SECTION 3.0

DESCRIPTION OF THE AFFECTED ENVIRONMENT

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DESCRIPTION OF AFFECTED ENVIRONMENT

3.1 INTRODUCTION

This section describes the existing environment of the area that may be affected by the Proposed Action or other alternatives as required by CEQ Guidelines (40 C.F.R. §1502.15). Resources that are described include Land Resources, Water Resources, Air Quality, Biological Resources, Cultural Resources, Socioeconomic Conditions, Resource Use Patterns and other values including Noise, Hazardous Materials and Visual Resources.

3.2 LAND RESOURCES

This section describes existing land resources conditions for the Wilfred site, the Stony Point site and the Lakeville site. Issues appearing in this section include geological setting, topography, soil and soil conditions, seismic considerations and mineral resources. The following provides a general discussion and site-specific analyses of these issues. The geotechnical studies supporting the data below appear in **Appendix F**. The Wilfred site and the Stony Point Site are differentiated from each other by boundary configurations and total acreages. They do, however, share the same general location, and as such their boundaries have considerable overlap as discussed in **Section 1.0**. Therefore, they are substantially similar in soils, geomorphology and regional seismic considerations.

3.2.1 GENERAL ISSUES

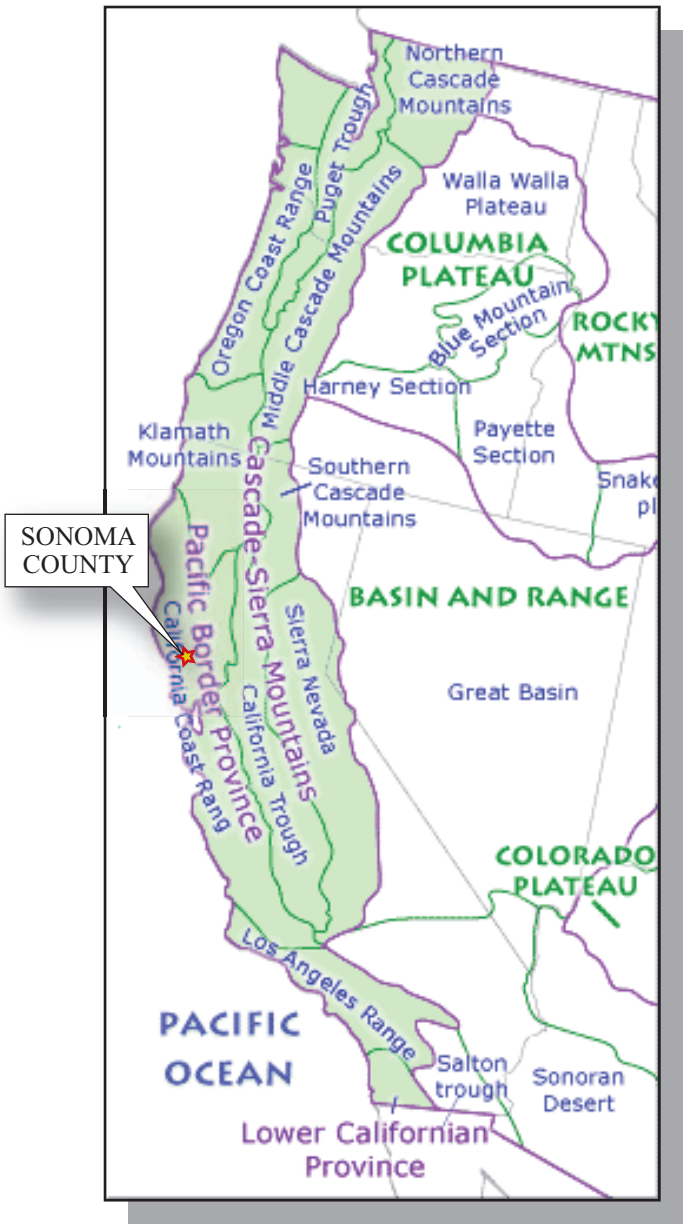
The Wilfred site, Stony Point site and the Lakeville site lie within Sonoma County, which is situated in the Coast Ranges Geomorphic Province (**Figures 3.2-1, 3.2-2**). This province is characterized by a trend of northwest-southeast longitudinal mountain ranges and valleys influenced by faulting, folding, and other tectonic forces. Seismic hazards specific to the project alternatives are identified along with project impacts in **Section 4.2**.

SONOMA COUNTY SOIL SURVEY

The Natural Resource Conservation Service, or NRCS (formerly the Soil Conservation Service [SCS]) published a soils survey for the Sonoma area in 1972. The survey maps soil units, and provides a summary of major physical characteristics for each unit, with management recommendations. General data on Capability Classes is presented immediately below. Soil characteristics specific to the Wilfred site, the Stony Point site and the Lakeville site are presented in the following sections.

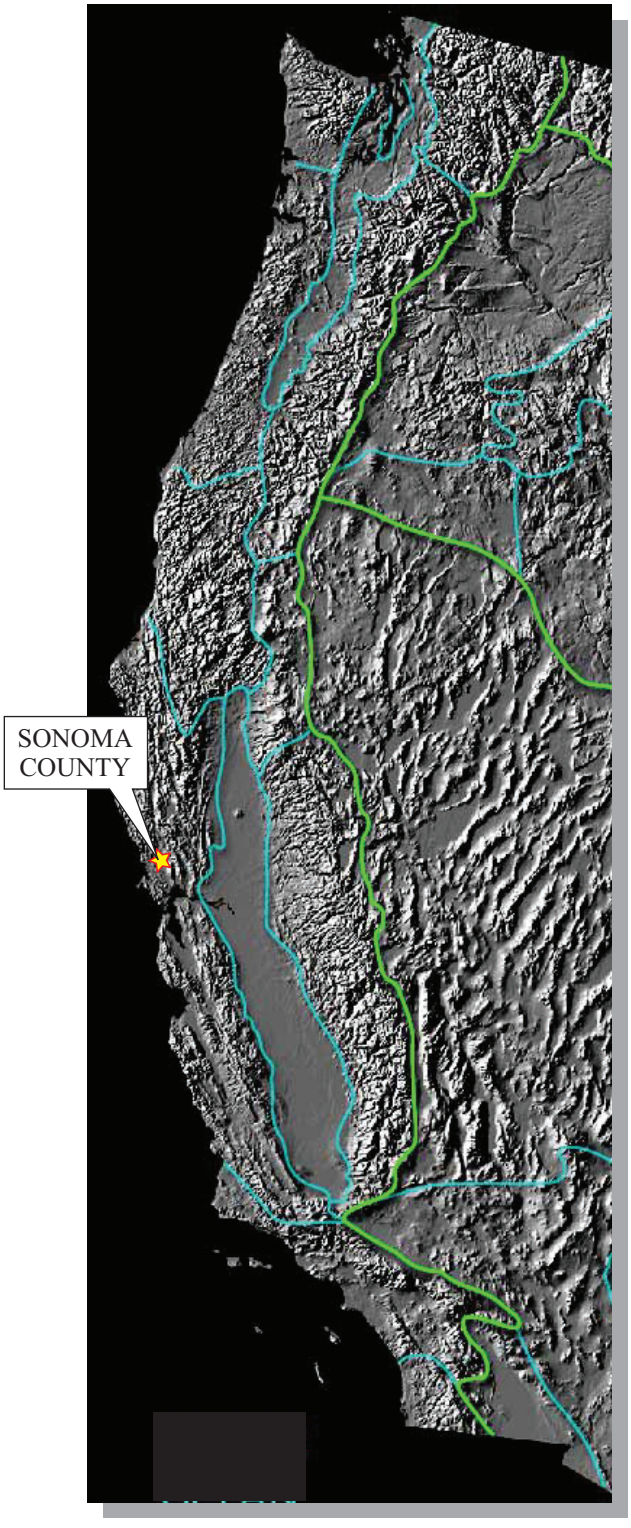
In the Land Capability Classification System used by the NRCS, soils are grouped according to Soils Capability Class. A Soils Capability Class indicates limitations for practical use for food, fiber, or forage production. Classes are designated by Roman numerals I through VIII, with additional coding by subclass indicated by lower case letters. Class I is the least restricted with Class VIII being severely limited and nearly precluded from use for commercial crop production. Prime soils are those located on land which has a combination of physical and chemical characteristics best suited to produce forage, feed, food, and other crops. Soils Capability Class I and II soils typically form prime crop and pasture land, which, under provisions of the Farmland Protection Policy Act of 1980, must be evaluated in implementation of NEPA for potential environmental effects if they are to be used for non-agricultural development.

NOT TO SCALE



SOURCE: US Geological Survey; AES, 2005

Figure 3.2-1
West Coast Geomorphic Provinces



SOURCE: US Geological Survey; AES, 2005

Figure 3.2-2
West Coast Geomorphic Provinces – Topography

The Land Capability Classification System is broken down into Capability Classes, subclasses and units, which are defined for the Wilfred site, the Stony Point site and the Lakeville site as discussed below. The Land Capability Classification System reflects a degree of limitation on soils for the suitability of most kinds of field crops. The soils in one capability unit are enough alike to require similar management. Capability subclasses are soil groups within one class. Adding a small letter to the Capability Class designation designates the restrictions in the soil groups.

SEISMIC CONSIDERATIONS

Seismic Intensity: the Modified Mercalli Intensity Scale

The Modified Mercalli Intensity (MMI) scale (**Table 3.2-1**) is a common measure of earthquake effects due to ground shaking intensity. The MMI values for intensity range from I (earthquake not felt) to XII (damage nearly total), and intensities ranging from IV to X could cause moderate to significant structural damage. The damage level represents the estimated overall level of damage that will occur for various MMI intensity levels. The damage, however, will not be uniform. Some buildings will experience substantially more damage than this overall level, and others will experience substantially less damage. Not all buildings perform identically in an earthquake. The age, material, type, method of construction, size, and shape of a building all affect its performance (ABAG, 1998). In addition, the physical characteristics of the soil and or rock that a structure rests upon have a major influence on the damage that may result from ground shaking. Maximum peak ground acceleration intensities at the Wilfred site, the Stony Point site and the Lakeville site are expected to cause between MMI VIII and IX ground shaking. Site-specific ground acceleration analyses are presented in **Section 3.2.2**, **Section 3.2.3** and **Section 3.2.4** below.

Magnitude

The Richter magnitude scale was developed in 1935 by Charles F. Richter of the California Institute of Technology as a mathematical device to compare the size of earthquakes. The magnitude of an earthquake is determined from the logarithm of the amplitude of waves recorded by seismographs. Adjustments are included for the variation in the distance between the various seismographs and the epicenter of the earthquakes. On the Richter scale, magnitude is expressed in whole numbers and decimal fractions. For example, a magnitude 5.3 might be computed for a moderate earthquake, and a strong earthquake might be rated as magnitude 6.3. Because of the logarithmic basis of the scale, each whole number increase in magnitude represents a tenfold increase in measured amplitude; as an estimate of energy, each whole number step in the magnitude scale corresponds to the release of about 31 times more energy than the amount associated with the preceding whole number value.

Earthquakes with magnitude of about 2.0 or less are usually called microearthquakes; they are not commonly felt by people and are generally recorded only on local seismographs. Events with magnitudes of about 4.5 or greater are strong enough to be recorded by sensitive seismographs all over the world. Great earthquakes, such as the 1964 Good Friday earthquake in Alaska, have magnitudes of 8.0 or higher. The Richter scale is not used to express damage.

TABLE 3.2-1
MODIFIED MERCALLI INTENSITY SCALE

Intensity Value	Intensity Description	Average Peak Acceleration
I.	Not felt except by a very few persons under especially favorable circumstances.	< 0.0015 g[a]
II.	Felt only by a few persons at rest, especially on upper floors on buildings. Delicately suspended objects may swing.	< 0.0015 g
III.	Felt quite noticeably indoors, especially on upper floors of buildings, but many persons do not recognize it as an earthquake. Standing motor cars may rock slightly. Vibration similar to a passing of a truck. Duration estimated.	< 0.0015 g
IV.	During the day felt indoors by many, outdoors by few. At night, some awakened. Dishes, windows, doors disturbed; walls make cracking sound. Sensation like heavy truck striking building. Standing motor cars rocked noticeably.	0.015 g-0.02 g
V.	Felt by nearly everyone, many awakened. Some dishes, windows, etc., broken; a few instances of cracked plaster; unstable objects overturned. Disturbances of trees, poles, and other tall objects sometimes noticed. Pendulum clocks may stop.	0.03 g-0.04 g
VI.	Felt by all, many frightened and run outdoors. Some heavy furniture moved; a few instances of fallen plaster or damaged chimneys. Damage slight.	0.06 g-0.07 g
VII.	Everybody runs outdoors. Damage negligible in buildings of good design and construction; slight to moderate in well-built ordinary structures; considerable in poorly built or badly designed structures; some chimneys broken. Noticed by persons driving cars.	0.10 g-0.15 g
VIII.	Damage slight in specially designed structures; considerable in ordinary substantial buildings, with partial collapse; great in poorly built structures. Panel walls thrown out of frame structures. Fall of chimneys, factory stacks, columns, monuments, walls. Heavy furniture overturned. Sand and mud ejected in small amounts. Changes in well water. Persons driving motor cars disturbed.	0.25 g-0.30 g
IX.	Damage considerable in specially designed structures; well-designed frame structures thrown out of plumb; great in substantial buildings, with partial collapse. Buildings shifted off foundations. Ground cracked conspicuously. Underground pipes broken.	0.50 g-0.55 g
X.	Some well-built wooden structures destroyed; most masonry and frame structures destroyed with foundations; ground badly cracked. Rails bent. Landslides considerable from river banks and steep slopes. Shifted sand and mud. Water splashed (slopped) over banks.	> 0.60 g
XI.	Few, if any, (masonry) structures remain standing. Bridges destroyed. Broad fissures in ground. Underground pipelines completely out of service. Earth slumps and land slips in soft ground. Rails bent greatly.	> 0.60 g
XII.	Damage total. Practically all works of construction are damaged greatly or destroyed. Waves seen on ground surface. Lines of sight and level are distorted. Objects are thrown upward into the air.	> 0.60 g

NOTE: [a] g is gravity = 980 centimeters per second squared.
SOURCE: Bolt, Bruce A., 1988

Liquefaction

Soil liquefaction can occur during ground shaking in soils under structures saturated with high groundwater. Liquefaction is a temporary condition wherein saturated granular soils near the ground surface experience a substantial loss of strength between grains during a seismic event. Liquefaction transforms the soil condition to a liquefied state as a result of increased soil pore water pressure. Soil pore water pressure is the water pressure between soil particles. Liquefaction can occur if three factors are present: seismic activity, loose sand or silt, and shallow ground water. Liquefaction potential has been found to be greatest where the ground water is within a depth of 50 feet or less, and submerged loose, fine sands occur within that depth. The potential for liquefaction is diminished by the presence of soils that have larger grain sizes, higher clay content (i.e. provides more cohesion between soil grains), and the presence of gravel. Site-specific liquefaction analyses appear in **Section 3.2.2**, **Section 3.2.3** and **Section 3.2.4** below.

