



LIVE OAK

ASSOCIATES, INC.

March 19, 2026

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Subject: San Lorenzo Valley High Master Plan Field Project: An assessment as to whether implementing the Master Plan would result in site specific and/or cumulative impacts on the local cougar (aka mountain lion) population.

Dear Mr. Danielson,

Live Oak Associates, Inc. (LOA) has evaluated the potential adverse impacts (both site specific and cumulative) of implementing the San Lorenzo High Field Project on the cougar (*Puma concolor*), a species listed as threatened by the California Endangered Species Act. San Lorenzo Valley High is located at 7105 Highway 9, Felton, Santa Cruz County, California. San Lorenzo Valley High (SLV) is a four-year high school built in the 1950s with a current student enrollment of over 1,100. The school site encompasses about 35 acres plus and consist of several buildings, various ball fields, parking lots, maintenance facilities, walking paths, etc. Highway 9 forms its eastern boundary, residential areas occur on its northern boundary, while mixed redwood forest occur on its southern and western boundary. The San Lorenzo River occurs just east of Highway 9.

The campus currently supports security and nighttime lighting around all the buildings. SLV also supports several night basketball games, volleyball games, school plays and concerts throughout the school year. In other words, nighttime activity occurs at the campus throughout the year, though these events are indoors.

PROJECT DESCRIPTION

The Master Plan includes the installation and operation of field lights and an upgraded PA system at the SLV football, softball, and baseball fields. Additionally, the project would replace the aging bleachers for all three fields, construct a restroom and snack shack between the softball and baseball fields, and construct two press boxes attached to the softball and baseball

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bleachers. Currently, the lack of field lights has restricted outdoor events to daylight hours. The field lights would allow for school to host some evening practices and games and marching band activities. The lights would not be operated past 10PM for football games (a total of four games) while all other games and practices lights will be operated until 8:30PM. The runtime for the lights will varying with the time of year being a greater length in winter and notably less in early fall and late spring (Table 1).

Table 1. Predicted games and practices uses lights through the school year.

Month	Event*	Sunset**	Run Time lights (hrs.)	Estimated Spectators per event**	Total Run Time Lights by Months (hrs.)	Days of Months with lights
August	1 FB game	7:56PM	2.6	500-1000	4.8	3 (9.7%)
	2 practices	7:56PM	2.2	Few		
September	2 FB games	7:00PM	7.0	500-1000	15.0	6 (20%)
	4 practices	7:00PM	8.0	Few		
October	2 GFB games	6:30PM	5.0	200	15.0	6 (19.4%)
	4 practices	6:30PM	10.0	Few		
November	1 FB game	5:30PM	5.0	500-1100	15.5	4 (13.3%)
	3 practices	5:30PM	10.5	Few		
December	2 S games	4:51PM	8.3	200	29.1	7 (22.6%)
	5 practices	4:51PM	20.8	Few		
January	2 S games	5:17PM	7.6	200	23.6	7 (22.6%)
	5 practices	5:17PM	16.0	Few		
February	2 S games	5:47PM	6.4	200	22.5	7 (25%)
	5 practices	5:47PM	16.1	Few		
March	3 - T&F, L	6:16PM	7.6	200	24.0	9 (29%)
	6 practices	6:16PM	16.4	Few		
April	3 - T&F, L	7:43PM	3.8	200	7.6	6 (20%)
	3 practices	7:43PM	3.8	Few		
May	2 - T&F, L	8:08PM	1.7	200	3.4	4 (12.9%)
	2 practices	8:08PM	1.7	Few		
June	none	8:26PM	0.0	N/A	0	0
July	none	8:23PM	0.0	N/A	0	0
TOTAL			160.5		160.5	59 (16.2)

* Event refers to FB (football), GFB (girls flag football), S (boys/girls soccer), T&F (track and field), and L (lacrosse).

**Sunset for the month is the average based on the 1st day and last day of month. A half hour was added to the time of each event as it is assumed the lights would go on at least a 0.5 hrs. prior to sunset.

***Blue shading denotes lights until 10PM, all other games and practices lights would stay on until 8:30PM



Table 1 summarizes the distribution of games and practices, estimated runtime of lights, and total run time per month. Ten of 12 months have an event that would result in using lights. Lights will be used approximately 59 days (16.2% of the year); 20 days (5.5% of the year) are for events (games, meets, etc.); four of which use lights to 10PM and 16 until 8:30PM. A total of 39 days (10.7% of the year) are for practices. Only four football games (1 in August, 2 in September and 1 in November) will use lights up to 10PM, all other games and practices (55) will have lights only until 8:30PM (2 in August, 4 September, 6 in October, 3 in November, 7 in December, 7 in January, 7 in February, 9 in March, 6 in April, and 4 in May).

Practices are assumed to have limited attendance of observers and as such the public announcement system (PA System) and refreshment stands will not be operating. The number of practices per month varies from 2 practices each for August and May, and as many as 6 practices in March. January and February support 4 practices a month. The assumption for this analysis is that noise pollution and traffic associated with practices are substantially less than on a game days. Attendance at football games is expected to be 500 for most games increasing to 1,000 for rivalry or homecoming games. Other sporting events would have about 200 attendees. Four football games will rely on nighttime lighting until 10PM resulting in a longer period of light, noise, PA system, higher attendance, greater need for parking and concession stands

DISTURBANCE FOOTPRINT

Light

The color temperature of the lights is what is recommended for sports and is the maximum color temperature adopted by Dark Sky International. These lights are designed to be energy efficient and to emit no more light than is necessary to illuminate the playing field. These lights are designed to have minimal spillover light and light levels in adjacent areas (e.g., the mixed redwood woodland habitat) would be minimal.

