maximum wind gusts)
Wind Direction	210° and 315°	0° and 135°
Wind Adjustment Factor (BehavePlus)	0.4	0.4
Slope	15% to 16%	7% to 16%

FIRE BEHAVIOR MODELING RESULTS

Four focused analyses were completed, each assuming worst-case fire weather conditions for a fire approaching the site from the north, southeast, west, and northwest. Four fire behavior variables were selected as outputs from the BehavePlus analysis conducted for the Project site, and include flame length (feet), rate of spread (mph), fireline intensity (BTU/feet/second), and spot fire distance (miles). The aforementioned fire behavior variables are an important component in understanding fire risk and fire agency response capabilities. Flame length, the length of the flame of a spreading surface fire within the flaming front, is measured from midway in the active flaming combustion zone to the average tip of the flames (Andrews, Bevins, and Seli 2004). It is a somewhat subjective and non-scientific measure of fire behavior but is extremely important to fireline personnel in evaluating fireline intensity and is worth considering as an important fire variable (Rothermel 1983). Fireline intensity is a measure of heat output from the flaming front, and also affects the potential for a surface fire to transition to a crown fire. Fire spread rate represents the speed at which the fire progresses through surface fuels and is another important variable in initial attack and fire suppression efforts. Spotting distance represents the maximum distance that one can expect potential spot fires based on firebrands from a spreading wind-driven surface fire. The results of fire behavior modeling efforts are presented in Table 3.

Table 3. BehavePlus Fire Behavior Modeling Results

Fire Scenario	Flame Length[1] (feet)	Spread Rate (mph[4])	Fireline Intensity (Btu/ft/s)	Spot Fire[5] (miles)	Surface Fire to Tree Crown Fire	Tree Crown Fire Rate of Spread (mph)	Crown Fire Flame Length (feet)
Scenario 1: 7% slope; Fall Off-shore Extreme Wind (97th percentile) – Pre-BMZ (North of Project site)							
Low load, humid climate timber-shrub (Sh4)[2]	12.1 (23.1)[6]	1.0 (4.1)	1,291 (5,237)	0.5 (1.5)	Crowning [3]	1.0 (4.1)	48.4 (124.5)
Low load, Dry Climate Grasses (Gr2)	9.1 (14.1)	1.6 (4.2)	685 (1,791)	0.4 (1.1)	Crowning [3]	1.0 (4.1)	40.9 (105.1)
Moderate load, Dry Climate Grasses (Gr4)	17.0 (33.3)	3.2 (14.0)	2,669 (11,575)	0.6 (2.0)	Crowning [3]	1.0 (4.1)	44.5 (114.4)
Scenario 2: 16% slope; Fall Off-shore Extreme Wind (97th percentile) – Pre-BMZ (Southeast of Project site)							
Low load, Dry Climate Grasses (Gr2)	9.0 (14.1)	1.6 (4.2)	667 (1,791)	0.4 (1.1)	N/A	N/A	N/A
Moderate load, Dry Climate Grasses (Gr4)	16.7 (33.2)	3.1 (13.9)	2,598 (11,503)	0.6 (2.0)	N/A	N/A	N/A
Scenario 3: 15% slope; Summer On-shore, Summer Winds (50th percentile) – Pre-BMZ (Southwest of Project site)							
Low load, Dry Climate Grasses (Gr2)	6.6	1.0	345	0.4	N/A	N/A	N/A
Moderate load, Dry Climate Grasses (Gr4)	12.4	2.0	1,349	0.5	N/A	N/A	N/A
Scenario 4: 16% slope; Summer, On-shore Winds (50th percentile) – Pre-BMZ (Northwest of Project site)							
Low load, humid climate timber-shrub (Sh4)[2]	7.3	0.5	424	0.4	Crowning [3]	0.6	33.2
Low load, Dry Climate Grasses (Gr2)	6.6	1.0	341	0.3	Crowning [3]	0.6	29.9
Moderate load, Dry Climate Grasses (Gr4)	12.3	1.9	1,334	0.5	Crowning [3]	0.6	32.2

Note:
1. Wind-driven surface fire.
2. Coast live oak overstory torching increases fire intensity. Modeling included canopy fuel over Sh4, which represents surface fuels beneath the tree canopies.
3. Crowing = fire is spreading through the overstory crowns.
4. MPH = miles per hour
5. Spotting distance from a wind driven surface fire
6. It should be noted that the wind MPH in parenthesis represents peak gusts of 50 MPH.

