

APPENDIX C

Species Accounts and Land Cover Types within the Habitat Study Area

Special-Status Plant Species

Colusa Grass

Colusa grass (*Neostapfia colusana*) is a California endangered plant species and is listed as threatened under FESA; it is also ranked CRPR 1B.1. Colusa grass grows in alkaline vernal pools in alkaline basins of Sacramento and San Joaquin valleys, as well as acidic soils along the eastern San Joaquin Valley and the Sierra Nevada foothills (Authority 2019).

The major threat to Colusa grass is habitat loss caused by agriculture and development, which can directly remove vernal pool habitat, and can also indirectly affect habitat by altering hydrology. Development and agricultural irrigation can reduce or remove the flow of water into vernal pools and can create new sources of runoff into the vernal pool habitat. Additional threats include inappropriate grazing, invasive native and nonnative plants, herbicide use, and groundwater contamination; large outbreaks of grasshoppers are also noted as a threat. Small populations of fewer than 100 individuals at least nine known sites are also threatened by low genetic diversity and are vulnerable to random events (Authority 2019).

Colusa grass occurrences in the regional RSA are associated with vernal pools in the San Joaquin Valley and lower Sierra Nevada foothills east of Merced. According to a query of the California Natural Diversity Database (CNDDDB), there are 57 specific extant occurrence polygons in the regional RSA. None of these occurrence polygons overlap with the special-status plant study area. Habitat for this species is present in the special-status plant study area for the San Joaquin Valley Subsection.

Coyote Ceanothus

Coyote ceanothus (*Ceanothus ferrisiae*) is listed under FESA as endangered; it is also ranked CRPR 1B.1. Coyote ceanothus occurs only in the vicinity of Morgan Hill in Santa Clara County, where it is known from three occurrences within a 5-mile area: Anderson Dam, Kirby Canyon, and Llagas Road. Coyote ceanothus is a perennial shrub that grows on rocky serpentine slopes in chaparral (Authority 2019).

The primary threat to coyote ceanothus is development, including expansion of the Anderson Reservoir and the Kirby Canyon Landfill; other threats include heavy cattle browsing, and alteration of fire regimes, although fire is thought to be important in germination and recruitment of this obligate seeder. The Llagas Road site is nearly surrounded by residential development that is grazed by cattle that heavily browse the serpentine chaparral. Seed predation before and after seed dispersal has been documented to remove a large percentage of the seed production and therefore reduce the soil seed bank: beetles are primarily responsible for pre-dispersal seed predation, and small mammals, especially *Peromyscus* mice, consume seed on the ground, and may remove up to 70 percent of the seeds in the litter layer (Authority 2019).

Coyote ceanothus occurrences in the regional RSA are associated with serpentine chaparral in the hills bordering the Santa Clara Valley (i.e., Anderson Reservoir in Mt. Hamilton Range and one occurrence in Santa Cruz Mountains). There are seven CNDDDB specific extant occurrence polygons in the regional RSA. None of these occurrence polygons overlap with the special-status plant study area. Suitable habitat for this species is present in the special-status plant study area for the Morgan Hill and Gilroy Subsection.

Greene's Tuctoria

Greene's tuctoria (*Tuctoria greenei*) is listed under FESA as endangered and is listed as Rare under the NPPA; it is also ranked CRPR 1B.1. Greene's tuctoria occurs in scattered locations throughout the Central Valley, with additional populations in eastern Shasta County and southeast Modoc County. In the San Joaquin Valley, populations formerly occurred along the eastern side of the valley, from San Joaquin County to Tulare County, but extant populations now occur only in Merced County (Authority 2019).

Greene's tuctoria is a small annual grass that grows in vernal pools in open grasslands. As with other vernal pool species, the major threat to hairy Orcutt grass is habitat loss caused by

agriculture and development, which can directly remove vernal pool habitat, and can also indirectly affect habitat by altering hydrology. Development and agricultural irrigation can reduce or remove the flow of water into vernal pools and can create new sources of runoff into the vernal pool habitat. Additional threats include inappropriate grazing, invasive native and nonnative plants, herbicide use, recreational activities, climate change, and groundwater contamination. Small isolated populations of 110 or fewer plants in Butte, Glenn, and Merced Counties are also threatened by low genetic diversity and are vulnerable to random events (Authority 2019).

Greene's tuctoria occurrences in the regional RSA are associated with vernal pools in the lower Sierra Nevada foothills east of Merced. There are six CNDDDB specific extant occurrence polygons in the regional RSA. None of these occurrence polygons overlap with the special-status plant study area. Suitable habitat for this species is present in the special-status plant study area for the San Joaquin Valley Subsection.

Hairy Orcutt Grass

Hairy Orcutt grass (*Orcuttia pilosa*) is a California endangered plant species and is listed as endangered under FESA; it is also ranked CRPR 1B.1. Hairy Orcutt grass currently occurs in two areas: in the Sacramento Valley in Glenn and Tehama Counties, and in the San Joaquin Valley in Madera and Stanislaus Counties (Authority 2019).

Hairy Orcutt grass is a small annual plant that grows in vernal pools, apparently favoring larger pools (median size was 4.2 acres in the 1980s) that hold water for several months, and is found on a variety of soil types in the Southern Sierra Foothills Vernal Pool Region. As with other Orcutt grasses, the plants grow underwater for at least 3 months, producing specific aquatic leaves that are different from the terrestrial leaves that appear as the pools dry, typically in June or July (Authority 2019).

As with other vernal pool species, the major threat to hairy Orcutt grass is habitat loss caused by agriculture and development, which can directly remove vernal pool habitat, and can also indirectly affect habitat by altering hydrology. Development and agricultural irrigation can reduce or remove the flow of water into vernal pools and can create new sources of runoff into the vernal pool habitat. Competition from invasive plants is considered a problem for most populations of hairy Orcutt grass. Additional threats include inappropriate grazing, invasive native and nonnative plants, herbicide use, recreational activities, climate change, and groundwater contamination. Six of the presumably extant populations are small (fewer than 100 plants at their peak) and are therefore threatened by low genetic diversity and vulnerable to random events (Authority 2019).

Hairy Orcutt grass occurrences in the regional RSA are associated with vernal pools in the lower Sierra Nevada foothills east of Merced. There are six CNDDDB specific extant occurrence polygons in the regional RSA. None of these occurrence polygons overlap with the special-status plant study area. Suitable habitat for this species is present in the special-status plant study area for the San Joaquin Valley Subsection.

Hoover's Spurge

Hoover's spurge (*Euphorbia hooveri*, formerly known as *Chamaesyce hooveri*) is listed as threatened under FESA; it is also ranked CRPR 1B.2. Hoover's spurge occurs in scattered locations in the Central Valley, in Butte, Colusa, Tehama, and Glenn Counties in the Sacramento Valley. In the San Joaquin Valley, occurrences are in the Visalia-Yetttem area in Tulare County, in the Hickman-La Grange area in Stanislaus County, and on the Bert Crane Ranch in Merced County (Authority 2019).

Hoover's spurge is a small annual plant that grows in vernal pools below 250 meters elevation. It grows on a wide variety of soil types, from clay to sandy loam. Deeper vernal pools may provide better habitat because inundation is longer, which reduces competition from other plants (Authority 2019).

As with other vernal pool species, the major threat to *Hoover's spurge* is habitat loss caused by agriculture and development, which can directly remove vernal pool habitat, and can also indirectly affect habitat by altering hydrology. Development and agriculture can reduce or remove

the flow of water into vernal pools and can also create new sources of runoff into the vernal pool habitat. Small isolated populations are also threatened by low genetic diversity and are vulnerable to random events. Additional specific threats include high livestock use that damages plants by direct trampling (cattle do not graze Hoover's spurge) and invasive native and nonnative plants (Authority 2019).

The only Hoover's spurge occurrence in the regional RSA is associated with alkaline grassland in the San Joaquin Valley, approximately 4 miles southwest of Merced (CNDDDB occurrence no. 22). This occurrence polygon does not overlap with the special-status plant study area. Suitable habitat for this species is present in the special-status plant study area for the San Joaquin Valley Subsection.

Metcalf Canyon Jewelflower

Metcalf Canyon jewelflower (*Streptanthus albidus* ssp. *albidus*) is listed as endangered under FESA; it is also ranked CRPR 1B.1. Metcalf Canyon jewelflower occurs in a small range between Anderson Lake and San Jose in Santa Clara County. Metcalf Canyon jewelflower is an annual herb that grows on barren slopes, serpentinite outcrops, and dry grassy meadows on serpentine soils between 45 to 400 meters elevation (Authority 2019).

The primary threats to Metcalf Canyon jewelflower are destruction and fragmentation of habitat from residential and recreational development, off-road vehicle use, road widening and maintenance, feral pigs, and inappropriate grazing. Invasive nonnative plants have also been considered a threat, and nitrogen deposition has been recently recognized as a threat to grasslands in the vicinity of urban areas and causes an increase in soil fertility that encourages the growth of nonnative grasses and facilitates invasive species. However, because Metcalf Canyon jewelflower grows on rock outcrops, it is likely to be insulated from effects of invasive plants. Disturbance from increased recreation in the open-space areas surrounding the increasing urban population in the Bay Area has been mentioned as a specific threat (Authority 2019).

Metcalf Canyon jewelflower occurrences in the regional RSA are associated with serpentine rock outcrops and grassland in the hills east of the Santa Clara Valley (i.e., Coyote Ridge). There are 33 CNDDDB specific extant occurrence polygons in the regional RSA. Two of these occurrence polygons overlap with the special-status plant study area at Communication Hill in the Monterey Corridor Subsection. Suitable habitat for this species is present in the special-status plant study area for the Monterey Corridor and Morgan Hill and Gilroy Subsections.

Palmate-Bracted Bird's-Beak

Palmate-bracted bird's-beak, or palmate salty bird's-beak (*Chloropyron palmatum*, formerly known as *Cordylanthus palmatus*) is a California endangered plant species and is listed as endangered under FESA; it is also ranked CRPR 1B.1. Palmate-bracted bird's-beak occurred historically in scattered locations in the San Joaquin Valley, the Sacramento Valley, and the Livermore Valley. Currently there are four extant populations in Colusa, Yolo, Alameda, and San Joaquin Counties (Authority 2019).

Palmate-bracted bird's-beak grows in saline-alkaline soils in seasonally-flooded plains and basins at elevations below 155 meters. It is strongly associated with small-scale topographic features such as small basins and rims, mounds, swales, and levees (Authority 2019). Palmate-bracted bird's-beak is hemiparasitic: in addition to manufacturing food through photosynthesis it also obtains water and nutrients from the roots of other plants, attaching to hosts such as saltgrass (*Distichlis spicata*).

The primary threats to palmate-bracted bird's-beak are habitat loss and alteration from caused by agriculture and urban development, and encroachment of nonnative invasive plant species, especially perennial pepperweed (*Lepidium latifolium*) — the species does not compete well with invasive weeds. Other threats include changes in hydrology, road maintenance, unauthorized fill of wetlands, off-road vehicle use, and climate change (Authority 2019).

There are no known occurrences of palmate-bracted bird's-beak in the regional RSA. Suitable habitat for this species is present in the San Joaquin Valley Subsection.

San Joaquin Orcutt Grass

San Joaquin Orcutt grass or San Joaquin Valley Orcutt grass (*Orcuttia inaequalis*) is a California endangered plant species and is listed as threatened under FESA; it is also ranked CRPR 1B.1. San Joaquin Orcutt grass is restricted to a 36-mile-long band in the Southern Sierra Nevada Foothills Vernal Pool Region in the eastern San Joaquin Valley; most of the extant occurrences are in Merced County, with additional occurrences in Fresno, Madera, and Tulare Counties (Authority 2019).

San Joaquin Orcutt grass is a small annual grass that occurs in vernal pools below 755 meters and grows in acidic soils of a wide range of soil series with textures ranging from clay to sandy loam. As with other Orcutt grasses, the plants grow underwater for at least 3 months, producing specific aquatic leaves that are different from the terrestrial leaves that appear as the pools dry, typically in June or July (Authority 2019).

As with other vernal pool species, the major threat to hairy Orcutt grass is habitat loss caused by agriculture and development, which can directly remove vernal pool habitat, and can also indirectly affect habitat by altering hydrology. Development can reduce or remove the flow of water into vernal pools and can create new sources of runoff into the vernal pool habitat. Additional threats include inappropriate grazing, invasive native and nonnative plants, herbicide use, recreational activities, climate change, and groundwater contamination. During grasshopper outbreaks, grasshoppers may damage populations of San Joaquin Valley Orcutt grass and destroy plants before they set seed. Small isolated populations are also threatened by low genetic diversity and are vulnerable to random events—at least six occurrences were considered to be threatened by the small size of the population (Authority 2019).

San Joaquin Orcutt grass occurrences in the regional RSA are associated with vernal pools in the Sierra Nevada foothills east and southeast of Merced. There are 25 CNDDDB specific extant occurrence polygons in the regional RSA. None of these occurrence polygons overlap with the special-status plant study area. Suitable habitat for this species is present in the special-status plant study area for the San Joaquin Valley Subsection.

Santa Clara Valley Dudleya

Santa Clara Valley dudleya (*Dudleya abramsii* ssp. *setchellii*, formerly known as *Dudleya setchellii*) is listed as endangered under FESA; it is also ranked CRPR 1B.1. Santa Clara Valley dudleya is restricted to a small area in the Coyote Valley area between San Jose and Gilroy in Santa Clara County. Santa Clara Valley dudleya is a small succulent perennial herb that grows on rocky outcrops in serpentine grassland between 60 and 455 meters elevation (Authority 2019).

The primary threats to Santa Clara Valley dudleya are destruction and fragmentation of habitat from residential and recreational development, urban development, off-road vehicle use, road widening and maintenance, and inappropriate grazing. Invasive nonnative plants have also been considered a threat, and nitrogen deposition has been recently recognized as a threat to grasslands in the vicinity of urban areas and causes an increase in soil fertility that encourages the growth of nonnative grasses and facilitates invasive species. However, because Santa Clara Valley dudleya grows on rock outcrops, it is likely to be insulated from effects of invasive plants. Disturbance from increased recreation in the open-space areas surrounding the increasing urban population in the Bay Area has been mentioned as a specific threat (Authority 2019).

Santa Clara Valley dudleya occurrences in the regional RSA are associated with serpentine rock outcrops and grassland in the hills east of the Santa Clara Valley (i.e., Coyote Ridge). There are 395 CNDDDB specific extant occurrence polygons in the regional RSA. One of these occurrence polygons overlaps with the special-status plant study area north of Dana Rock Park in the Monterey Corridor Subsection (CNDDDB occurrence no. 12). Suitable habitat for this species is present in the special-status plant study area for the Monterey Corridor and Morgan Hill and Gilroy Subsections.

Succulent Owl's-Clover

Succulent owl's-clover (*Castilleja campestris* var. *succulenta*) is a California endangered plant species and is listed as threatened under FESA; it is also ranked CRPR 1B.2. Currently all occurrences but one are located in the eastern portion of the San Joaquin Valley in the Southern Sierra Foothills Vernal Pool Region; the other occurrence is outside the regional RSA in the Southeastern Sacramento Valley Vernal Pool Region. Within the regional RSA, occurrences are currently known from eastern Merced County (Authority 2019).

Succulent owl's-clover is a small annual plant that grows in vernal pools below 750 meters. It grows in a wide range of sizes and types of vernal pools, from shallow to deep pools, and in pools with short and long inundation periods. It is hemiparasitic: in addition to manufacturing food through photosynthesis, it also obtains water and nutrients from other plants by attaching to hosts plant's roots, and can use several different plant species as hosts (Authority 2019).

As with other vernal pool species, the major threat to succulent owl's-clover is habitat loss caused by agriculture and development, which can directly remove vernal pool habitat, and can also indirectly affect habitat by altering hydrology. Development and agricultural irrigation can reduce or remove the flow of water into vernal pools and can create new sources of runoff into the vernal pool habitat. Additional threats include inappropriate grazing, invasive native and nonnative plants, herbicide use, and groundwater contamination. Small isolated populations are also threatened by low genetic diversity and are vulnerable to random events. Nine sites that support this species have never exceeded 100 plants, and several other sites that formerly contained more than 100 plants each now appear to have declined to fewer than 100 (Authority 2019).

Succulent owl's-clover occurrences in the regional RSA are associated with vernal pools in the Sierra Nevada foothills east and southeast of Merced. There are 183 CNDDDB specific extant occurrence polygons in the regional RSA. None of these occurrence polygons overlap with the special-status plant study area. Suitable habitat for this species is present in the special-status plant study area for the San Joaquin Valley Subsection.

Tiburon Paintbrush

Tiburon paintbrush (*Castilleja affinis* var. *neglecta*) is a California endangered plant species and is listed as threatened under FESA; it is also ranked CRPR 1B.2. Tiburon paintbrush occurs on the Tiburon Peninsula, Ring Mountain Preserve, and in the Golden Gate National Recreation Area in Marin County, with one additional occurrence in Napa County near American Canyon, and two occurrences along Coyote Ridge in the Kirby Canyon area north of Morgan Hill in Santa Clara County (Authority 2019).

Tiburon paintbrush is a perennial herb that grows in serpentine bunchgrass grassland, on open, rocky usually north- or west-facing slopes. It is hemiparasitic: in addition to manufacturing food through photosynthesis, it also obtains water and nutrients from other plants by attaching to hosts plant's roots, and can use several different plant species as hosts. Residential development is a significant threat to Tiburon paintbrush; other threats to one or more populations include trampling by recreational activities, erosion, inappropriate cattle grazing, deer browsing, disturbance by feral pigs, and competition from nonnative invasive plants (Authority 2019).

Tiburon paintbrush is known from only nine extant occurrences, two of which are in the regional RSA on Coyote Ridge east of the Santa Clara Valley (CNDDDB occurrence nos. 7 and 9). The two occurrences are composed of four specific occurrence polygons northwest of Pigeon Point and Anderson Reservoir. None of these occurrence polygons overlap with the special-status plant study area. Habitat was not modeled for this species due to uncertainty of habitat parameters.

Special-Status Wildlife Species

Bay Checkerspot Butterfly

Bay checkerspot butterfly is listed as threatened under the FESA. The species was once widely distributed across Alameda, Contra Costa, San Mateo, San Francisco, and Santa Clara Counties,

but is now limited to Coyote Ridge in Santa Clara County and a few occurrences within 9 miles of this core population; all extant occurrences are in Santa Clara County (Authority 2019).

Habitat for Bay checkerspots occurs on shallow serpentine or similar soils that support dwarf plantain (*Plantago erecta*), the primary larval host plant. In years when dwarf plantain dries, larvae also feed on purple owl's clover (*Castilleja densifolia*) or exserted paintbrush (*C. exserta*).

The primary threat to Bay checkerspot butterfly is habitat loss and fragmentation. Other threats include reduced larval host plants due to competition from invasive nonnative plants, nitrogen deposition (including NO_x and ammonia), pesticide application (including drift), illegal collecting, fire, overgrazing, and gopher control (Authority 2019).

Bay checkerspot occurrences in the regional RSA are associated with serpentine and annual grassland on the hills bordering the Santa Clara Valley. There are 16 CNDDDB specific occurrence polygons in the regional RSA. One of these occurrence polygons overlaps with the habitat study area at Tulare Hill in the Santa Clara Valley (Authority 2019). Suitable habitat for this species is present in the habitat study area for the Monterey Corridor and Morgan Hill and Gilroy Subsections.

Critical Habitat

The USFWS designated 23,903 acres of critical habitat for the Bay checkerspot butterfly in San Mateo and Santa Clara Counties on April 30, 2001 (66 Fed. Reg. 21450). The USFWS designated revised critical habitat on August 22, 2007 (19,576 acres) and August 26, 2008 (18,293 acres) (73 Fed. Reg. 50406), the latter of which is currently in effect. The physical and biological features (PBFs) of critical habitat for Bay checkerspot butterfly are the habitat components that provide:

1. The presence of annual or perennial grasslands with little to no overstory that provide north-south and east-west slopes with a tilt of more than 7 degrees for larval host plant survival during periods of atypical weather.
2. The presence of the primary larval host plant, dwarf plantain, and at least one of the secondary host plants, purple owl's-clover or exserted paintbrush.
3. The presence of adult nectar sources for feeding (e.g., desert parsley [*Lomatium* spp.], California goldfields [*Lasthenia californica*], tidy-tips [*Layia platyglossa*]).
4. Soils derived from serpentinite ultramafic rock or similar soils that provide areas with fewer aggressive, nonnative plant species for larval host plant and adult nectar plant survival and reproduction.
5. The presence of stable holes and cracks in the soil, and surface rock outcrops that provide shelter for larval Bay checkerspot butterflies during summer diapause.

Designated critical habitat for Bay checkerspot butterfly is present in the Morgan Hill and Gilroy Subsection. Specifically, the Tulare Hill Unit (Unit 6) overlaps with the habitat study area at Monterey Road and Metcalf Road and the San Marin Unit (Unit 12) includes several network upgrade sites.

Crotch Bumble Bee

Crotch bumble bee (*Bombus crotchii*) is considered a candidate for listing as endangered under the CESA. The current range of the Crotch bumble bee is nearly limited to California and generally includes the majority of the state south of Sacramento (Authority 2019).

Bumble bees have three basic habitat requirements: suitable nesting sites for colonies, availability of nectar and pollen from floral resources, and suitable overwintering sites for the queens. Crotch bumble bee inhabits open grassland and scrub habitats and primarily nests underground (Authority 2019). Little is known about the nesting and overwintering sites for Crotch bumble bee, however similar species typically overwinter in soft, disturbed soil, or under leaf litter or other debris (Authority 2019). Nests are often located underground in abandoned holes made by ground squirrels, mice, and rats, or occasionally abandoned bird nests.

Agricultural intensification and rapid urbanization in the Central Valley are threats that are thought to have impacted Crotch bumble bee (Authority 2019). However, the species has been detected in agricultural landscapes in Yolo County and Contra Costa County in recent years (Authority 2019). Bumble bees, generally, are threatened by pesticide use, pathogens, and competition with non-native bees (Authority 2019).

Generally, activities which significantly disturb native, fallow, or relatively undisturbed soils could affect colonies or overwintering sites, if they are present. Additionally, activities which remove significant concentrations of flowering plants, especially those known to be used by the species, could impact the insect's ability to find suitable pollen and nectar sources (if there are nearby colonies).

There are 8 CNDDDB specific extant occurrence polygons in the regional RSA. None of these occurrence polygons overlap with the habitat study area. Suitable habitat for this species is present in the habitat study area in all Subsections.

Valley Elderberry Longhorn Beetle

Valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*) is listed as threatened under the FESA. Valley elderberry longhorn beetle is limited to elevations of 60–2,260 feet in and adjacent to the Central Valley (79 Fed. Reg. 55875). At the time of its listing in 1980, the beetle was known from fewer than 10 locations on the American River, Putah Creek, and Merced River. It currently ranges from southern Shasta County to Fresno County (Authority 2019).

Valley elderberry longhorn beetle's life cycle is entirely dependent on its host plant: red or blue elderberry (*Sambucus racemosa*, *S. mexicana*), both of which occur commonly in riparian forest patches along the rivers, creeks, and other drainages in the Central Valley and surrounding foothills. Elderberry shrubs also can be found as isolated bushes or clumps of bushes in elderberry savannas adjacent to riparian vegetation. Elderberry shrubs usually co-occur with other woody riparian plants, including Fremont cottonwood, California sycamore, various willows, wild grape, blackberry, and poison-oak. Females lay their eggs on the bark. Larvae hatch and burrow into the stems. Stems need to be at least about 1 inch in diameter for larvae to burrow into them (Authority 2019).

The primary threat to valley elderberry longhorn beetle is habitat loss and alteration due to urbanization and agriculture. Specific activities that have removed or degraded habitat include overgrazing, levee construction (including riprapping of the shoreline), and stream and river channelization. Other threats include nonnative predators (e.g., Argentine ant) that may eat the early phases of the beetle, recreational development, and insecticide and herbicide use in agricultural areas and along road rights-of-way (Authority 2019).

Valley elderberry longhorn beetle occurrences in the regional RSA are associated with riparian land cover types in the San Joaquin Valley. There are four CNDDDB specific extant occurrence polygons in the regional RSA. None of these occurrence polygons overlap with the habitat study area. Suitable habitat for this species is present in the habitat study area for the San Joaquin Valley Subsection.

Conservancy Fairy Shrimp

Conservancy fairy shrimp (*Branchinecta conservatio*) is listed as endangered under FESA and is known from six disjunct populations in California: Vina Plains, Tehama County; south of Chico, Butte County; Jepson Prairie, Solano County; Sacramento National Wildlife Refuge, Glenn County; near Haystack Mountain northeast of Merced, Merced County; and the Lockwood Valley, northern Ventura County. Conservancy fairy shrimp produce cysts (eggs) that lie dormant in the soil over summer and hatch during the winter rainy season, when favorable environmental conditions prevail: when pools are inundated, the water temperature is cool, and high oxygen concentration is present. This species typically is associated with large, clay-bottomed vernal pool playas with turbid water (Authority 2019). Conservancy fairy shrimp completes its entire life cycle within vernal pools and, therefore, is dependent on suitable habitat and sufficient seasonal rains for survival.

The primary threat to Conservancy fairy shrimp is habitat loss and alteration due to urbanization and agriculture. Many remaining populations are vulnerable to stochastic (random) extinction because of their small size and isolation from other populations (59 Fed. Reg. 48136). Other threats include invasive species, erosion, and contamination.

Conservancy fairy shrimp occurrences in the regional RSA are associated with vernal pools in the San Joaquin Valley and lower Sierra Nevada foothills east of Merced. There are 10 CNDDDB specific occurrence polygons in the regional RSA. None of these occurrence polygons overlap with the habitat study area. Suitable habitat for this species is present in the habitat study area for the San Joaquin Valley Subsection.