The per event (game or practice) run time of lights is shortest in May of 1.7 hrs. per event and longest in November of 5.0 hrs. for a football game. The total run time per month varies from 3.4 hrs. in May (2 games and 2 practices) to 29.1 hrs. in December (2 games and 5 practices). Approximately 99.2hrs. (62%) of total run time of lights for the year from all events (30: 9 games 21 practices) occurs from December through March. None of these events last past 8:30PM.

It is estimated that the disturbance footprint from light into the adjacent redwood woodland is less than 100 ft, but for purposes of this analysis we have assumed a 200 ft disturbance footprint from the edge of the school.

Noise

The IS/MND estimates noise at 1,000 to 1,200 ft east and north of the football field with a game of 1,000 spectators would be expected to range from 47 to 57 dBA Leq and from 52 to 67 dBA Lmax, respectively. The Noise Section of the IS/MND noted "The noise levels produced by the homecoming varsity football game at SLV (1,000 spectators) would be below the 75 dB limit



that defines “offensive noise” in the Santa Cruz County Municipal Code...”. The noise levels produced during other sporting events will generally be noticeably less (attendance of 200 vs 1200). Four events will have 1,000 to 1,200 in attendance and last until 10PM, while 16 events will have attendance of up to 200 and last until 830PM. Thirty-nine practices will have limited number of spectators and last until 830PM.

Suraci et al. (2019) found that cougars in the SCMR avoided human sounds. They developed an experimental design with 25 speakers in a 5X5 grid of 1 km square. They played back various human voices at 80 dB at 1 m. They found that cougars avoided areas of perceived human presence using the playback grids 30% more often when human sounds were broadcast. The fear of humans resulted in an average avoidance distance to the nearest speaker playing human voices approximately 530 ft.

For the purposes of this analysis we estimate that the disturbance footprint is no more than 600 ft during the four football games that last until 10PM and likely only 400 ft or less for all other events that would last until 830PM.

Traffic

The traffic analysis in the IS/MND noted most games and practices already occur and are shifting from early to later in the day. All events, but four football games will end by 8:30PM and the four football games will end at 10PM. The traffic analysis in the IS/MND noted the largest change occurs with considering traffic from a homecoming game which does not currently occur on the SLV campus. On that evening in general (including JV), 1,200 attendees would be expected, and there would be a vehicle occupancy rate of 3.24 people per vehicle. The vehicle occupancy rate was used to estimate the number of vehicle trips that would be generated by the new evening sports games. The overall homecoming event would involve 370 incoming trips and 370 outcoming trips throughout the day/evening. The other three football games may result in slightly fewer trips than the homecoming game. The other 16 events would support about 200 spectators resulting in about 62 outbound and 62 inbound events. The 39 practices would not result in any significant difference in trips (inbound and outbound).

The Master Plan Project would increase the number of games played on campus by one to two football games. All other events currently occur on campus and would be shifted from daylight hours to nighttime. Four football games (2 already occur during daytime and sometimes on Saturday) would occur under lights up until 10PM while all other events will end by 8:30PM. The Traffic Section of the IS/MND estimated that traffic on a homecoming game (1,200 attendees) would be 370 inbound trips and 370 outbound trips throughout the day, mainly on Highway 9. It was also noted that the Project would reduce the number of sporting events held at other venues, that SLV students and supporters currently travel to, which are longer trips that would occur. The level of traffic (except for the one or two additional games) is expected to be roughly the same, and is shifting the time of travel to later in the day.



COUGAR (*Puma Concolor*) – LEGAL STATUS, ECOLOGY AND LOCAL OCCURRENCE

Federal Listing Status: None; State Listing Status: Southern California and Central Coast DPS threatened.

Legal Status.

The legal status of the cougar (*Puma concolor*) in California has changed substantially over the last 120 years. The cougar in California, as occurred throughout the west, was a bountied predator in the early- to mid- 20th Century, where 12,454 cougars were killed for bounties from 1907-1963. The bounty was ended in 1963 and until 1969 there was no restriction to removing or killing cougars. The California Fish and Game Commission established a sport hunting season in 1970 and during two hunting seasons that lasted until early 1972, 118 cougars were killed. In 1971, the California state legislature passed a five-year moratorium on the sport-hunting of cougars (took effect on March 1, 1972) and directed the California Fish and Game Department (CDFG; its name at the time) to undertake a study to ascertain the status of the cougar in the State. The moratorium was extended two additional times, with the last one ending in 1986. CDFG proposed a sport-hunting season shortly thereafter, but implementation was delayed due to various lawsuits. In 1990, the citizens of California passed Proposition 117, which permanently banned sport hunting in the state and designated the cougar a specially protected mammal. As such, the cougar has now, not been sport-hunted in the State for 50 years. While Proposition 117 prohibited sport-hunting of cougars, it did provide provisions for CDFG (now CDFW) to issue depredation permits (allowing landowners to kill cougars that take livestock or pets) and for CDFW to remove cougars they believed represented a human safety concern.

A great deal has changed in the State since CDFW initiated the first radio-telemetry study in California in 1972. At that time, it was reasonable to conclude, that cougars were widespread and doing well, except for in some highly urbanized areas. However, the California human population nearly doubled from 20 million people in 1970, to nearly 40 million in 2025. The doubling of humans in 55 years, put extreme pressure on existing cougar populations in some large areas of the State. For example, six southern California counties now support 55% of the human population which resulted in significant loss and fragmentation of the remaining habitat in these areas.

For those reasons, the Center for Biological Diversity (CBD) petitioned the California Fish and Game Commission in 2020, to consider listing as threatened part of or all of six important cougar population centers in Southern California up the Central Coast into Santa Cruz County. These six evolutionary significant units (ESUs) are:

1. Santa Ana Mountains
2. Eastern Peninsular Range
3. San Gabriel/San Bernardino Mountains
4. Central Coast South (Santa Monica Mountains)
5. Central Coast North (Santa Cruz Mountains)
6. Central Coast Central



The Commission directed the CDFW in April of 2020 to evaluate the petition and come back within one year with a recommendation. In December 2025 CDFW submitted a report to the Commission that rejected the ESU analysis of the petition and instead recommended the Commission list as threatened one large Distinct Population Segment (DPS) which they called the Central Coast and Southern California DPS which encompasses a 37,541 mi² area or approximately 24% of the state. The Fish and Game Commission on April 12, 2026 concurred with CDFW's recommendation and listed the Southern California and Central Coast Mountain Lion Distinct Population segment as threatened under the California Endangered Species Act.