Lateral Spreading

Lateral spreading typically occurs during a seismic event in the form of horizontal ground displacement, and is typical where the ground surface is relatively flat, and comprised of alluvium or depositional sediment. This movement in soils is generally due to failure along a weak sublayer that is formed within an underlying liquefied layer. Cracks develop within the weakened material, while blocks of soil move laterally toward the free face. Site-specific analyses on lateral spreading appear in **Section 3.2.2**, **Section 3.2.3** and **Section 3.2.3** below.

MINERAL RESOURCES

Regional Late Mesozoic eugeosynclinal rocks of the Franciscan Formation, Late Mesozoic shelf and slope sedimentary rocks, Cenozoic marine sedimentary rocks, Cenozoic nonmarine sedimentary rocks and alluvial deposits, Cenozoic volcanic rocks, granitic rocks chiefly of Mesozoic age, and ultramafic rocks chiefly of Mesozoic age characterize the rock types with their associated mineral assemblages which are common in Sonoma County (USGS, 1966). The rock types described here support regional operations of limited mining facilities for the production of granitic and sandstone gravel. No mining activity has been reported on or in the vicinity of the Wilfred site, the Stony Point site or the Lakeville site.

3.2.2 WILFRED SITE

The Wilfred Site is situated within the Santa Rosa Plain, also known as the Cotati Valley, which is bounded by the Sonoma Mountains and Mayacama Mountains to the east, and the Mendocino Range to the west. The geomorphology of surface features in the Cotati Valley is characterized by fluvial and alluvial deposits, as well as basin sediment.

TOPOGRAPHY

With the exception of depressed drainage channels for flood control, the Wilfred site is generally flat and level. The major drainage depressions occur at the Bellevue-Wilfred Channel and the Laguna de Santa Rosa (**Figure 3.2-3**). The former traverses the larger, western portion of the Wilfred site in a northeasterly direction, while the latter forms a portion of the southern boundary of the same portion. Both channels intersect at the southwest corner of the Wilfred site.

SOILS

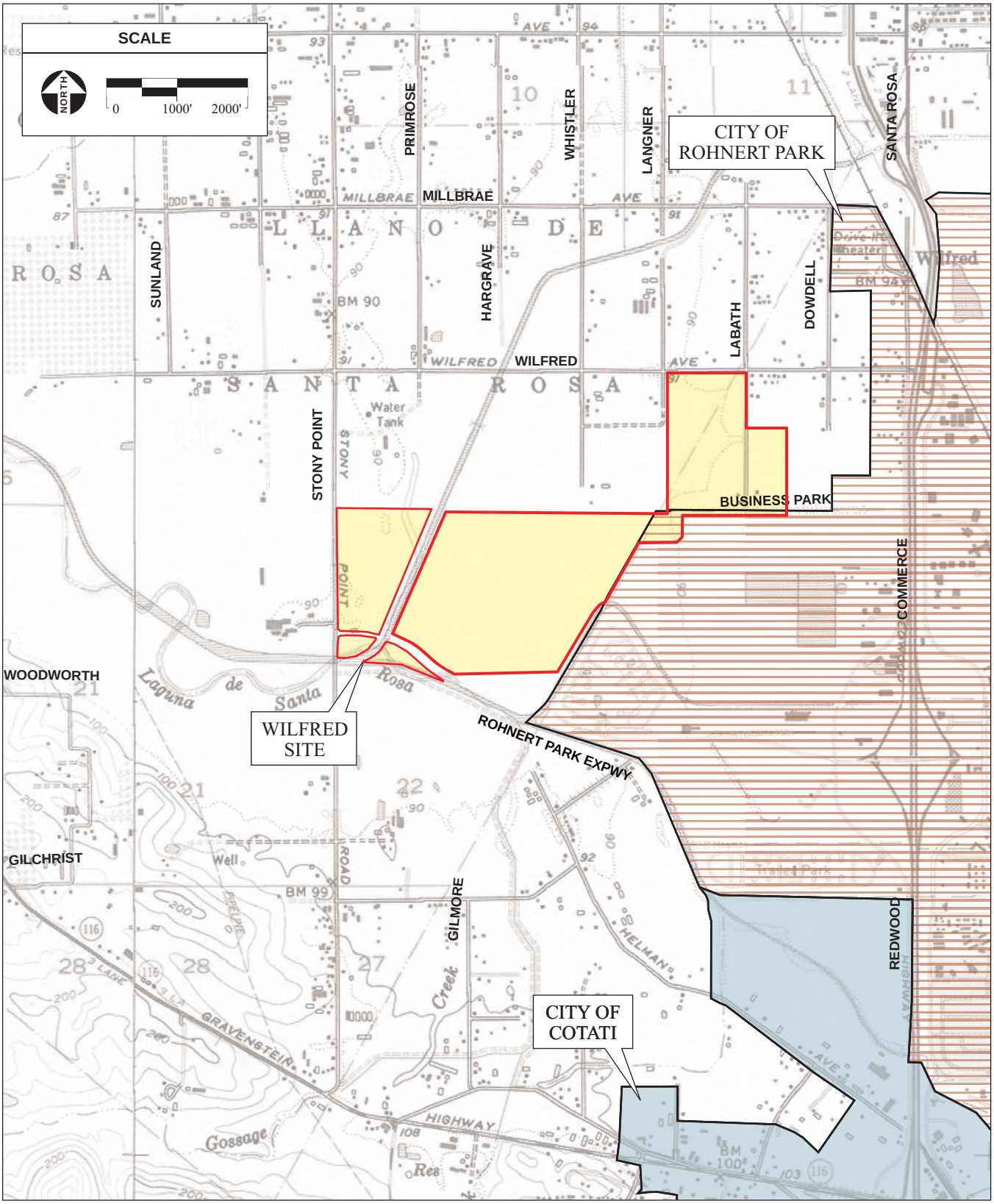
The Wilfred site is comprised of areas consisting of three soil classifications (**Figure 3.2-4**). The majority of the site is classified as Clear Lake clay (CeA), with portions classified as Wright loam, shallow, wet (WoA), and a small portion of Wright loam, wet (WhA).

TABLE 3.2-2
PROJECT SOIL LIMITATIONS - WILFRED SITE

	FACTOR						
SOILS	**Depth**	**Permeability**	**Drainage**	**Erosion**	**Shrink/ Swell**	**Runoff**	**Capability Class[a]**
Clear Lake Clay (CeA) 0-2% slope	72 Inches	Low	Drained	Slight	Low to moderate	Slow	IIs-5
Wright Loam, wet (WhA) 0-2% slope	70 Inches	Very low	Moderately poor	None to slight	Moderate to high	Very slow	IIIw-3
Wright Loam, shallow, wet (WoA) 0-2% slope	20 Inches	Very low	Moderately poor	None to slight	Moderate to high	Very slow	IVw-3

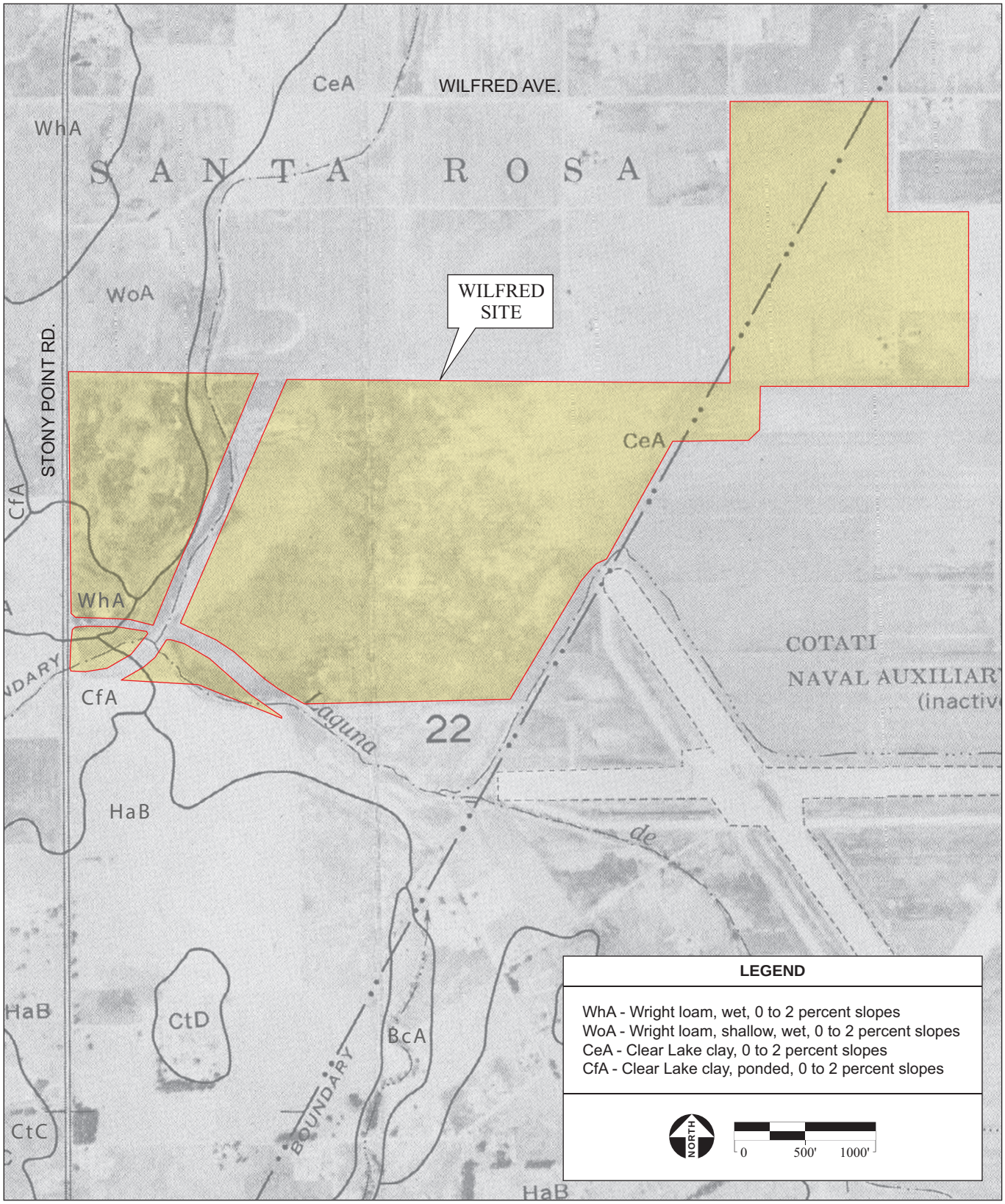
NOTE: [a] Capability Class: Class I soils have few limitations that restrict their use; Class II soils have moderate limitations that reduce the choice of plants or that require moderate conservation practices; Class III soils have severe limitations that reduce the choice of plants or that require special conservation practices, or both; Class IV soils have very severe limitations that reduce the choice of plants or that require very careful management, or both; Class V soils are not likely to erode but have other limitations, impractical to remove, that limit their use; Class VI soils have severe limitations that make them generally unsuitable for cultivation; Class VII soils have very severe limitations that make them unsuitable for cultivation. Capability subclasses: (e) erosion, (s) shallow, droughty or rocky, (w) water interferes with plant growth. Subclasses: (3) limitation from slow or very slow permeability of subsoil or substratum, (5) limitation from fine or very fine surface soil.
SOURCE: NRCS, 1972.

The Clear Lake series generally consists of clays, formed under conditions of poor drainage. Beneath the upper layers are usually alluvial strata comprised of basic and sedimentary rock. The Clear Lake series is often found on plains and in flat basins. Acidity for this series ranges from neutral to strongly acidic. Clays in the Clear Lake series are characterized by slow permeability and runoff, and a slight erosion hazard. The Capability Class assigned by the NRCS to this soil is IIs-5, indicating a sum of limitations requiring moderate conservation, soil limitations due to being shallow, droughty, saline or stony, and limitations resulting from a fine-textured stature.



SOURCE: "Cotati, CA" USGS 7.5 Minute Topographic Quadrangle, Un-sectioned Area "Llano De Santa Rosa", T6N, R8W, Mt. Diablo Baseline and Meridian; AES, 2005

Figure 3.2-3
Wilfred Site Topography



SOURCE: USDA Soil Survey of Sonoma County, May 1972; AES, 2007

Figure 3.2-4
Wilfred Site Soil Map

Soils classified under the Wright series are generally moderate to poor in drainage, due in part to a clay subsoil. Beneath Wright strata is often a layer of old valley alluvium from composite sources, such as volcanic and marine sediment. Wright soils are often found on low terraces and appear as undulated. Soils under both the WoA and WhA classification symbols share many characteristics in terms of appearance and plasticity, although WoA is considerably shallower than WhA. These soils are generally somewhat poor in drainage, with little to no erosion hazard. WhA soils have a Capability Classification of IIIw-3, indicating limitations requiring conservation measures, often requiring artificial drainage, and problems associated with slow to very slow permeability. The NRCS has assigned a Capabilities Class IVw-3 to WoA soils, indicating severe limitations to agricultural uses, a need for artificial drainage, and problems associated with slow to very slow permeability.