Longhorn Fairy Shrimp

Longhorn fairy shrimp (*Branchinecta longiantenna*) is listed as endangered under the FESA. The historical distribution of this species is not known, but probably did not include the northern portion of the Central Valley or southernmost California. The longhorn fairy shrimp is known from four populations: near Soda Lake in the Carrizo Plain National Monument (San Luis Obispo County), areas within the San Luis National Wildlife Refuge (Merced County), areas within Bush Peak Preserve (Alameda County) and within the Vasco Caves Preserve near the town of Byron (Contra Costa County). There is also a single occurrence in a roadside ditch adjacent to Miller Road approximately 2 miles north of Los Banos in Merced County (Authority 2019).

Longhorn fairy shrimp occur in a variety of vernal pool types. They inhabit clear as well as moderately turbid pools, including clear-water depressions in sandstone outcroppings near Tracy, grass-bottomed pools in Merced County, and claypan pools around Soda Lake in San Luis Obispo County. Conservancy fairy shrimp completes its entire life cycle in vernal pools and is thus dependent on sufficient seasonal rains for survival.

The primary threat to longhorn fairy shrimp is habitat loss and alteration due to urbanization and agriculture. Many remaining populations are vulnerable to stochastic (random) extinction because of their small size and isolation from other populations (59 Fed. Reg. 48136). Other threats include invasive species, erosion, and contamination.

Longhorn fairy shrimp in the regional RSA are associated with grassland vernal pools in the San Joaquin Valley. There is one CNDDDB specific occurrence polygon in the regional RSA that is associated with the entire GEA. This occurrence polygons overlaps with the habitat study area. Suitable habitat for this species is present in the habitat study area for the San Joaquin Valley Subsection. Vernal Pool Fairy Shrimp

Vernal pool fairy shrimp (*Branchinecta lynchi*) is listed as threatened under the FESA. It occurs at scattered locations throughout the Central Valley from the Millville Plains and Stillwater Plains in Shasta County, south through most of the Central Valley, and to the eastern margins of the Coast Ranges from San Benito County south to Ventura County (Authority 2019).

Vernal pool fairy shrimp are highly adapted to the ephemeral conditions of the vernal pools they inhabit. Their eggs, or cysts, remain dormant in the soil during the summer and fall when vernal pools are dry. They also have a relatively short life span, allowing them to hatch, mature to adulthood, and reproduce during the short time period in which vernal pools hold water (Authority 2019). Vernal pool fairy shrimp inhabit clear to turbid water in earth sumps and grass- or mud-bottom vernal pools and swales in unplowed grasslands and basalt-flow vernal pools. The species also has been observed in rock outcrop pools, roadside ditches, road ruts, bulldozer scrapes, and backhoe pits.

The primary threat to vernal pool fairy shrimp is habitat loss and alteration due to urbanization and agriculture. Many remaining populations are vulnerable to stochastic (random) extinction because of their small size and isolation from other populations (59 Fed. Reg. 48136). Other threats include invasive species, erosion, and contamination.

Vernal pool fairy shrimp occurrences in the regional RSA are associated with vernal pools, alkali sink scrub, and alkali grassland in the San Joaquin Valley and lower Sierra Nevada foothills east of Merced. There are 387 CNDDDB specific occurrence polygons in the regional RSA. None of

these occurrence polygons overlap with the habitat study area. Suitable habitat for this species is present in the habitat study area for the San Joaquin Valley Subsection.

Vernal Pool Fairy Shrimp

Vernal pool fairy shrimp (*Branchinecta lynchi*) is listed as threatened under the FESA. It occurs at scattered locations throughout the Central Valley from the Millville Plains and Stillwater Plains in Shasta County, south through most of the Central Valley, and to the eastern margins of the Coast Ranges from San Benito County south to Ventura County (Authority 2019).

Vernal pool fairy shrimp are highly adapted to the ephemeral conditions of the vernal pools they inhabit. Their eggs, or cysts, remain dormant in the soil during the summer and fall when vernal pools are dry. They also have a relatively short life span, allowing them to hatch, mature to adulthood, and reproduce during the short time period in which vernal pools hold water (Authority 2019). Vernal pool fairy shrimp inhabit clear to turbid water in earth sumps and grass- or mud-bottom vernal pools and swales in unplowed grasslands and basalt-flow vernal pools. The species also has been observed in rock outcrop pools, roadside ditches, road ruts, bulldozer scrapes, and backhoe pits.

The primary threat to vernal pool fairy shrimp is habitat loss and alteration due to urbanization and agriculture. Many remaining populations are vulnerable to stochastic (random) extinction because of their small size and isolation from other populations (59 Fed. Reg. 48136). Other threats include invasive species, erosion, and contamination.

Vernal pool fairy shrimp occurrences in the regional RSA are associated with vernal pools, alkali sink scrub, and alkali grassland in the San Joaquin Valley and lower Sierra Nevada foothills east of Merced. There are 387 CNDDDB specific occurrence polygons in the regional RSA. None of these occurrence polygons overlap with the habitat study area. Suitable habitat for this species is present in the habitat study area for the San Joaquin Valley Subsection.

Vernal Pool Tadpole Shrimp

Vernal pool tadpole shrimp (*Lepidurus packardi*) is listed as endangered under the FESA. Historically, the species likely did not occur outside the Central Valley and Central Coast regions. The vernal pool tadpole shrimp is currently distributed across the Central Valley of California and in the Bay Area. It currently occurs in scattered locations throughout the Sacramento and San Joaquin Valleys between Shasta County and Kings County, in the Sacramento–San Joaquin River Delta (Delta), and in Alameda County (Authority 2019).

Vernal pool tadpole shrimp occur in a wide variety of ephemeral wetlands. Some of these vernal pools may be too small to remain inundated for the entire life cycle of the tadpole shrimp, but the vernal pool tadpole shrimp may be able to tolerate temporary drying conditions. However, the tolerances of this species to specific environmental conditions have yet to be determined. The vernal pool tadpole shrimp is found on a variety of geologic formations and soil types (Authority 2019).

The primary threat to vernal pool tadpole shrimp is habitat loss and alteration due to urbanization and agriculture. Many remaining populations are vulnerable to stochastic (random) extinction because of their small size and isolation from other populations (59 Fed. Reg. 48136). Other threats include invasive species, erosion, and contamination.

Vernal pool tadpole shrimp occurrences in the regional RSA are associated with vernal pools, alkali sink scrub, and alkali grassland in the San Joaquin Valley and lower Sierra Nevada foothills east of Merced. There are 77 CNDDDB specific extant occurrence polygons in the regional RSA. None of these occurrence polygons overlap with the habitat study area. Suitable habitat for this species is present in the habitat study area for the Morgan Hill and Gilroy, Pacheco Pass, and San Joaquin Valley Subsections.

Steelhead (Central California Coast and South-Central California Coast Distinct Population Segments)

Central California coast (CCC) and south-central California coast (SCCC) steelhead (*Oncorhynchus mykiss*) are both federally listed as threatened. The distribution of the CCC

steelhead ranges from Ukiah down to Santa Cruz, from the ocean to inland streams. SCCC steelhead range from coastal streams from the Pajaro River, south to, but not including the Santa Maria River (Authority 2019).

Oncorhynchus mykiss can be anadromous (i.e., born in freshwater, spends most of its life in the ocean, then returns to freshwater to spawn) and called *steelhead* or can complete their life cycle within a given river reach. CCC and SCCC steelhead enter coastal streams during high precipitation events when flows are adequate to allow movement upstream. Depending on rain events, upstream migration can occur anywhere from November to February. Most steelhead spawn from December through April, with peak spawning occurring from January through March for all distinct population segments (DPS).¹ Unlike Pacific salmon, some steelhead may survive to spawn more than one time, returning to the ocean between spawning migrations. Juvenile steelhead feed on a variety of aquatic and terrestrial insects and other small invertebrates. Juvenile steelhead migration to the ocean generally occurs from December through March; juvenile steelhead generally migrate as 1-year-olds (smolts) at a length of 6 to 8 inches (15.2 to 20.3 centimeters) (Authority 2019). Newly emerged steelhead fry use shallow, protected areas along streambanks and move to faster, deeper areas of the river as they grow. Most juveniles occupy riffles in their first year of life, and some of the larger steelhead live in deep fast runs or in pools.

Both CCC and SCCC steelhead have been affected by agriculture, mining and urbanization activities which result in loss, degradation, and fragmentation of habitat. Specifically, water storage, diversions, and modification of natural stream flows have resulted in changes in water temperatures, depleted flows, and reduced gravel recruitment which is necessary for spawning. Estuarine habitat has been lost where the wetlands have become degraded. Other natural or human-made factors include climate change and effects of ocean conditions on the survival of salmonid populations. The drought from 2012–2015 depleted groundwater basins that provide surface water to coastal streams during the summer, reduced connectivity from coastal streams to the ocean by not breaching sandbars, and elevated water temperatures, which can be lethal or prevent spawning (Authority 2019).

CCC steelhead occur in the Guadalupe River, Los Gatos Creek, and Coyote Creek in the San Jose Diridon Station Approach and Morgan Hill to Gilroy Subsections. SCCC steelhead occur in Llagas Creek, Uvas Creek, Pacheco Creek, and the Pajaro River. Modeled habitat was determined by the National Hydrography Dataset (NHD) flowline streams/rivers data layer and the DPS boundaries of both CCC steelhead and SCCC steelhead and critical habitat.

Critical Habitat

The NMFS designated critical habitat for CCC and SCCC steelhead on September 2, 2005 (70 Fed. Reg. 43937). The PBFs of critical habitat for both DPS include the following:

1. Freshwater spawning sites
2. Freshwater rearing sites to support juvenile growth and development, including natural cover such as shade, submerged and overhanging woody debris, aquatic vegetation, large rocks and boulders, side channels, and undercut banks.
3. Freshwater migration corridors free of obstruction and excessive predation
4. Estuarine areas free of obstruction and excessive predation.

Designated critical habitat for CCC and SCCC steelhead is present in the project footprint for the Morgan Hill and Gilroy and Pacheco Pass Subsections). The Santa Clara Valley Habitat Plan (SCVHP) classified these streams according to their dominant fish communities in an analysis that primarily distinguished fish communities on the basis of water temperature, particularly noting

¹ A distinct population segment (DPS) is a vertebrate population or group of populations that is discrete from other populations of the species and significant in relation to the entire species. The FESA provides for listing species, subspecies, or DPSs of vertebrate species.

habitats that were or were not suitable for steelhead. That analysis found “cold steelhead” habitat in the upper portions of Coyote Creek and Pacheco Creek above the Cedar Creek confluence, and “warm potential trout/steelhead” habitat in the lower portions of Coyote Creek and portions of Pacheco Creek extending from the Cedar Creek confluence downstream to the Casa de Fruta area. These areas could potentially support PBF 1 (spawning habitat), as well as PBF 2 and PBF 3 (rearing and migration habitat). All other streams in the habitat study area are identified as warmer-water habitat and thus have a lower likelihood of supporting spawning habitat, but site-specific inspection of individual sites would be necessary to definitively identify whether suitable spawning habitat is present. Accordingly, all streams accessible to CCC and SCCC steelhead within the habitat study area are assumed to potentially support PBF 1, PBF 2, and PBF 3. The habitat study area does not contain any estuarine waters and thus does not support PBF 4 (Authority 2019).

Chinook Salmon (Central Valley Fall-run ESU)

Chinook salmon (Central Valley Fall-run ESU) (*Oncorhynchus tshawytscha*) are a California Species of Special Concern. Their habitat is Central Valley rivers and tributaries below impassable barriers. Adults enter rivers from San Francisco Estuary and move quickly to spawning grounds of cold, clear water with large gravel or cobble substrate. Peak spawning typically occurs October to November but can continue through December and into January.

Pacific Lamprey

Pacific lamprey (*Entosphenus tridentatus*) is a California Species of Special Concern. In California, Pacific lamprey occurs along the coast and in coastal and estuarine streams from Los Angeles and Del Norte Counties and the rivers in the Central Valley. Its upstream range is limited by impassable barriers such as dams on major Central Valley rivers. Pacific lamprey require cold, clear water for spawning and incubation.

California Red-Legged Frog

California red-legged frog (*Rana draytonii*) is listed as threatened under the FESA and is also a California species of special concern. Historically, the California red-legged frog occurred in the Pacific slope drainages from Shasta County to the Mexican border from sea level to 4,950 feet (Authority 2019). Although the species has experienced large reductions in geographic range and the size of local populations, California red-legged frogs are still found throughout much of their historic range.

California red-legged frogs breed in slow-moving streams or pools within streams, and seasonal or permanent waterbodies such as ponds. Submergent or emergent vegetation such as cattails or bulrush is an important component of aquatic breeding habitat. In the dry months, California red-legged frogs use a variety of microsites that remain moist and cool through the summer including moist leaf litter, dense understory, or small mammal burrows for refuge and foraging. Adult and juvenile California red-legged frogs are known to travel through a wide variety of upland habitat types (e.g., grassland, riparian, woodlands) to move between breeding and nonbreeding sites, between aquatic and upland refugia/foraging habitats, or to disperse to new breeding locations. Although they typically remain near streams or ponds, frogs have been observed to move more than 2 miles through upland habitat (Authority 2019).

The primary threats to California red-legged frog are habitat loss and alteration due to urbanization and agriculture and nonnative predators. Streams or ponds that have been altered by human activities or are near development are more likely to contain nonnative fishes and bullfrogs that are major predators of red-legged frog larvae and juveniles. Conversion of habitat to agriculture has resulted in an increase in pesticide exposure, which may have strong negative effects on this species (Authority 2019).

California red-legged frog occurrences in the regional RSA are associated with perennial ponds and streams throughout the mountains and foothills of the of the Santa Cruz Mountains and Diablo Range. There are 214 CNDDDB specific occurrence polygons in the regional RSA. Five of these occurrence polygons overlap with the habitat study area: one at Ogier Ponds near Coyote

Creek, one in Pacheco Creek near Casa de Fruta, two intermittent streams near Pacheco Pass, and one at a large pond northwest of the San Luis Reservoir. Suitable habitat for this species is present in the habitat study area for the Monterey Corridor, Morgan Hill and Gilroy, and Pacheco Pass Subsections.

Critical Habitat

The USFWS designated 4,140,440 acres of critical habitat for California red-legged frog in 28 California counties on March 13, 2001 (66 Fed. Reg. 14626). Critical habitat for this species has been revised several times since 2006, with the most recent revision (and the one currently in effect) dated March 17, 2010 and comprising approximately 1,636,609 acres in 27 counties (75 Fed. Reg. 12816). The PCEs of critical habitat for California red-legged frog are summarized as follows:

1. *Aquatic Breeding Habitat.* Standing bodies of fresh water (with salinities less than 4.5 parts per thousand [ppt]), including natural and constructed (e.g., stock) ponds, slow-moving streams or pools within streams, and other ephemeral or permanent waterbodies that typically become inundated during winter rains and hold water for a minimum of 20 weeks in all but the driest of years.
2. *Aquatic Nonbreeding and Riparian Habitat.* Freshwater ponds and streams that may not hold water long enough for the species to complete its aquatic life cycle but provide shelter, foraging, predator avoidance, and aquatic dispersal of juvenile and adult California red-legged frogs. Other wetland habitats considered to meet these criteria include, but are not limited to: plunge pools within intermittent creeks, seeps, quiet water refugia within streams during high water flows, and springs of sufficient flow to withstand short-term dry periods.
3. *Upland Habitat.* Upland areas adjacent to or surrounding breeding and nonbreeding aquatic and riparian habitat up to a distance of 1 mile in most cases (i.e., depending on surrounding landscape and dispersal barriers) including various vegetation types such as grassland, woodland, forest, wetland, or riparian areas that provide shelter, forage, and predator avoidance.
4. *Dispersal Habitat.* Accessible upland or riparian habitat within and between occupied or previously occupied sites that are located within 1 mile of each other, and that support movement between such sites. Dispersal habitat includes various natural habitats, and altered habitats such as agricultural fields, that do not contain barriers (e.g., heavily traveled roads without bridges or culverts) to dispersal. Dispersal habitat does not include moderate- to high-density urban or industrial developments with large expanses of asphalt or concrete, nor does it include large lakes or reservoirs over 50 acres in size, or other areas that do not contain those features identified in PCE 1, 2, or 3 as essential to the conservation of the species.

Designated critical habitat for California red-legged frog is present in the Morgan Hill and Gilroy and Pacheco Pass Subsections. Specifically, the Wilson Peak unit (Unit STC-2) overlaps with the habitat study area at Tunnel 1 in the Morgan Hill and Gilroy Subsection and between Casa de Fruta and the San Luis Reservoir in the Pacheco Pass Subsection. This unit contains all four PCEs of critical habitat for the species and its designation “is expected prevent further habitat fragmentation; provide connectivity to units farther north in Santa Clara, Alameda, and Contra Costa Counties; and represents the southern portion of the areas designated within Santa Clara County and [the] East Bay” (75 Fed. Reg. 12848).

California Tiger Salamander

California tiger salamander (*Ambystoma californiense*) is listed as threatened under the FESA and CESA. It is endemic to the low-elevation grassland and oak woodland plant communities of the Central Valley, coastal valleys, and bordering foothills from at least Colusa County south to Santa Barbara and Tulare Counties. California tiger salamanders still occur throughout much of their historical range and can be common in localities where the species still occurs (Authority 2019).

California tiger salamanders are typically found at elevations below 1,500 feet in grassland and oak woodland habitats that support fossorial rodents, whose burrows provide underground summer aestivation habitat for the salamanders, and with ponds, vernal pools, and intermittent streams that hold water during the winter and spring to provide aquatic breeding habitat. California tiger salamanders may also use less disturbed agricultural cover types such as irrigated pasture near suitable aquatic breeding habitat. California tiger salamanders are known to travel long distances from breeding ponds to upland habitat (i.e., small mammal burrows); a single-season study at Olcott Lake north of Livermore (Alameda County) showed that 95 percent of adult tiger salamanders dispersed to within 2,034 feet of their breeding pond and that 95 percent of sub-adults dispersed to within 2,067 feet (Authority 2019).

Multiple factors have contributed to population declines of this species, including habitat loss and fragmentation; predation from, and competition with, invasive species; hybridization with nonnative barred tiger salamanders (*Ambystoma tigrinum*); mortality from road crossings; contaminants; and rodent control efforts. Rodent control programs may reduce availability of burrows; poison used is also likely to affect salamanders. Use of pesticides in mosquito abatement may reduce the availability of prey. Automobiles and off-road vehicles kill migrating salamanders, and contaminated runoff from roads, highways, and agriculture may also have effects (Authority 2019).

California tiger salamander occurrences in the regional RSA are associated with ponds in the Diablo Range, Santa Cruz Mountains, and Sierra Nevada foothills; and pond-vernal pool complexes in the San Joaquin Valley (e.g., San Luis National Wildlife Refuge). There are 221 CNDDDB specific extant occurrence polygons in the regional RSA. Six of these occurrence polygons overlap with the habitat study area in the Santa Clara Valley. Suitable habitat for this species is present in the Monterey Corridor, Morgan Hill and Gilroy, Pacheco Pass, and San Joaquin Valley Subsections.

Critical Habitat

The USFWS designated 382,666 acres of critical habitat for the central California population of California tiger salamander on August 10, 2004 (69 Fed. Reg. 48570); this designation was revised to 199,109 acres in 19 California counties on August 23, 2005 (70 Fed. Reg. 49380). The PCEs of critical habitat for the central California population of California tiger salamander are summarized as follows:

1. ***Aquatic Breeding Habitat.*** Standing bodies of freshwater ponds, vernal pools, and other ephemeral or permanent waterbodies that typically support inundation during winter rains and hold water for a minimum of 12 weeks in a year of average rainfall.
2. ***Upland Habitat.*** Upland habitats adjacent and accessible to and from breeding ponds that contain small mammal burrows or other underground habitat for California tiger salamanders.
3. ***Dispersal Habitat.*** Accessible upland dispersal habitat between occupied locations that allow for movement between such sites.

Designated critical habitat for the central California population of California tiger salamander is present in the Morgan Hill and Gilroy Subsection). Specifically, the Lions Peak Unit (Bay Area Geographic Region Units 10a and 10b) overlaps a portion of the PG&E Spring to Llagas and Green Valley to Llagas 115-kV power lines that would be reconducted and the San Felipe Unit (Bay Area Geographic Region Unit 12) overlaps with Tunnel 1. Both units contain all three PCEs of critical habitat for the species (70 CFR 49401).

Foothill Yellow-Legged Frog

Foothill yellow-legged frog is a California species of special concern, a candidate for state listing as threatened under the CESA, and “under review” for federal listing under the FESA. Historically, foothill yellow-legged frogs occurred in foothill and mountain streams east of the Sierra-Cascade crest from the Willamette River drainage in Oregon to at least the San Gabriel River drainage in Los Angeles County, California. Extirpations in southern California and northern Oregon have resulted in its current range being much reduced from its historical extent (Authority 2019).

Foothill yellow-legged frogs occur in streams and require shallow, flowing water with at least some cobble-sized substrate. Breeding and egg deposition occur at the margins of relatively wide and shallow channel sections with stable flow conditions. Egg masses are attached in low-flow locations behind and sometimes under rocks. High-quality breeding areas are often used over multiple years. Young frogs use a variety of stream areas, including riffles, pools, and glides (reaches intermediate between riffles and pools) depending on the life stage and season. Less is known about terrestrial habitat use, although several studies have documented adults moving into tributaries and adjacent uplands after flooding events and during the winter (Authority 2019).

The primary threats to and likely causes of foothill yellow-legged frog decline are human activities that alter natural hydrologic regimes of streams and rivers, such as dams for hydroelectric power generation, water storage, and water delivery. Other potential threats include riparian habitat loss and degradation due to urbanization and agriculture, pesticides, disease, and invasive species (Authority 2019).

Foothill yellow-legged frog occurrences in the regional RSA are associated with streams in the Diablo Range and Santa Cruz Mountains. There are 12 CNDDDB specific extant occurrence polygons in the regional RSA. None of these occurrence polygons overlap with the habitat study area. Suitable habitat for this species is present in the Monterey Corridor, Morgan Hill and Gilroy, and Pacheco Pass Subsections.

Blunt-Nosed Leopard Lizard

The blunt-nosed leopard lizard (*Gambelia sila*) is listed as endangered under the FESA and CESA. This species is also a fully protected species under California Fish and Game Code Section 5050. Blunt-nosed leopard lizards are endemic to the San Joaquin Valley and the Carrizo Plain in California. Historically, this species was found from Stanislaus County in the north to the Tehachapi Mountains in Kern County in the south. The foothills of the Sierra Nevada and Coast Ranges roughly define the eastern and western boundaries of its distribution, except for populations on the Carrizo Plain and in the Cuyama Valley west of the San Joaquin Valley. Blunt-nosed leopard lizard occurs at elevations below 2,600 feet (Authority 2019).

Blunt-nosed leopard lizard is an arid-adapted species. It occurs in sparsely vegetated plains, alkali flats, grasslands, low foothills, canyon floors, and large washes with sandy soils and scattered vegetation, and is usually absent from areas with dense vegetation. On the floor of the San Joaquin Valley, they typically occur in grassland, valley sink scrub, alkali playa, and valley saltbush scrub. Blunt-nosed leopard lizards use small rodent burrows for shelter, predator avoidance, and behavioral thermoregulation. These burrows may be abandoned ground squirrel tunnels, or occupied or abandoned kangaroo rat tunnels (Authority 2019).

The primary threat to blunt-nosed leopard lizard is habitat loss and alteration due to urbanization and agriculture. Although incremental habitat loss from urbanization appears to be increasing, conversion of natural habitat to agriculture poses more of a threat to this species. Additional activities that remove or degrade habitat and cause direct mortality include oil and gas exploration, construction of water banking facilities (to provide and secure water supplies for continued urban and rural use), and construction of solar power facilities (Authority 2019).

Blunt-nosed leopard lizard occurrences in the regional RSA are associated with annual grassland in the Diablo Range foothills south of SR 152 and west of I-5. There are four CNDDDB specific extant occurrence polygons in the regional RSA. None of these occurrence polygons overlap with the habitat study area. Suitable habitat for this species is present in the habitat study area at the eastern end of the Pacheco Pass Subsection.

Giant Garter Snake

Giant garter snake (*Thamnophis gigas*) is listed as threatened under the FESA and CESA. It occurs in the Central Valley from Fresno County in the south to Butte County in the north. Though giant garter snake abundance in the Sacramento Valley has declined, its distribution in the northern part of its range may still reflect its historical distribution. Conversely, giant garter snakes

in the San Joaquin Valley have suffered an extensive reduction in abundance and distribution compared to historical times (Authority 2019).

Giant garter snakes inhabit marshes, ponds, sloughs, small lakes, low-gradient streams and other waterways, agricultural wetlands (including irrigation and drainage canals and rice fields), and adjacent uplands. There are three habitat components that appear to be most important to giant garter snake activities: (1) a freshwater aquatic component with protective emergent vegetation cover that allows foraging, (2) an upland component near aquatic habitat that can be used for thermoregulation and summer shelter in burrows, and (3) an upland refugia component that serves as winter hibernacula. The characteristics of active-season (April 1–October 1) upland habitat include: (1) proximity to aquatic habitat (individuals found up to 164 feet from suitable aquatic habitat); (2) availability of bankside vegetative cover (typically tule [*Scirpus* sp.] or cattail [*Typha* sp.]; and (3) presence of bankside cracks, crevices, holes, or small mammal burrows (for refugia). During the winter inactive season (October 1–April 1), giant garter snakes spend time in a lethargic state in refugia such as small mammal burrows or roadside riprap. Giant garter snakes have been found overwintering up 820 feet from summer aquatic habitat. A 17-year (1995–2011) study of giant garter snake upland habitat use in the Sacramento Valley found that snakes occurred in terrestrial habitat (i.e., away from water) more than half the time, and almost exclusively in terrestrial habitat during winter. The odds of giant garter snakes being in terrestrial habitat were higher earlier in the day than later in the day (Authority 2019).