Life History and Ecology.

The cougar is the largest remaining cat in the U.S. and Canada. The jaguar, the largest cat in the Western Hemisphere, once roamed the Southwestern US, Louisiana and Southern California. Reports of occasional jaguars still occurs in Arizona, but evidence of a population is scant. Like many carnivore species, cougar males are about 60 to 80% larger than the females. In California, males weigh as much as 160 to 170 lbs. and females 100 to 110 lbs. in the colder regions of the state (i.e., Sierra Nevada or Cascade ranges). For the Santa Cruz, Central Coast, Gabilan, and Mt Hamilton Ranges, males are smaller weighing about 140 to 150 lbs. and females 80 to 90 lbs.

The cougar has long evoked strong emotions from the public due to its predatory skills, inherently low population density and secretive nature (Hopkins 1989). From the time that European settlers came to the Americas, large predators, especially the cougar, were viewed through the lens of conflicts. These include human safety concerns, effects on large ungulate species (competition with humans), and the depredation or killing of livestock and pets. These perceptions of conflict influenced "management strategies" that focused on killing the cougar, from the earliest settlers into the late 1980s. The changing legal status of the cougar discussed above, reflects changes in public perception of large carnivores. While many sectors of the public perceive predators as important and desirable, less are likely to support strategies that focus on killing the cougar. The polarization of cougar perceptions on specific management strategies is potentially attributed to numerous factors, including the urban-rural divide and severity of human-cougar interactions (Vaske et al. 2018).

Human attitudes and emotions toward cougar have significant implications on conservation and management actions that sustain cougar populations and resiliency (Engle et al. 2015, Vaske 2017, Wieczorek 2012,). The cougar was, at one time, the most widely ranging land mammal in the western hemisphere, occurring from Canada to Patagonia (Sunquist and Sunquist 2002) and from the east to west coasts of the Americas. Its spatial extent has been reduced to only about one-third of its historic range in the U.S., largely due to conflicts with humans (Pierce and Bleich 2003). The cougar once occurred throughout the United States, but today is found mainly in the west, South and North Dakota and an endangered subspecies, the Florida panther (*Puma concolor coryi*), comprising 120 to 230 individuals in south Florida (LaRue et al. 2012, USFWS 2017). Predator eradication programs and overhunting led to the extinction of cougars in the eastern United States and eventual removal of the eastern subspecies (*Puma concolor cougar*) from the federal endangered species list (USFWS 2018b).



In California, the cougar is widespread and as it does throughout its range, occurs at inherently low densities (1 or less to 10 adults/100 mi²). It occupies many land cover types in the state from the high deserts to conifer forest and alpine habitats of the Sierra Nevada and Cascade ranges. Its distribution in the state is driven by the occurrence of its primary prey, the mule deer (*Odocoileus hemionus*). For these reasons, sustaining populations are absent from the San Joaquin Valley and the very xeric regions of the Mojave and Colorado Deserts.

Cougars are obligate carnivores and ungulate specialists with deer and elk comprising 60 to 80% of its diet throughout its range in the U.S. (Currier 1983). They will however feed on wild pigs, and smaller prey such as lagomorphs, rodents, porcupines, skunks, coyotes, and occasionally domestic stock animals or human pets. Hopkins (1989) found that individual cougar diets varied, with certain individuals preying more heavily on wild pigs than others. It is important to recognize that mammalian predators' diets are shaped not just by their instinct but also by learned behavior. As such, diets can vary amongst individual cougars in the same region.

Predation is considered one of the primary evolutionary processes that help shape ecosystems. Other important inter-species interactions include competition, herbivory and symbiosis. Thus, as an apex predator, the cougar can and does have substantial influence on the ecosystems in which they live. They may influence the distribution, behavior and movement patterns of prey species, and can at times influence the growth rates of their primary prey, deer or elk. It is important to note, that predator/prey relationships are complex and never static. Cougars at times, can and do suppress the growth rates of their primary prey, deer or elk, and at other times have little to no effect on the number of ungulates in a region (Hopkins 1989, NRC 1997, Hurley et al. 2011).

U.C. Santa Cruz (The Puma Project) has been conducting research on the cougar in the Santa Cruz Mountain Range (SCMR) since 2008. They have generated considerable amount of data on the local population and have radio-collared over 100 cougars during this time. Cougars that occur in human-dominated landscapes have been forced to shift hunting behaviors, while females in more developed areas of the County have higher mortality rates, creating source-sink dynamics throughout the range (Nisi et al. 2023). Smith et al. (2016) reported that cougars will shift to large or small prey items depending on the occurrence of residential development (Smith et al. 2016).

Cougars are generally solitary and reach sexual maturity at roughly two years of age. They have a polygynous social structure with females raising young without the assistance of the male for 16 to 24 months. Females are induced ovulators (copulation induces ovulation) and they breed any time of the year. During a breeding event, the male and female will travel together for 10 to 14 days. Cougars will breed anytime of the year and females will breed every 16 to 24 months, unless she loses her offspring, then she will breed sooner. They have a 90-day gestation period and give birth from one to five young. Cougar kittens are altricial and highly dependent on the mother for food and safety for several months.

Male home ranges usually overlap with more than one female, but overlap between males is limited to along the margins of their home ranges; females home ranges will tend to overlap more with adjacent females than male-male overlap. Cougars exhibit spatio-temporal territories— that is they defend only the area they are currently inhabiting as their home ranges



are so large is it energetically impossible to defend such large areas (Wilson 1975). Females who are either pregnant or with young 70% of the time, tend to utilize their homes more intensely than do males (Hopkins 1989). Females, though smaller, because they provide resources to cubs actually have greater metabolic requirements than males.