A crown fire with the modeled flame lengths listed in Table 3 would not be expected based on the FMZs being proposed, the ongoing maintenance of the FMZs, and the high moisture levels within the coast live oak areas. An active crown fire flame length modeled using the BehavePlus software is calculated based on the active crown fire intensity, which assumes that the crown fire is fully active.

The following describes the fire behavior variables (Heisch and Andrews 2010) as presented in Table 3:

Surface Fire:

- Flame Length (feet): The flame length of a spreading surface fire within the flaming front is measured from midway in the active flaming combustion zone to the average tip of the flames.

- Fireline Intensity (Btu/ft/s): Fireline intensity is the heat energy release per unit time from a one-foot wide section of the fuel bed extending from the front to the rear of the flaming zone. Fireline intensity is a function of rate of spread and heat per unit area and is directly related to flame length. Fireline intensity and the flame length are related to the heat felt by a person standing next to the flames.

- Surface Rate of Spread (mph): Surface rate of spread is the "speed" the fire travels through the surface fuels. Surface fuels include the litter, grass, brush and other dead and live vegetation within about 6 feet of the ground.

Crown Fire:

- Transition to Crown Fire: Indicates whether conditions for transition from surface to crown fire are likely. Calculation depends on the transition ratio. If the transition ratio is greater than or equal to 1, then transition to crown fire is Yes. If the transition ratio is less than 1, then transition to crown fire is No.

- Crown Fire Rate of Spread (mph): The forward spread rate of a crown fire. It is the overall spread for a sustained run over several hours. The spread rate includes the effects of spotting. It is calculated from 20-ft. wind speed and surface fuel moisture values. It does not consider a description of the overstory.

Fire Type:

Fire type is one of the following four types: surface (understory fire), torching (passive crown fire; surface fire with occasional torching trees), conditional crown (active crown fire possible if the fire transitions to the overstory), and crowning (active crown fire; fire spreading through the overstory crowns). Dependent on the variables: transition to crown fire and active crown fire.

SUMMARY

As presented in Table 3, wildfire behavior in non-maintained grasslands, modeled as Gr2 and Gr4 fuel models being fanned by 19 mph sustained, on-shore winds (fire scenarios 3 and 4) would result in a fire spreading in the non-native grasslands between 1.0 and 2.0 mph with 6.6 to 12.4 feet high flame lengths.

A worst-case fire under gusty Santa Ana winds and low fuel moistures (fire scenarios 1 and 2) is expected to be a fast-moving fire with spread rates between 4.1 and 14.0 mph. Surface flame length values with intense radiant heat could reach between approximately 14.1 and 33.3 feet for grassland fuels burning in specific portions off site. Spotting is projected to occur less than 1.0 mile during a fire influenced by on-shore winds and up to approximately 2.0 miles during a fire fanned by off-shore, gusty winds.

It should be noted that the results presented in Table 3 depict values based on inputs to the BehavePlus software. Changes in slope, weather, or pockets of different fuel types are not accounted for in this analysis, but models provide a worst-case wildfire condition as part of a conservative approach. Further, this modeling analysis assumes a correlation between the project site vegetation and fuel model characteristics. For planning purposes, the averaged worst-case fire behavior is the most useful information for conservative fuel modification design. Model results should be used as a basis for planning only, as actual fire behavior for a given location will be affected by many factors, including unique weather patterns, small-scale topographic variations, or changing vegetation patterns.

The information in Table 4 presents an interpretation of the outputs for five fire behavior variables as related to fire suppression efforts. The results of fire behavior modeling efforts are presented in Table 3. Identification of modeling run locations is presented graphically in Figure 6 of the FPP.

Table 4. Fire Suppression Interpretation

Flame Length (ft)	Fireline Intensity (Btu/ft/s)	Interpretations
Under 4 feet	Under 100 BTU/ft/s	Fires can generally be attacked at the head or flanks by persons using hand tools. Hand line should hold the fire.
4 to 8 feet	100-500 BTU/ft/s	Fires are too intense for direct attack on the head by persons using hand tools. Hand line cannot be relied on to hold the fire. Equipment such as dozers, pumpers, and retardant aircraft can be effective.
8 to 11 feet	500-1000 BTU/ft/s	Fires may present serious control problems -- torching out, crowning, and spotting. Control efforts at the fire head will probably be ineffective.
Over 11 feet	Over 1000 BTU/ft/s	Crowning, spotting, and major fire runs are probable. Control efforts at head of fire are ineffective.