At the time of listing in 1993, habitat loss from urbanization and conversion of wetlands was recognized as the primary threat to giant garter snake. Today, habitat loss and fragmentation due to urbanization and changes in the levels of rice production are the largest threats to giant garter snake. Additional threats include changes in water availability for aquatic habitat; levee and canal maintenance that can injure or kill snakes; water management and water delivery that do not account for giant garter snake; water transfers that reduce aquatic habitat; small populations that are vulnerable to extirpation from random, unpredictable environmental, genetic, and demographic events; and invasive aquatic species that may prey on (e.g., introduced game fish, bullfrogs) or outcompete (southern water snake [*Nerodia fasciata*]) giant garter snakes (Authority 2019).

Giant garter snake occurrences in the regional RSA are associated with freshwater marsh in the San Joaquin Valley. There are eight CNDDDB specific extant occurrence polygons in the regional RSA. Two of these occurrence polygons overlap with the habitat study area at the GEA (CNDDDB occurrence nos. 23 and 161). Suitable habitat for this species is present in the habitat study area for the San Joaquin Valley Subsection.

Bald Eagle

Bald eagle (*Haliaeetus leucocephalus*) is listed as endangered under the CESA. It is also a fully protected species under Section 3511 of the California Fish and Game Code and protected under the federal BGEPA. Bald eagles nest primarily in mountainous habitats near reservoirs, lakes, and rivers mainly in the northern two-thirds of the state, in the Coast Ranges, and on Santa Catalina Island (Authority 2019).

Bald eagles nest on a variety of natural structures, including projections or ledges on cliffs, trees protruding from cliffs, deciduous trees lining river courses, and several conifer species found along or near major waterbodies (Authority 2019). Snags and dead-topped live trees are important for perch and roost sites. Bald eagles winter along rivers, lakes, and reservoirs that support adequate fish or waterfowl and have mature trees or large snags available for perch sites. Bald eagles often roost communally during the winter, typically in a stand of mature trees with an open branching structure and well-developed canopies. Winter roost areas are usually isolated from human disturbance.

The most significant threat to survival of the bald eagle in the 20th century was the widespread use of the pesticide DDT in the decades after World War II, which caused abnormalities in bald eagle eggshells, resulting in widespread nesting failures. Other threats have included habitat modification from road, housing, and other developments; agriculture; timber harvest; pesticides

and contaminants, including lead poisoning; off-road vehicles and other human disturbances; electrocution and collision at power lines; and shooting (Authority 2019).

Bald eagle occurrences in the regional RSA are associated with known nest occurrences or winter roost sites near reservoirs in Alameda (Del Valle) and Merced County, including San Luis Reservoir (Authority 2019). There are five CNDDDB specific extant occurrence polygons in the regional RSA. None of these occurrence polygons overlap with the habitat study area, but the San Luis Reservoir nest (CNDDDB occurrence no. 365) is located approximately 2.9 miles west of the project footprint for the eastern tunnel portal north of San Luis Reservoir. Suitable habitat for this species is present in the habitat study area for the Morgan Hill and Gilroy and Pacheco Pass Subsections.

California Condor

The California condor (*Gymnogyps californianus*) is listed as endangered under the FESA and CESA and is also a state fully protected species. California condors are permanent residents of semi-arid mountain and foothill ranges along the southern San Joaquin Valley, the Coast Ranges from Santa Clara County south to Los Angeles County, the Transverse Ranges, Tehachapi Mountains, and southern Sierra Nevada. Breeding adults remain near nesting areas throughout the year, while nonbreeding individuals seasonally move north to foraging and roosting grounds in Kern and Tulare Counties in spring and return south in the fall to winter in the Tehachapi Mountains, Mt. Pinos, and Ventura and Santa Barbara Counties. The species nests within the southern part of their range, along the Coast and Transverse Ranges of Ventura and Santa Barbara Counties (Authority 2019).

California condors require large areas of open savannah, grasslands, and foothill chaparral, with cliffs, large trees, and snags for roosting and nesting. Condors forage over wide areas of open rangelands and have been documented to travel over 35 miles from roost to feeding site (Authority 2019). Condors are strictly scavenging species that feed on carrion, including cattle, sheep, deer, and small mammals. Condors roost sites consists of cliffs, ledges, large snags, and old-growth Douglas-fir and ponderosa pine trees. Nest sites are in caves, on crevices, behind rock slabs, or on large ledges of high cliffs, and are generally hidden by dense brush. A nest structure is not constructed, and eggs are laid on bare scrapes.

Historically, condors were widespread in western North America, but by the early 1980s, the condor populations dropped to approximately 23 birds worldwide. By 1987, all wild individuals were captured and placed into a captive breeding program. Reintroductions of captive breed individuals began in the early 1990s; as of 2016, there were 276 California condor in the wild, with the majority of wild condors residing in central California. In recent decades the greatest threat to California condor is associated with lead contamination primarily by ingesting lead shots or fragments of lead bullets when feeding on carcasses. Ingestion of microtrash, eggshell thinning, avian diseases such as West Nile virus and avian influenza, and habitat modification from human encroachment on foraging, roosting, and nesting habitat have also been identified as threats to the recovery of the species (Authority 2019).

Telemetry data from September 2017 to December 2018 show that condors occasionally fly over the Diablo Range at the eastern end of the Morgan Hill and Gilroy Subsection and the Pacheco Pass Subsection. These individuals likely belong to the population at Pinnacles National Park, where condors were reintroduced in 2003 (Authority 2019). Habitat was not modeled for this species because any natural cover types in the Diablo Range could theoretically be used for foraging.

Sandhill Crane (Greater and Lesser)

California's Central Valley is an important wintering region for both the Central Valley population of greater sandhill crane (*Antigone canadensis tabida*), which is listed as threatened under the CESA and is a state fully protected species, and the Pacific Flyway population of lesser sandhill crane (*A. c. canadensis*), which is a California species of special concern. Greater sandhill cranes breed in Siskiyou, Modoc and Lassen Counties, and in the Sierra Valley in Plumas and Sierra Counties. Lesser sandhill cranes do not breed in California. Both subspecies winter primarily in

the Central Valley from Tehama County south to Kings County. The southern extreme of the winter range for greater sandhill cranes is the Pixley National Wildlife Refuge northwest of Delano. Lesser sandhill cranes winter primarily in the San Joaquin Valley and on the San Joaquin River Delta; Merced is thought to be the most important wintering area for this subspecies in the Central Valley (Authority 2019).

Sandhill cranes use large and small areas of open habitat with few trees; wet meadows, marshes, shallow ponds, hayfields, and grain fields provide nesting, foraging, and roosting habitat. Sandhill cranes forage in short, open annual and perennial grasslands, moist croplands with rice or corn stubble, and in open emergent wetlands. They feed on a wide variety of plant tubers, grains, small mice and snakes, and invertebrates. Most roosting flocks stand in moist fields or shallow water, but may also use expansive, dry grasslands, island sites, and in sandbars. A study in the Sacramento-San Joaquin River Delta found that, on average, greater sandhill cranes flew shorter distances from roost sites to foraging areas than lesser sandhill cranes (1.2 ± 0.4 vs. 3.1 ± 0.1 kilometers, respectively) (Authority 2019).

The primary threat to sandhill cranes on both wintering and breeding grounds is habitat loss. The majority of the state's breeding population of greater sandhill cranes occur on private agricultural lands. Breeding and wintering sandhill cranes are dependent on certain agricultural practices and cropping pattern that are compatible with their foraging and nonforaging needs. The potential conversion of private agricultural lands, meadow and marsh habitat to cereal grain or alfalfa crops is a significant threat to the cranes. Other threats include predation, marsh drainage, increased human presence, and collision with power lines (Authority 2019).

There are no sandhill crane CNDDB occurrences in the regional RSA. eBird shows multiple locations along Henry Miller Avenue between Volta and Carlucci Road (San Joaquin Valley Subsection) where sandhill cranes have been observed, however, mostly within the GEA. High counts include 453 between Johnson Road and Nantes Avenue on February 14, 2015, and 425 between Box Car Road and Turner Island Road on December 26, 2014 (Authority 2019). Although the eBird checklists do not differentiate between lesser and greater sandhill cranes, it is likely that at least some of the observed birds belong to the "greater" subspecies. Suitable habitat for this species is present in the San Joaquin Valley Subsection.

Least Bell's Vireo

Least Bell's vireo (*Vireo bellii pusillus*) is listed as endangered under the FESA and CESA. It is a neotropical migrant songbird that breeds from central California to northern Baja California, and winters in southern Baja California. Over 99 percent of least Bell's vireos in California occur in southern California (from Santa Barbara County southward). In 2005, a pair of least Bell's vireo successfully bred in the San Joaquin Wildlife Refuge. This was the first recorded least Bell's vireo occurrence in the San Joaquin Valley since the species was listed (Authority 2019). There also have been incidental occurrences in Santa Clara and San Benito Counties.

Bell's vireos primarily occur in early successional (5–10 years old) riparian scrub and woodlands with a developed canopy layer and dense shrubs, but least Bell's vireos can use any age riparian habitat if such an understory is present. The most critical structural component of nesting habitat in California is a dense shrub layer 2–10 feet aboveground. A structurally diverse canopy for foraging is also very important; least Bell's vireo has been found to have a preference for foraging within the 10–20 foot zone. Male territory size has been found to range from 0.5 to 7.5 acres and nests are typically found on active floodplains within 0.19 mile (984 feet) of water (Authority 2019).

Like many riparian-breeding songbirds, extensive loss of breeding habitat and brood parasitism by brown-headed cowbirds (*Molothrus ater*) are the primary threats to the recovery of least Bell's vireo. Populations formerly occurring in the Owens Valley, Death Valley, Sacramento-San Joaquin Valleys and Sierra Nevada foothills, and Tehama County have been completely extirpated, and large portions of these areas are no longer available for recolonization or expansion (Authority 2019).

Least Bell's vireos occurrences in the regional RSA are associated with riparian land cover types in the Santa Clara and San Joaquin Valleys. There are four CNDDB specific extant occurrence

polygons in the regional RSA. One of these occurrence polygons overlaps with the habitat study area near Gilroy (CNDDDB occurrence no. 198). The CNDDDB maps this occurrence as an approximately 3.4-mile reach of Llagas Creek between SR 152 and the Pajaro River where individuals were detected in June 1997 and May 2001. The exact location of the detected individuals is not specified in CNDDDB. Suitable habitat for this species is present in all five subsections.

Swainson's Hawk

Swainson's hawk (*Buteo swainsoni*) is listed as threatened under the CESA. In California, Swainson's hawk is known to breed in the Central Valley, Klamath Basin, Northeastern Plateau, Lassen County, and Mojave Desert with limited breeding in the south. The majority of the state's breeding sites occur in two disjunct populations in the Great Basin and Central Valley; however, the state's primary breeding population is within the Central Valley from Sacramento south to Modesto, particularly along riparian systems in Sacramento, Sutter, Yolo, and San Joaquin Counties. The species winters in South America and Central America (Authority 2019).

Swainson's hawks that breed in California's Central Valley are associated with agricultural and riparian land cover types. The suitability of a given tree for nesting depends on its proximity to foraging habitat. Typical nest sites in the Central Valley are located in riparian forest and oak woodland, as well as isolated trees or small groves of trees in grassland or cropland. Both native and nonnative ornamental trees (e.g., eucalyptus) are used for nesting. Foraging habitat includes open agricultural fields and pastures. Preferred crop types used by foraging Swainson's hawks include alfalfa fields, fallow fields, low-growing row or field crops, rice fields during the nonflooded period, and cereal grain crops (Authority 2019), due to their high abundance of prey.

Formerly abundant in California with a wider breeding range, the Swainson's hawk population decline has been attributed in part to loss of native nesting habitat and foraging habitat (Authority 2019). Habitat loss (e.g., removal of suitable nest trees from riparian habitat due to flood control practices, conversion of agricultural lands to urban development or incompatible crops) is the primary threat to this species. Other threats include pesticide poisoning, shooting, disturbance to nest sites, and loss of wintering habitat in South and Central America.

Swainson's hawk occurrences in the regional RSA are associated with agricultural and riparian land cover in the San Joaquin Valley, and in the Morgan Hill and Gilroy subsection. There are 98 CNDDDB specific extant occurrence polygons in the regional RSA. Three of these occurrence polygons overlap with the habitat study area: one in the Morgan Hill and Gilroy Subsection (CNDDDB occurrence no. 2667) (Authority 2019) and two in the San Joaquin Valley Subsection (CNDDDB occurrence nos. 972 and 1750). In addition, biologists observed an active nest (incubating adult) in a tree row adjacent to and west of I-5 during the May 4, 2016 reconnaissance field survey. Suitable habitat for this species is present in the Monterey Corridor, Morgan Hill and Gilroy, Pacheco Pass, and San Joaquin Valley Subsections.

Tricolored Blackbird

Tricolored blackbird (*Agelaius tricolor*) is currently "under review" for federal listing under the FESA and a state candidate for listing under the CESA. It is also a state species of special concern. Tricolored blackbirds are largely endemic to California, with more than 99 percent of the global population occurring in the state. Breeding tricolored blackbirds occur in four general areas of the state: the Central Valley, the central coast, the Sierra Nevada foothills, and southern California. Breeding has occurred historically in all counties of the regional RSA: Santa Clara, San Benito, Madera, Merced, Stanislaus, and San Joaquin; however, Madera, Merced, and Stanislaus Counties are those with the greatest number of consistently breeding birds (Authority 2019).

Tricolored blackbirds nest in colonies, primarily in freshwater marshes dominated by dense stands of emergent vegetation such as cattails and bulrushes, but they also nest in willows, blackberries (*Rubus* spp.), thistles (*Cirsium*, *Silybum*, and *Centaurea* spp.), and nettles (*Urtica* spp.). A portion of the population, particularly in the San Joaquin Valley, now typically nests in agricultural fields of crops such as triticale, a wheat-rye hybrid grain. Tricolored blackbird individuals exhibit low breeding site fidelity (they do not typically return to the same colony each

year). However, colonies may be established in the same location over multiple years if they continue to provide essential resources. Tricolored blackbirds forage primarily in grassland, open cultivated land, and pastures, but also at dairies and feedlots. Tricolored blackbirds are known to forage within approximately 3 miles from active breeding colonies. In the winter, tricolored blackbirds are widely dispersed in the San Joaquin Valley, foraging in grassland and agricultural fields with low-growing vegetation and at dairies and feedlots (Authority 2019).

The primary threat to tricolored blackbird is habitat loss and degradation due to human activities. Entire colonies in cereal crops and silage in the Central Valley are often destroyed by agricultural operations. Freshwater marsh colonies have been decimated by predators such as black-crowned night-herons (*Nycticorax nycticorax*), common ravens (*Corvus corax*), and coyote (*Canis latrans*), which are able to access colonies after water levels are lowered by active management. Various herbicide and pesticides have also contributed to reproductive failure of colonies (Authority 2019).

Tricolored blackbird occurrences in the regional RSA are associated with freshwater marshes and ponds in the Santa Clara and San Joaquin Valleys. There are 19 CNDDDB specific extant occurrence polygons in the regional RSA. Six of these occurrence polygons overlap with the habitat study area. Suitable habitat for this species is present in the habitat study area of all five subsections.

Yellow-Headed Blackbird

The yellow-headed blackbird (*Xanthocephalus xanthocephalus*) is a California Species of Special Concern and mainly a summer resident and migrant in California range with small numbers in winter. The yellow-headed blackbird breeds in loose colonies in freshwater wetlands (e.g., marshes) with tall dense emergent vegetation adjacent to deep water, and along borders of lakes or ponds. It places its nest over water, attached to cattails and reeds. It forages in the wetlands and in surrounding grasslands and croplands, while it forages in large flocks in agricultural areas during the winter.

Fresno Kangaroo Rat

Fresno kangaroo rat (*Dipodomys nitratoides exilis*) is a subspecies of San Joaquin kangaroo rat that is listed as endangered under the FESA and CESA. It historically occupied the Tulare Basin and the southeastern half of the San Joaquin Basin in the San Joaquin Valley. There are no known populations of the Fresno kangaroo rat within its historical geographic range in Merced, Madera, and Fresno Counties. However, it may still survive in lands that have not been surveyed or that have been only minimally surveyed. As part of the species habitat modeling effort described in Chapter 4, biologists and agency staff defined the potential range of Fresno kangaroo rat in the regional RSA as follows: Sandy Mush Road as the northern boundary, Highway 99 as the eastern boundary, Highway I-98 south of the Kings River as the southern boundary, and the known maximum elevational limit of the species (300 feet) as the western boundary (Authority 2019).

Fresno kangaroo rat habitat consists of elevated grassy patches on alkali plains or in annual grassland communities with scattered alkali patches on the valley floor up to 300 feet in elevation. Topography of their habitat is generally level, but is associated with slightly elevated hummocks. Fresno kangaroo rats dig and use burrows and therefore require friable soils that are easily excavated (Authority 2019). A variety of agricultural lands contain small inclusions of natural or ruderal vegetation that may be used by Fresno kangaroo rat, particularly where adjacent to occupied habitat. Similarly, idle agricultural land also may be used by Fresno kangaroo rat in some instances.

There are no known Fresno kangaroo rat occurrences in the regional RSA. Suitable habitat for this species is present in the San Joaquin Valley Subsection.

San Joaquin Kit Fox

San Joaquin kit fox (*Vulpes macrotis mutica*) is listed as endangered under the FESA and listed as threatened under the CESA. The historical range of San Joaquin kit fox included most of the

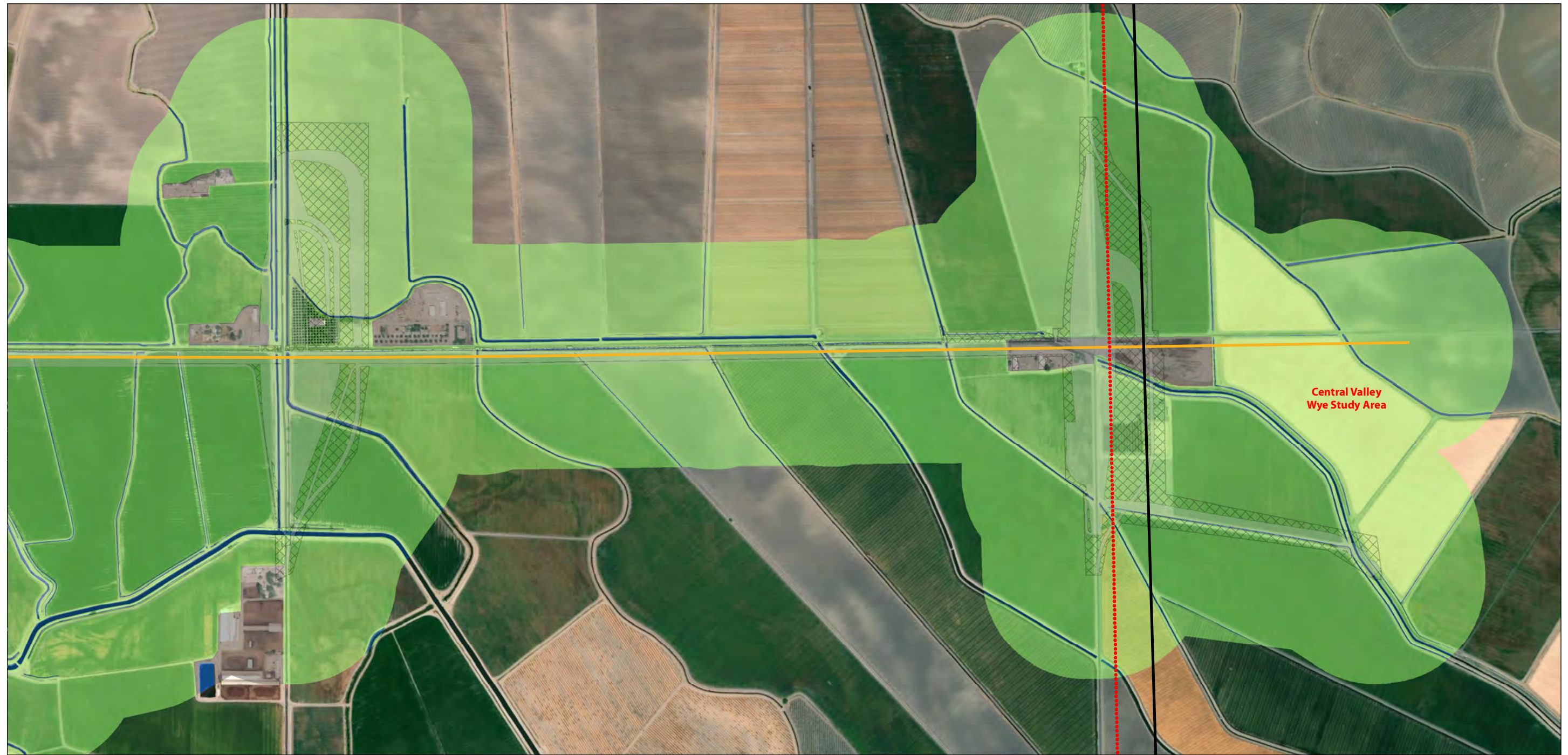
San Joaquin Valley as well as low-elevation basins and ranges along the eastern side of the Coast Ranges. By 1930, this range had been reduced by more than half, with the largest populations occurring in the southern and western portions of the San Joaquin Valley. Today, the San Joaquin kit fox occurs in the remaining valley and foothill grasslands and chenopod scrub communities of the valley floor and surrounding foothills, from southern Kern County north to Los Banos, Merced County. Smaller, less dense populations may be found farther north and in the narrow corridor between I-5 and the Interior Coast Ranges from Los Banos to Contra Costa County. The San Joaquin kit fox's range also includes portions of Monterey, Santa Clara, and San Benito Counties (Authority 2019).

The San Joaquin kit fox uses a variety of land cover types, including grasslands; scrublands; vernal pool areas; alkali meadows and playas; and agricultural row crops, field crops, irrigated pastures, orchards, and vineyards. Kit fox prefer land cover types with loose-textured soils for digging and occur primarily in arid grasslands and open scrublands, but occur on virtually every soil type. Dens generally are located in open areas with grass or grass and scattered brush, and seldom occur in areas with thick brush. Preferred sites are relatively flat, well-drained terrain. They are seldom found in areas with shallow soils resulting from high water tables or impenetrable bedrock or hardpan layers. However, kit fox may occupy soils with high clay content where they can modify burrows dug by other animals, such as ground squirrels. San Joaquin kit fox also use some developed areas such as oil exploration and extraction equipment and wind turbines; they also occur in urban areas, including Bakersfield (Authority 2019).

San Joaquin kit fox occurrences in the regional RSA are associated with grassland, oak woodland, and agricultural land cover types in the Santa Clara Valley, Diablo Range, and San Joaquin Valley. There are 71 CNDDDB specific extant occurrence polygons in the regional RSA. None of these occurrence polygons overlap with the habitat study area. Suitable habitat for this species is based on the model prepared by the California State University, Stanislaus' Endangered Species Recovery Program (Authority 2019) and is present in the Morgan Hill and Gilroy, Pacheco Pass, and San Joaquin Valley Subsections.

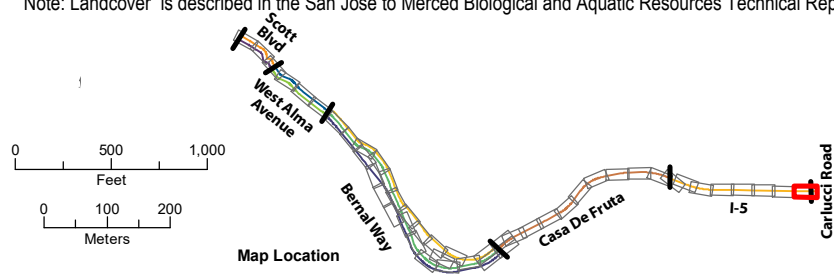
REFERENCES

California High Speed Rail Authority. 2019. *San Jose to Merced Project Section Biological and Aquatic Resources Technical Report*.



Source: Imagery Eagle Aerial 2017; ICF Compiled

Note: Landcover is described in the San Jose to Merced Biological and Aquatic Resources Technical Report.