Even though cougar populations are influenced by many of same forces that determine the growth rates of any species, considerable “loose writing and wild fables” abound regarding the species, as Teddy Roosevelt noted in 1890. Cougar populations are usually limited by the availability of food resources and the spatial extent and connectedness of the landscape (Roemer et al. 2008); that is, their growth rates are determined by the availability of land and food. One “wild fable” that never seems to die is that cougar populations will grow unabated without human intervention. Studies have long showed this not to be true (Cain et al. 1972; NRC 1997; Cougar Management Guideline Working Group 2005; Berger 2006; and Hurley et al. 2011).

The spatial use patterns of the cougar in California are dependent on not just the abundance of their prey, but also on the density and distribution of human development (Hopkins 1989, Wang et al. 2017).

Local Occurrence.

Cougar populations in Central California and particularly the Bay Area are non-migratory, and their densities and home ranges do not appreciably vary seasonally. The Santa Clara Valley is situated between the Mt Hamilton Range to its east and the SCMR to the west. Both ranges are topographically varied with steep, rugged terrain. However, both ranges have distinct differences. The Mt. Hamilton Range supports drier land cover types in mixed oak woodlands, grasslands and chaparral communities, with some large semi-perennial streams like Coyote Creek and Calaveras Creek. The rainfall is much lower on the drier eastern side of the Mt. Hamilton Range and is noted by the occurrence of junipers, kangaroo rats, and road runners. The Range has a low population of humans and as such relatively few homes, and very few paved roads. Deer populations are modest throughout the range, higher on the western slopes and lower densities on the eastern slopes (Hopkins 1989). Hopkins (1989) reported a cougar population that was relatively stable, older, with low adult mortality (very low human caused mortality) and young that dispersed at close to 2 years of age. In areas where adult mortality is high, juvenile cougars dispersed between 14 to 16 months of age. The density of cougars was on the order of about 10 adults/100 mi² and remained relatively static during the 12 years of the study. Home ranges were noticeably smaller for females ranging between 20 to 30 mi² vs. the 60-80 mi² for males.

In contrast, the SCMR supports more mesic and diverse land cover types, including redwood forest, oak woodland, chaparral, and grassland communities. Rainfall is on the order of 3 to 5 times greater than the Mt. Hamilton Range. Summer fog adds to the mesic nature of the region. It also supports a relatively large distribution of urban or human dominated landscapes with small and larger communities and numerous homes dispersed throughout the range. Because of these urban landscapes, the paved road network is quite extensive when compared with the Mt. Hamilton Range.



Cougars in the SCMR bear the increased stresses of human dominated landscapes which greatly affect their nutrition, spatial use patterns and mortality from vehicles and depredation permits (Wilmer et al. 2013; Smith et al. 2015; Allen et al. 2016; Smith et al. 2017; and Wang et al. 2017). While the amount of area cougars occupy is not substantially different from those in the Mt. Hamilton Range, the relative density of adult cougars in the SCMR is much less. This may well be due largely to the significance of human dominated landscapes, and relatively high levels of human caused mortality. Cougars in the SCMR tend to have smaller home ranges than other areas of California, due in large to part to the higher energetic cost of survival in these landscapes (Wang et al. 2017). Home ranges in the SCMR varied for 11 male cougars of 36 mi² to 18.5 mi² for 15 female cougars. Average density of adult cougars is approximately 5 to 8 cougars per 100 mi² (Santa Cruz Puma Project 2023 - Human-Mountain Lion Interaction Study and Management Plan Annual Update (Year 2) Report to MPROSD Board). Wang et al. (2017) found that energetics requirements of cougars in the SCMR shifted with the proximity to housing. Female cougars were found to shift their activity patterns to more nighttime hours as they moved closer to development.

IMPACT ANALYSIS

SLV is situated along the Highway 9 corridor and is typical of the human-dominated landscapes in which the regional population of cougar inhabits. Large significant patches of mixed redwood forest exist north, west and south of the SLV campus. These forested areas support cougar home ranges where they live, reproduce and hunt for prey. The campus itself is of minimal value for cougars and cougar occurrence is uncommon and represents a sink or an area of much higher mortality risk for the cougar.

To understand whether the proposed Master Plan for SLV constitutes a significant adverse site specific effect on the local cougar population requires an understanding of ecological scale. Regionally black-tailed deer (*Odocoileus hemionus columbianus*) have densities in range of 20 (or more) per mi², coyote (*Canis latrans*) and bobcat (*Lynx rufus*) 1 to 2 per mi² and cougars 0.05 to 0.08 per mi² (5 to 8 adults per 100 mi²). On any given day, there is a near 100% chance deer are near the campus, a high probability that a coyote or bobcat are near the campus, and a low probability that a cougar is nearby, even though the mixed redwood forest constitutes high quality habitat for them.

As noted above, the average home range of a female cougar in the region is about 18.5 mi² which is approximately 11,840 acres. Females tend to utilize their home ranges to a greater degree than a male, as females are often pregnant or with young (roughly 70% of their life). How they use their range is largely dependent on numerous factors (e.g., prey abundance, vulnerability of prey, human density roads, etc.) Dividing the average female home range into 100 acres blocks results in approximately 118 blocks; these 100 acres blocks would average 2087 ft per side.

If we assume the entire home range is homogenous and that the average female utilizes all blocks equally, the expectation is that probability of a female occurring on any day is equal across all blocks. However, if a cougar occurs in a block greater than chance alone, we would predict they are selecting it and if they occur statistically less often, then they are avoiding it. In the originally unrealistic example of a homogenies environment we would assume that each



100 acres block would be visited with a female at least 3 days of the year ($365/118 = 3.09$ days). This visit would not simply be moving through the block (as cougars can travel several miles in a day), but spending significant time hunting, or laying up for a day or two.