Source: BehavePlus 6.0 fire behavior modeling program (Andrews, Bevins, and Seli 2004)

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Appendix D

Acceptable Plant List

APPENDIX D
Potential Acceptable Plant List for Fuel Modification Zones

Botanical Name	Common Name
Achillea spp.	Yarrow – only species growing under 12 inches height
Baccharis pilularis	Dwarf coyote bush – only in areas over 100 feet from Gen-tie structures
Cerastium tomentosum	Snow in Summer
Dudleya brittonii	Britton's dudleya
Dudleya pulverulenta	Chalk lettuce
Eschscholzia californica	California poppy
Helianthemum spp.	Sunrose
Lasthenia californica glabrata	California goldfields
Trifolium frageriferum Verbena	Strawberry clover
Trifolium frageriferum rigida	White clover
Viguiera laciniata	Goldeneye
Satureja douglasii	Yerba buena
Sisyrinchium bellum	Blue-eyed grass
Sisyrinchium californicum	Yellow-eyed grass

Notes:

1 For the purpose of using this list as a guide in selecting plant material, it is stipulated that all plant material will burn under various conditions.

2 The absence of a particular plant, shrub, groundcover, or tree, from this list does not necessarily mean it is not fire resistive.

3 All vegetation used in Brush Management Zones and elsewhere in this Project shall be subject to approval of the SSCCFD Fire Marshal.

4 Plants that are considered undesirable due to their invasiveness nature should not be utilized in the fuel modification area plantings. The California Invasive Plant Council's Web site at www.cal-ipc.org/ip/inventory/index.php provides a listing of invasive plants.

5 Landscape architects may submit proposals for use of certain vegetation not included on this list. They shall also submit justifications as to the fire resistivity of the proposed vegetation.

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Appendix E

Prohibited Plant List

APPENDIX E
Prohibited Plant List

Botanical Name	Common Name
Trees	
Abies species	Fir
Acacia species (numerous)	Acacia
Agonis juniperina	Juniper Myrtle
Araucaria species *(A. heterophylla, A. araucana, A. bidwillii)*	Araucaria (Norfolk Island Pine, Monkey Puzzle Tree, Bunya Bunya)
Callistemon species *(C. citrinus, C. rosea, C. viminalis)*	Bottlebrush (Lemon, Rose, Weeiping)
Calocedrus decurrens	Incense Cedar
Casuarina cunninghamiana	River She-Oak
Cedrus species *(C. atlantica, C. deodara)*	Cedar (Atlas, Deodar)
Chamaecyparis species (numerous)	False Cypress
Cinnamomum camphora	Camphor
Cryptomeria japonica	Japanese Cryptomeria
Cupressocyparis leylandii	Leyland Cypress
Cupressus species *(C. fobesii, C. glabra, C. sempervirens,)*	Cypress (Tecate, Arizona, Italian, others)
Eucalyptus species (numerous)	Eucalyptus
Juniperus species (numerous)	Juniper
Larix species *(L. decidua, L. occidentalis, L. kaempferi)*	Larch (European, Japanese, Western)
Leptospermum species *(L. laevigatum, L. petersonii)*	Tea Tree (Austrailian, Tea)
Lithocarpus densiflorus	Tan Oak
Melaleuca species *(M. linariifolia, M. nesophylla, M. quinqenervia)*	Melaleuca (Flaxleaf, Pink, Cajeput Tree)
Olea europea	Olive
Picea (numerous)	Spruce
Palm species (numerous)	Palm
Pinus species *(P. brutia, P. canariensis, P. eldarica, P. halopensis, P. pinea, P. radiate, numerous others)*	Pine (Calabrian, Canary Island, Mondell, Aleppo, Italian Stone, Monterey)
Platycladus orientalis	Oriental arborvitae
Podocarpus species *(P. gracilior, P. macrophyllus, P. latifolius)*	Fern Pine (Fern, Yew, Podocarpus)
Pseudotsuga menziesii	Douglas Fir
Schinus species (S. molle, S. terebenthifolius)	Pepper (California and Brazilian)
Tamarix species *(T. Africana, T. apylla, T. chinensis, T. parviflora)*	Tamarix (Tamarisk, Athel Tree, Salt Cedar, Tamarisk)
Taxodium species *(T. ascendens, T. distichum, T. mucronatum)*	Cypress (Pond, Bald, Monarch, Montezuma)
Taxus species *(T. baccata, T. brevifolia, T. cuspidata)*	Yew (English, Western, Japanese)
Thuja species (*T. occidentalis, T. plicata)*	Arborvitae/Red Cedar
Tsuga species *(T. heterophylla, T. mertensiana)*	Hemlock (Western, Mountain)
Groundcovers, Shrubs and Vines	
Acacia species	Acacia
Adenostoma fasciculatum	Chamise
Adenostoma sparsifolium	Red Shanks
Agropyron repens	Quackgrass
Anthemis cotula	Mayweed
Arbutus menziesii	Madrone
Arctostaphylos species	Manzanita