SEISMICITY

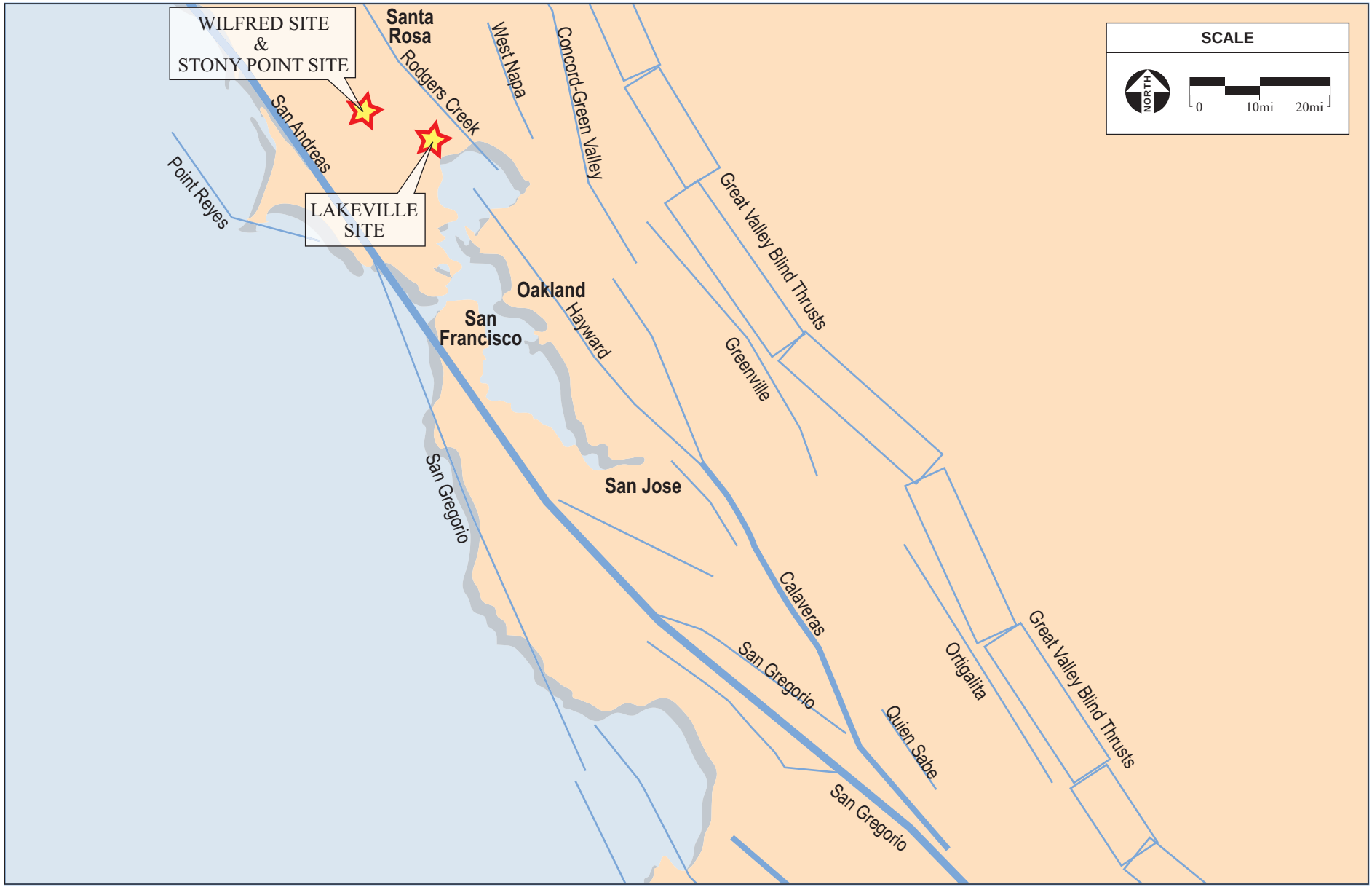
The Wilfred site is located within the San Francisco Bay Area, which is a seismically active area. Ten active fault lines have been identified within 33 miles of the Wilfred site (**Figure 3.2-5**), with several other faults influencing seismic factors in the San Francisco Bay Area. **Table 3.2-3** below lists the ten nearest faults to the Wilfred site, and indexes the magnitude and intensity for seismic events that may result.

TABLE 3.2-3
DETERMINISTIC SEISMIC CHARACTERISTICS – WILFRED SITE

Fault Name	Approximate Distance From Site (miles)	Maximum Considered Earthquake Moment Magnitude (Mw)	Peak Horizontal Ground Acceleration (g)
Rodgers Creek	4.8	7.0	0.36
San Andreas	14.9	7.9	0.26
Mayacama	15.0	6.9	0.17
West Napa	20.3	6.5	0.10
Point Reyes	25.1	6.8	0.12
Hayward	27.8	7.1	0.10
Hunting Creek – Berryessa	29.1	6.9	0.09
Collayomi	29.1	6.1	0.06
Concord – Green Valley	30.0	6.9	0.08
San Gregorio	32.4	7.3	0.10

SOURCE: GEOCON Consultants, Inc., AES, 2004.

Table 3.2-1 lists theoretical intensity levels alongside site acceleration factors and typical structural consequences to seismic events. As shown in **Table 3.2-3** above, the Rogers Creek Fault is approximately 4.8 miles east of the Wilfred site, with a Maximum Moment Magnitude of7.0, and a peak horizontal ground acceleration of 0.36g. The Rodgers Creek Fault is considered to be the source of the greatest seismic ground shaking at the Wilfred site.



SOURCE: Geocon Consultants; AES, 2005

Figure 3.2-5
Regional Fault Map

Computerized probabilistic modeling estimates a 10% chance of exceeding 0.36g ground acceleration in a seismic event within the next 50 years, with a predicted ground motion of 0.45*g* (GEOCON 2004). As shown in **Table 3.2-1**, such an event would fall between Level VIII and Level IX in intensity. Predictable structural outcomes include moderate to considerable damage in specially designed structures; well-designed frame structures thrown out of plumb; considerable damage in substantial buildings, with partial collapse. Buildings may be shifted off foundations. Ground may become cracked conspicuously. Underground pipes may be severed.

A maximum probable earthquake (magnitude 7.9) on the San Andreas Fault, approximately 14.9 miles away from the Wilfred site, may produce a peak horizontal ground acceleration of 0.26g at the Wilfred site. On the Mayacama Fault, approximately 15 miles away from the Wilfred site, a maximum probable earthquake (magnitude 6.9) may produce a peak horizontal ground acceleration of 0.17g. Approximately 20.3 miles away, a maximum probable earthquake (magnitude 6.5) at the West Napa Fault may produce a peak horizontal ground acceleration of 0.10g at the Wilfred site. A maximum probable earthquake (magnitude 6.8) on the Point Reyes Fault, at a distance of 25.1 miles, may produce a peak horizontal ground acceleration of 0.12g at the Wilfred site. On the Hayward Fault, approximately 27.8 miles from the Wilfred site, a maximum probable earthquake (magnitude 7.1) may produce a peak horizontal ground acceleration of 0.10g.

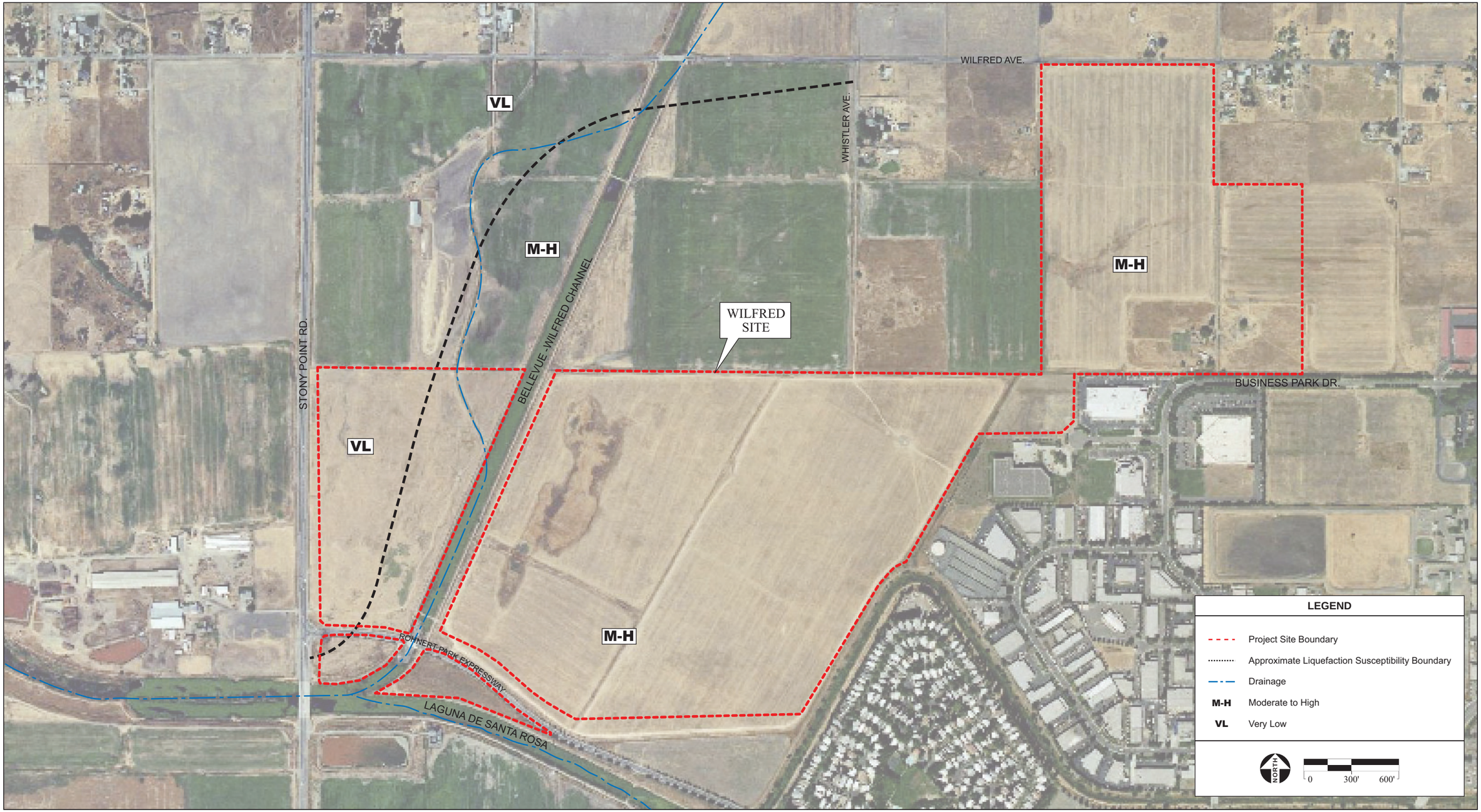
Approximately 29.1 miles away, a maximum probable earthquake (magnitude 6.9) at the Hunting Creek-Berryessa Fault may produce a peak horizontal ground acceleration of 0.9g in the Wilfred site. A maximum probable earthquake (magnitude 6.1) on the Collayomi Fault, at a distance of 29.1 miles, may produce a peak horizontal ground acceleration of 0.06g in the Wilfred site. On the Concord-Green Valley Fault, approximately 30 miles from the Wilfred site, a maximum probable earthquake (magnitude 6.9) may produce a peak horizontal ground acceleration of 0.08g. Approximately 32.4 miles away, a maximum probable earthquake (magnitude 7.3) at the San Gregorio Fault may produce a peak horizontal ground acceleration of 0.1g in the Wilfred site.

Liquefaction

Based on geotechnical analysis performed by GEOCON (2004), the potential of liquefaction on site varies from low to high (**Figure 3.2-6**). This potential results from the presence of isolated "lenses" of liquefiable soils.

Lateral Spreading

Based on observed subsurface conditions at the Stony Point site, potentially liquefiable sand deposits occur in isolated "lenses" rather than in layers on the Wilfred site. Layers, rather than lenses, are subject to lateral spreading associated with liquefaction (GEOCON 2004). Therefore, the potential for lateral spreading is low on the Wilfred site.



SOURCE: Aerial Photography August 2002; William Lettis & Associates, Maps showing Quaternary Geology and Liquefaction Susceptibility in Napa, California; Geocon Consultants, Inc.; AES, 2005

Figure 3.2-6
Wilfred Site Liquefaction Susceptibility Map

Seismically Induced Flooding

Based on their spatial and topographical removal from the Pacific Ocean, the Wilfred, Stony Point, and Lakeville sites are well protected from a tsunami in the event of an offshore seismic event. Moreover, none of the sites considered is located downstream from any major dams or reservoirs in sufficient proximity to cause inundation in the event of seismically induced breakage.

3.2.3 STONY POINT SITE

As with the Wilfred site above, the Stony Point site is situated within the Santa Rosa Plain.

TOPOGRAPHY

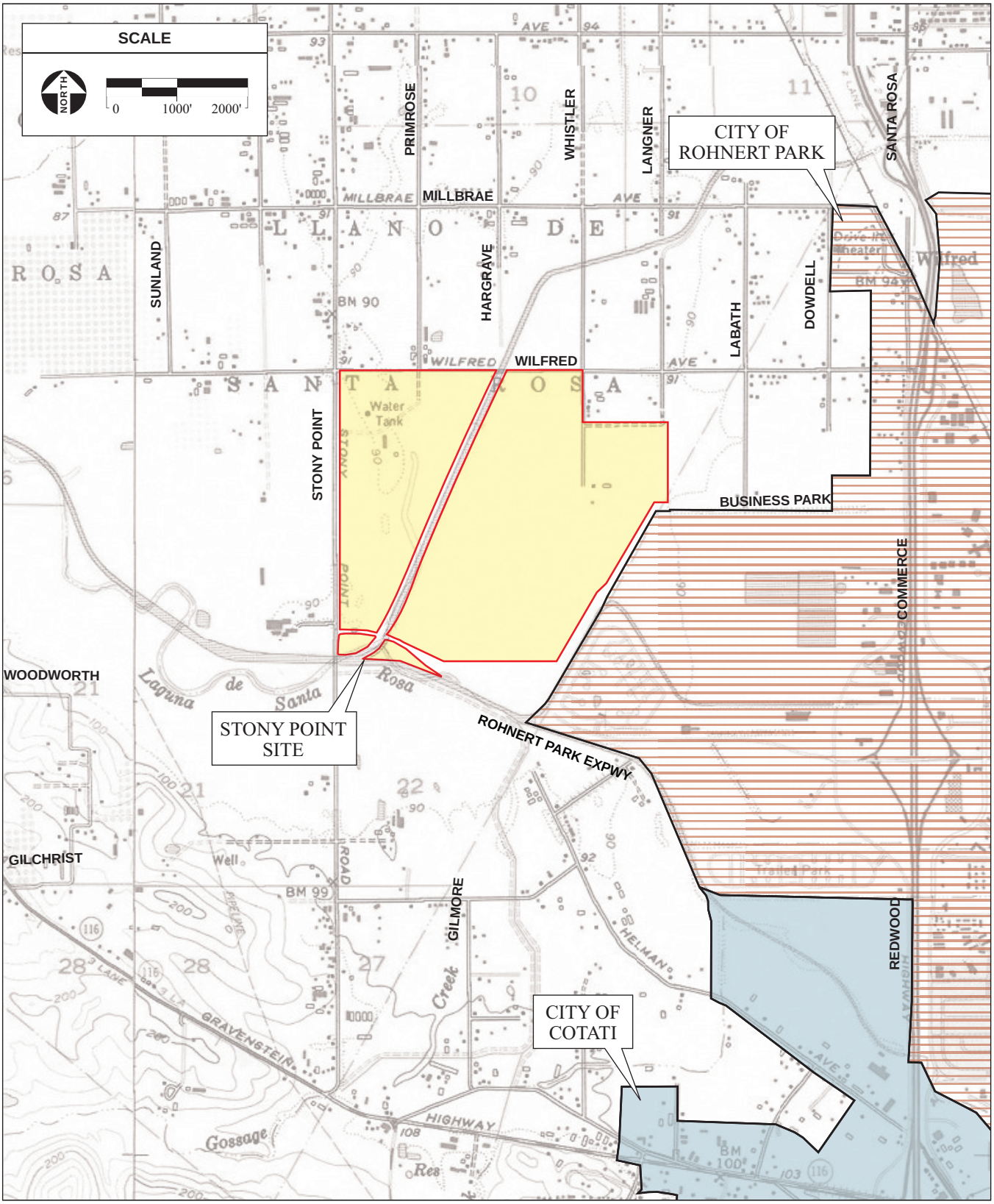
With the exception of depressed drainage channels for flood control, the Stony Point site is generally flat and level. The major drainage depressions occur at the Bellevue-Wilfred Channel and the Laguna de Santa Rosa (**Figure 3.2-7**). The former traverses the center of the Stony Point site in a northeasterly direction, while the latter forms a portion of the southern boundary of the site. Both channels intersect at the southwest corner of the Stony Point site.