What is the probability that a cougar would occur in one of two 100 acres block (2087 ft on a side) lined up along the western and southern edge of the school (Figure 1)? If we shift from the unrealistic homogenous landscape to the real world, not all blocks would be used equally. It would be safe to say if a cougar spent 9 days a year (3 times the baseline number of 3) in one of these two these blocks they would be statistically be selecting one of these two blocks over others. Given the location of these two blocks relative to the school and residential area, it is unlikely, that these two blocks would support sufficient resources that a cougar statistically selects them over blocks occurring at further distances. That is not to say that these blocks lack food resources, simply that the high human occurrence adjacent to the blocks are more likely to influence cougars to use them less.

If we combined these two blocks and allowed for 18 days occurrence in a given year, then what is the probability that any of these 18 days coincide with any of the 20 games? There is only a 35.6% likelihood none of these days would coincide with a sport event. In other words, there is an approximately 65% probability a cougar spent at least one day in the two blocks coinciding with one sport event at the school. The probabilities drop fairly quickly after that to only a 30% chance for cougar presence to coincide with two sport events, 5.5% for three events and less than about 1% for 4 events. The probability of cougar co-occurrence with at least three games increases to 10% and 19% if we increase the cougar days in the 200 acre block to 24 and 36 days, respectively. The key point is, the potential for the Project to adversely affect a cougar is very limited as cougars' occurrence adjacent to the SLV campus during school nighttime events has relatively low probabilities due in large part to the inherently low population density.

To better visualize this, the City of San Jose supports approximately one million people and is 70 mi² in size. If instead of development, the City of San José had the topography and habitat of Big Basin State Park, which is approximately 35 mi², little human influence and supported a similar density of adult cougars as the SCMR; then the City of San José would support about 5 to 6 adult cougars. As noted above, the average home range for cougars in the SCMR varies from 18.5 mi² for females to 36 mi² for males. As with the SCMR, not all parts of the City would be used equally as important resources are not distributed equally. The social structure of these cougars will vary depending on sex and whether a female cougar has accompany young. Males spend their time searching for prey and available females, while females with cubs, will avoid males. While cougars generally exhibit a more solitary behavior, there are reports of adult females sharing meals on occasion (Elbroch et al. 2017). The probability of a cougar occurring at the location of City Hall for example on any given day is low; it is likely that City Hall would only fall within the home range of one or two cougars – three at most. As in any landscape, the intersection of movement of a few cougars can be drawn to strategically placed topographic features such as prominent ridgelines or important creeks systems with little human influence, while other areas of the landscape receive little use. This exercise is to illustrate that the inherently low densities and large home ranges of the cougar, require a different mindset to truly understand spatial use patterns and to best evaluate the potential effects of the SLV Master Plan on the regions cougars.



It is important to consider the baseline condition with which the SLV Master Plan is being evaluated. SLV is situated on the west side of the Highway 9 Corridor between Ben Lomond and Felton. The San Lorenzo River runs roughly along Highway 9 on its east side. There is a relatively small, forested area about 1.5 miles long and about one mile long along the east side of Highway 9; this forested area is nearly surrounded by development along its northern, eastern and southern area. SLV sits just west of Highway 9 with large, forested area to its northwest, west and south. In other words, SLV sits within a compromised area for cougars, with only the large forested areas to its west, south and north providing better habitat to support cougars. The existence of SLV since the 1950s has already adversely influenced space use of cougars adjacent to it. This does not mean a cougar would not occur within the edge of the forested area next to the campus, merely that it would occur there less often than other portions of the individual's territory. There is an existing human footprint that reaches into the forest, although the exact boundary of the footprint is unknown (whether the footprint is 100, 200 or 500 ft is not presently known), but based on the plethora of studies in the area we know the footprint exists. So it is important to understand that the baseline condition is a compromised forest edge.

The events as noted in Table 1 introduce relatively infrequent light and noise disturbance. There will be only two additional football games held on campus, with the remaining events and practices remaining the same compared to the baseline condition. The difference is shifting from daylight to evening hours. Four events will provide the greatest level of disturbance: 200 ft light disturbance footprint, 600 ft noise disturbance footprint and 370 inbound and 370 outbound trips. The disturbance for the remaining 16 nighttime events is noticeably less as the lights will run only until 830PM with 80% fewer spectators and trips. The 39 practices will have an even smaller potential impacts with few spectators and limited noise disturbance.

A cougar encountering a small number of events (i.e., 2-4) in one of the two 100-acre blocks over the year would only avoid the immediate vicinity during the event; they would only avoid portions of the block if the light and noise disturbance was relatively constant throughout the year. Add on top of that, the highest light and noise disturbance event occurs during the one football home coming game held every fall with a very limited intrusion footprint into the adjacent 100-acre blocks (a upper limit of 600 ft for noise). It is important to keep in mind the presence of SLV has already shaped spatial use patterns by cougars in the region, and so the real question is, will running these nighttime events cause a measurable change in either space use or behavior – will it measurably reduce uptake of nutrition, adversely affect breeding, effect the survival of young our dispersing cougars, etc.

Even if we assume that two or three adult cougar home ranges overlapped in the area of the school, the probability that two adult cougars inhabiting the two blocks at the same time is very low, unless it is a male and female socializing for breeding. Given the location of SLV, it is not likely that more than two home ranges overlap adjacent to the high school.

Each cougar (unless traveling together) will react to stresses independently. So if two separate adult cougars occurred at different events during the year, each would have been exposed to minimal light and noise disturbance footprint for one event. If each cougar avoided SLV during that one event, it is two cougars exhibiting avoidance behavior once a year. The probability that



a single event (or even two or three during the year) causes a permanent shift in range over the existing condition is very unlikely. Two studies have evaluated the efficacy of using hounds to haze cougars in Utah Parsons et al (2024), and California (Winter et al 2024). Neither studied detected cougars moving meaningful distances from livestock with the hazing efforts versus the control group. While the Utah study did report a significant difference in distance moved (282m vs 582m), it was not particularly meaningful in that a cougar can cover the difference in a matter of a few minutes. So for a single cougar being exposed to the disturbance footprint one to three event in a given year, would not likely cause it to permanently avoid the forested area adjacent to the school.