HSR Alignment

Henry Miller Road

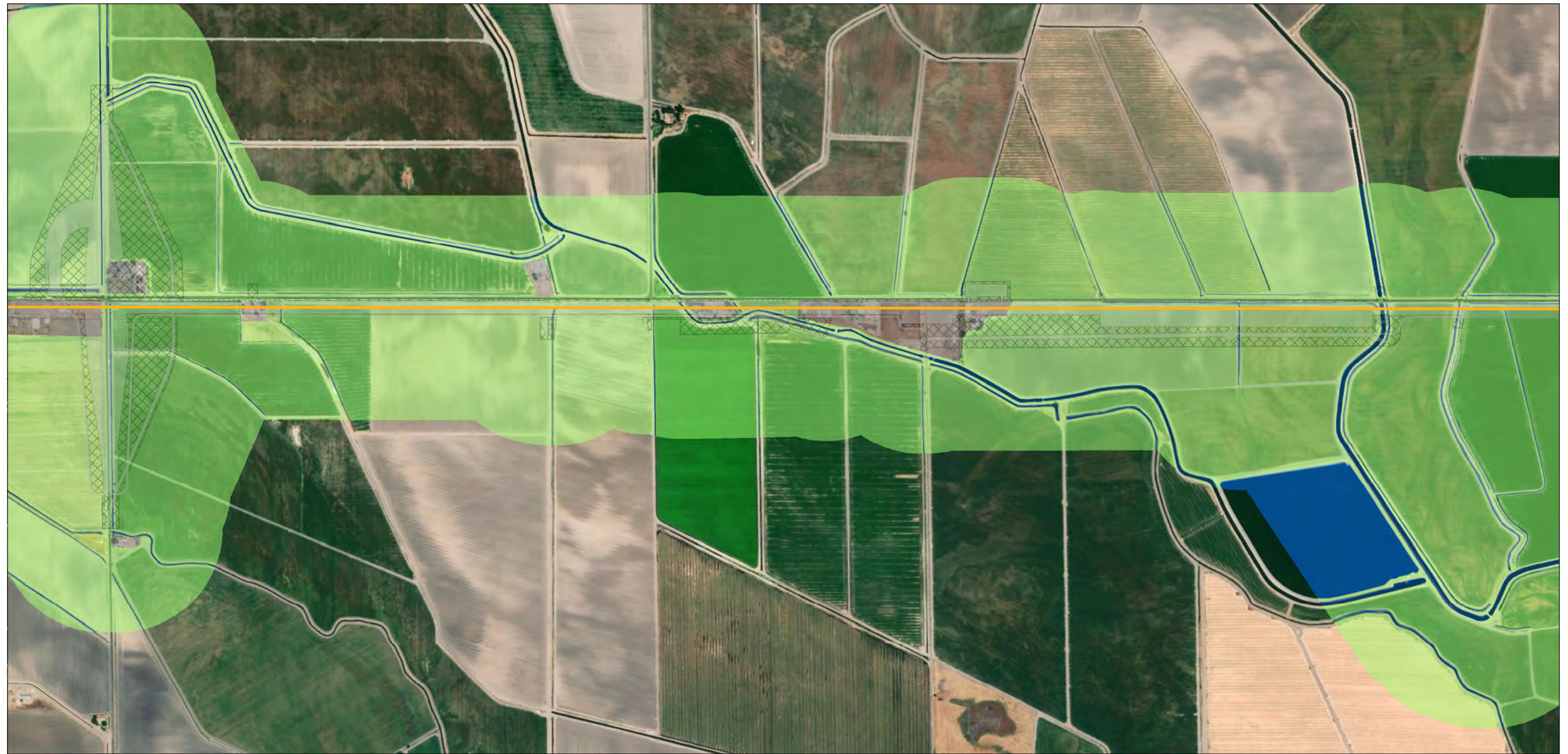
Footprint Impact Type

Permanent-Surface
Temporary

Agriculture
Commercial/Industrial

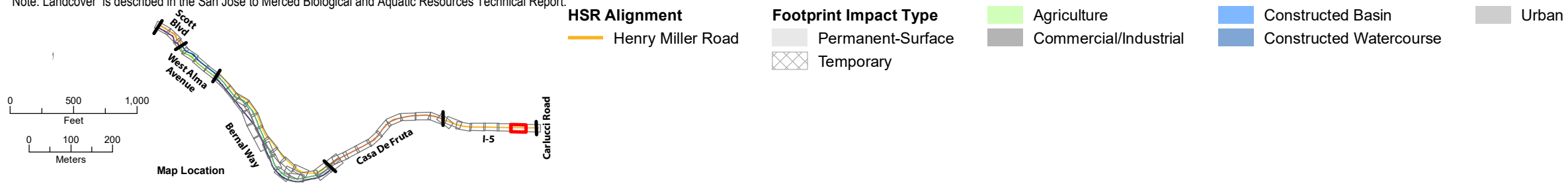
Constructed Basin
Constructed Watercourse

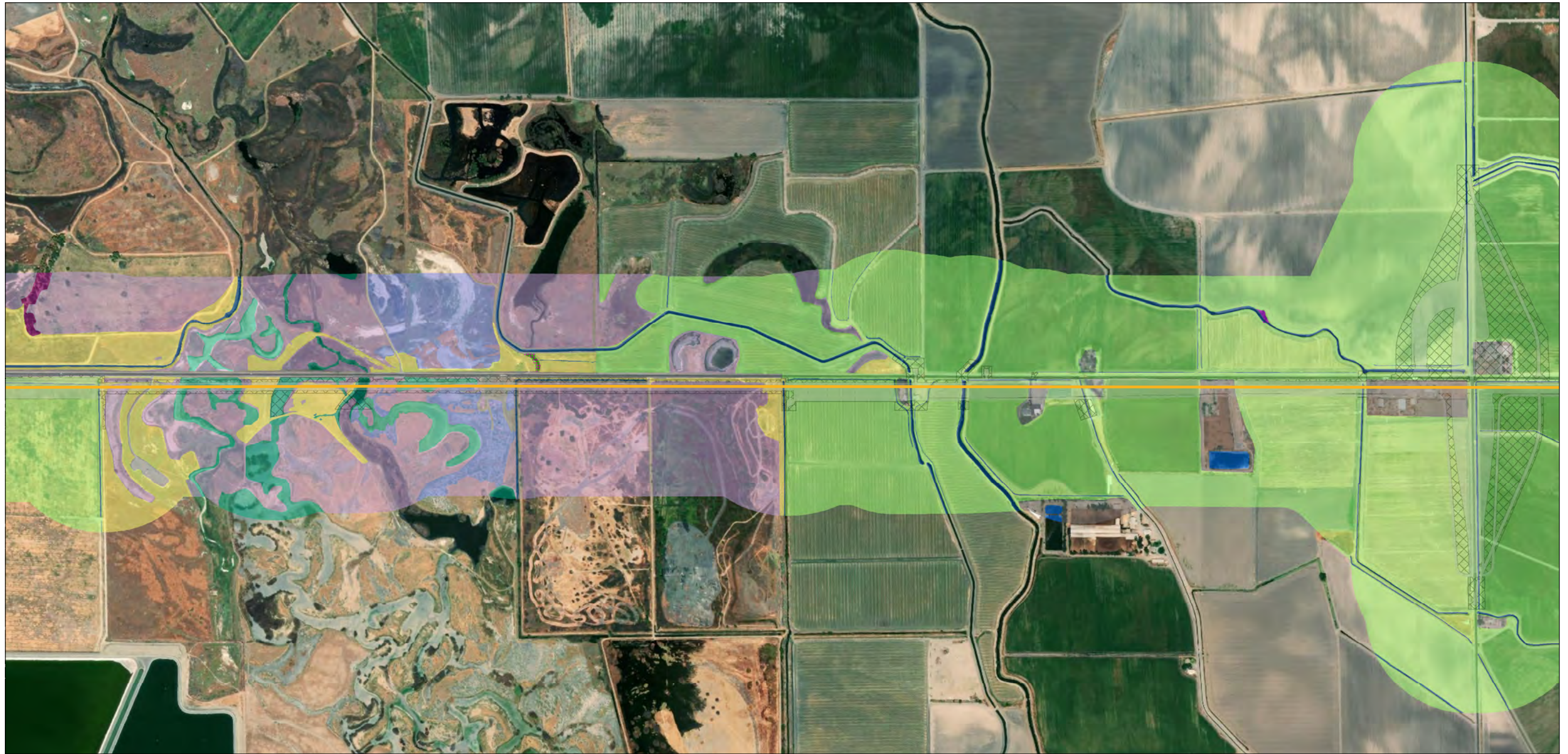
Orchard
Urban



Source: Imagery Eagle Aerial 2017; ICF Compiled

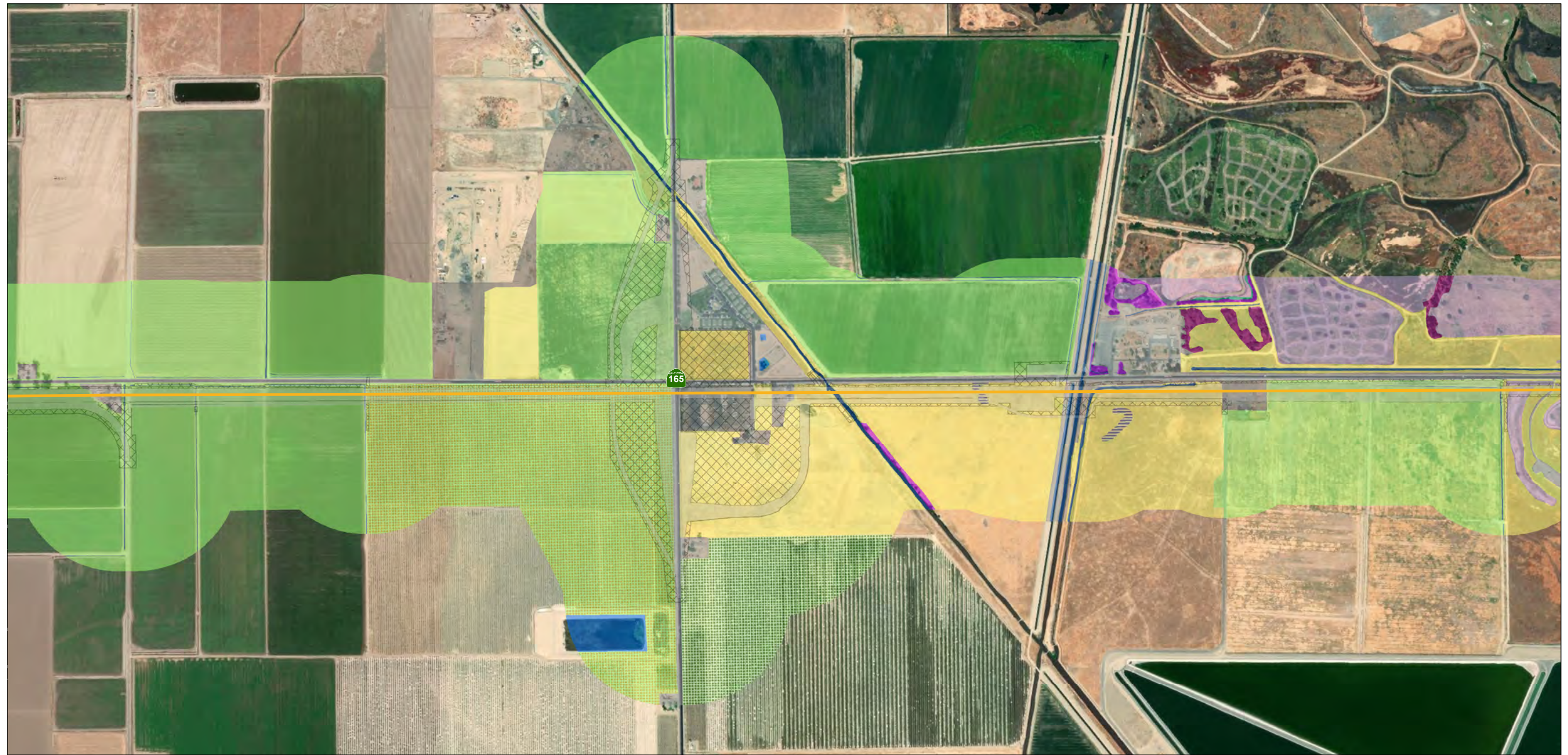
Note: Landcover is described in the San Jose to Merced Biological and Aquatic Resources Technical Report.





Source: Imagery Eagle Aerial 2017; ICF Compiled
 Note: Landcover is described in the San Jose to Merced Biological and Aquatic Resources Technical Report.

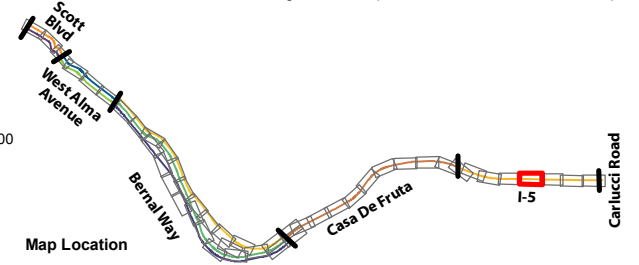
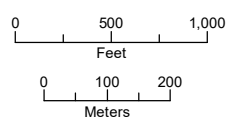
<p>Map Location</p>	<p>HSR Alignment</p> <p>— Henry Miller Road</p>	<p>Footprint Impact Type</p> <p>— Permanent-Surface</p> <p>⊠ Temporary</p>	<p>— Agriculture</p> <p>— Alkali Marsh</p> <p>— Alkali Scrub Wetland</p> <p>— Alkali Vernal Pool</p> <p>— California Annual Grassland</p>	<p>— Commercial/Industrial</p> <p>— Constructed Basin</p> <p>— Constructed Watercourse</p> <p>— Freshwater Pond</p> <p>— Mixed Riparian</p>	<p>— Natural Watercourse</p> <p>— Palustrine Forested Wetland</p> <p>— Seasonal Wetland</p> <p>— Urban</p>
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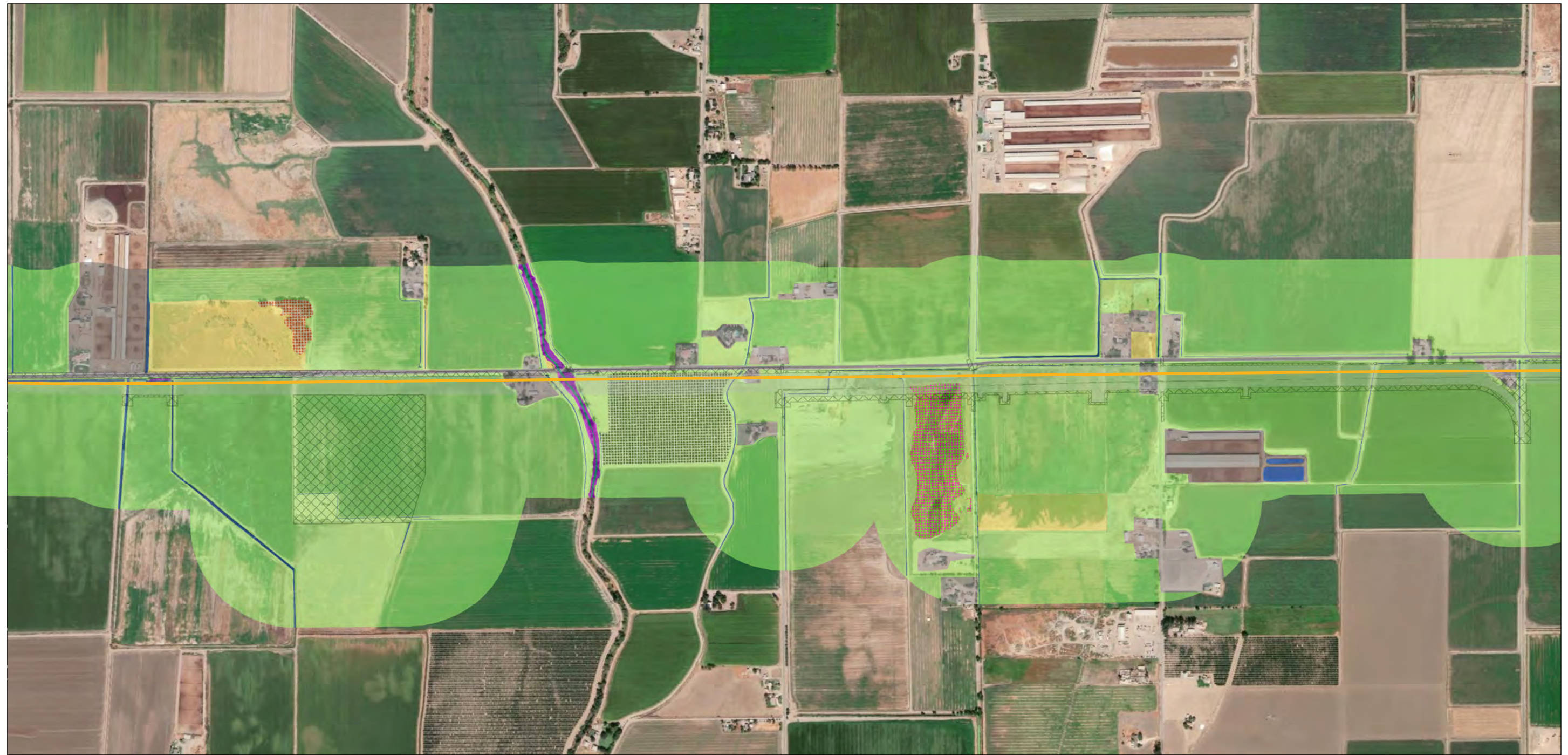


Source: Imagery Eagle Aerial 2017; ICF Compiled

Note: Landcover is described in the San Jose to Merced Biological and Aquatic Resources Technical Report.

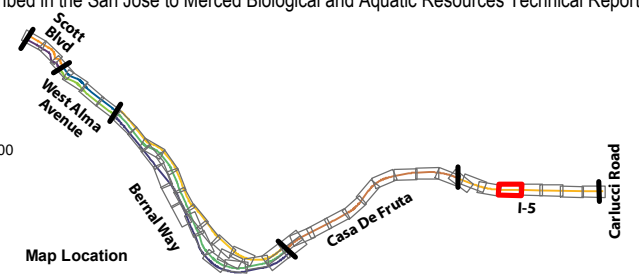
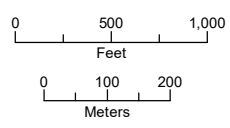
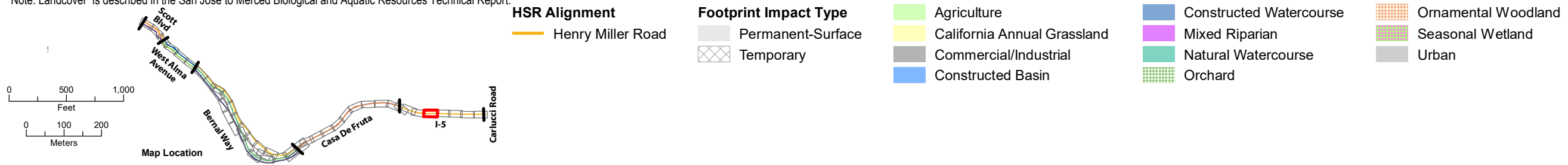
<p>HSR Alignment</p> <p>Henry Miller Road</p>	<p>Footprint Impact Type</p> <p>Permanent-Surface</p> <p>Temporary</p>	<p>Agriculture</p>	<p>Constructed Basin</p>	<p>Orchard</p>
		<p>Alkali Marsh</p>	<p>Constructed Watercourse</p>	<p>Palustrine Forested Wetland</p>
		<p>California Annual Grassland</p>	<p>Mixed Riparian</p>	<p>Urban</p>
		<p>Commercial/Industrial</p>	<p>Natural Watercourse</p>	<p>Vernal Pools</p>
				<p>Vineyard</p>

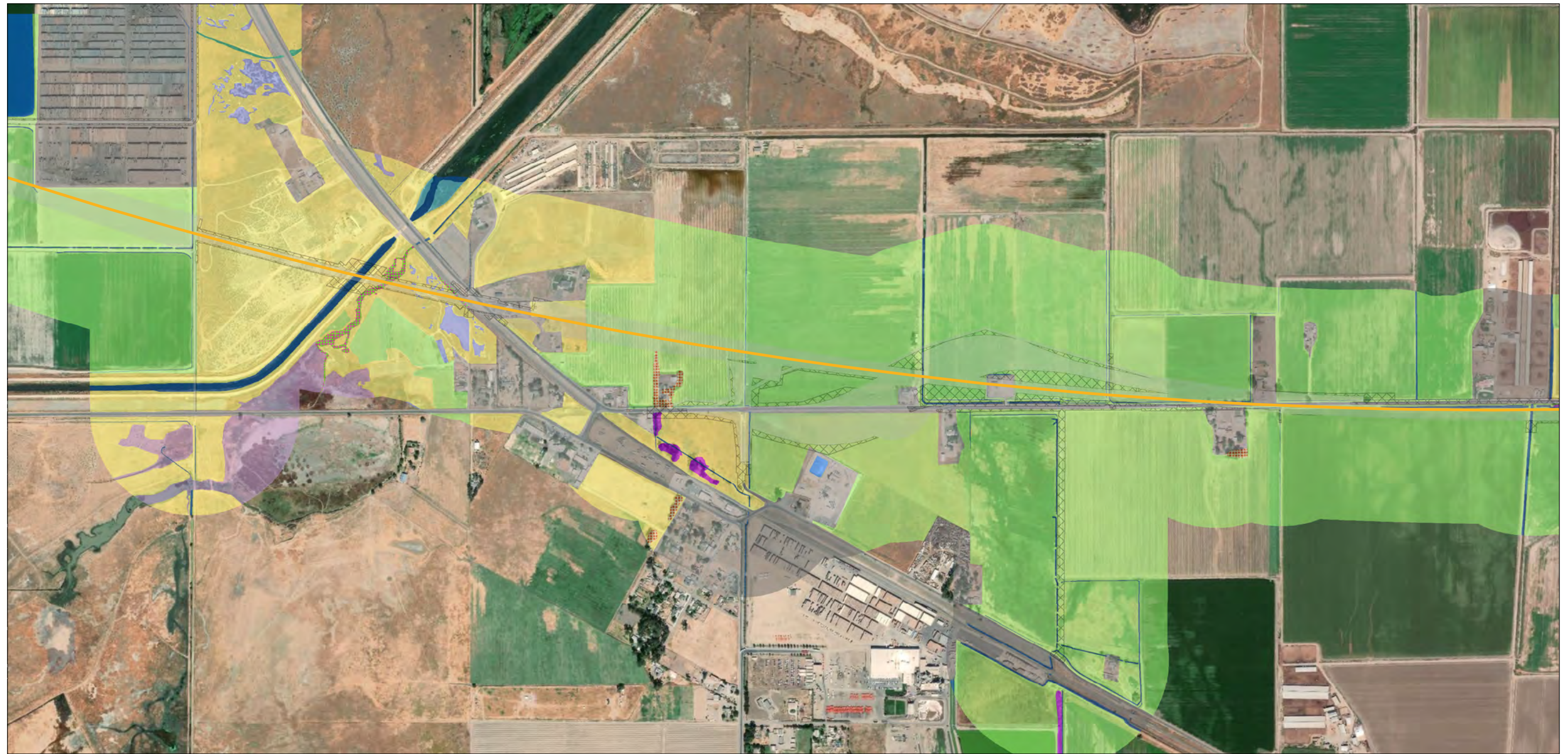




Source: Imagery Eagle Aerial 2017; ICF Compiled

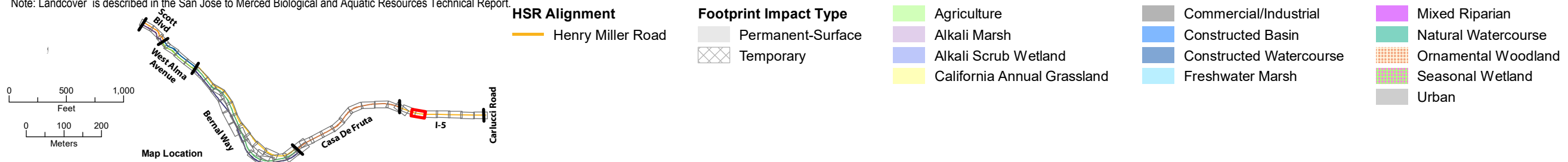
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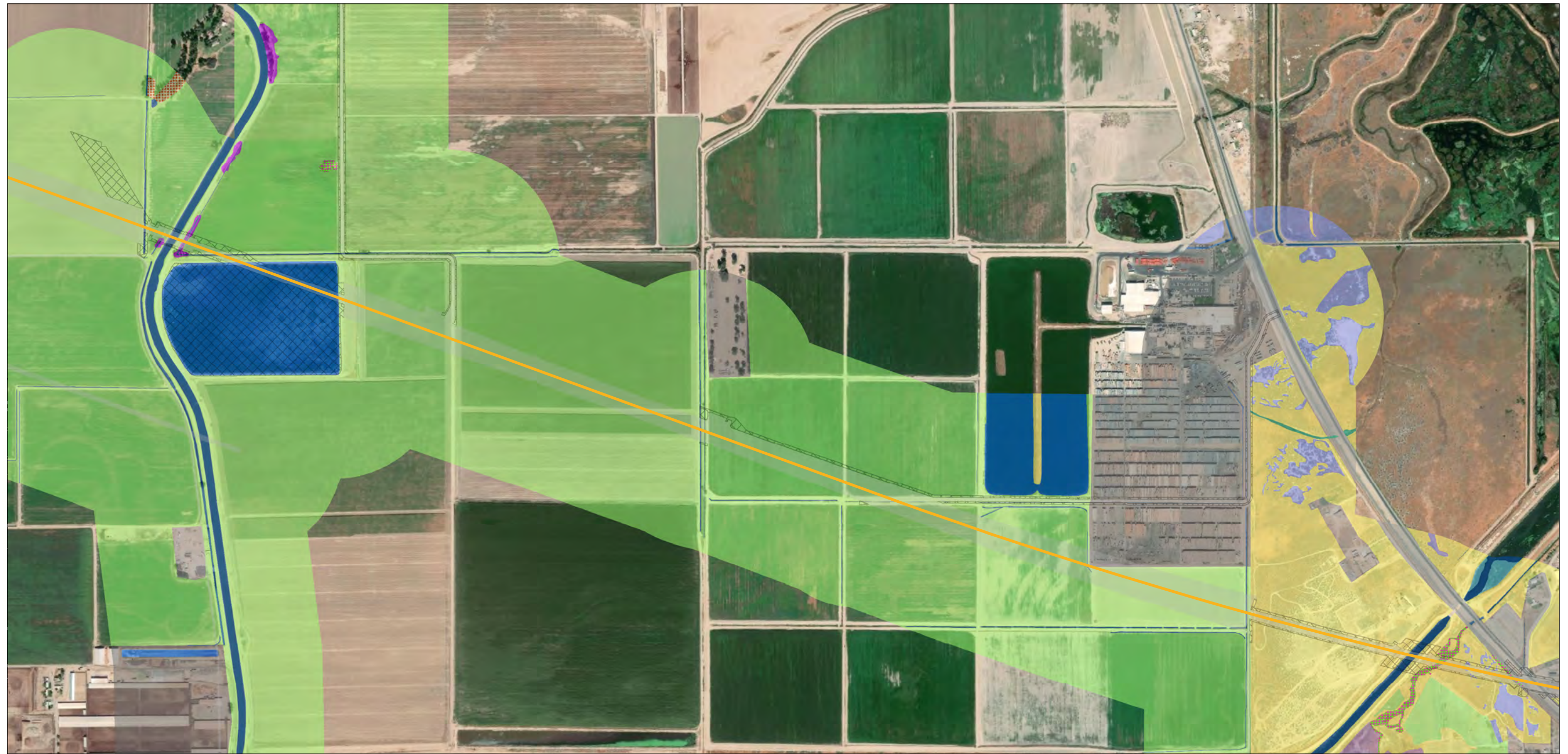