SOILS

The Stony Point site is comprised of areas consisting of three soil classifications (**Figure 3.2-8**). The majority of the site is classified as Clear Lake clay (CeA), with portions classified as Wright loam, shallow, wet (WoA), and a small portion of Wright loam, wet (WhA) (**Table 3.2-4**).

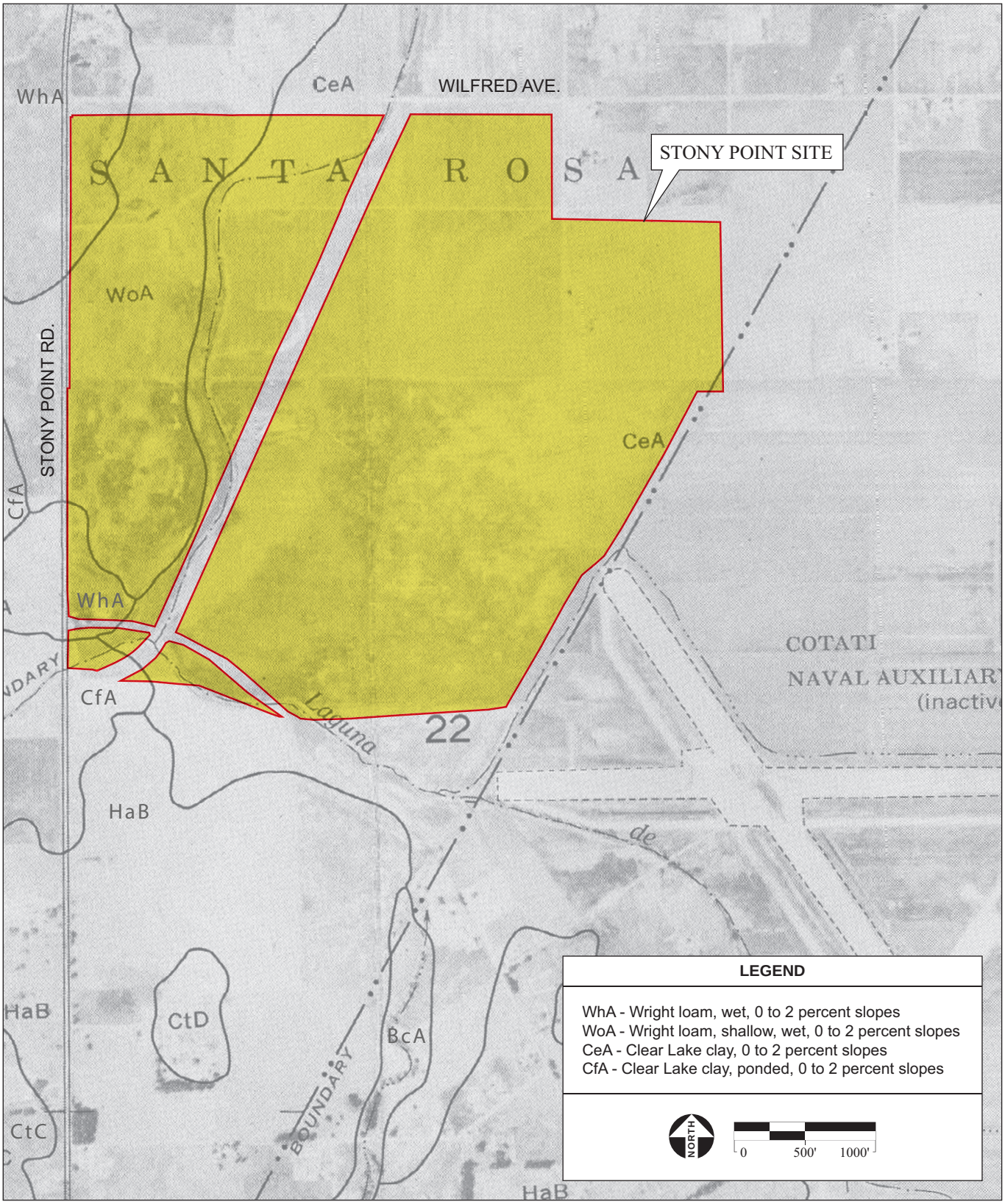
The Clear Lake series generally consists of clays, formed under conditions of poor drainage. Beneath the upper layers are usually alluvial strata comprised of basic and sedimentary rock. The Clear Lake series is often found on plains and in flat basins. Acidity for this series ranges from neutral to strongly acidic. Clays in the Clear Lake series are characterized by slow permeability and runoff, and a slight erosion hazard. The Capability Class assigned by the NRCS to this soil is IIs-5, indicating a sum of limitations requiring moderate conservation, soil limitations due to being shallow, droughty, saline or stony, and limitations resulting from a fine-textured stature.

Soils classified under the Wright series are generally moderate to poor in drainage, due in part to a clay subsoil. Beneath Wright strata is often a layer of old valley alluvium from composite sources, such as volcanic and marine sediment. Wright soils are often found on low terraces and appear as undulated. Soils under both the WoA and WhA classification symbols share many characteristics in terms of appearance and plasticity, although WoA is considerably shallower than WhA. These soils are generally somewhat poor in drainage, with little to no erosion hazard. WhA soils have a Capability Classification of IIIw-3, indicating limitations requiring



SOURCE: "Cotati, CA" USGS 7.5 Minute Topographic Quadrangle, Un-sectioned Area "Llano De Santa Rosa", T6N, R8W, Mt. Diablo Baseline and Meridian; AES, 2005

Figure 3.2-7
Stony Point Site Topography



SOURCE: USDA Soil Survey of Sonoma County, May 1972; AES, 2007

Figure 3.2-8
Stony Point Site Soil Map

TABLE 3.2-4
PROJECT SOIL LIMITATIONS – STONY POINT SITE

	FACTOR						
SOILS	**Depth**	**Permeability**	**Drainage**	**Erosion**	**Shrink/ Swell**	**Runoff**	**Capability Class[a]**
Clear Lake Clay (CeA) 0-2% slope	72 Inches	Low	Drained	Slight	Low to moderate	Slow	IIs-5
Wright Loam, wet (WhA) 0-2% slope	70 Inches	Very low	Moderately poor	None to slight	Moderate to high	Very slow	IIIw-3
Wright Loam, shallow, wet (WoA) 0-2% slope	20 Inches	Very low	Moderately poor	None to slight	Moderate to high	Very slow	IVw-3

NOTE: [a] Capability Class: Class I soils have few limitations that restrict their use; Class II soils have moderate limitations that reduce the choice of plants or that require moderate conservation practices; Class III soils have severe limitations that reduce the choice of plants or that require special conservation practices, or both; Class IV soils have very severe limitations that reduce the choice of plants or that require very careful management, or both; Class V soils are not likely to erode but have other limitations, impractical to remove, that limit their use; Class VI soils have severe limitations that make them generally unsuitable for cultivation; Class VII soils have very severe limitations that make them unsuitable for cultivation. Capability subclasses: (e) erosion, (s) shallow, droughty or rocky, (w) water interferes with plant growth. Subclasses: (3) limitation from slow or very slow permeability of subsoil or substratum, (5) limitation from fine or very fine surface soil.
SOURCE: NRCS, 1972.

conservation measures, often requiring artificial drainage, and problems associated with slow to very slow permeability. The NRCS has assigned a Capabilities Class IVw-3 to WoA soils, indicating severe limitations to agricultural uses, a need for artificial drainage, and problems associated with slow to very slow permeability.

SEISMICITY

The Stony Point site is located within the San Francisco Bay Area, which is a seismically active area. During the life of the project, it is therefore expected that strong ground shaking could occur in the region. Ten active fault lines have been identified within 33 miles of the Stony Point site (**Figure 3.2-5** above), with several other faults influencing seismic factors in the San Francisco Bay Area. **Table 3.2-5** below lists the ten nearest faults to the Stony Point site, and indexes the magnitude and intensity for seismic events that may result.

TABLE 3.2-5
DETERMINISTIC SEISMIC CHARACTERISTICS – STONY POINT SITE

Fault Name	Approximate Distance From Site (miles)	Maximum Considered Earthquake Moment Magnitude (Mw)	Peak Horizontal Ground Acceleration (g)
Rodgers Creek	4.8	7.0	0.36
San Andreas	14.9	7.9	0.26
Mayacama	15.0	6.9	0.17
West Napa	20.3	6.5	0.10
Point Reyes	25.1	6.8	0.12
Hayward	27.8	7.1	0.10
Hunting Creek – Berryessa	29.1	6.9	0.09
Collayomi	29.1	6.1	0.06
Concord – Green Valley	30.0	6.9	0.08
San Gregorio	32.4	7.3	0.10

SOURCE: GEOCON Consultants, Inc., AES, 2004.

Table 3.2-1, above, lists theoretical intensity levels alongside site acceleration factors and typical structural consequences to seismic events. As shown in **Table 3.2-5** immediately above, the Rogers Creek Fault is approximately 4.8 miles east of the Stony Point site, with a Maximum Moment Magnitude of 7.0, and a peak horizontal ground acceleration of 0.36g. The Rodgers Creek Fault is considered to be the source of the greatest seismic ground shaking at the Stony Point site.

Computerized probabilistic modeling specific to the Stony Point site estimates a 10% chance of exceeding 0.36g ground acceleration in a seismic event within the next 50 years, with a predicted ground motion of 0.45*g* (GEOCON 2004). As shown in **Table 3.2-1**, such an event would fall between Level VIII and Level IX in intensity. Predictable structural outcomes include moderate to considerable damage in specially designed structures; well-designed frame structures thrown out of plumb; considerable damage in substantial buildings, with partial collapse. Buildings may be shifted off foundations. Ground may become cracked conspicuously. Underground pipes may be severed.

A maximum probable earthquake (magnitude 7.9) on the San Andreas Fault, approximately 14.9 miles away from the Stony Point site, may produce a peak horizontal ground acceleration of 0.26g at the Stony Point site. On the Mayacama Fault, approximately 15 miles away from the Stony Point site, a maximum probable earthquake (magnitude 6.9) may produce a peak horizontal ground acceleration of 0.17g. Approximately 20.3 miles away, a maximum probable earthquake (magnitude 6.5) at the West Napa Fault may produce a peak horizontal ground acceleration of 0.10g at the Stony Point site. A maximum probable earthquake (magnitude 6.8) on the Point Reyes Fault, at a distance of 25.1 miles, may produce a peak horizontal ground acceleration of

0.12g at the Stony Point area. On the Hayward Fault, approximately 27.8 miles from the Stony Point site, a maximum probable earthquake (magnitude 7.1) may produce a peak horizontal ground acceleration of 0.10g.

Approximately 29.1 miles away, a maximum probable earthquake (magnitude 6.9) at the Hunting Creek-Berryessa Fault may produce a peak horizontal ground acceleration of 0.9g in the Stony Point site. A maximum probable earthquake (magnitude 6.1) on the Collayomi Fault, at a distance of 29.1 miles, may produce a peak horizontal ground acceleration of 0.06g in the Stony Point site. On the Concord-Green Valley Fault, approximately 30 miles from the Wilfred site, a maximum probable earthquake (magnitude 6.9) may produce a peak horizontal ground acceleration of 0.08g. Approximately 32.4 miles away, a maximum probable earthquake (magnitude 7.3) at the San Gregorio Fault may produce a peak horizontal ground acceleration of 0.1g in the Stony Point site.

Liquefaction

Based on site-specific geotechnical analysis performed by GEOCON (2004), the potential of liquefaction on site varies from low to high (**Figure 3.2-9**). This potential results from the presence of isolated "lenses" of liquefiable soils.

Lateral Spreading

Based on observed subsurface conditions at the site of Alternative B, potentially liquefiable sand layers are non-existent (GEOCON 2004). Therefore, the potential for lateral spreading is low.

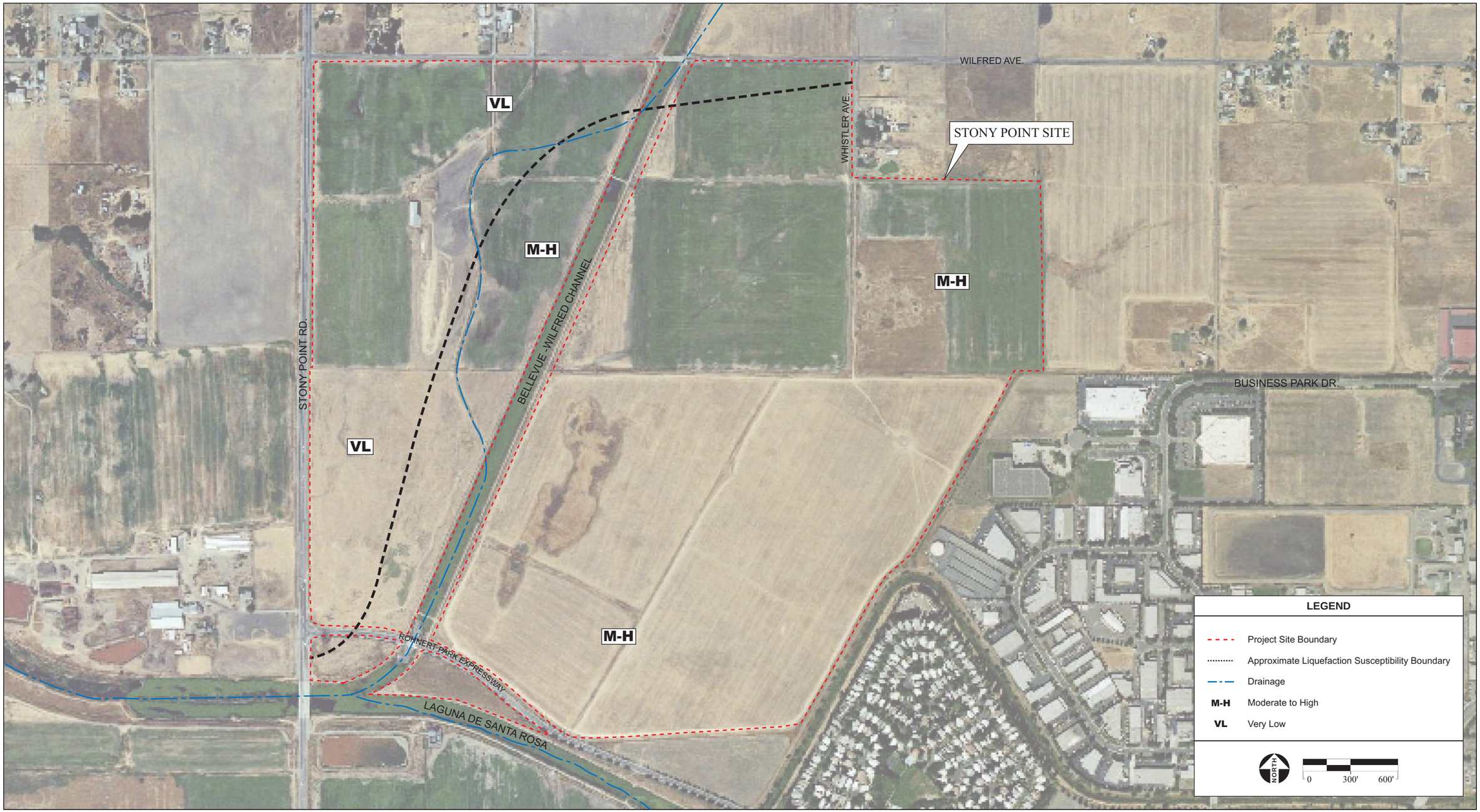
Seismically Induced Flooding

Based on its spatial and topographical removal from the Pacific Ocean, the Stony Point site is well protected from a tsunami in the event of an offshore seismic event. Moreover, the site is not located downstream from any major dams or reservoirs that could inundate the site in the event of seismically induced breakage.