There are 39 practice events planned for the year with an end time of 8:30PM. While the minimal spill over lighting will occur as with a game, there will be few spectators, no concessions nor PA System and traffic will remain the same; simply shifting outbound traffic from daylight to evening hours. There is only a 12.4% likelihood none of these days would coincide with an event annually, but an approximately 87% probability at least one day per year a cougar spent in the block coinciding with one event at the school. The probabilities drop fairly quickly after that to only a 67% chance for a cougar presence to coincide with two events annually, 30% for three events, 18% for 4 events and 3% for 5 events. As with game events, the potential for the Project to adversely affect a cougar remains limited for practice events.

Relying on the standard CEQA significance criteria and integrating CDFW's 2025 report provides a robust framework for us to judge the effect of the Project on cougars. The three criteria that CDFW's 2025 report provides are:

1. Maintaining and enhancing landscape connectivity between robust core populations and the smaller, more isolated populations within the proposed threatened Central Coast and Southern California DPS
2. Protecting important patches of remaining habitat within the DPS from development and enhancing degraded habitats where feasible.
3. Reducing human-related mortality rates within the populations of the DPS.

Project Specific Impact Assessment

Construction Related Impacts

The IS/MND notes that the construction activities would only occur during weekdays between 7:00 a.m. and 6:00PM and on Saturdays between 9:00AM and 6:00PM. Construction equipment noise level 50 ft away varies from 70 dBA (generators) to 105 dBA (pile driver), although pile driving is not proposed for construction of the project. The IS/MND notes that construction noise levels drop off at a rate of about six dBA per doubling of the distance between the source and receptor. Other factors such as shielding by buildings or terrain can provide an additional five to 10 dBA noise reduction at distant receptors. The activity periods of male and female cougars shift to more nocturnal times as they move closer to development, such as the school and residential areas both north and south of the school (Wang et al. 2017). Unlike events that are spaced out over time, construction activities will be concentrated during period over a few months. There is a higher probability that cougars will occur within the 200 acres noted above during the construction window of the Project and thus exposed to



construction noise. At distances of 300 ft, construction noise is expected to drop by 36dBA, and 400 ft 38 dBA. The construction impacts on cougars is considered less than significant given that cougar occupy adjacent habitat infrequently [e.g., as a very low-density species), less active during daylight hours near development, and as the distance doubles from the construction site noise levels drops noticeably.

Operational Impacts

The limited disturbance footprint into the adjacent forest from the various events noted in Table 1 is rather limited. The likelihood of a cougar occurring in proximity of the school during more than one event a year drops significantly from approximately 65% for one event to 5.5% probability for a cougar to occur adjacent to the school during three events. Thus, cougar avoidance behavior beyond the baseline (i.e., existing conditions) would be minimal as the probability of occurring adjacent to the school during 2 or more events is relatively low, and the light and noise disturbance footprint is minimal. Therefore the potential impact from on-going operations of the Project is a less than significant impact.

Road Mortality

Road mortality has been shown to be a major contributor to overall mortality for the cougar in the SCMR. The traffic analysis in the IS/MND noted most games and practices already occur and are shifting from early to later in the day. All events, but four football games will end by 8:30PM and the four football games will end at 10PM. The traffic analysis in the IS/MND noted the largest change occurs with considering traffic from a homecoming game which does not currently occur on the SLV campus. They estimated that 1,000 spectators would generate approximately 309 inbound trips and 31 outbound trips during the busiest hour of 5PM. They estimated that the level of service at 3 intersections would remain unchanged. There is a 4.8% probability that one of the estimated 18 days of cougar occupancy within the two adjacent blocks of 200 acres falls on the specific day of the Fall for the homecoming game. The relatively low probability of occurrence of a cougar occurring adjacent to the campus on game day combined with the relatively small number of trips added to Highway 9 results in a less than significant impact to road mortality.

CONFLICTS WITH THE 2025 CDFW REPORT GUIDANCE

Does the project conflict with the three considerations by CDFW.

1. Maintaining and enhancing landscape connectivity between robust core populations and the smaller, more isolated populations within the proposed threatened Central Coast and Southern California DPS
2. Protecting important patches of remaining habitat within the DPS from development and enhancing degraded habitats where feasible.
3. Reducing human-related mortality rates within the populations of the DPS.



1. Landscape Connectivity

Landscape connectivity refers to the ability of the landscape to either facilitate or impede the movement of organisms and their genes amongst suitable habitat patches. While connectivity is truly species agnostic, ecologists often focus on the ability of landscapes to facilitate movement of wildlife species, particularly mammalian carnivores. This is due in large part to the ecology and behavior of carnivores as they have inherently lower population densities than their prey and as such can and do travel great distances.

Movement corridors or landscape linkages are usually linear habitats that connect two or more habitat patches (Harris and Gallagher 1989), providing assumed benefits to the species by reducing inbreeding depression, and increasing the potential for recolonization of habitat patches. Some researchers have even demonstrated that poor quality corridors can still provide some benefit to the species that use them (Beier 1996).

To understand functionality of a corridor, it is important to evaluate the topographic and landcover types along with other factors that might facilitate or impede movement within a potential landscape linkage. To that end, the quality and type of habitat within the corridors is important: “better” habitat consists of an area with a minimum of human interference (e.g., roads, homes, etc.) and is more desirable to more species than areas with sparse vegetation and high-density roads. Movement corridors in San Francisco Bay Area are typically associated with valleys, rivers and creeks supporting riparian vegetation, and ridgelines. With increasing encroachment of humans on wildlife habitats, it has become important to establish and maintain linkages, or movement corridors, for animals to be able to access locations containing different biotic resources that are essential to maintaining their life cycles.