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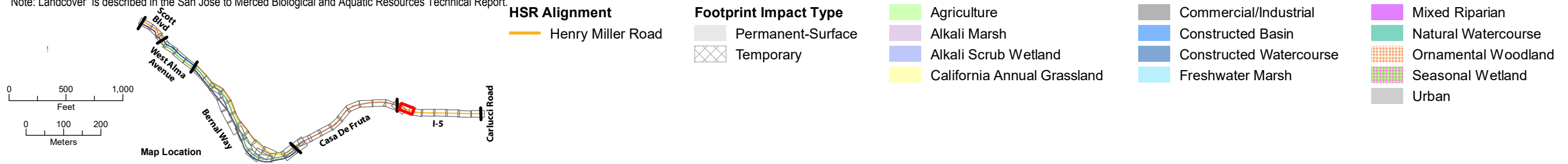
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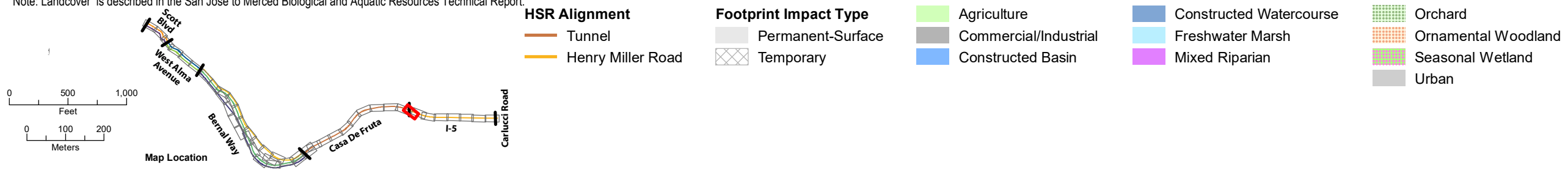
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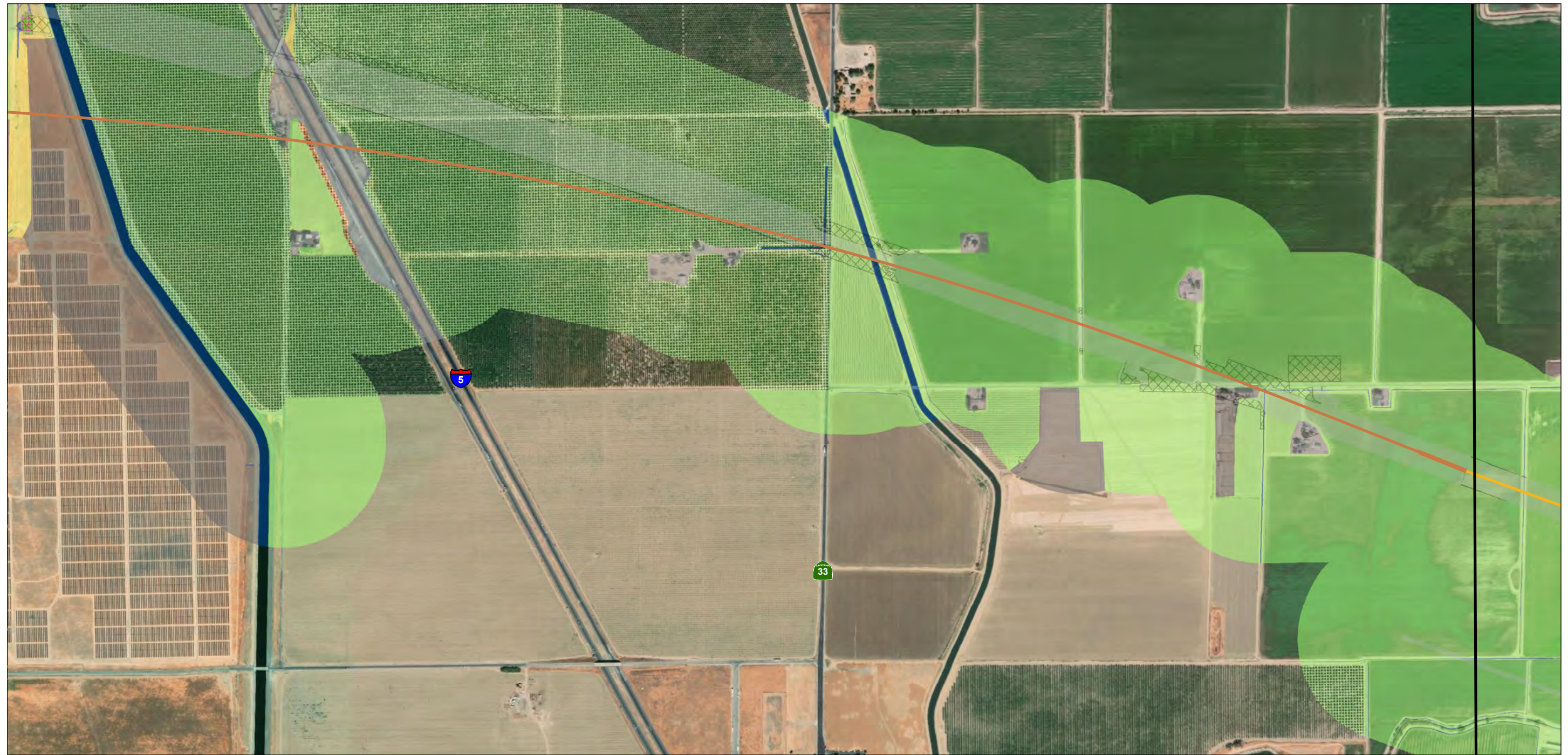




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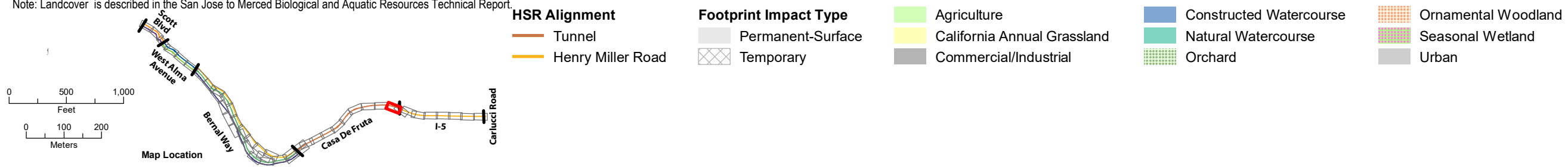
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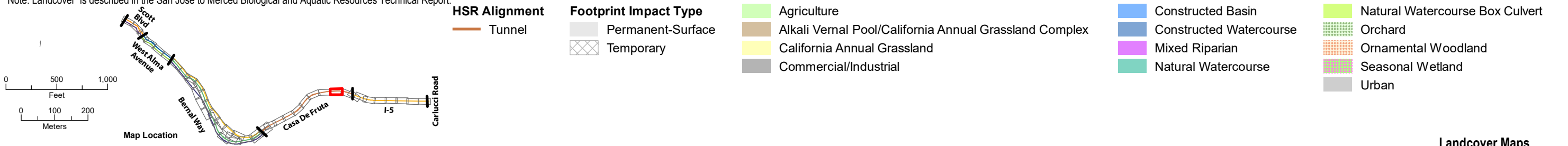
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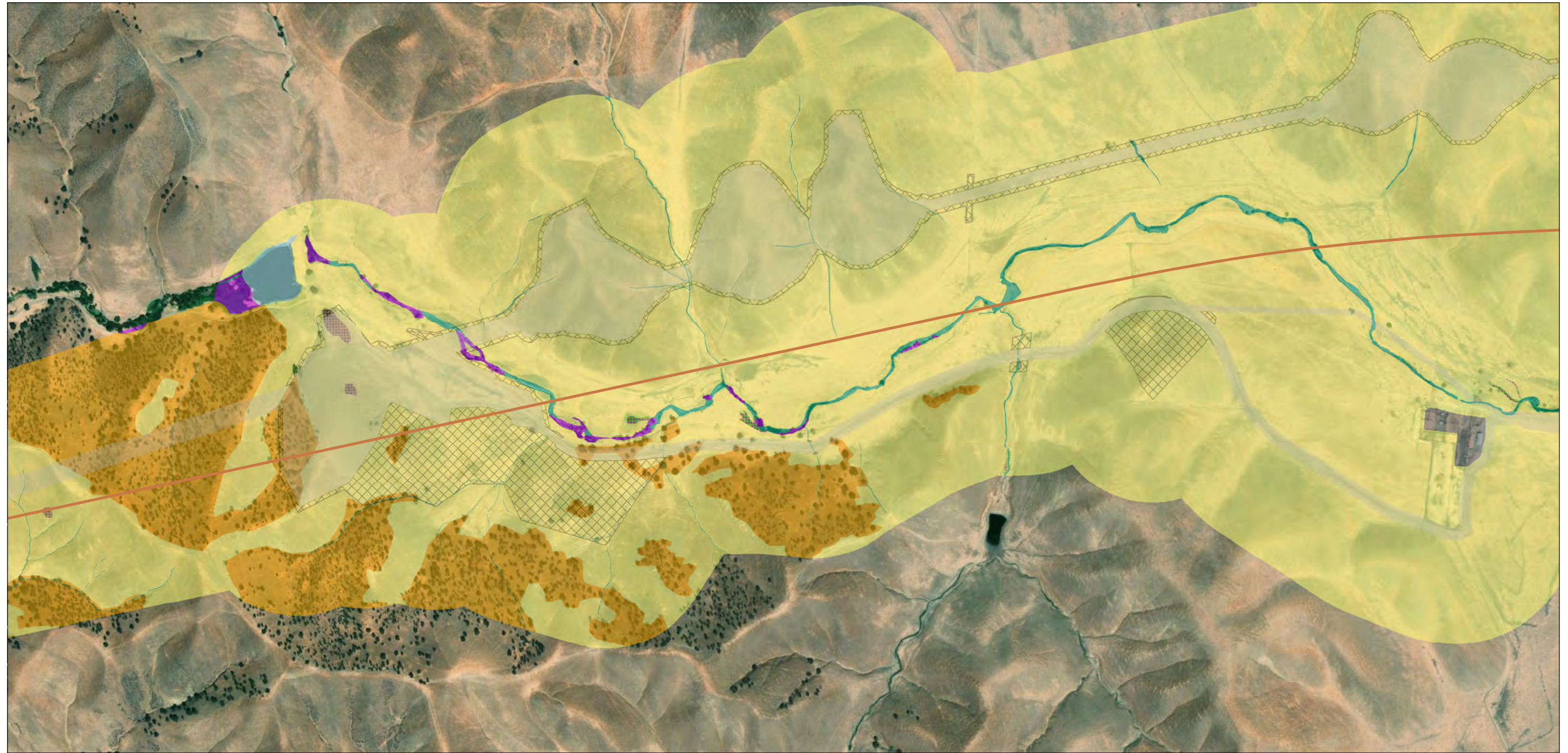


Source: Imagery Eagle Aerial 2017; ICF Compiled

Note: Landcover is described in the San Jose to Merced Biological and Aquatic Resources Technical Report.

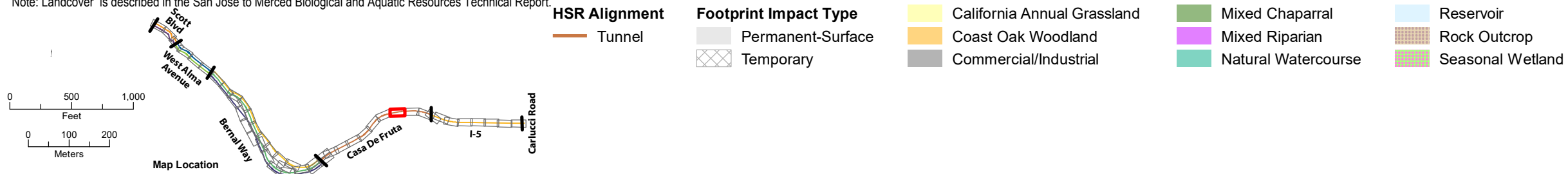


Landcover Maps



Source: Imagery Eagle Aerial 2017; ICF Compiled

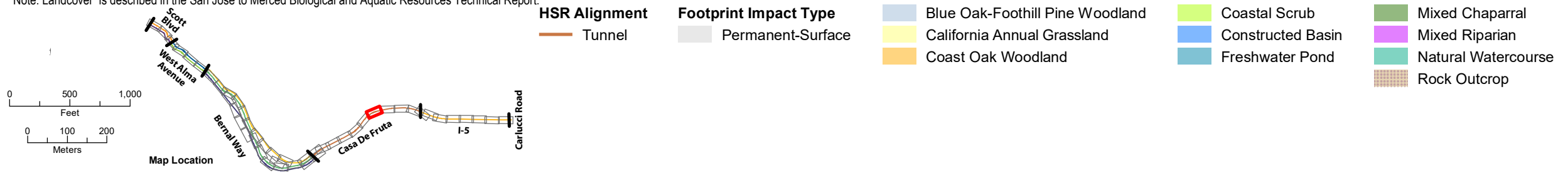
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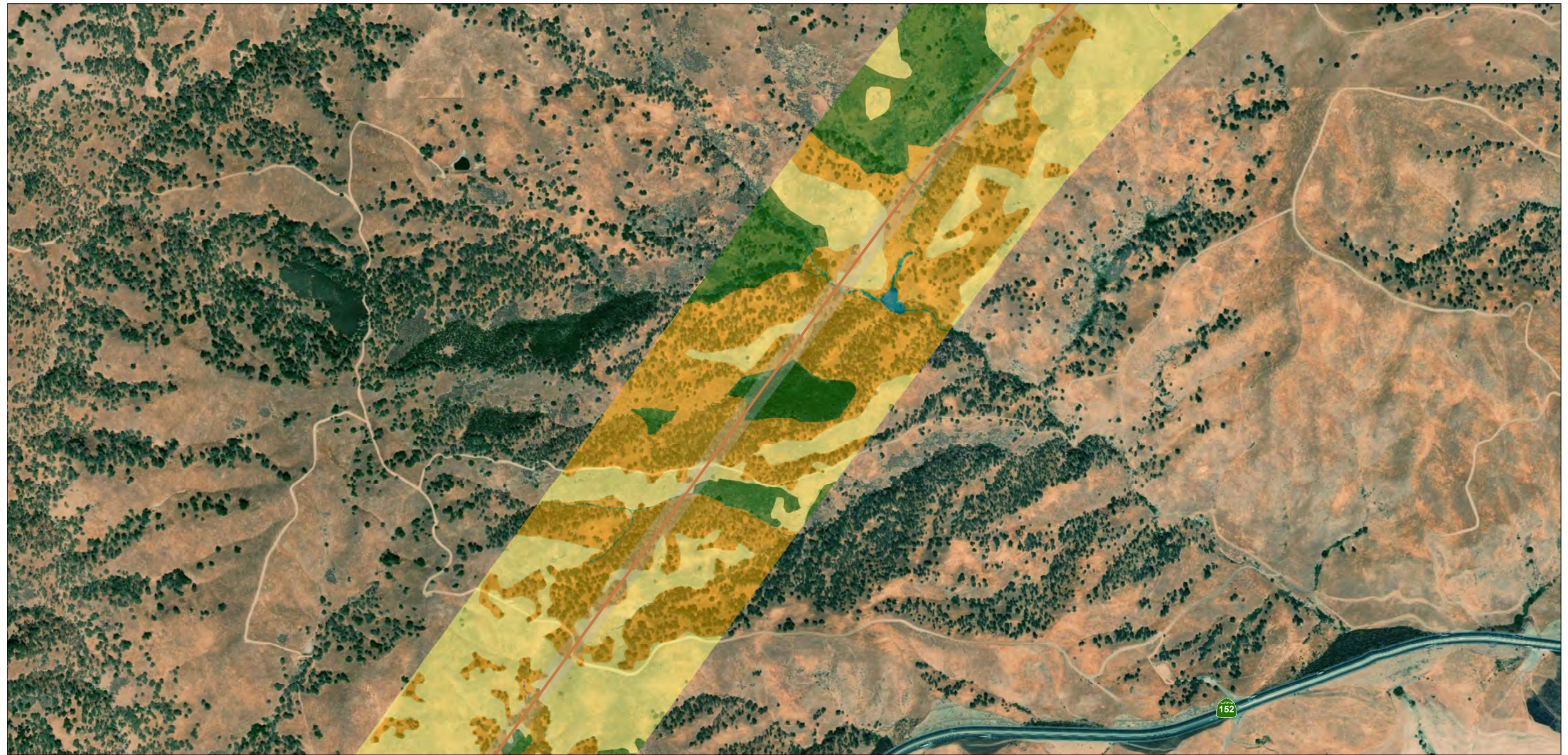




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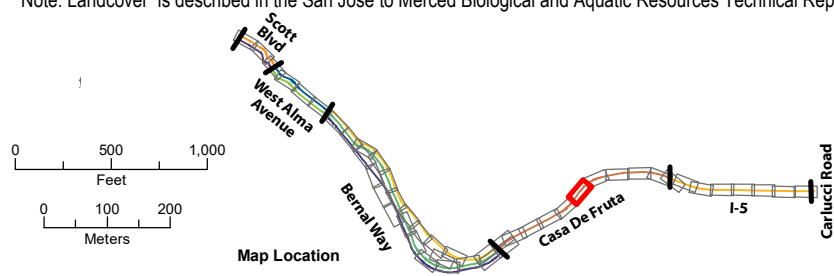
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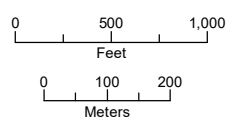
HSR Alignment
 — Tunnel

Footprint Impact Type
 Permanent-Surface
 Temporary

California Annual Grassland
 Coast Oak Woodland

Freshwater Pond
 Mixed Chaparral

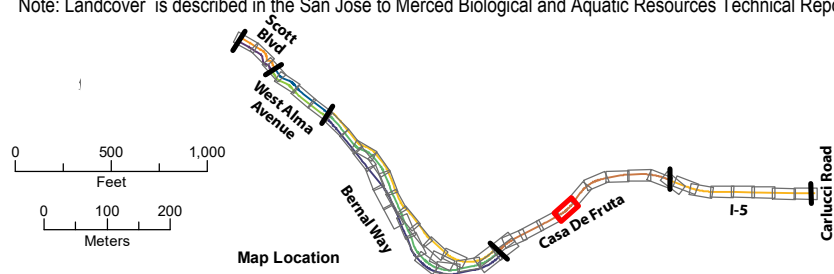
Natural Watercourse
 Seasonal Wetland





Source: Imagery Eagle Aerial 2017; ICF Compiled

Note: Landcover is described in the San Jose to Merced Biological and Aquatic Resources Technical Report.



HSR Alignment

— Tunnel

Footprint Impact Type

— Permanent-Surface

California Annual Grassland

Coast Oak Woodland

Coastal Scrub

Constructed Watercourse

Freshwater Marsh

Freshwater Pond

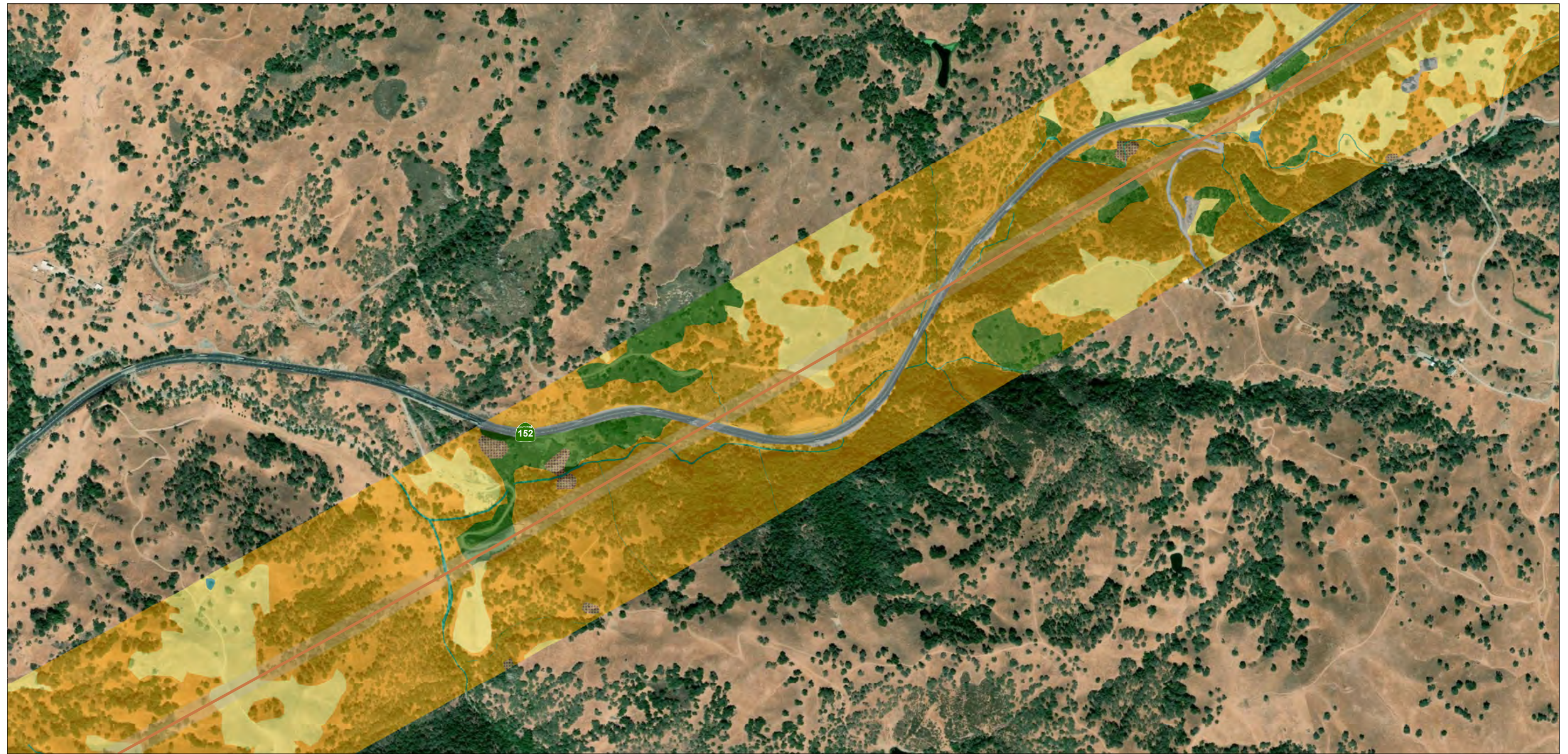
Mixed Chaparral

Natural Watercourse

Rock Outcrop

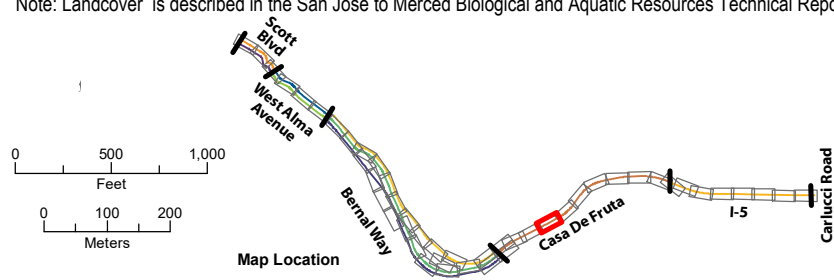
Seasonal Wetland

Urban



Source: Imagery Eagle Aerial 2017; ICF Compiled

Note: Landcover is described in the San Jose to Merced Biological and Aquatic Resources Technical Report.