3.2.4 LAKEVILLE SITE

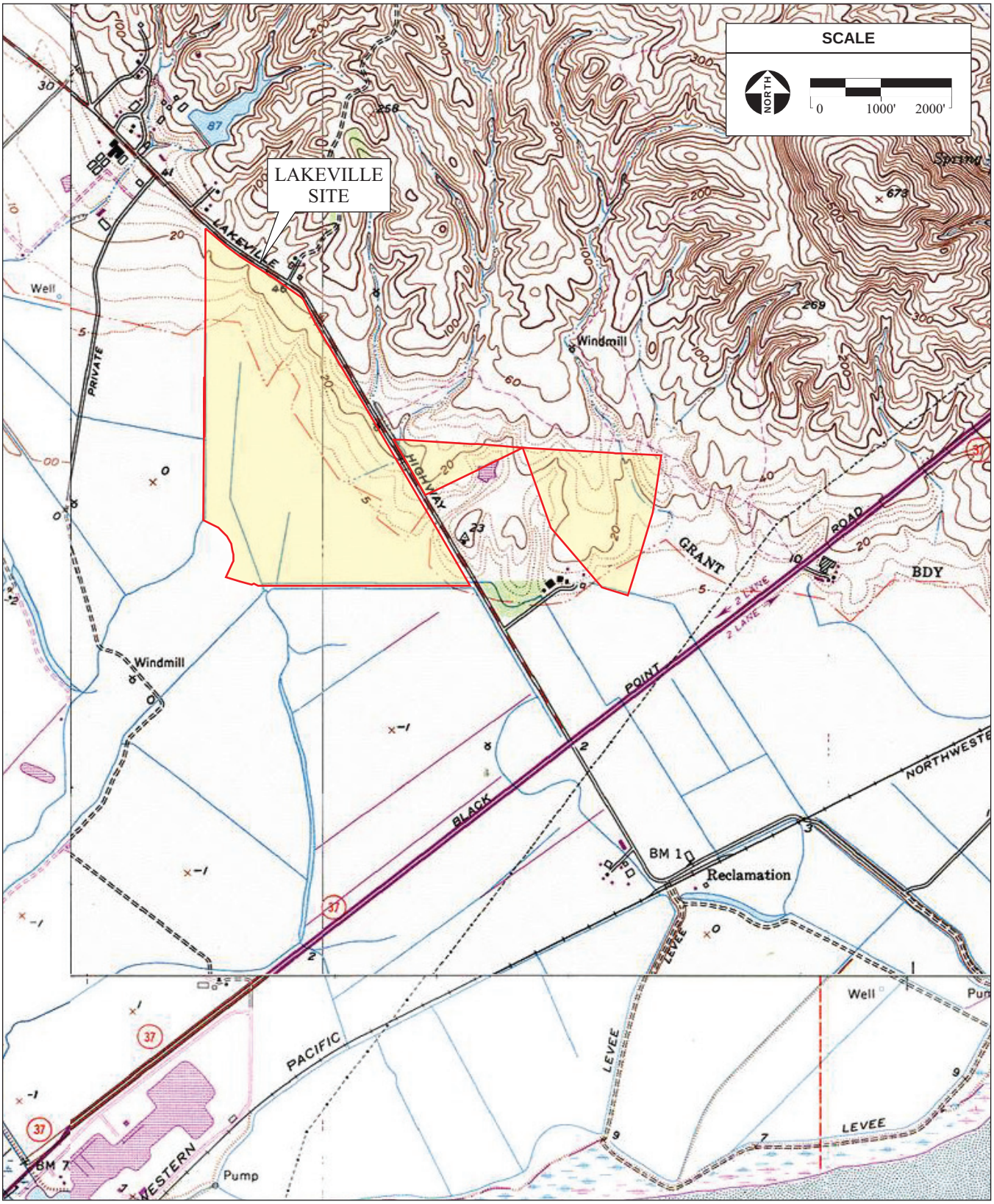
TOPOGRAPHY

The Lakeville site is characterized as having lowland areas to the west, with higher elevations trending eastward (**Figure 3.2-10**). The southwestern portion of the site is mostly level, sloping slightly to the east from an elevation of approximately 5 feet above mean sea level (msl). The portions of the site adjacent to the Lakeville Highway and further east includes terrain elevating up to approximately 40 feet above msl.



SOURCE: Aerial Photography August 2002; William Lettis & Associates, Maps showing Quaternary Geology and Liquefaction Susceptibility in Napa, California; Geocon Consultants, Inc.; AES, 2005

Figure 3.2-9
Stony Point Site Liquefaction Susceptibility Map



SOURCE: "Sears Point, CA" USGS 7.5 Minute Topographic Quadrangle,
Unsectioned areas of "San Pablo Mountains", T4N, R5W; Mt. Diablo Baseline & Meridian; AES, 2005

Figure 3.2-10
Lakeville Site Topography

SOILS

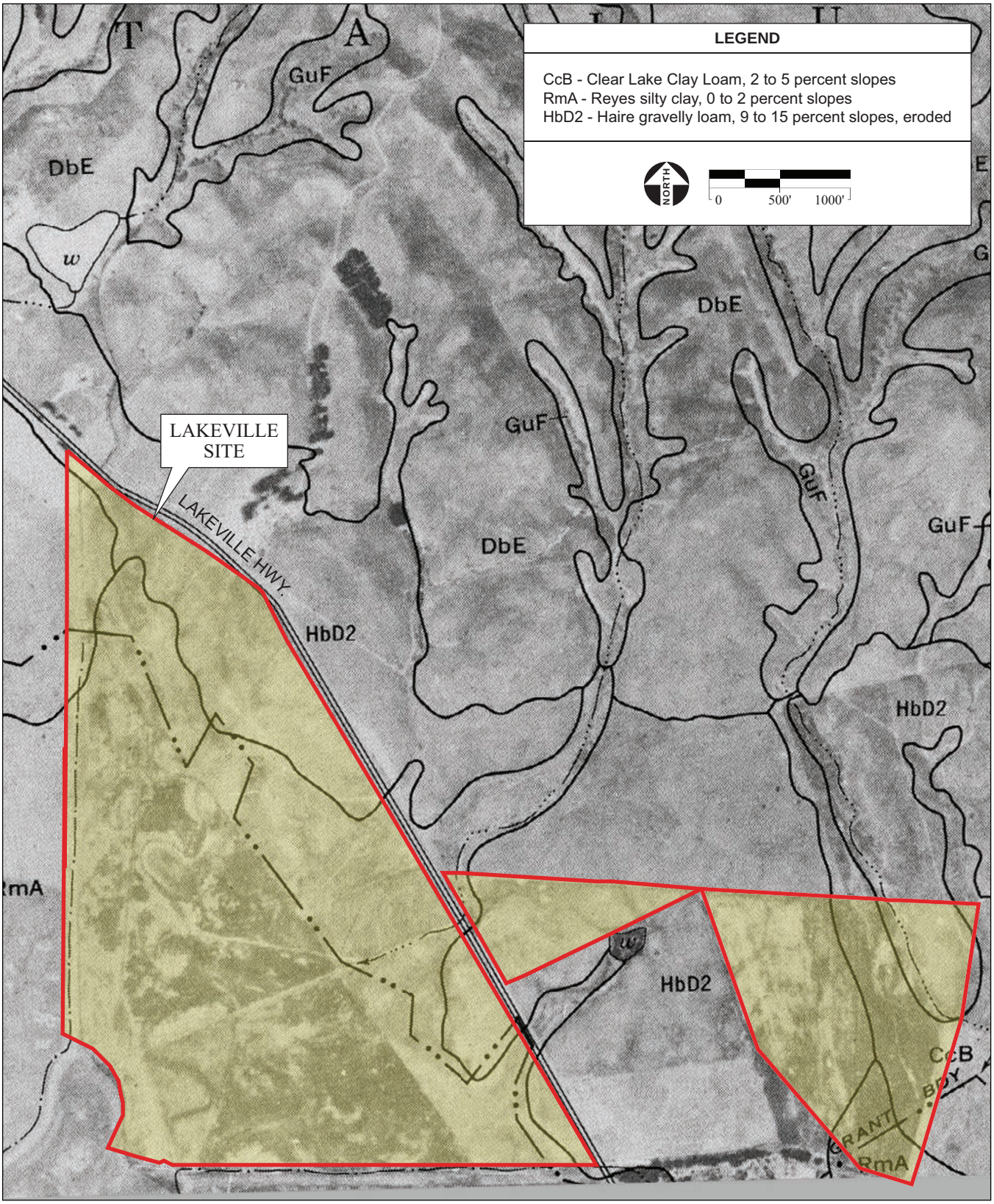
The Lakeville site is comprised of areas consisting of three soil classifications (**Figure 3.2-11, Table 3.2-6**). The majority of the site is classified as Reyes silty clay (RmA), with portions classified as Haire gravelly loam (HbD2), and a small portion of Clear Lake clay loam (CcB).

The geologic formations found on the Lakeville site are classified (**Appendix F**) as Artificial Fill (Af, Abm), Quaternary Alluvium (Qal, Qhf, Qpf), Bay Mud (Qhbm), Younger Bay Mud, Alluvial Interface Sand Deposit, Older Bay Mud, and Upper Petaluma Formation (Tpu) (GEOCON, 2003).

Alluvial material found on the site is derived from adjacent areas. The classes of alluvium are standard alluvium (Qal), Holocene alluvial fan deposits (Qhf), and Pleistocene alluvial fan deposits (Qpf). These types are described as similar to each other by GEOCON (2003), and are generally comprised of dense, stiff mixtures of sand, silt, clay and gravels.

Holocene age Bay Mud (Qhbm) is found in the lowland areas of the site. Generally, the ground surface of these deposits is at, or just above, sea level. The degree of consolidation and stratigraphic position determines the subclassifications of Bay Mud soils. Younger Bay Mud generally consists of very soft, saturated silty clay (CH) with varying amounts of decomposed organics. Very little (if any) fine sand was observed within the samples of the Younger Bay Mud. The material is firm in the upper five to six feet below ground surface (bgs) due to drying. However, material has a high moisture content, low dry density, and is very weak and compressible. This material is sensitive to changes in moisture; it swells when wet and desiccates when dried. The soft consistency of this deposit was demonstrated by a Standard Penetration Test (SPT, see **Appendix F**) with blow counts of less than five (5) and by very little tip resistance during the Cone Penetrometer Test (CPT). The engineering properties of Younger Bay Mud are very poor. Furthermore, Younger Bay Mud loses approximately 50% of its strength when disturbed.

The alluvial sand deposit located at the interface between the Younger and Older Bay Mud generally consisted of dense, gravelly, silty, clayey sand (SM, SC). In general, the engineering properties of this material are good. The granular nature provides increased shear strength. The Older Bay Mud at the site generally consists of stiff to very stiff, silty clay (CL, CH) and clayey silt (ML). Based on the CPT soundings, the Older Bay Mud extends to depths up to 140 feet bgs. Unlike the Younger Bay Mud, the engineering properties of this material are good. The material properties are usually adequate to support most pile foundations.



SOURCE: USDA Soil Survey of Sonoma County, May 1972; AES, 2005

Figure 3.2-11
Lakeville Site Soil Map

TABLE 3.2-6
PROJECT SOIL LIMITATIONS - LAKEVILLE SITE

SOILS	FACTOR						
	Depth	**Permeability**	**Drainage**	**Erosion**	**Shrink/ Swell**	**Runoff**	**Capability Class[a]**
Clear Lake Clay (CcB) 2-5% slope	72 Inches	Low	Drained	Slight	Low to moderate	Slow	IIs-5
Reyes silty clay (RmA) 0-2% slope	70 Inches	Very low	Moderately poor	None to slight	Moderate to high	Very slow	IIIw-3
Haire gravelly loam (HbD2) 9-15% slope	20 Inches	Very low	Moderately poor	None to slight	Moderate to high	Very slow	IVw-3

NOTE: [a] Capability Class: Class I soils have few limitations that restrict their use; Class II soils have moderate limitations that reduce the choice of plants or that require moderate conservation practices; Class III soils have severe limitations that reduce the choice of plants or that require special conservation practices, or both; Class IV soils have very severe limitations that reduce the choice of plants or that require very careful management, or both; Class V soils are not likely to erode but have other limitations, impractical to remove, that limit their use; Class VI soils have severe limitations that make them generally unsuitable for cultivation; Class VII soils have very severe limitations that make them unsuitable for cultivation. Capability subclasses: (e) erosion, (s) shallow, droughty or rocky, (w) water interferes with plant growth. Subclasses: (3) limitation from slow or very slow permeability of subsoil or substratum, (5) limitation from fine or very fine surface soil.
SOURCE: Sonoma County Soil Survey – NRCS, 1972.

Within the eastern portion of the site, the Upper Petaluma Formation consists of severely weathered material generally comprised of stiff to hard, silty, sandy lean clay (CL). This material has likely weathered from sandstone and siltstone. The severe degree of weathering has eliminated any visible bedding strata within this material. This material exhibits rock-like structure below approximately six feet bgs; however, the material remained readily excavatable with a backhoe and exploratory drill rig. The upper one (1) to five (5) feet of this material consists of highly plastic fat clay (CH) residual soil. GEOCON anticipates that this material has a moderate to high potential for expansion due to seasonal moisture variations. In general, the plasticity of this material decreases with depth. Other than the expansive nature of the surficial residual soils, the engineering parameters of this material are quite good.

SEISMICITY

The area of Alternative F is located within the San Francisco Bay Area, which is a seismically active area. During the life of the project, it is therefore expected that strong ground shaking could occur in the region. **Table 3.2-7** below identifies five (5) active faults within 20 miles of the site for Alternative F. The active Rodgers Creek Fault Zone is located approximately 2.7 miles northeast of the site. The active Hayward Fault is located about 6.5 miles to the south and the active San Andreas Fault is located about 18 miles to the west. The Rogers Creek Fault has a

Maximum Credible Earthquake (MCE) moment magnitude (M_w) of 7.0. This fault is considered to be the source of the greatest seismic ground shaking at the site.

TABLE 3.2-7
DETERMINISTIC SEISMIC CHARACTERISTICS - LAKEVILLE SITE

Fault Name	Approximate Distance From Site (Miles)	Maximum Considered Earthquake Moment Magnitude (Mw)	Peak Horizontal Ground Acceleration (g)	
			Lowland Areas	Upland Areas
Rodgers Creek	2.7	7.0	0.47	0.37
Hayward	6.5	7.1	0.33	0.26
West Napa	11	6.5	0.17	0.13
Concord – Green Valley	18	6.9	0.15	0.11
San Andreas	19	7.9	0.24	0.19

SOURCE: GEOCON Consultants, Inc., 2003, AES 2004.