A corridor is “wide enough” when it meets these functions for the suite of animals in the area. It is important to note that landscape linkages are used differently by different species. For instance, medium to large mammals (or some bird species) may traverse a corridor in a matter of minutes or hours, while smaller mammals or other species may take a longer period of time to move through the same corridor (e.g., measured in days, weeks and even years). For example, an individual cougar may traverse the entire length of a long narrow corridor in an hour while travel of smaller species (such as rodent or rabbit species) may best be measured as gene flow within regional populations. These examples demonstrate that landscape linkages are not simply highways that animals use to move back and forth. While linkages may serve this purpose, the higher valued linkages also allow for slower or more infrequent movement. Width and length must be considered in evaluating the value of a landscape linkage. A long narrow corridor would most likely only be useful to wide ranging animals such as cougars and coyotes when moving between core habitat areas.

SLV is situated on the western side of the Highway 9 transportation corridor. The San Lorenzo River runs roughly along Highway 9 on its east side. There is a relatively small, forested area about 1.5 miles long and about one mile long along the east side of Highway 9; this forested area is nearly surrounded by development along its northern, eastern and southern area.



The large, forested area northwest, west and south of the SLV campus supports a significant amount of cougar habitat in the region. While small communities and small two-lane roads (e.g., Empire Grade, Felton Empire, Bonny Doon Road, etc.) dot the landscape, the existing cougar population has shifted its use patterns and diel activity patterns to accommodate the existing human presence. This large forested area west of SLV is not a corridor per se, but instead a landscape that supports resident and dispersing cats. The infrequent exposure to the limited noise and disturbance footprint is not likely to have any measurable effect on regionally occurring resident or dispersing cougars over the baseline condition.

2. Protecting Important Patches of Remaining Habitat

These forested areas adjacent to the SLV are important habitat for the cougar providing habitat where they live, reproduce and hunt for prey. The SLV campus is about 70 years old and the developing community around SLV has established the baseline which has diminished the value for cougars of the forest edge. Resident cougars occur in the forested lands adjacent to the SLV and after the implementation of the Master Plan, they will continue to do so. As noted above, given the inherently low density of cougars, the exposure of a cougar being exposed to noise and light disturbance from one or two events a year is low, as the disturbance footprint is at most 600 ft from the edge of the stadium and the probability of a cougar occurring next to campus on a game day is low. Shifting sport events and practices from early in the day to evening hours (i.e., for events to 10PM the remaining to 830PM) may cause a cougar if present to avoid an area within 600 ft of the campus, but should have no effect on the cougar using these areas if desired other times. The Master Plan does not add to protected landscapes in the SCMR, nor does it diminish usable habitat over the existing condition.

3. Reducing human -related mortality rates within the populations of the DPS.

The campus is not itself an important patch of remaining habitat, nor does the Project have a measurable impact on cougar occupancy within the adjacent mixed redwood woodland. The small number of trips that are added to overall annual trips generated to and from the existing uses of the campus operation, would not in any measurable way increase human-related mortality.

Cumulative Impact Assessment

The above analytic framework provided the foundation for concluding that the Master Plan Project would result in a less than significant impact. It remains to be determined if this less than significant effect analysis, when combined with the cumulative effects of other current or future projects in the area, rises to the level of significance.

Establishing the spatial extent of a Cumulative Analysis is critical. This analysis looks at both a more local perspective to tease out if other current or future projects with the region of SLV could exacerbate the small effects from the project and then zoom out and look at the entire range of the SCMR, which may be an isolated population.

Local Effects

There are only two major projects within three miles of the SLV campus project: the Valley Gardens project and the Scotts Valley Town Center Specific Plan Update (the Plan Update).



he Valley Gardens project in Scotts Valley (2.75 miles SE) – with 196 residential dwelling units includes 62 two-story single-family dwellings, 80 attached and two detached, to three story single-family dwellings. 54 multi-family apartments are proposed in two buildings (18 units and 36 units, respectively) on the northeastern corner of the project site. The project also includes up to three retail buildings near Mt. Hermon Road totaling approximately 8,350 square feet of commercial building space and up to 3,000 square feet of associated outdoor dining areas. The project also includes 4.99 acres of parks, open space, common areas and public trails. The project is a 30-acre infill site within Scotts Valley proper and will result in the conversion of the former golf course.

The Plan Update will manage and direct changes in development patterns through 2045 and guide present and future land uses, development intensity and scale, urban design, economic development, circulation management and mobility, infrastructure and public services, and community benefits for a 58-acre site within the City of Scotts Valley. The Plan allows for up to 657 residential units, 82,000 square feet of commercial uses, and 35,000 square feet of public/civic uses. The Plan included adopting amendments to the City's General Plan and Zoning ordinance, changing existing land use designations in the Plan Area, creating new zoning districts, and updating existing (or establishing new) development standards.

Neither project would not result in the loss of habitat for cougars nor impede regional connectivity. The project transportation component for Valley Gardens would result in a less than significant Impact (Kimely Horne 2024) and none of its transportation consideration reaches Highway 9. The project transportation component for the Plan Update would result in a significant impact to VMT, but would not have transportation considerations reaching Highway 9, adjacent to the SLV campus.

An additional project, the Highway 9 project adjacent to the school is to add sidewalks, but this would not be a major light-generating project which is intended to improve safety for pedestrians and would not add any trips.

Based on the above information, the Master Plan Project combined with known present and future projects with the SLV sphere will result in a less than significant cumulative Impact. The combined effects from these projects does not diminish the extent of existing habitat for the cougar nor the use of it by cougars, it does it diminish the functionality of any regional landscape linkage for the cougar, and the combined projects result in a less than significant impact to human caused mortality.