HSR Alignment

— Tunnel

Footprint Impact Type

— Permanent-Surface

California Annual Grassland

Coast Oak Woodland

Freshwater Pond

Mixed Chaparral

Natural Watercourse

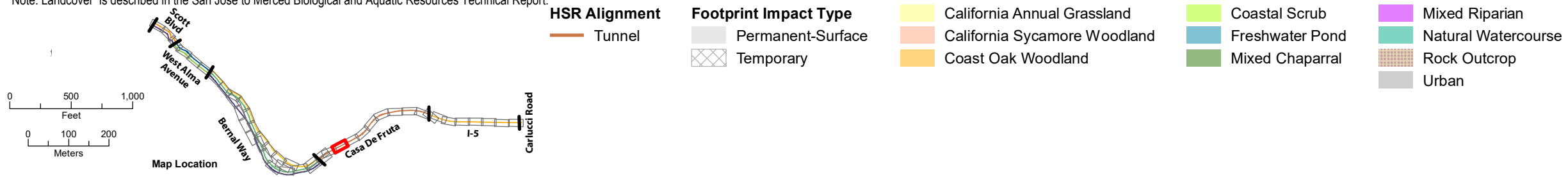
Rock Outcrop

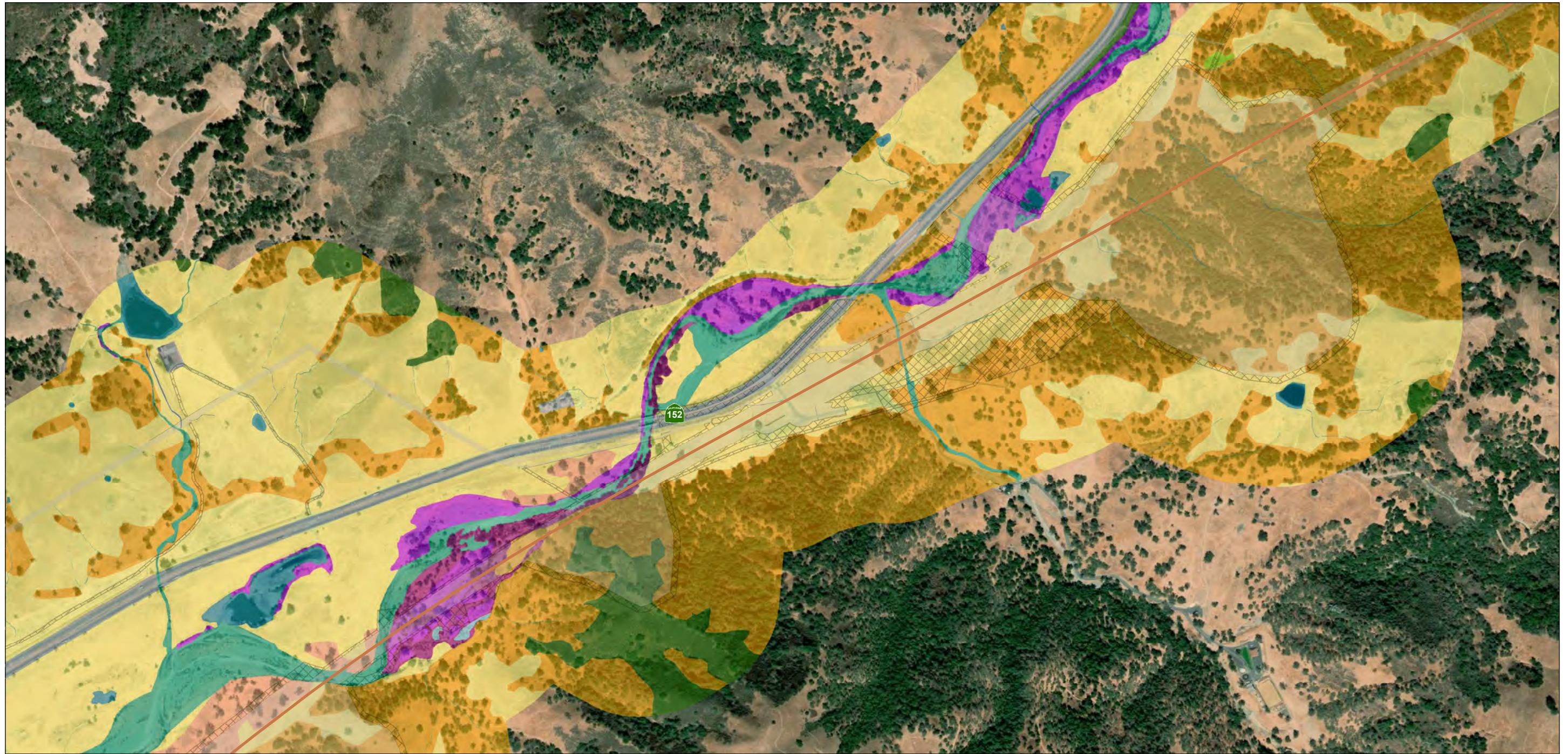
Urban



Source: Imagery Eagle Aerial 2017; ICF Compiled

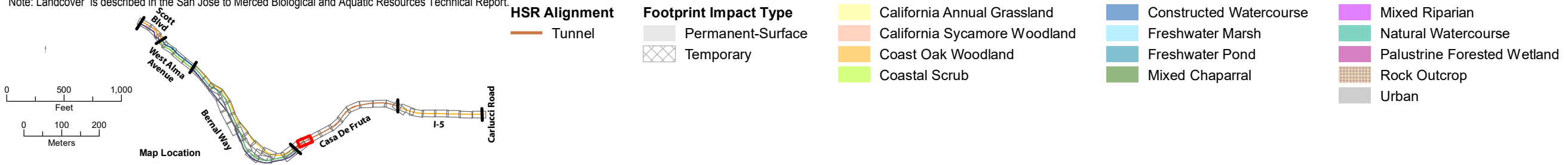
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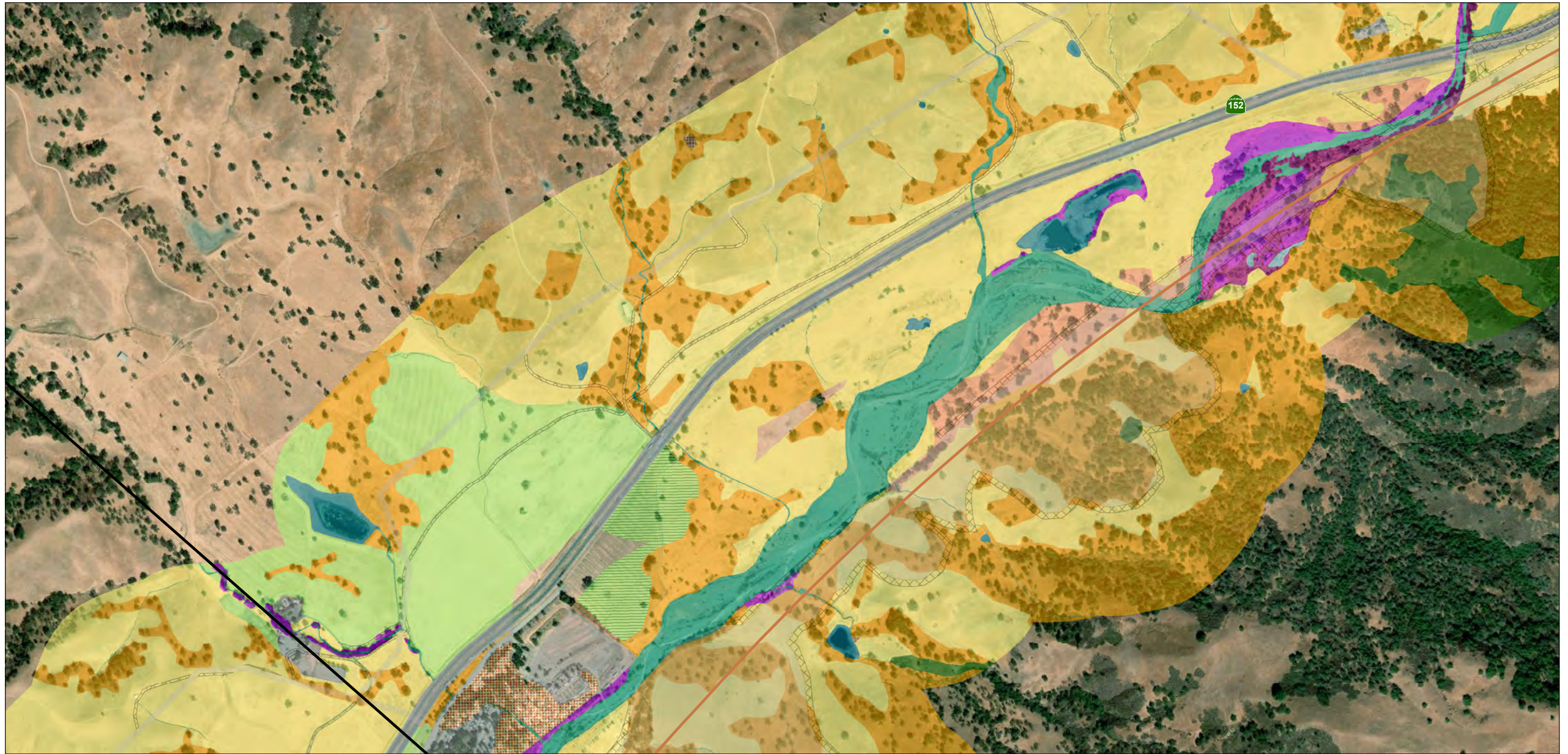




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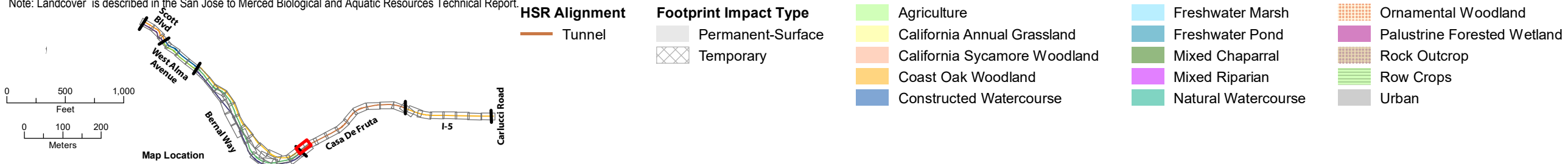
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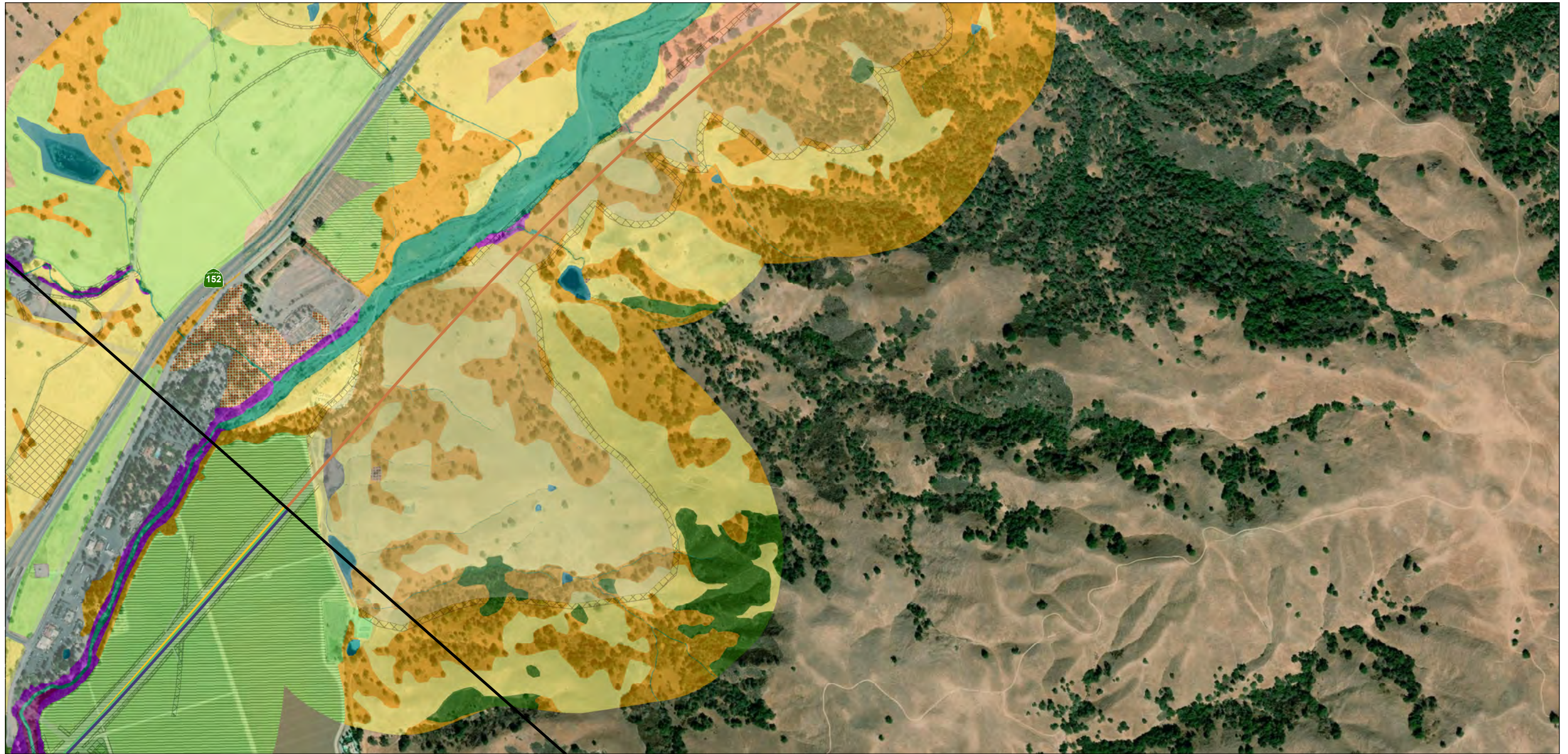




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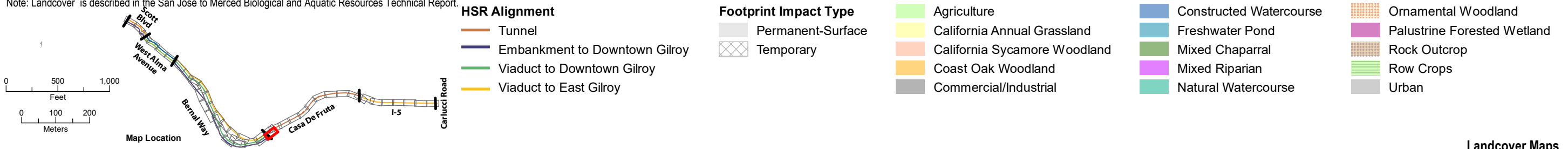
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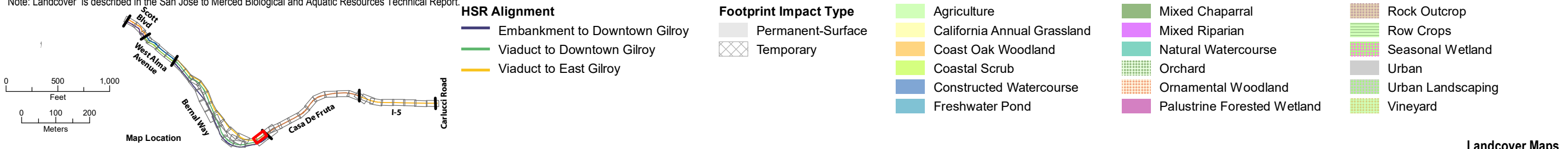
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Source: Imagery Eagle Aerial 2017; ICF Compiled

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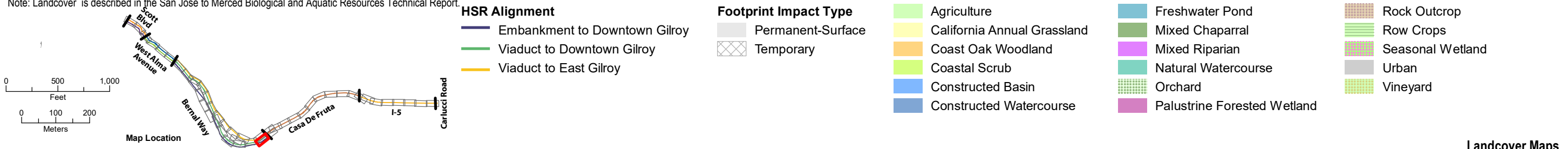


Landcover Maps



Source: Imagery Eagle Aerial 2017; ICF Compiled

Note: Landcover is described in the San Jose to Merced Biological and Aquatic Resources Technical Report.

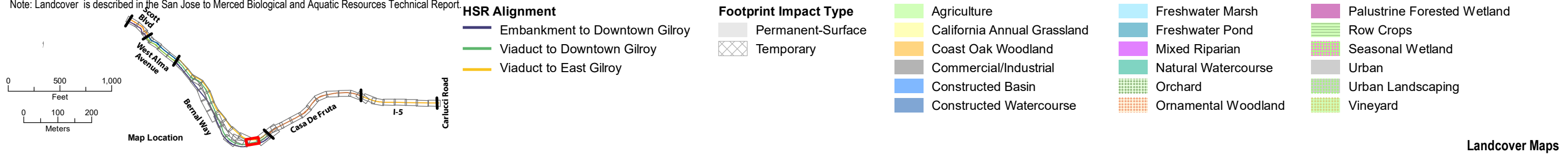


Landcover Maps



Source: Imagery Eagle Aerial 2017; ICF Compiled

Note: Landcover is described in the San Jose to Merced Biological and Aquatic Resources Technical Report.



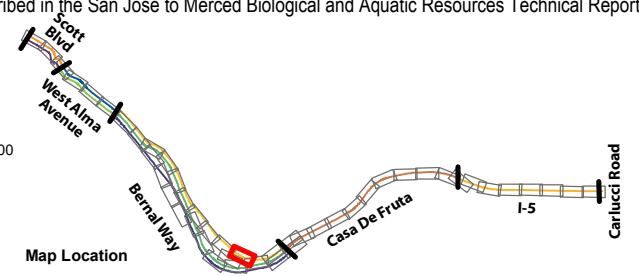
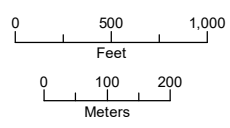
Landcover Maps



Source: Imagery Eagle Aerial 2017; ICF Compiled

Note: Landcover is described in the San Jose to Merced Biological and Aquatic Resources Technical Report.

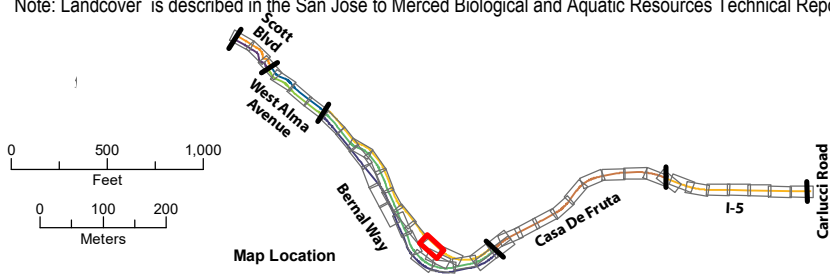
<p>HSR Alignment</p> <p>— Viaduct to East Gilroy</p>	<p>Footprint Impact Type</p> <p>■ Permanent-Surface</p> <p>▨ Temporary</p>	<p>■ Agriculture</p>	<p>■ Constructed Watercourse</p>	<p>■ Palustrine Forested Wetland</p>
		<p>■ California Annual Grassland</p>	<p>■ Freshwater Marsh</p>	<p>■ Row Crops</p>
		<p>■ Coast Oak Woodland</p>	<p>■ Freshwater Pond</p>	<p>■ Seasonal Wetland</p>
		<p>■ Commercial/Industrial</p>	<p>■ Natural Watercourse</p>	<p>■ Urban</p>





Source: Imagery Eagle Aerial 2017; ICF Compiled

Note: Landcover is described in the San Jose to Merced Biological and Aquatic Resources Technical Report.



HSR Alignment

— Viaduct to East Gilroy

Footprint Impact Type

— Permanent-Surface
 [Grid Pattern] Temporary

- | | | |
|--|-----------------------------------|---|
| [Light Green Box] Agriculture | [Light Blue Box] Freshwater Marsh | [Orange Grid Box] Ornamental Woodland |
| [Yellow Box] California Annual Grassland | [Dark Blue Box] Freshwater Pond | [Dark Purple Box] Palustrine Forested Wetland |
| [Orange Box] Coast Oak Woodland | [Purple Box] Mixed Riparian | [Light Green Grid Box] Row Crops |
| [Grey Box] Commercial/Industrial | [Teal Box] Natural Watercourse | [Light Green Diagonal Box] Seasonal Wetland |
| [Blue Box] Constructed Watercourse | [Green Grid Box] Orchard | [Grey Box] Urban |



Source: Imagery Eagle Aerial 2017; ICF Compiled

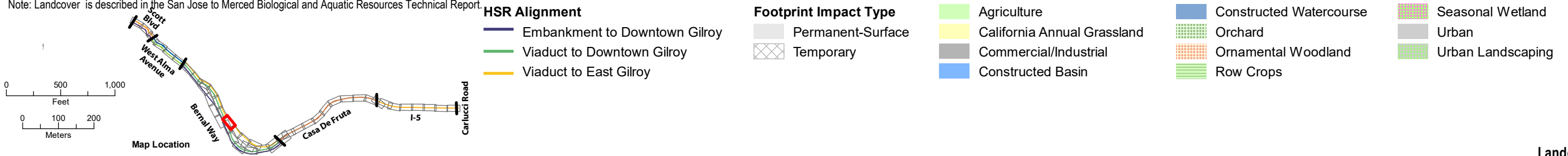
Note: Landcover is described in the San Jose to Merced Biological and Aquatic Resources Technical Report.

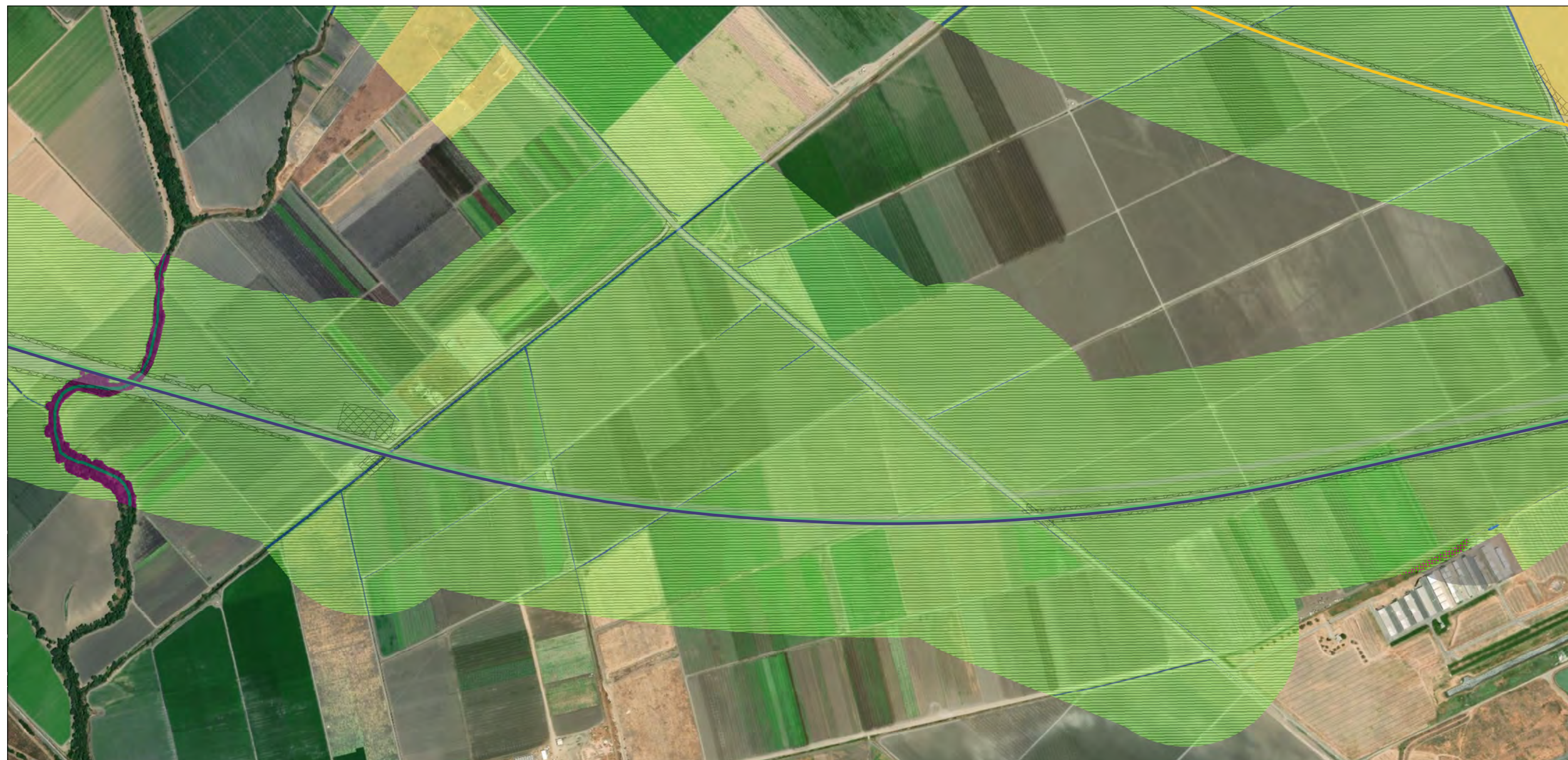
<p>Map Location</p>	<p>HSR Alignment</p> <ul style="list-style-type: none"> — Embankment to Downtown Gilroy — Viaduct to Downtown Gilroy — Viaduct to East Gilroy 	<p>Footprint Impact Type</p> <ul style="list-style-type: none"> Permanent-Surface Temporary 	<ul style="list-style-type: none"> Agriculture California Annual Grassland Coast Oak Woodland Commercial/Industrial 	<ul style="list-style-type: none"> Constructed Watercourse Mixed Riparian Natural Watercourse Orchard 	<ul style="list-style-type: none"> Palustrine Forested Wetland Row Crops Urban Urban Landscaping 	
	<p>0 500 1,000 Feet</p> <p>0 100 200 Meters</p>					



Source: Imagery Eagle Aerial 2017; ICF Compiled

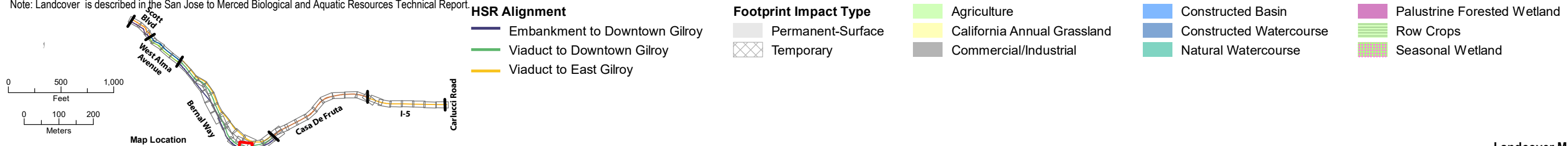
Note: Landcover is described in the San Jose to Merced Biological and Aquatic Resources Technical Report.