As shown in **Table 3.2-7**, the maximum credible peak site acceleration is 0.47g for the lowland areas of the Lakeville site, while upland areas could sustain an acceleration of 0.37g. According to **Table 3.2-1**, such an event would fall between Level VIII and Level IX in intensity. Predictable structural outcomes include moderate to considerable damage in specially designed structures; well-designed frame structures thrown out of plumb; considerable damage in substantial buildings, with partial collapse. Buildings may be shifted off foundations. Ground may become cracked conspicuously. Underground pipes may be broken.

Lateral Spreading

Lateral spreading typically occurs during a seismic event in the form of horizontal ground displacement and is typical where ground surface is relatively flat, and comprised of alluvium or depositional sediment. This movement in soils is generally due to failure along a weak sublayer that is formed within an underlying liquefied layer. Cracks develop within the weakened material, while blocks of soil move laterally toward the free face. Subsurface conditions near the Lakeville site indicate that potentially liquefiable sand layers beneath ground surface are non-existent or relatively thin and isolated; therefore, the potential for lateral spreading is considered low.

Liquefaction

The upland portions of the Lakeville site along Lakeville Highway are expected to contain soils sufficiently dense and/or fine-grained so as not to present a liquefaction risk (**Appendix F**). Although not observed during GEOCON's investigation in the area of the Lakeville site, Bay Mud deposits within the lowland portion of the site may contain lenses of saturated, granular material. These materials may be subject to liquefaction during a seismic event.

Seismically Induced Flooding

San Pablo Bay is well protected from tsunamis (great sea waves produced by a submarine earthquakes) emanating from the Pacific Ocean. The Lakeville site, located north of undeveloped agricultural land that borders the San Pablo Bay, is unlikely to be affected by tsunamis and/or seiche waves. The site is not located downstream from any major dams or reservoirs that could inundate the site in the event of seismically induced breakage.

3.3 WATER RESOURCES

3.3.1 SURFACE WATER

WILFRED SITE

Watershed

The Wilfred Site is located in the Laguna de Santa Rosa watershed, within the Santa Rosa Plain Sub-basin of the Santa Rosa Valley Groundwater Basin (City of Rohnert Park, 2005). The Laguna de Santa Rosa is the Russian River's largest tributary and one of the larger freshwater wetlands in northern California (Sonoma Land Trust and Laguna de Santa Rosa Foundation, 2003) (**Figure 3.3-1**).

At the south end of the Wilfred and Stony Point Sites, the Laguna de Santa Rosa is a broad, shallow, excavated channel more than 300 feet wide and less than 40 feet deep. According to a recent Biological Assessment, the Laguna de Santa Rosa is seasonally eutrophic (Entrix, 2004). A Total Maximum Daily Load (TMDL) for ammonia and dissolved oxygen (DO) was proposed in 1995 (Morris, 1995), and was established by the RWQCB and USEPA (for total nitrogen and ammonia) in 2004 (Santa Rosa, 2004e). However, the nutrient-rich bottom deposits in the Laguna de Santa Rosa continue to decrease DO (Entrix, 2004).

The Wilfred Site is divided by the Bellevue-Wilfred Channel, also called the North Branch of the Laguna de Santa Rosa, which is a manmade flood control channel. The Bellevue-Wilfred Channel drains into the Laguna de Santa Rosa immediately south of the site (The Huffman-Broadway Group, Inc., 2006). The Sonoma County Water Agency (SCWA), the principal water agency of the region, manages this channel (KOMEX, 2007a), **Appendix G**.

The Wilfred Site contains several depressions that retain standing water in the winter and spring. These depressions are most concentrated in the western portion of the site, near the Bellevue-Wilfred Channel. The Bellevue-Wilfred Channel contains gently flowing water at a constant level year-round (The Huffman-Broadway Group, Inc., 2006).

Floodplain

Federal Executive Order 11988 addresses floodplain management. The order requires the evaluation of actions taken in a floodplain. Specifically, the order states that agencies shall first determine whether the proposed action will occur in a floodplain. Second, if an agency proposes to allow an action to be located in a floodplain, "the agency shall consider alternatives to avoid adverse effects and incompatible development in the floodplains." Finally, if the only practicable

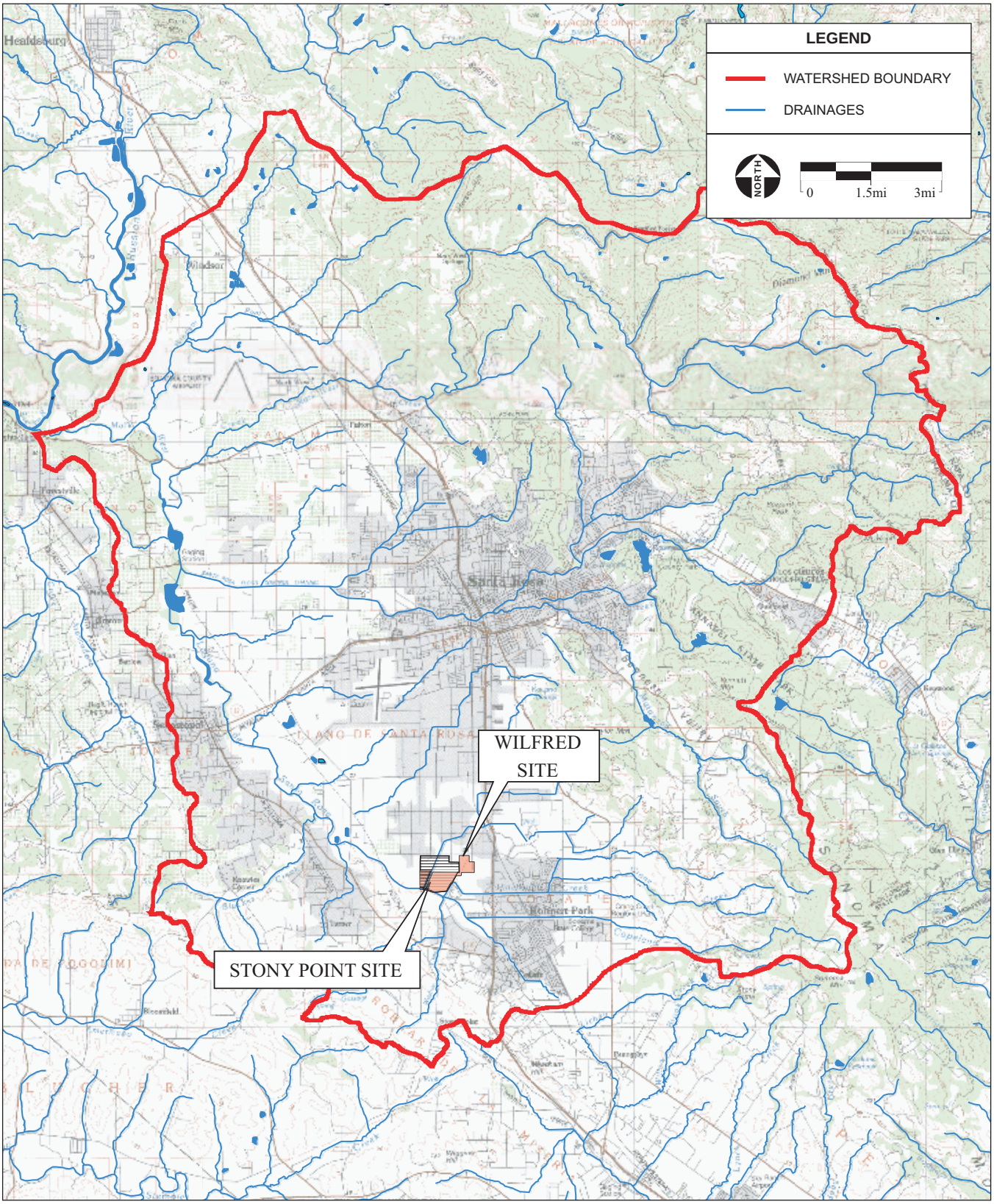
alternative action requires siting in a floodplain, the agency shall "minimize potential harm to or within the floodplain."

FEMA designates flood zones based on the chance of flooding in any given year. Flood Zone A has a one percent annual chance of flooding, for which no Base Flood Elevations (BFEs) have been determined. A BFE is the computed elevation to which a 100-year flood is expected to rise. Flood Zone A is commonly referred to as 100-year floodplain. Flood Zone X500 has a 0.2 percent annual chance of flooding; a one percent chance of flooding with an average depth of less than one foot or with a drainage area of less than one square mile; or is protected by levees from a one percent annual chance of flooding. Flood Zone X is outside of areas with a one-percent or 0.2-percent annual chance of flooding.

Based on the Flood Insurance Rate Maps (FIRM) prepared by the Federal Emergency Management Agency (FEMA), the northeast corner Wilfred Site is located outside of the 100-year flood zone. Most of the balance of the site is located within the 100-year flood zone. The approximate flood zone designations for the Wilfred Site are depicted on the FEMA Flood Zone Map, **Figure 3.3-2**. Surface water emanating from the site generally flows into ditches tributary to the Bellevue-Wilfred Channel. From there, the water flows to the Laguna de Santa Rosa and then to the Russian River. Runoff from the Wilfred Site was assessed in a technical report, "Site Grading and Storm Drainage" (Robert A. Karn & Associates, Inc., 2006). This report discusses the existing on-site drainage. It appears as **Appendix C**.

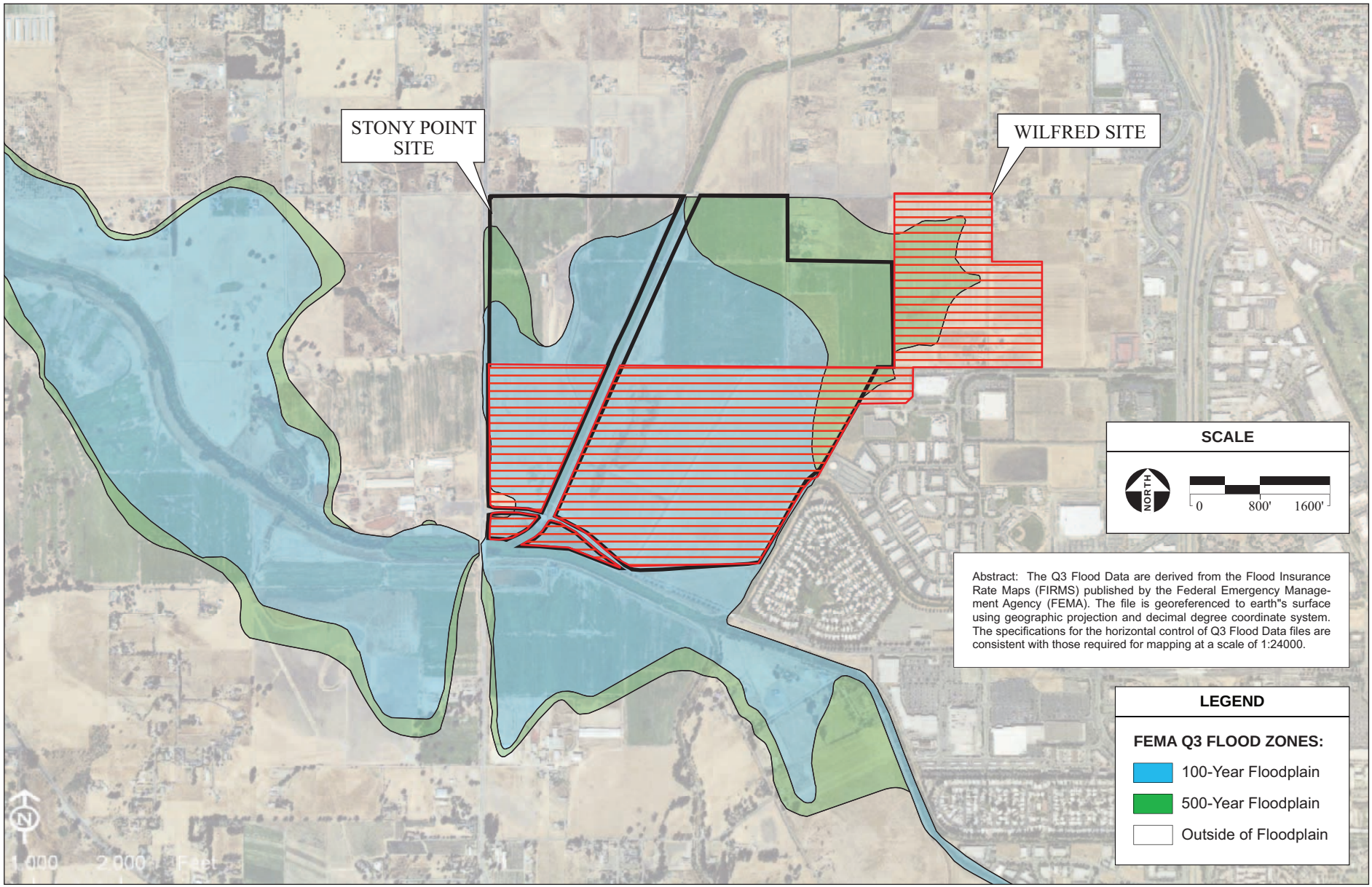
Surface Water Quality

The Laguna de Santa Rosa is currently on the list of Clean Water Act 303(d) impaired waterbodies. Nutrient loading in runoff; elevated water temperature; levels of nitrogen and phosphorous; erosion; sedimentation; and lowered dissolved oxygen affect the Laguna de Santa Rosa's water (SWRCB, 2003). The State of California has been studying ways to reduce loading in the Laguna de Santa Rosa for at least 10 years. In 1995 the Regional Water Quality Control Board (RWQCB) waste reduction strategy was to reduce total nitrogen (N) in the Laguna to levels that inhibit rapid algal growth. Concentrations of 3.7 milligrams per liter (mg/l) with an annual loading of 116,000 pounds per year of total N from all sources was thought to be the allowable load (equivalent to the modern "Total Maximum Daily Load" [TMDL] at that time) (Morris, 1995). Since 1995, the City of Santa Rosa has been studying and analyzing the impacts of regional wastewater discharges into the Laguna. These studies include the *Santa Rosa Sub-regional Wastewater Reclamation Project EIR* (Santa Rosa, 1997), the *Incremental Recycled Water Program Draft EIR* (Santa Rosa, 2003), and the *Santa Rosa Subregional Water Reclamation System, Incremental Recycled Water Program, Addendum to Program Environmental Impact Report* (Santa Rosa, 2004e).



SOURCE: Napa, CA & Healdsburg, CA 1:100,000 USGS Quadrangles; (1983, Laguna de Santa Rosa Foundation; AES, 2005

Figure 3.3-1
Laguna de Santa Rosa Watershed Map



SOURCE: Aerial Photography August 2002; AES, 2005

Figure 3.3-2
Wilfred and Stony Point Site Floodplain Map

The RWQCB has placed limitations on the discharge of treated wastewater into the Laguna de Santa Rosa by the Santa Rosa Sub-regional Wastewater Treatment Plant based upon flows in the Russian River. It is anticipated that similar limitations would be placed on discharge from this project.