Botanical Name	Common Name
Arundo donax	Giant Reed
Artemesia species *(A. abrotanium, A. absinthium, A. californica, A. caucasia, A. dracunulus, A. tridentate, A. pynocephala)*	Sagebrush (Southernwood, Wormwood, California, Silver, True tarrangon, Big, Sandhill)
Atriplex species (numerous)	Saltbush
Auena fatua	Wild Oat
Baccharis pilularis	Coyote Bush[6]
Bambusa species	Bamboo
Bougainvillea species	Bougainvillea
Brassica species *(B. campestris, B. nigra, B. rapa)*	Mustard (Field, Black, Yellow)
Bromus rubens	Foxtail, Red brome
Cardera draba	Noary Cress
Carpobrotus species	Ice Plant, Hottentot Fig
Castanopsis chrysophylla	Giant Chinkapin
Cirsium vulgare	Wild Artichoke
Conyza bonariensis	Horseweed
Coprosma pumila	Prostrate Coprosma
Cortaderia selloana	Pampas Grass
Cytisus scoparius	Scotch Broom
Dodonea viscose	Hopseed Bush
Eriodyctyon californicum	Yerba Santa
Eriogonum species *(E. fasciculatum)*	Buckwheat (California)
Fremontodendron species	Flannel Bush
Hedera species *(H. canariensis, H. helix)*	Ivy (Algerian, English)
Heterotheca grandiflora	Telegraph Plant
Hordeum leporinum	Wild barley
Juniperus species	Juniper
Lactuca serriola	Prickly Lettuce
Larix species (numerous)	Larch
Larrea tridentata	Creosote bush
Lolium multiflorum	Ryegrass
Lonicera japonica	Japanese Honeysuckle
Mahonia species	Mahonia
Mimulus aurantiacus	Sticky Monkeyflower
Miscanthus species	Eulalie Grass
Muehlenbergia species	Deer Grass
Nicotania species *(N. bigelevil, N. glauca)*	Tobacco (Indian, Tree)
Pennisetum setaceum	Fountain Grass
Perronskia Atriplicifloria	Russian Sage
Phoradendrom species	Mistletoe
Pickeringia montana	Chaparral Pea
Rhus species *(R. diversiloba, R. laurina, R. lentii)*	Sumac (Poison oak, Laurel, Pink Flowering)
Ricinus communis	Castor Bean
Rosmarinus species	Rosemary

Botanical Name	Common Name
Salvia species (numerous)	Sage
Sacsola austails	Russian Thistle
Solanium Xantii	Purple Nightshade (toxic)
Sylibum marianum	Milk Thistle
Thuja species	Arborvitae
Urtica urens	Burning Nettle
Vinca major	Periwnkle
Rhus lentii	Pink Flowering Sumac

Notes:

1 For the purpose of using this list as a guide in selecting plant material, it is stipulated that all plant material will burn under various conditions.

2 The absence of a particular plant, shrub, groundcover, or tree, from this list does not necessarily mean it is fire resistive.

3 All vegetation used in Fuel Modification Zones and elsewhere on this site shall be subject to approval of the SSCCFD Fire Marshal.

4 Additional plants that are considered undesirable due to their invasiveness nature are detailed on the California Invasive Plant Council's Web site at www.cal-ipc.org/ip/inventory/index.php.

5 Landscape architects may submit proposals for use of certain vegetation on a project specific basis. They shall also submit justifications as to the fire resistivity of the proposed vegetation.

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