Source: Imagery Eagle Aerial 2017; ICF Compiled

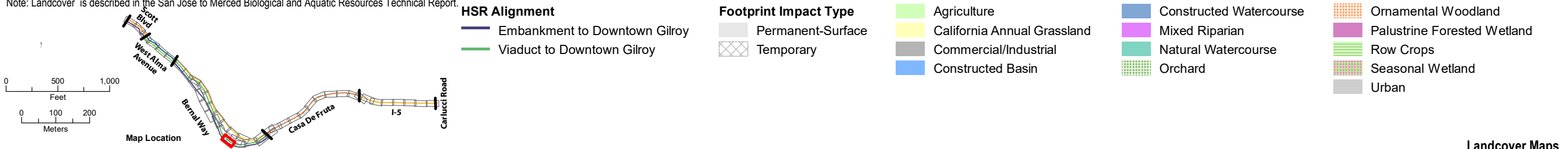
Note: Landcover is described in the San Jose to Merced Biological and Aquatic Resources Technical Report.





Source: Imagery Eagle Aerial 2017; ICF Compiled

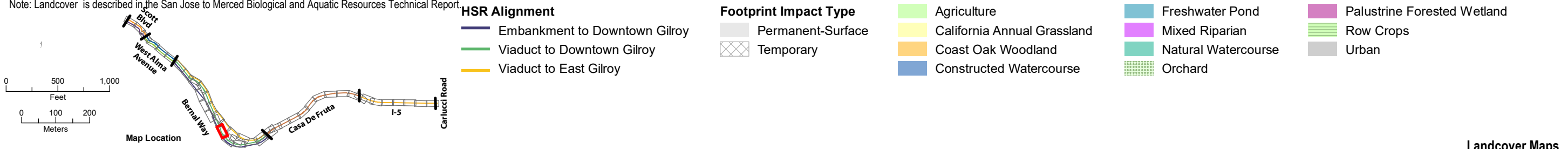
Note: Landcover is described in the San Jose to Merced Biological and Aquatic Resources Technical Report.





Source: Imagery Eagle Aerial 2017; ICF Compiled

Note: Landcover is described in the San Jose to Merced Biological and Aquatic Resources Technical Report.

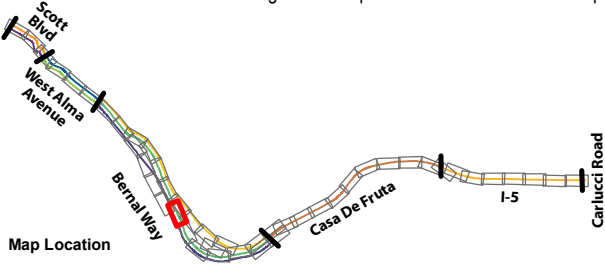
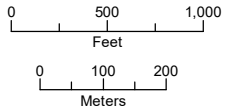
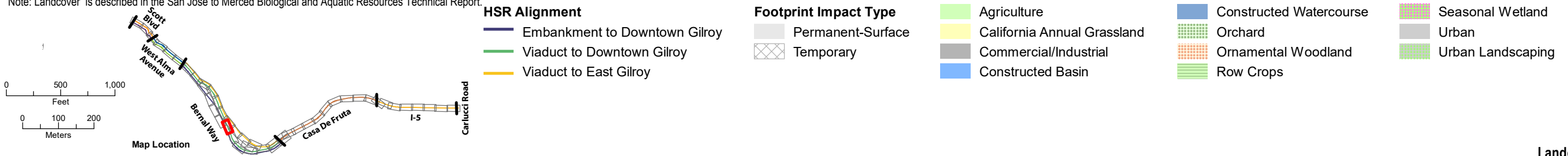


Landcover Maps



Source: Imagery Eagle Aerial 2017; ICF Compiled

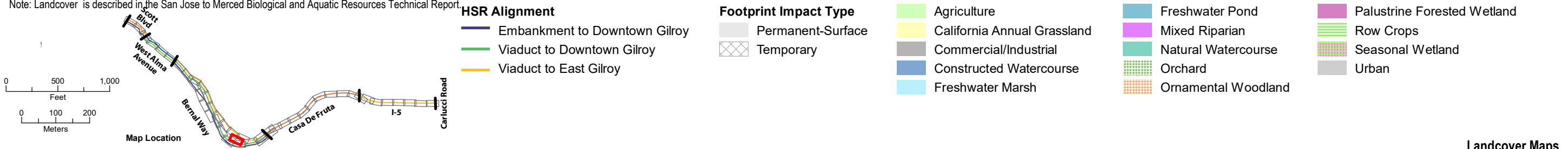
Note: Landcover is described in the San Jose to Merced Biological and Aquatic Resources Technical Report.





Source: Imagery Eagle Aerial 2017; ICF Compiled

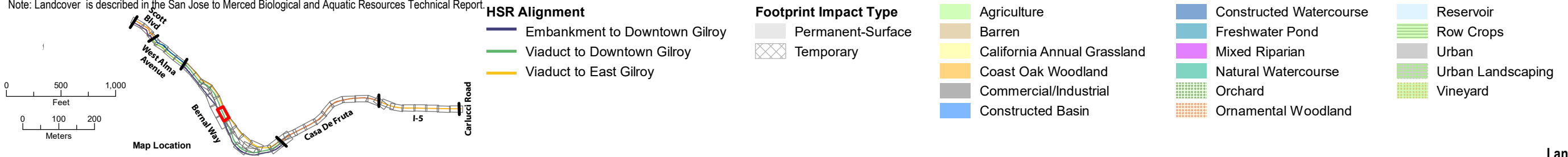
Note: Landcover is described in the San Jose to Merced Biological and Aquatic Resources Technical Report.





Source: Imagery Eagle Aerial 2017; ICF Compiled

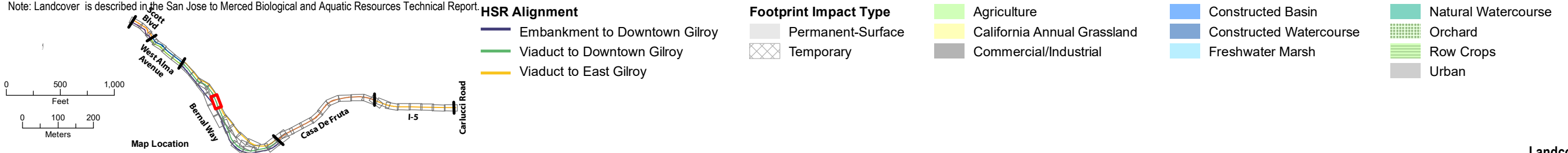
Note: Landcover is described in the San Jose to Merced Biological and Aquatic Resources Technical Report.

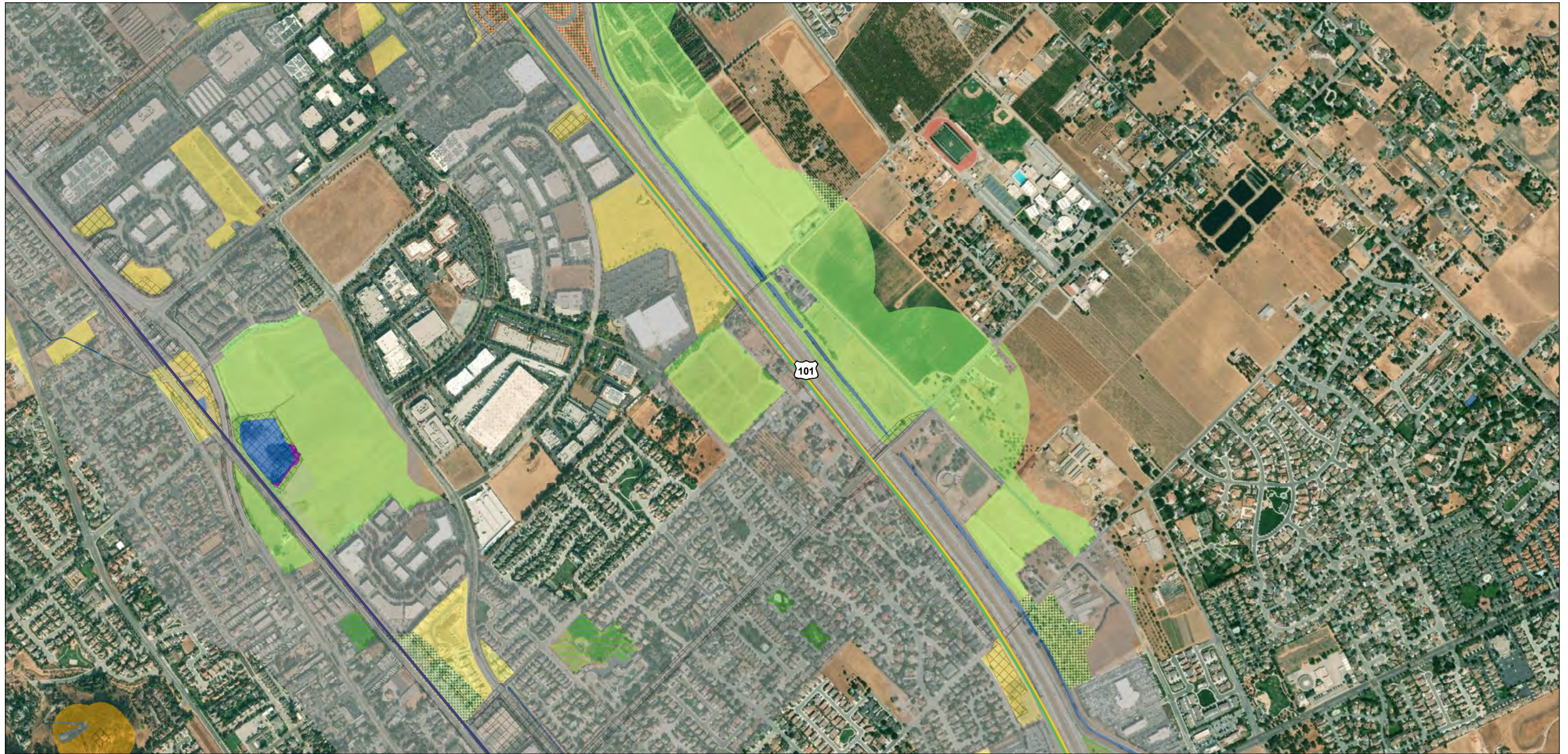




Source: Imagery Eagle Aerial 2017; ICF Compiled

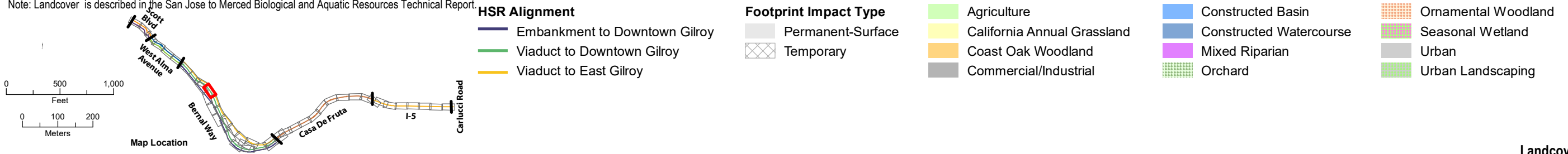
Note: Landcover is described in the San Jose to Merced Biological and Aquatic Resources Technical Report.

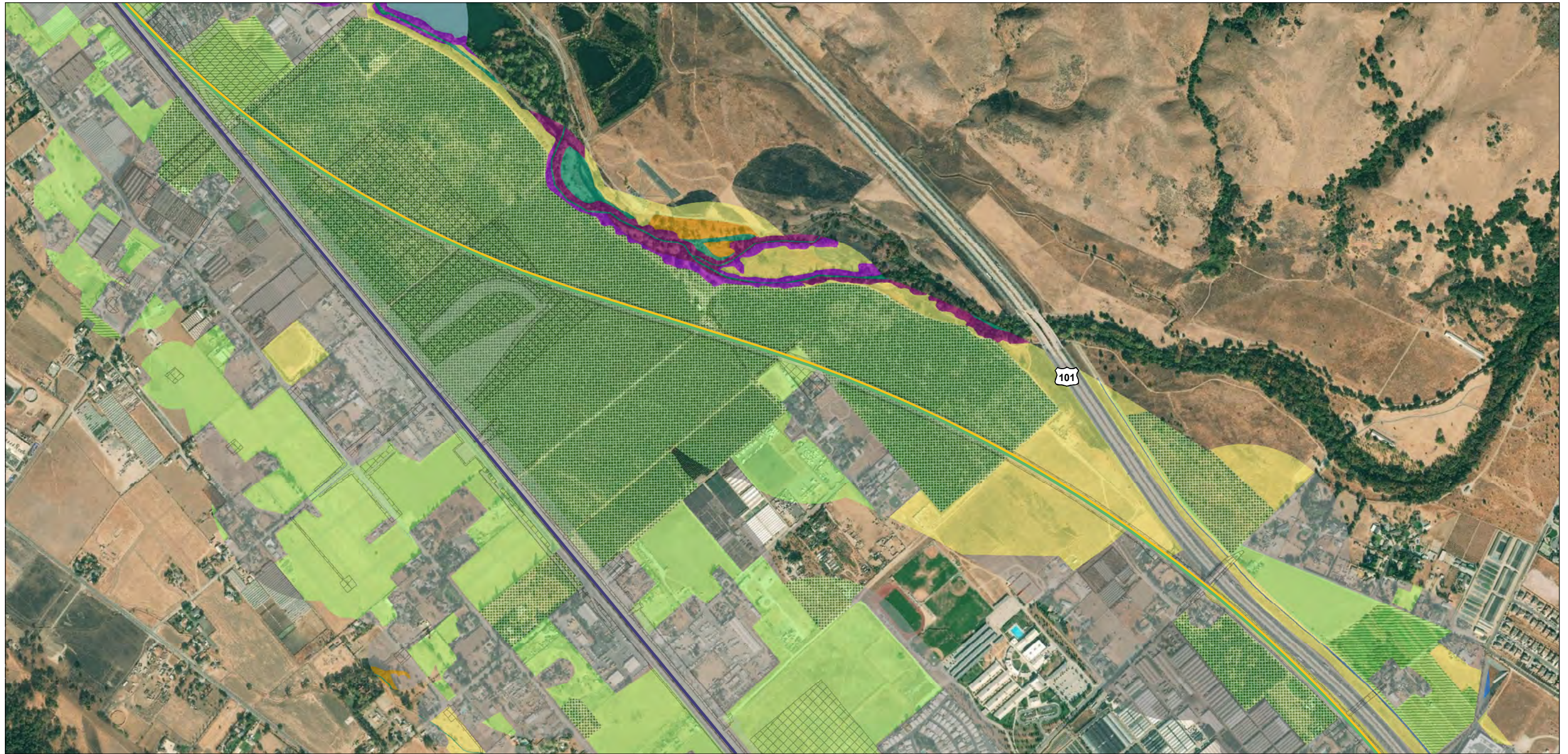




Source: Imagery Eagle Aerial 2017; ICF Compiled

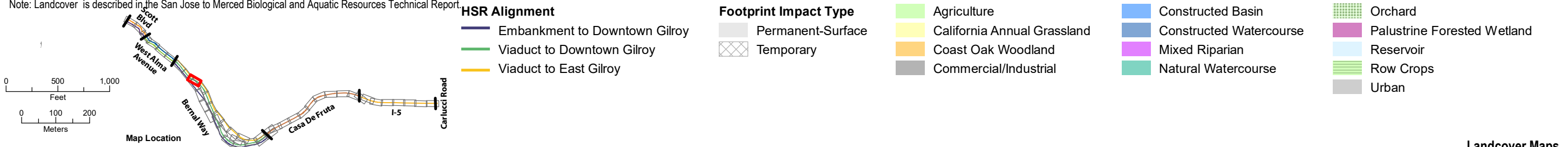
Note: Landcover is described in the San Jose to Merced Biological and Aquatic Resources Technical Report.





Source: Imagery Eagle Aerial 2017; ICF Compiled

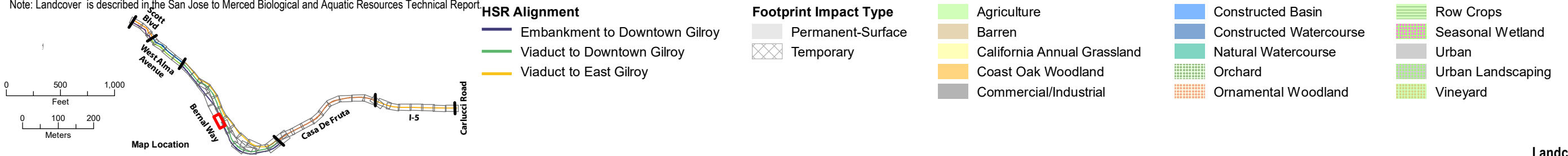
Note: Landcover is described in the San Jose to Merced Biological and Aquatic Resources Technical Report.



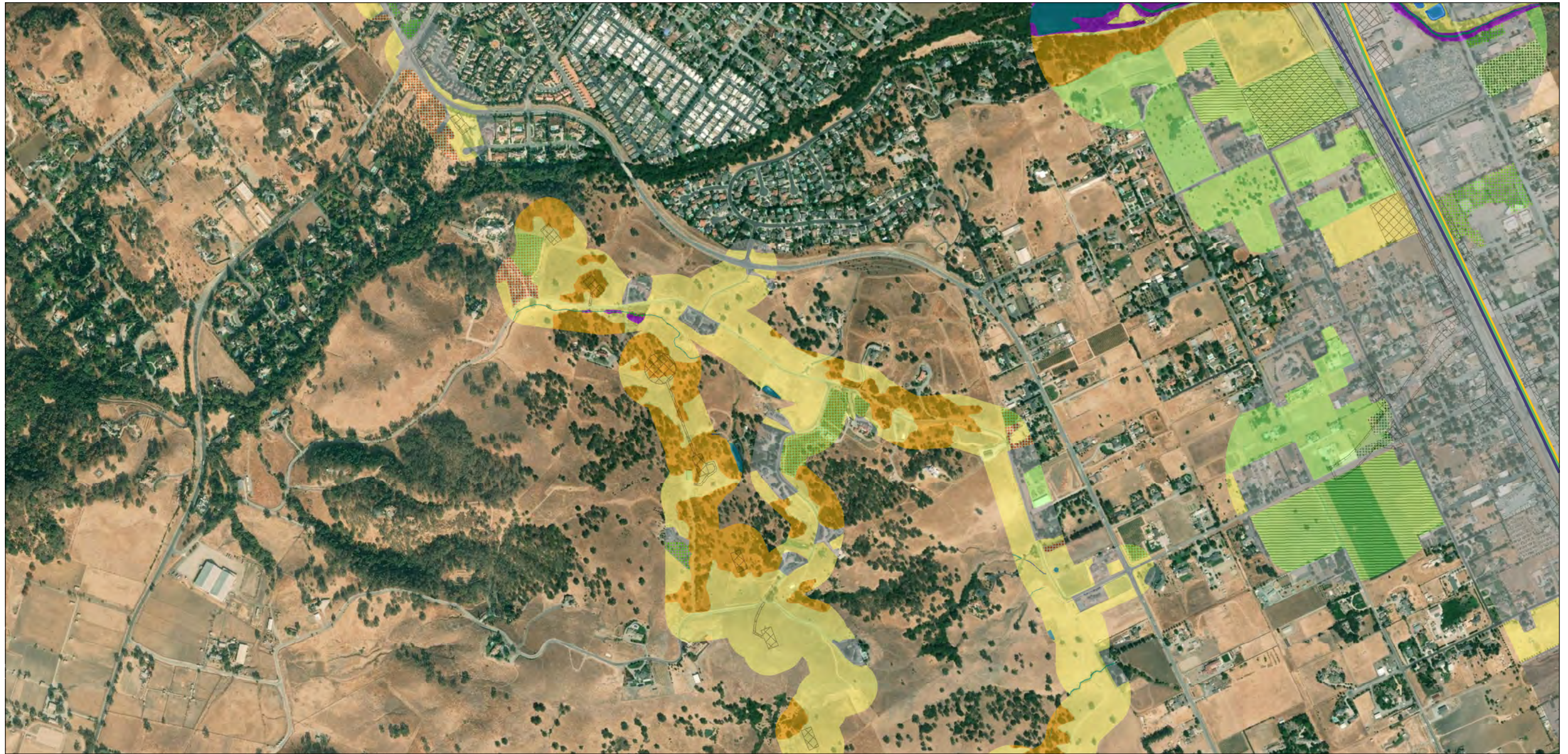


Source: Imagery Eagle Aerial 2017; ICF Compiled

Note: Landcover is described in the San Jose to Merced Biological and Aquatic Resources Technical Report.

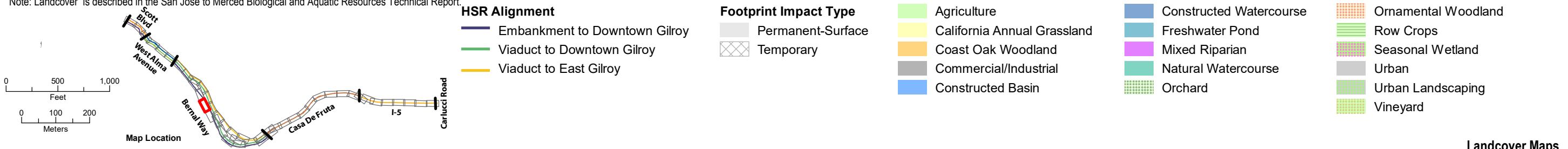


Landcover Maps

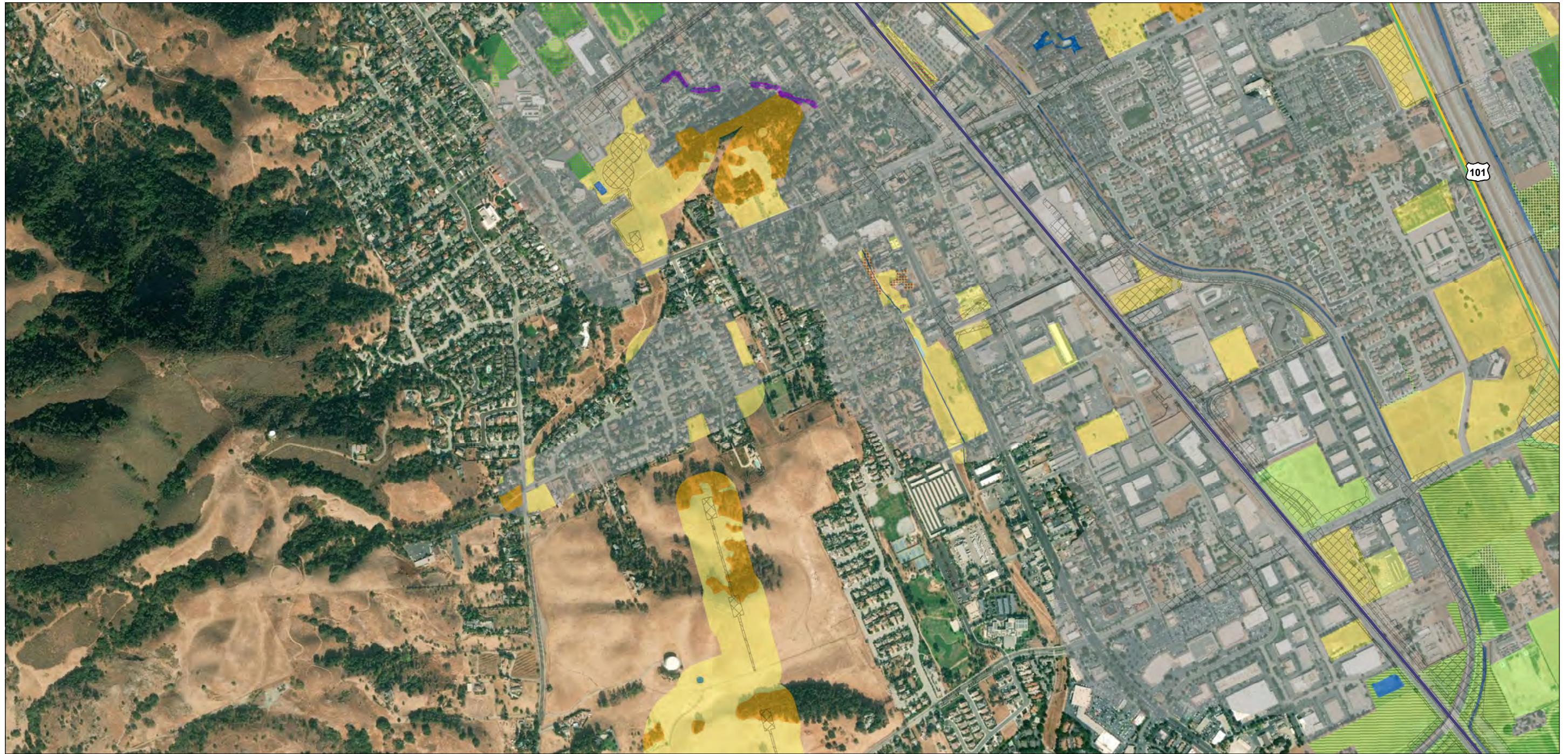


Source: Imagery Eagle Aerial 2017; ICF Compiled

Note: Landcover is described in the San Jose to Merced Biological and Aquatic Resources Technical Report.