The established TMDLs for total nitrogen and ammonia for the Laguna de Santa Rosa are 265,700 lbs per year and 35,100 lbs per year, respectively (Santa Rosa, 2004e). According to a letter from USEPA Region 9 to the SWQCB, the USEPA standard in surface water is 1 mg/L total N (USEPA, 2003). Based upon the data, the Laguna de Santa Rosa exceeds the USEPA standard of 1 mg/L for total nitrogen.

The history of water quality impacts to the Laguna de Santa Rosa was summarized in 1995 (Morris, 1995), and more recently in the Russian River Fisheries Restoration Plan (California Department of Fish and Game [CDFG], 2002). In past years, nutrients in the Laguna de Santa Rosa came from several sources including lawns, landscapes, vineyards, dairy farms and the Santa Rosa Sub-regional Wastewater Treatment Plant.

More than 50 water quality monitoring stations exist in the Russian River system including the Mark West Creek and Laguna de Santa Rosa subsystem. These stations are operated by the City of Santa Rosa, California Department of Fish and Game, California Division of Water Resources, Mendocino County Water Agency, North Coast RWQCB, Sonoma County Water Agency (SCWA), and United States Geological Survey. The stations have amassed data on temperature, dissolved oxygen, pH, and specific conductivity. The SCWA has been compiling these data (Entrix, 2004).

The current State Water Resources Control Board (SWRCB) Water Quality Order No. 2000-02 for the City of Santa Rosa's Laguna Sub-regional Wastewater Treatment Plant prohibits discharge of tertiary treated "Title 22" reclaimed water from May 14 to September 30 each year. In addition, discharges of advance treated wastewater (tertiary treated, Title 22 reclaimed water) are not generally allowed until the Russian River flow reaches 1000 cfs measured at the Hacienda Bridge (SWRCB, 2000).

The beneficial uses of the Laguna de Santa Rosa may be affected by changes in the quality of surface water it conveys. HydroScience, Inc. has compiled baseline data for the Bellevue-Wilfred Channel on the site, which reflects on the quality of the Laguna de Santa Rosa just downstream from the site (HydroScience, 2006) (**Appendix D**).

STONY POINT SITE

Watershed

Like the Wilfred Site, the Stony Point Site is located in the Laguna de Santa Rosa watershed, within the Santa Rosa Plain Sub-basin of the Santa Rosa Valley Groundwater Basin (City of Rohnert Park, 2005). Like the Wilfred Site, the Stony Point Site is divided by the Bellevue-Wilfred Channel. The Stony Point Site contains several depressions that retain standing water in the winter and spring, and that are most concentrated in the western portion of the site, near the Bellevue-Wilfred Channel (The Huffman-Broadway Group, Inc., 2006).

Floodplain

A discussion of floodplain regulations and Federal policy appears in the Wilfred Site portion of **Section 3.3.1**, above. Most of the Stony Point Site is located within the 100-year floodplain. The approximate flood zone designations for the Stony Point Site are depicted on the FEMA Flood Zone Map, **Figure 3.3-2**. Surface water emanating from the site generally flows into tributary ditches of the Bellevue-Wilfred Channel. From there, the water flows to the Laguna de Santa Rosa and then to the Russian River.

Runoff from the Stony Point Site was assessed in a technical report, "*Site Grading and Storm Drainage"* (Robert A. Karn & Associates, Inc., 2006). This report discusses the existing drainage on the Stony Point Site. It appears as **Appendix C**.

Surface Water Quality

Like the Wilfred Site, the Stony Point Site is, located along a tributary to the Laguna de Santa Rosa. The Laguna de Santa Rosa is currently on the list of Clean Water Act 303(d) impaired waterbodies. For a discussion on surface water quality in the Laguna de Santa Rosa, see the discussion of surface water quality for the Wilfred Site, above. HydroScience, Inc. has compiled baseline data for the Bellevue-Wilfred Channel on the site, to help evaluate the quality of the Laguna de Santa Rosa downstream from the site (HydroScience, 2006) (**Appendix D**).

LAKEVILLE SITE

Watershed

Located at the lower end of the Petaluma River Valley, the principal water body adjacent to the Lakeville Site is San Pablo Bay with its fringing saltmarsh and diked agricultural wetlands. At least four unnamed ditches and several intermittent streams and ephemeral gulches convey runoff from the hills at the south end of the Sonoma Mountains into San Pablo Bay, agricultural wetlands, and marshes between the mouth of the Petaluma River and Tubbs Island near Midshipment Point.

The 322-acre site contains about an acre of intermittent watercourse and ponds, which convey water to the relatively flat agricultural land bordering Lakeville Highway. More than 20 acres of marsh occur on the Site.

Floodplain

A discussion of floodplain regulations and Federal policy appears in the Wilfred Site portion of **Section 3.3.1**, above. Most of the lower end of the Lakeville Site lies within the 100-year floodplain (**Figure 3.3-3**).

Surface Water Quality

Water quality in the ditches and agricultural wetlands that are fed from the intermittent and ephemeral streams that drain from the hills at the southern end of the Sonoma Mountains is probably poor due to the long history of grazing and farming on the property. Grazing and farming introduce modest quantities of fecal matter and urine into the soil, which is often washed into intermittent watercourses.

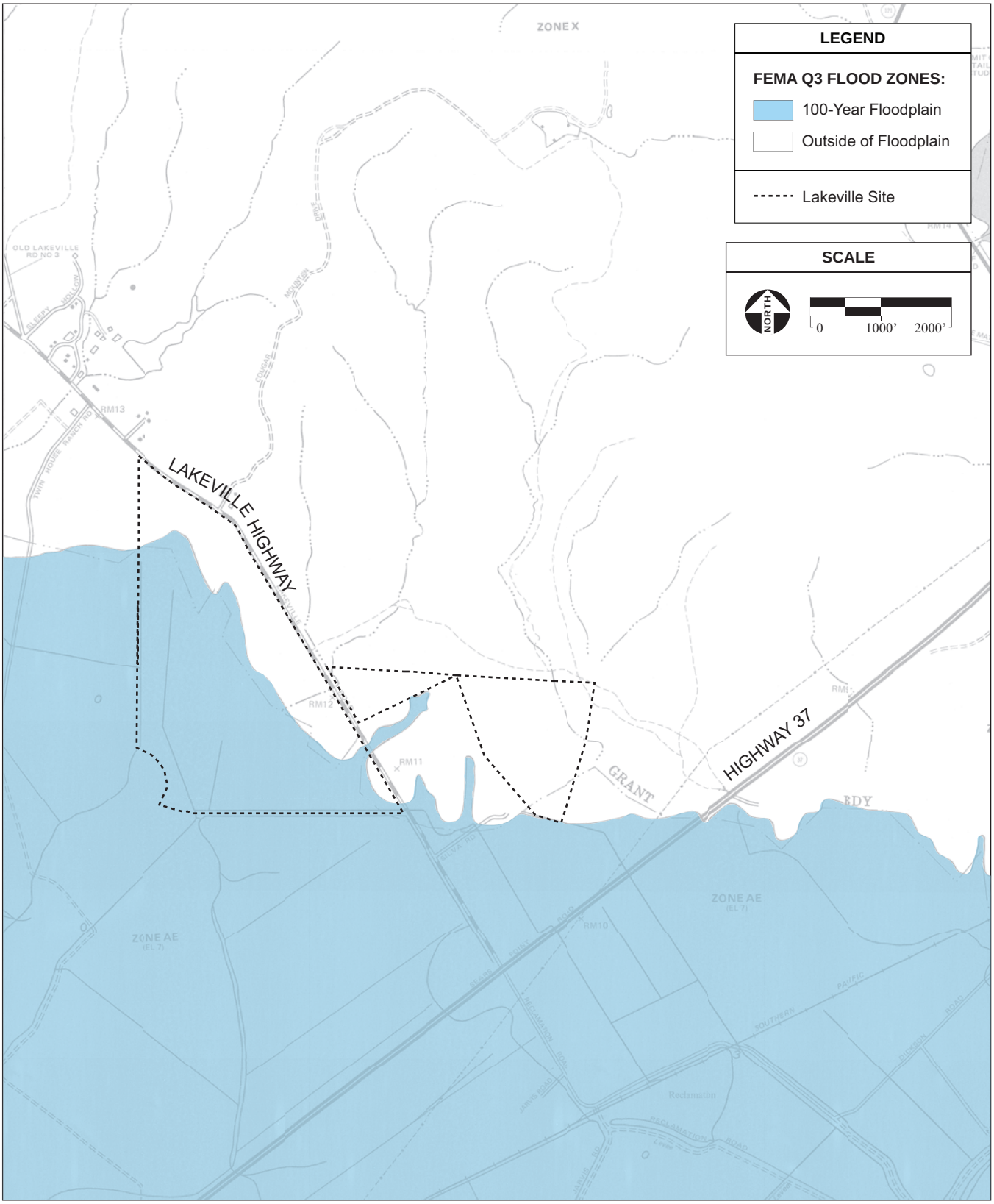
3.3.2 GROUNDWATER

WILFRED SITE

Groundwater Basins

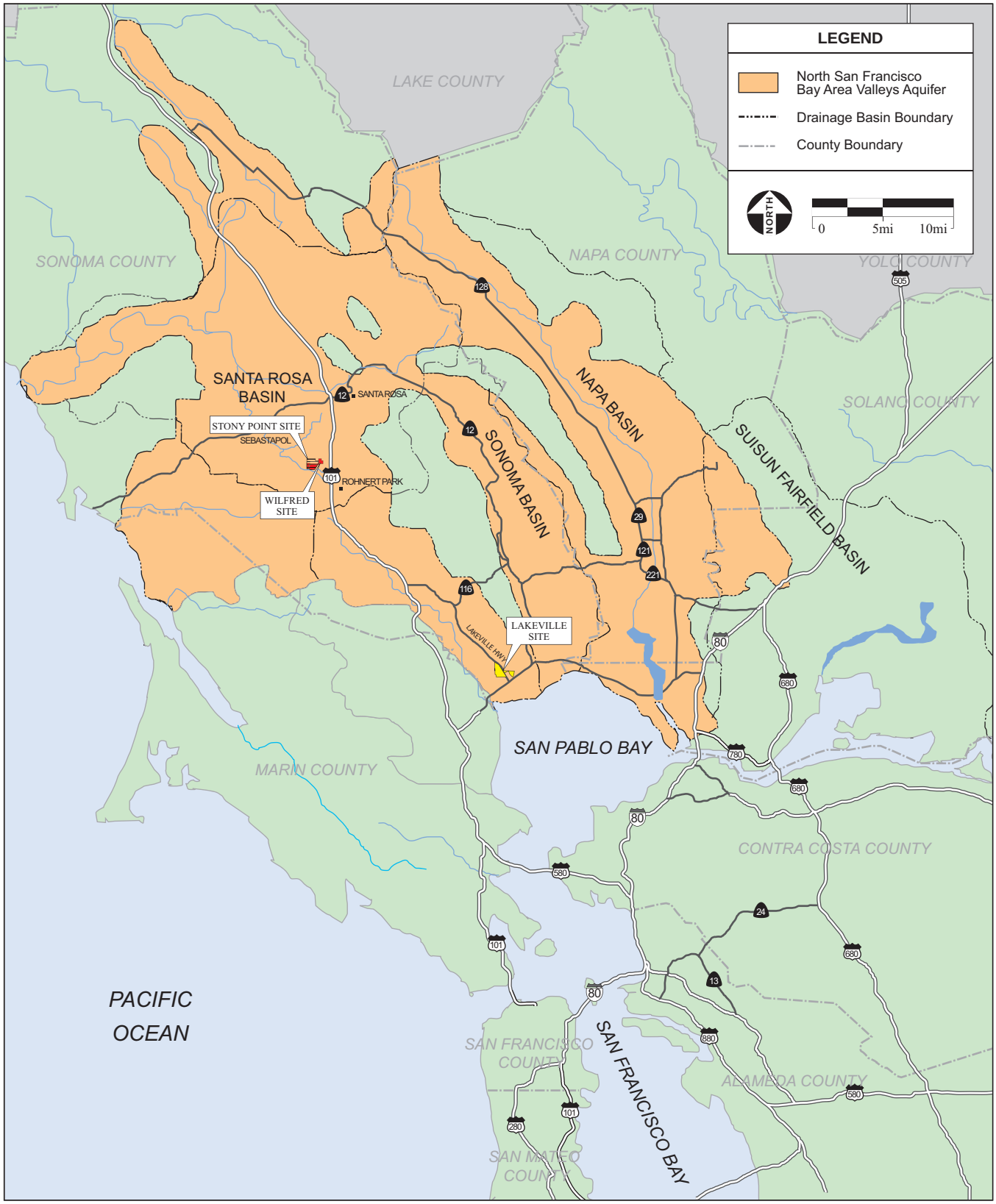
According to the California Department of Water Resources (CDWR), the Wilfred Site lies within the Santa Rosa Plain groundwater sub-basin (Basin No. 1-55 [formerly Basin No. 2-18] of the North Coast Hydrologic Region (CDWR, 2004). The Santa Rosa Valley is part of a structural depression of the North Coast Ranges (CDWR, 2004; **Figure 3.3-4**). The sub-basin contains one main water-bearing unit known as the Wilson Grove Formation (formerly known as the Merced Formation) and several smaller units including the Glen Ellen Formation, Sonoma volcanics, "Basin deposits" and "Alluvial fan deposits" (KOMEX, 2007a; **Appendix G**).

Groundwater-bearing zones (i.e. aquifers) in the vicinity of the site are not laterally continuous due to the presence of faults and isolated lenses of clay, sand and gravel. Alluvial deposits of clay, sand and gravel blanket most of the Santa Rosa Valley. Older water-bearing alluvium, up to 100 feet thick, is Late Pleistocene in age, and is overlain with younger alluvium 30 to 100 feet thick. The deposits are not perennially saturated, have low permeability, and are either slightly confined or unconfined (CDWR, 2003). The City of Rohnert Park's well log data indicates groundwater at depths of over 200 feet.



SOURCE: FEMA Flood Insurance Rate Map dated April 2, 1991; AES, 2005

Figure 3.3-3
Lakeville Site Floodplain Map



SOURCE: Kurkel, F. and Upson, 1960, Geology and groundwater in Napa and Sonoma Counties, California: USGS Water-Supply Paper 1495, 252 p.; AES, 2005

Figure 3.3-4
Regional Groundwater Basins

Numerous wells have been identified within the vicinity of the Wilfred Site, including several municipal wells. Within a 1.5-mile radius of the site, 193 shallower wells (up to 200 feet deep) and 61 deeper wells (over 200 feet deep) were identified. These wells are shown on Figures 10 and 11 of the Groundwater Study prepared for the Wilfred and Stony Point Sites (**Appendix G**). There are three wells located on the Wilfred Site, HydroScience Well #7, KOMEX Well #38 and KOMEX Well #58 (KOMEX, 2007a; HydroScience, 2006). Well #7 is a small diameter well with a pump to fill cattle watering troughs. Well #38 is a deep irrigation well with a depth of 1,028 feet. Well #58 is a shallow domestic well installed in 1979 with a depth of 120 feet (KOMEX, 2007a). Information on location of these wells is presented in **Section 3.9**.