Cumulative Analysis based on the Santa Cruz Mountain Range Cougar Population

Without a doubt, the SCMR cougar population has challenges within an area with considerable human presence. The key biological limitation for this population is connectivity to other regional populations. Wilmers (CDFW 2025) has noted that he has no evidence that cougars have immigrated into the SCMR from any adjacent populations (e.g., Diablo Range, Gavilan Range, etc.). The SCMR is essentially isolated – that is the biggest challenge this population has for sustainability. The SLV Master Plan has absolutely no effect on that issue. It does no worsen



or improve connectivity that would facilitate immigrating cougars from other subpopulations (e.g., Diablo Range).

The effects of the project are fairly minimal for a several reasons: 1) the baseline condition has already diminished the value of the forest edge; 2) the disturbance footprint, conservatively (i.e., it is probably less) is at most 600 ft for noise and 200 ft for light; 3) cougar population density is inherently low; 4) probability that a cougar occurs near SLV during more than one event is very low; 5) the low number of traffic trips being added on an annual basis; 6) only two football games are being added to the schedule, all other events are simply shifting time from early in the day to later; and 7) only four events occur to 10PM with the remaining events and practices ending at 830PM. The low occurrence of a cougar avoiding the forest within 600 ft of the SLV will have no measurable effect on its ability to find prey, find mates and breed, raise young or move regionally.

So when considered on a cumulative scale of the SCMR, the minimal effects of the Master Plan are still less than significant.

Should you wish to discuss this analysis or any of its assumptions, please feel free to reach to me at rhopkins@loainc.com.

Sincerely,

A handwritten signature in black ink, appearing to read 'A. Hopkins', with a horizontal line extending to the right.

Rick A. Hopkins, Ph.D.
President
Senior Conservation Biologist

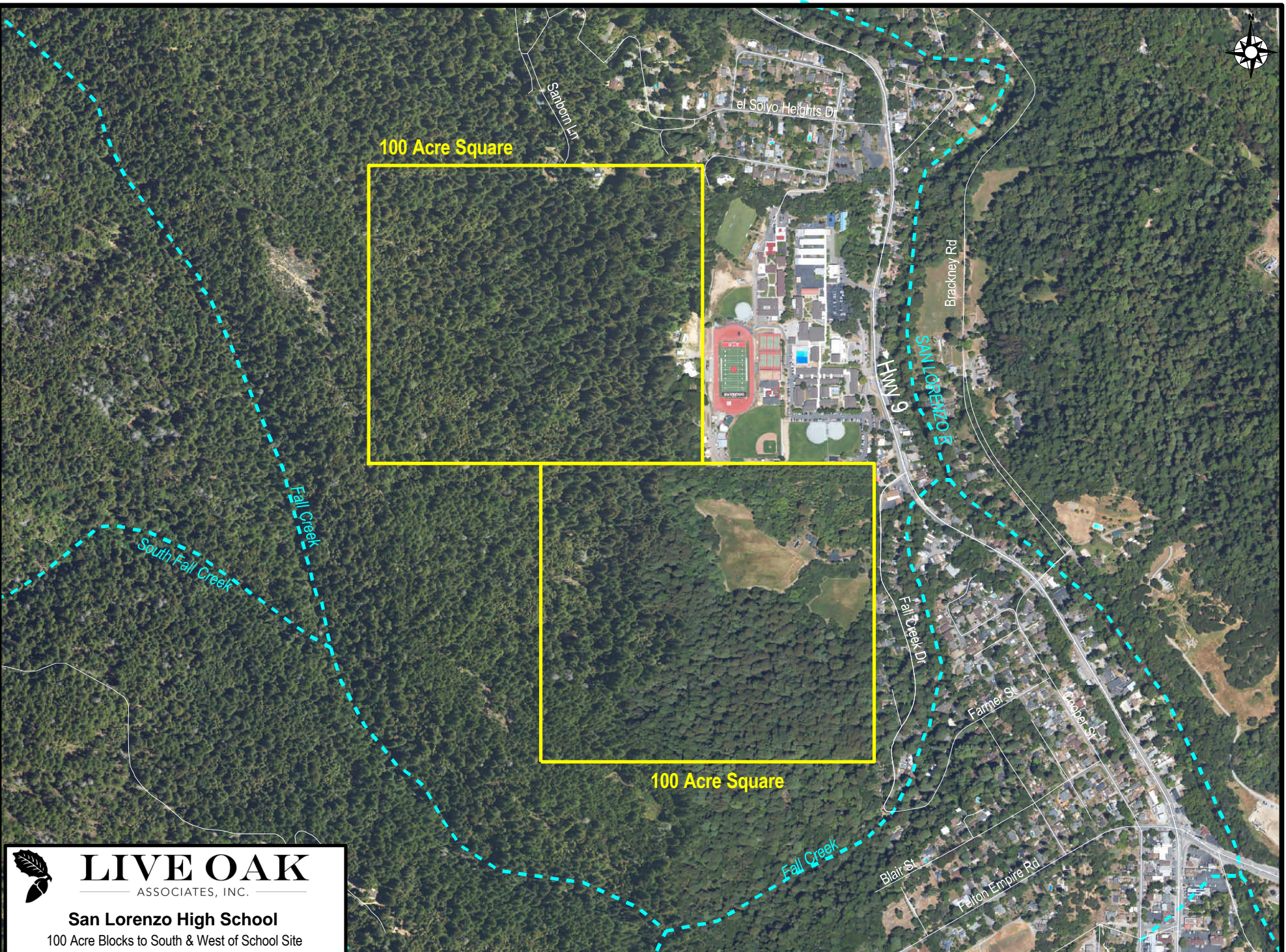




100 Acre Square



100 Acre Square



 **LIVE OAK**
ASSOCIATES, INC.

San Lorenzo High School
100 Acre Blocks to South & West of School Site

Date	Project #	Figure #
3/03/2026	2996-01	1