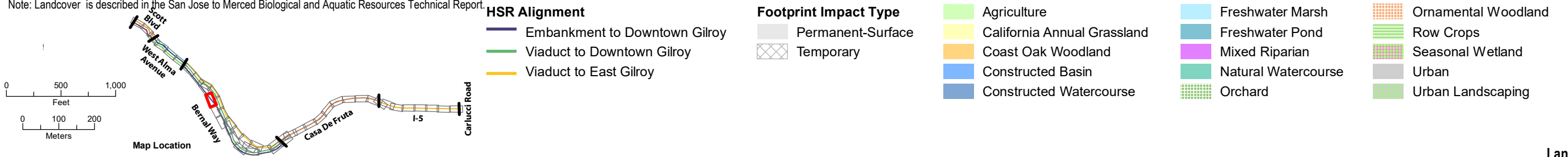


Landcover Maps



Source: Imagery Eagle Aerial 2017; ICF Compiled

Note: Landcover is described in the San Jose to Merced Biological and Aquatic Resources Technical Report.

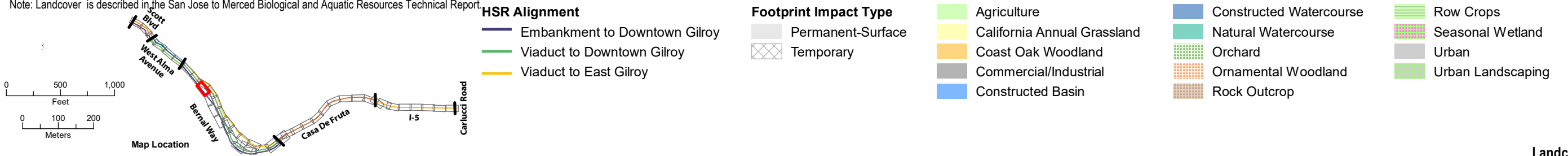


Landcover Maps



Source: Imagery Eagle Aerial 2017; ICF Compiled

Note: Landcover is described in the San Jose to Merced Biological and Aquatic Resources Technical Report.

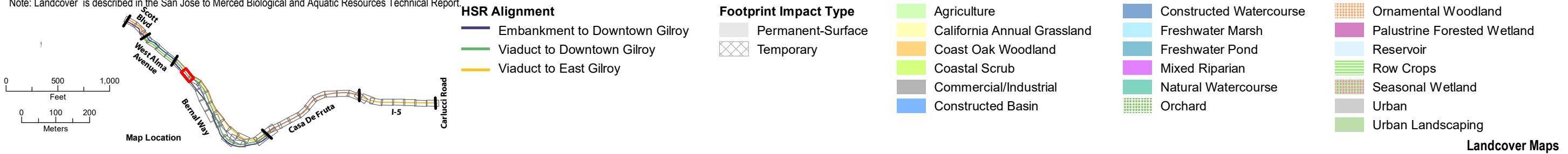


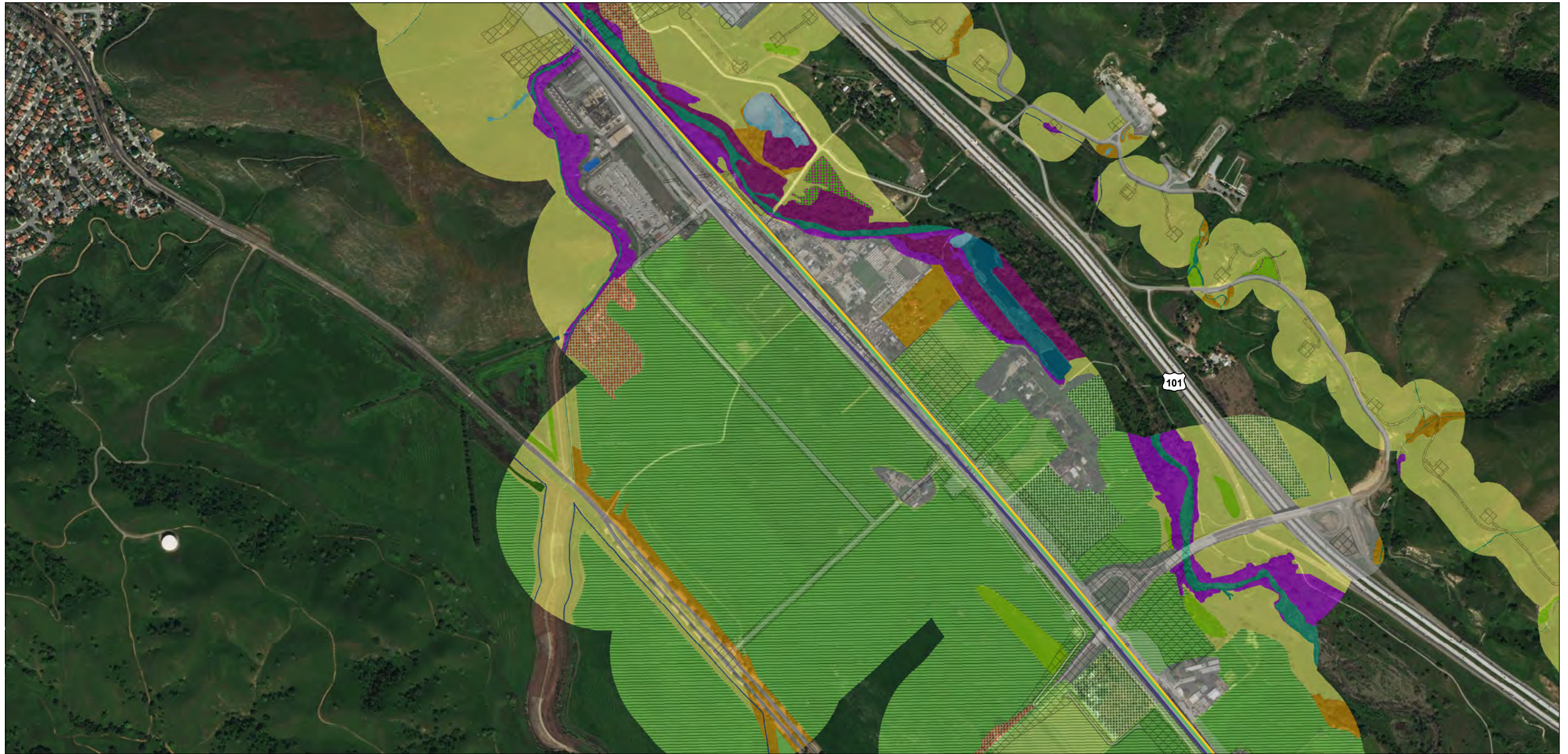
Landcover Maps



Source: Imagery Eagle Aerial 2017; ICF Compiled

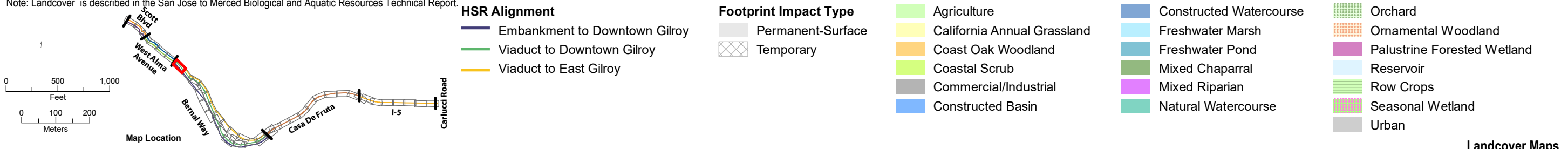
Note: Landcover is described in the San Jose to Merced Biological and Aquatic Resources Technical Report.





Source: Imagery Eagle Aerial 2017; ICF Compiled

Note: Landcover is described in the San Jose to Merced Biological and Aquatic Resources Technical Report.

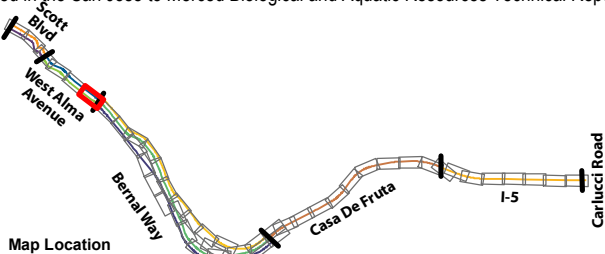
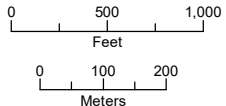
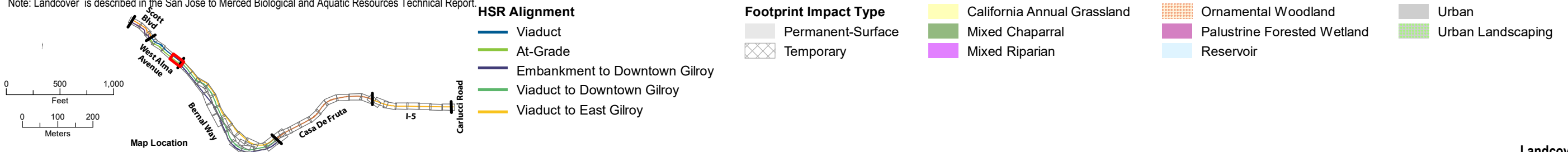


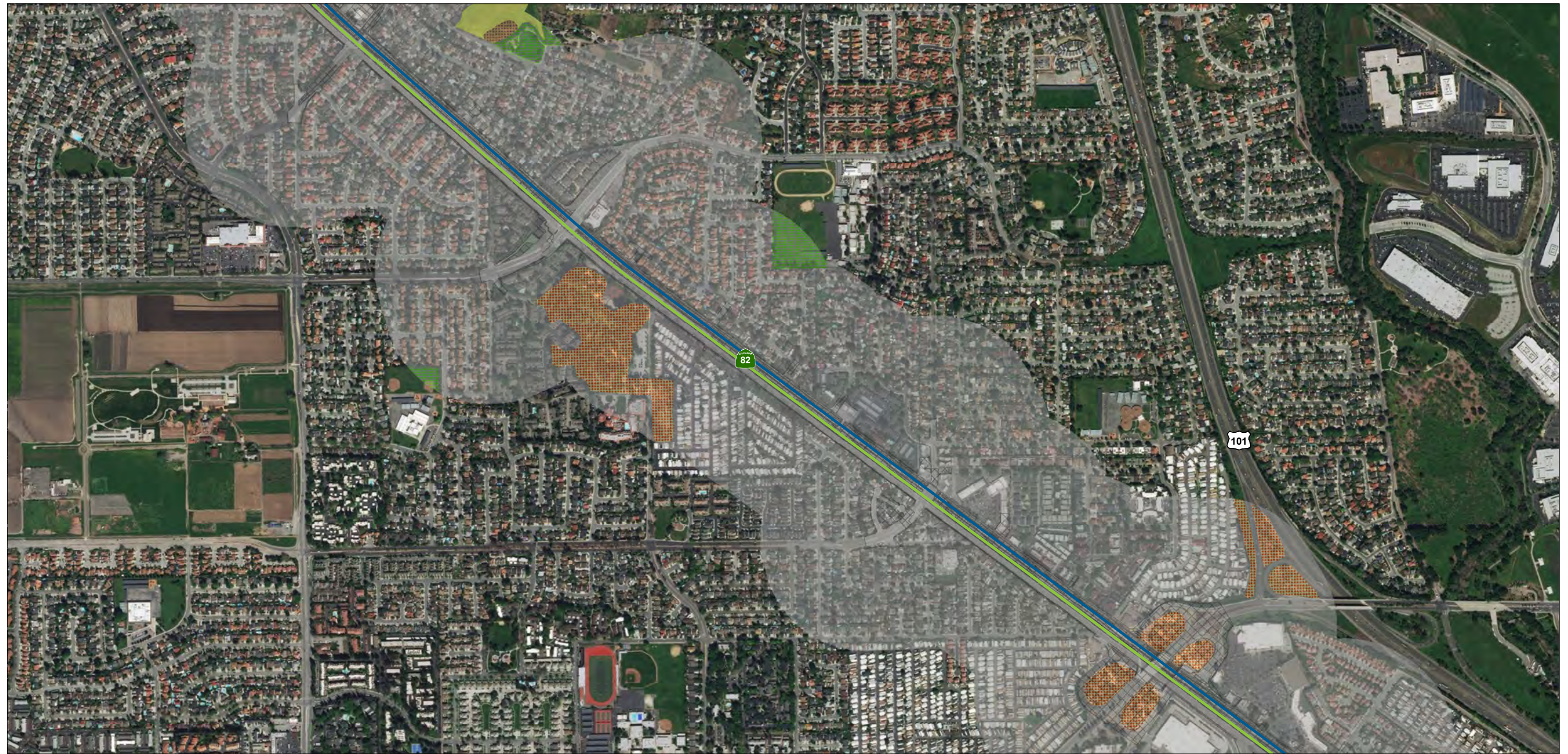
Landcover Maps



Source: Imagery Eagle Aerial 2017; ICF Compiled

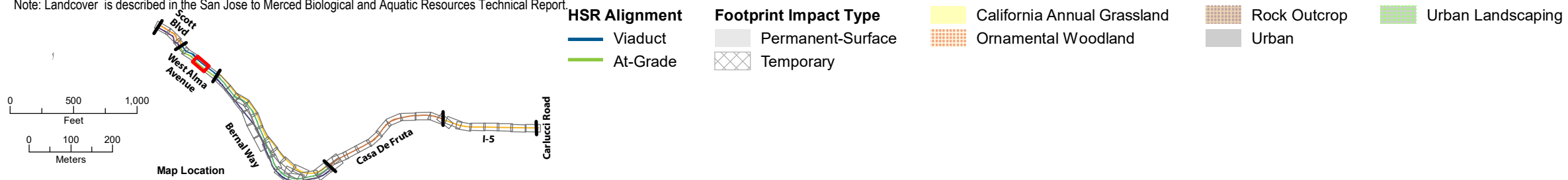
Note: Landcover is described in the San Jose to Merced Biological and Aquatic Resources Technical Report.





Source: Imagery Eagle Aerial 2017; ICF Compiled

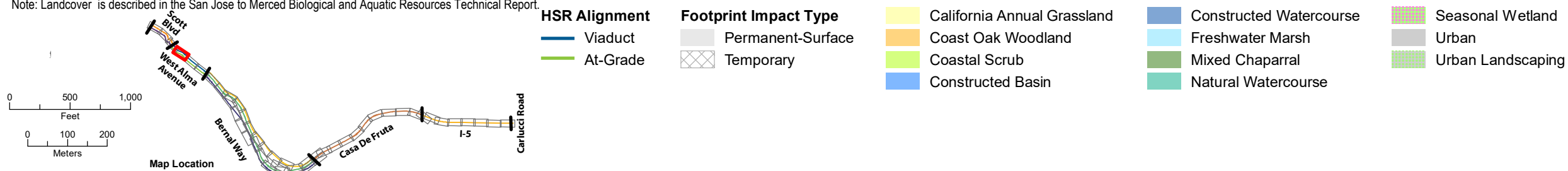
Note: Landcover is described in the San Jose to Merced Biological and Aquatic Resources Technical Report.

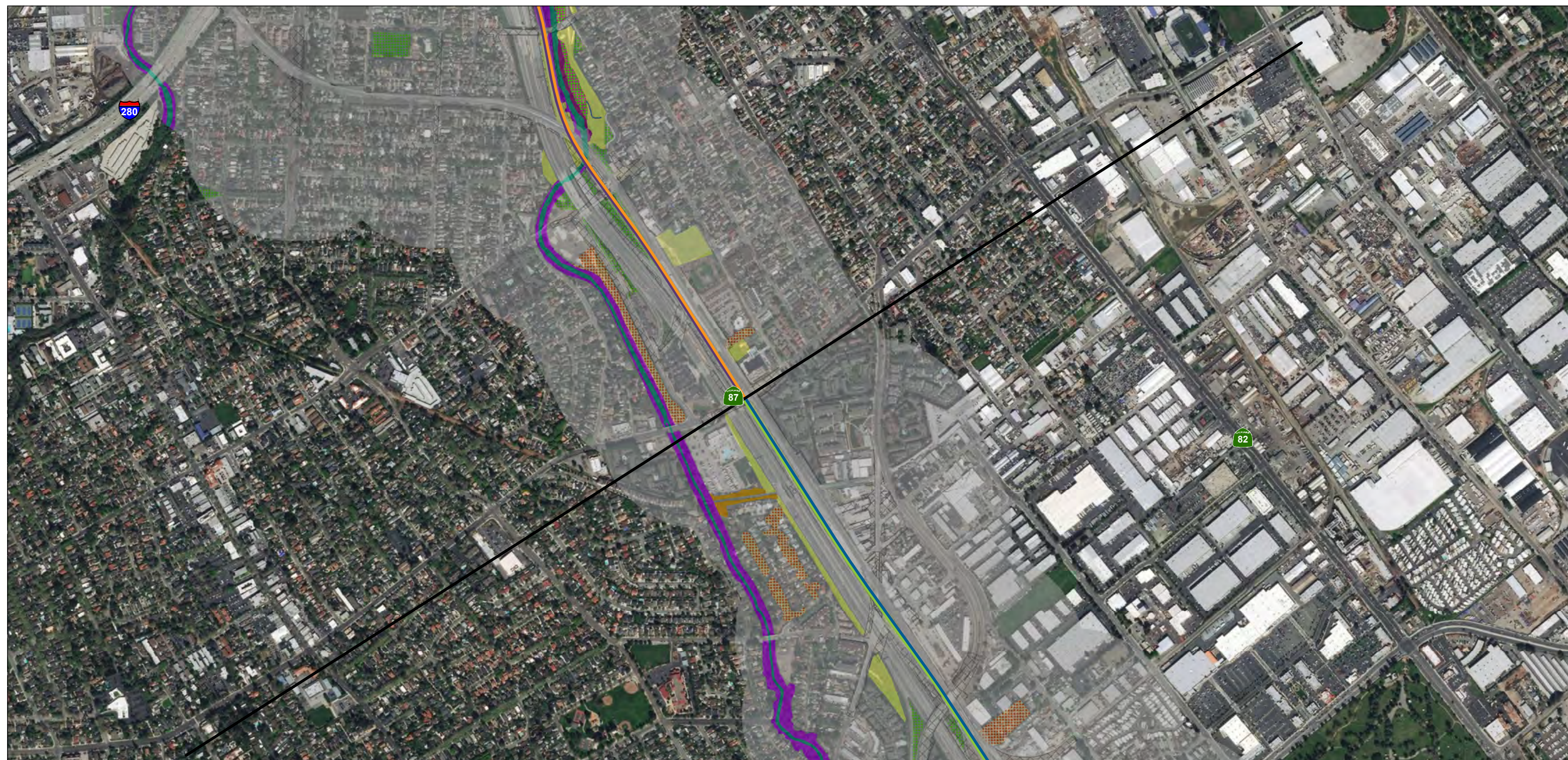




Source: Imagery Eagle Aerial 2017; ICF Compiled

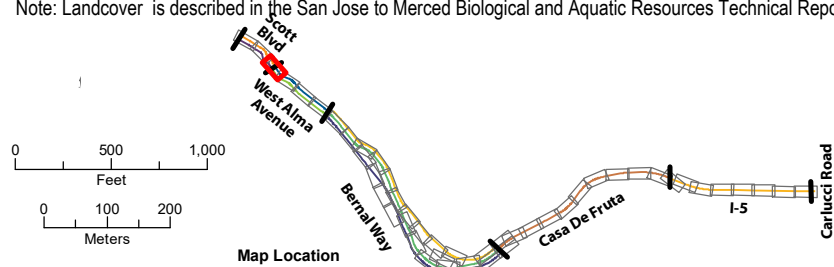
Note: Landcover is described in the San Jose to Merced Biological and Aquatic Resources Technical Report.





Source: Imagery Eagle Aerial 2017; ICF Compiled

Note: Landcover is described in the San Jose to Merced Biological and Aquatic Resources Technical Report.



HSR Alignment

- Viaduct to Scott Blvd
- Viaduct to I-880
- Viaduct
- At-Grade

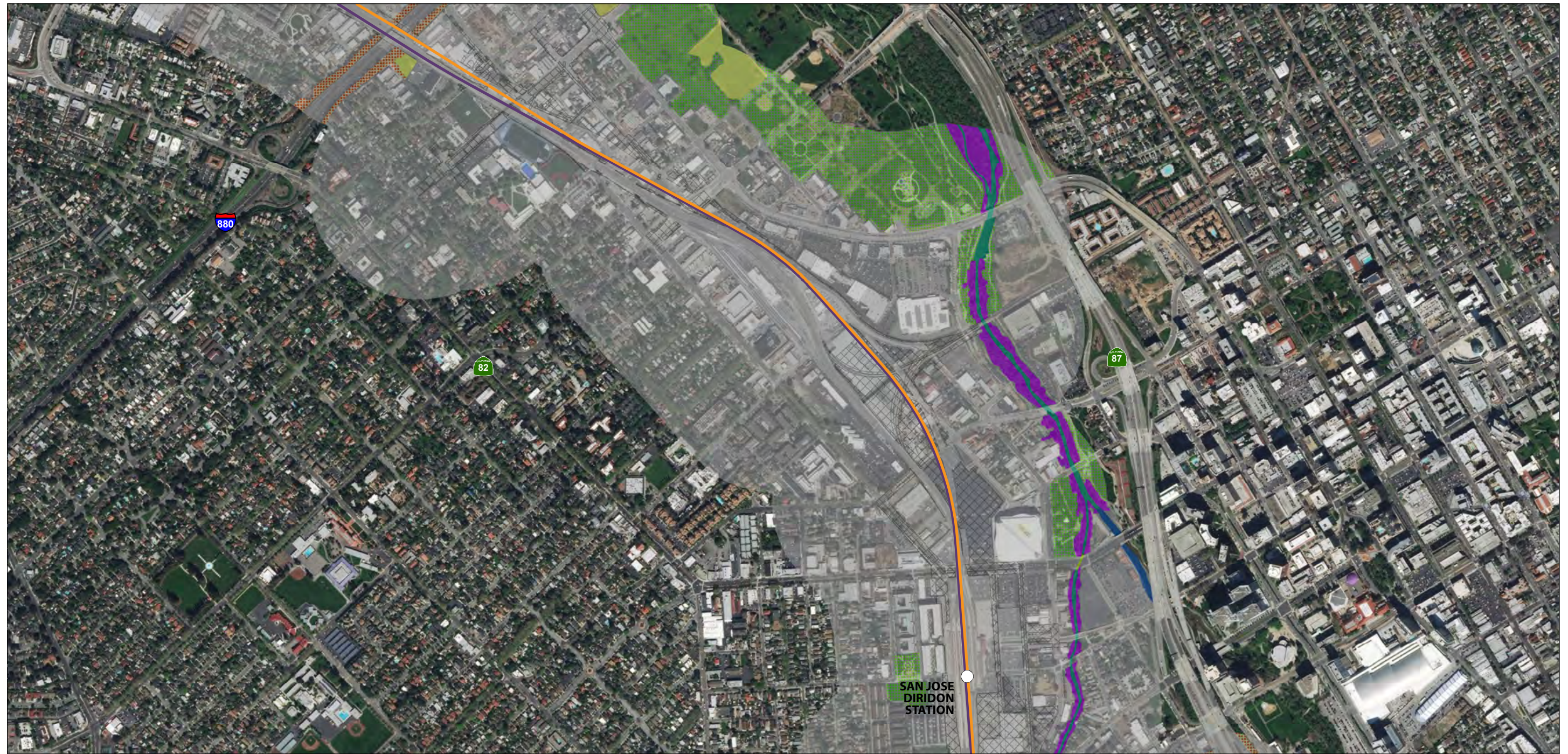
Footprint Impact Type

- Permanent-Surface
- ▨ Temporary

- California Annual Grassland
- Coast Oak Woodland
- Constructed Watercourse

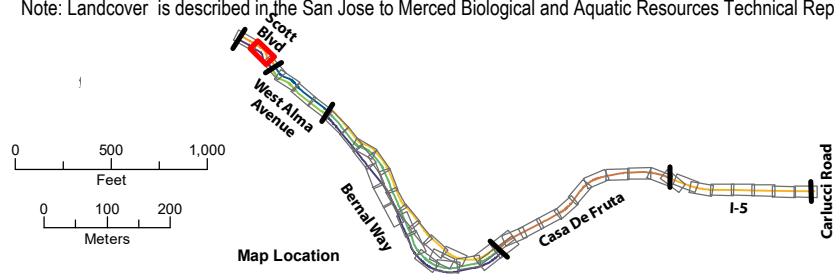
- Mixed Riparian
- Natural Watercourse
- Ornamental Woodland

- Palustrine Forested Wetland
- Seasonal Wetland
- Urban
- Urban Landscaping



Source: Imagery Eagle Aerial 2017; ICF Compiled

Note: Landcover is described in the San Jose to Merced Biological and Aquatic Resources Technical Report.



HSR Alignment

- Viaduct to Scott Blvd
- Viaduct to I-880

Footprint Impact Type

- Permanent-Surface
- Temporary

- California Annual Grassland
- Constructed Watercourse
- Mixed Riparian

- Natural Watercourse
- Natural Watercourse Box Culvert
- Ornamental Woodland

- Urban
- Urban Landscaping



Source: Imagery Eagle Aerial 2017; ICF Compiled

Note: Landcover is described in the San Jose to Merced Biological and Aquatic Resources Technical Report.