The estimated current groundwater usage in the Santa Rosa Plain groundwater basin is between 33,900 and 38,600 acre-feet per year (afy) (approximately 18,400 afy from municipal and industrial uses, 14,000-18,000 from agricultural uses, and 1,500-2,200 from rural domestic uses). Detailed calculations can be found in **Appendix G**. Historically, the City of Rohnert Park has been the largest single user of groundwater in the area, pumping from 850 to 4,600 afy from 2000 to 2005 (other regional groundwater users are described in detail in **Appendix G**). The City extracts groundwater from up to 42 wells located in the Santa Rosa Valley Groundwater Basin and inside city limits. Most city wells are constructed to depths of 600 feet or less. A few wells extend to depths of about 800 feet. Three wells extend to greater depths of up to 1,500 feet. Four water producing zones in the aquifer system have been identified: (1) shallow (0 to 200 feet deep), (2) intermediate (200-600 feet deep), (3) deep (600-800 feet deep), and (4) lower (depths greater than 800 feet) (City of Rohnert Park, 2005, **Appendix H**).

Pumpage from Rohnert Park's well field has been associated with a lowering of the groundwater surface beneath both the City and the proposed Wilfred Site. Court action against the City of Rohnert Park has resulted in a negotiated settlement requiring the City to cut back groundwater usage from 4.2 to 2.3 mgd (4,705 to 2,580 afy) before additional growth could take place on yet-to-be-annexed County land. Groundwater cutbacks by the City have primarily been dependent upon the quantity of surface water supplied by the SCWA, which has limited contracted water allocations throughout the region due to delays in its expansion project caused by litigation and regulatory constraints. Nonetheless, in 2004 the City adopted a resolution capping future groundwater pumping at a rate of 2.3 mgd (2,580 afy), further affirming the negotiated settlement. Since then the City has significantly decreased its groundwater usage (1.36 mgd in 2004, 0.76 mgd in 2005, and 0.30 mgd in 2006 (through September 30th)). By 2010 the City Plans to use groundwater as a backup/emergency source only after expected substantial additional water resources are obtained from SCWA (KOMEX, 2007a; **Appendix G**).

Local groundwater elevations, at any given time, appear to be strongly influenced by pumping of the City of Rohnert Park's well field due to an apparent horizontal continuity between

groundwater bearing zones in the area. Shallow groundwater levels had dropped up to 50-feet as a result of the regional drought conditions of the 1980's coupled with excessive groundwater withdrawals (i.e. overdraft). However, by the mid-1990's groundwater levels rose gradually (KOMEX, 2007a; **Appendix G**). More recently, when City of Rohnert Park groundwater pumpage was reduced in 2003, groundwater levels exhibited additional recovery (City of Rohnert Park, 2005).

Several Sonoma County groundwater use studies have been conducted in the latter part of the last decade, including the relatively recent 2003-2004 Sonoma County Grand Jury Study, 2004 Todd Engineers Study, and the 2005 City of Rohnert Park Water Supply Assessment (WSA; City of Rohnert Park, 2005, **Appendix H**). A joint U.S. Geological Survey (USGS) / SCWA 5-year cooperative study of the Santa Rosa Valley groundwater basin commenced in October 2005. All of these studies have been summarized in the groundwater studies for this EIS (KOMEX, 2007a), which appear in **Appendix G**.

The 2003-2004 Sonoma County Grand Jury Study found that the volume of groundwater being extracted in Sonoma County is not monitored and is not definitively known; that there was a need for Cities and the County to consider future sustainability of groundwater within the County; that there is currently no regional governing board to monitor and coordinate Countywide water issues; that the County does not have a groundwater management plan; and that the County's General Plan Update to the year 2020 includes a "Water Resources Element," designed to ensure the County's water resources are sustained and protected. The study recommended that the County and each of the cities adopt a sustainable water element as part of their general plan, together with a comprehensive groundwater management plan (KOMEX, 2007a; **Appendix G**).

The 2004 Todd Engineers study was conducted as part of the Environmental Impact Report (EIR) for a proposed development project located in Canon Manor West, an unincorporated area of Sonoma County located adjacent to the City of Rohnert Park. The Todd Engineers study includes an analysis of groundwater level trends in the area, finding that increased groundwater pumping by Rohnert Park in the 1970s and 1980s was a major factor in local groundwater level decline. The study also notes that Rohnert Park pumpage stabilized after 1985 and that groundwater levels have also stabilized. Todd Engineers carried out a water balance analysis for their study area (which includes the Wilfred and Stony Point Sites). The study was based on water years 1986-87 through 2000-01. During this time period, the study found a small but positive change in groundwater storage, which was considered "consistent with the observed groundwater level trends that have leveled off and even increased slightly since 1987…" In evaluating the long-term effects of the Canon Manor West project on groundwater levels, a major factor and area of uncertainty was determining future pumping by the City of Rohnert Park. The study notes that should the City decrease its reliance on groundwater pumping, in line with the City's General

Plan (see **Appendix G** and **Section 4.9**), then this would compensate entirely for not only the water demand of the Canon Manor West project, but also for all other future increased groundwater demands predicted by Todd Engineers (including the proposed Graton Rancheria casino/hotel resort). The converse was that if Rohnert Park did not decrease its pumping from current levels, then the predicted future groundwater demands could lead to another period of groundwater level decline.

Rohnert Park's WSA was published in January 2005 (City of Rohnert Park, 2005; **Appendix H**). The WSA was prepared in compliance with California Senate Bill 610 (SB 610) to assist the City in making decisions related to land use and water supply through the year 2025. The report provides background on the City's water supply, together with a detailed study of groundwater conditions in the upper Laguna de Santa Rosa watershed (similar to the area studied in the 2004 Todd Engineers study). For the purposes of the WSA, the subsurface was divided into a shallow zone (ground level to 200 feet below ground surface (bgs)), an intermediate zone (200 to 600 feet bgs), a deep zone (600 to 800 feet bgs) and a lower zone (deeper than 800 feet bgs). After study of hydrographs for wells in the area, the following conclusions were made:

- Most shallow zone wells located on the periphery of the City's well field were interpreted to exhibit relatively stable long-term groundwater levels, with little response to changes in (City) pumping or climatic conditions.
- Intermediate zone wells were interpreted to exhibit changes in groundwater elevations in response to changes in the City's pumping. Most of the City's wells extract water from the intermediate zone. In central Rohnert Park wells, Spring groundwater elevations were generally stable from 1977 to 1981, declined from 1982 to 1990 when City pumping increased, and were stable to slightly increasing from 1990 to 1997 when total pumping was relatively stable. Groundwater levels remained stable until 2003, and then showed a marked recovery as pumping was reduced.

The WSA states that the groundwater level rises (in intermediate zone wells) since 1990 indicate that the groundwater level declines of the 1980's were not the result of overdraft conditions. Furthermore, the WSA states there is no indication of generally declining groundwater levels elsewhere in the sub-basin; that is, there is no indication of overdraft on a sub-basin scale. The WSA discusses water budgets for the area, including a review of previous recharge estimates made by PES and Todd Engineers (see **Appendix G**). The WSA concludes that PES's estimate of annual average recharge (1.6 million gallons per day (mgd)) pertains to a limited geographic area that does not include the areas of highest recharge to the northeast of Rohnert Park. The WSA also presents calculations that derive a recharge estimate of 7.4 mgd from data previously reported by Todd Engineers.

The WSA provides an analysis of future groundwater supply sufficiency, noting that the City has recently shifted its primary source of water supply from groundwater to surface water supplied by SCWA. The report estimates projected future pumping in the study area through 2025, and notes that the projected total of 7,350 afy (6.6 mgd) is less than the total pumping in the 1990 to 1997 time period of 8,700 afy (7.8 mgd) during which groundwater elevations were stable or rising slightly. The conclusion reached by the WSA is that projected groundwater pumping through 2025 falls in the range of historically sustainable pumping and would not result in overdraft conditions in the study area.

The O.W.L. Foundation (a local citizen's group) filed suit in the California Superior Court challenging adoption of the WSA in 2005. On May 31, 2006 the court issued a decision invalidating the WSA. The reason cited for this action was that the WSA's evaluation of water supply sufficiency was based on considering existing groundwater demand for a study area that encompassed only the upper Laguna de Santa Rosa Watershed, and not the entire groundwater basin or sub-basin in which the City is located. The court also found that the WSA used the CDWR's definition of "critical overdraft" rather than the CDWR's definition of "overdraft" when discussing the adequacy of the groundwater supply. The court specified that it was not ruling as to the sufficiency of the water supply, but only the method used to support the sufficiency determination as required by SB 610.

In October 2005 the USGS and SCWA initiated a planned 5-year cooperative study of the Santa Rosa Valley groundwater basin. USGS staff indicate that the work will include data compilation and conceptual model development, preparation of a numerical groundwater flow model of the basin, and reporting. Among other items, the final report will address the question of whether the basin is in overdraft. In 2006 the USGS completed a preliminary analysis of the hydrostratigraphy of the basin. In 2007 this analysis will be used to help develop a conceptual model, which in turn will be used to build the numerical model. The study is still in its preliminary stages and no findings have been made yet.

Groundwater Quality

The updated California's Groundwater - Bulletin 118 contains very little information on the quality of water of alluvial aquifers. Reporting on a 45-year-old study by Cardwell, the bulletin states, "Although the water quality is generally good for most uses, there are few wells screened adjacent to the deposits." According to the City of Rohnert Park, naturally occurring iron and manganese are found in some well water (City of Rohnert Park, 2005, **Appendix H**).

Most of Sonoma County's groundwater is of suitable quality for domestic purposes (HydroScience, 2006). CDWR has described overall groundwater quality in the Santa Rosa Plain Sub-basin as "good". Few wells in the sub-basin have been found to contain constituents in

concentrations higher than those recommended for drinking water (HydroScience, 2006; KOMEX, 2007a, **Appendix G**).

Though few wells in Sonoma County have been rendered non-potable by chemical constituents, many have produced water with aesthetic problems (HydroScience, 2006; KOMEX, 2007a, **Appendix G**). Chemical constituents that may pose aesthetic problems at the Wilfred Site include iron; manganese; boron; and sodium. Iron and manganese are believed to have caused severe corrosion in a well (HydroScience Well #1) that is located on the Stony Point Site, adjacent to the Wilfred Site. Though neither iron nor manganese poses a health hazard, both can stain laundry, dishes, glassware, etc. Boron is present in the water from several local wells. Boron, while not a drinking water health hazard, may be injurious or toxic to a variety of plants. Sodium is present in high concentrations in a number of wells throughout Sonoma County, and is the dominant cation in deep wells under the western part of Rohnert Park. Sodium can be toxic to plants (HydroScience, 2006; KOMEX, 2007a).

TDS concentrations reported by CDWR in 1979 for wells in Rohnert Park ranged from 135 to 321 mg/L. These concentrations compare to the California Secondary Maximum Contaminant Level (MCL) of 500 mg/L (KOMEX, 2007a, **Appendix G**). MCLs are standards set for allowable levels of constituents in drinking water, and are required under the Federal Safe Drinking Water Act of 1974 and its updates. Primary standards, developed to protect public health, are legally enforceable. Secondary standards, generally for the protection of aesthetic qualities such as taste, odor, appearance, etc., are generally non-enforceable (CDWR, 2003).

STONY POINT SITE

The Stony Point Site occurs within the Santa Rosa Plain groundwater sub-basin, on a site that partially overlaps the Wilfred Site. Like the Wilfred Site, numerous wells have been identified within the vicinity of the Stony Point Site, including several municipal wells. Four wells have been identified on the Stony Point Site. One well (HydroScience Well #7) is active; occurs on the portion of the Stony Point Site that overlaps the Wilfred Site; and is discussed for Wilfred Site: Groundwater Basins, above. A second well (HydroScience Well #1) is currently active. Like Well #7, Well #1 supplies water to cattle watering troughs. Well #1 also supplies barnyard wash water. Two wells are abandoned and sealed (HydroScience, 2006). Like the Wilfred Site, existing pumpage on the Stony Point Site appears to be of low volume.

For further discussion on groundwater basins and groundwater quality, see the discussion of groundwater basins and groundwater quality for the Wilfred Site.

LAKEVILLE SITE

Groundwater Basins

The Petaluma Valley Groundwater Basin No. 2-1, which is part of the larger San Francisco Bay Hydrologic Region (CDWR, 2004), underlies the Lakeville Site (**Figure 3.3-4**). The site is at the lower end of the Petaluma Valley at the base of the Sonoma Mountains in a structural depression in the Coast Ranges.

The Petaluma Valley is underlain by a basement complex consisting primarily of marine metamorphic and igneous rocks belonging to the Mesozoic Franciscan Assemblage. In the southern Petaluma Valley, the Pliocene Petaluma formation overlays the Mesozoic Franciscan Assemblage. The Pliocene Petaluma formation consists of claystone with some sands and gravels of marine and continental origins. Overlaying these formations are Quarternary and Recent estuarine sediments (locally called Bay Mud) and alluvial deposits.

The principal aquifers in the basin occur in the Quarternary to Recent deposits and the Petaluma formation (KOMEX, 2007b). The water-bearing portion of Quarternary to Recent deposits may be less than 100 to more than 200 feet thick (CDWR, 2004). According to CDWR (2004), the Merced Formation is also an important water-bearing formation in the Petaluma Valley. The Merced Formation is between 300 and 2,000 feet thick. Of lesser importance as a groundwater source is Pliocene-age volcanic tuff (CDWR, 2004; KOMEX, 2007b).

In the shallow alluvial deposits near the valley margins, groundwater is unconfined, or occurs under water-table conditions. In deeper parts of the groundwater basin, groundwater is confined or semiconfined (KOMEX, 2007b).

Fifty-seven wells were identified within 1¼ mile of the Lakeville Site. These wells are shown on Figure 5 of the Groundwater Study prepared for the Lakeville Site (**Appendix G**). None of the wells are utilized for municipal use. Current status of the wells was not known. Two wells are located on the Lakeville Site. North #1 is located on the east side of the Lakeville Site and has a depth of 413 feet. North #2 is located on the west side of the Lakeville Site and has a depth of 650 feet (KOMEX, 2007b).

The Petaluma Valley groundwater basin has been subject to intensive development for domestic use (mostly in rural areas), and moderate development for stock watering, municipal, irrigation, and industrial use. The latest accurate estimate of groundwater pumping in the basin is 7,800 afy in 1980. Current rough estimates of groundwater usage are very similar to the 1980 estimate (7,700 afy). Detailed calculations can be found in **Appendix G**.

Groundwater Quality

The quality of groundwater of the water-bearing formations in the Petaluma Valley Groundwater Basin varies from place to place because of the nature of the sedimentary layers (CDWR, 2004). Within most areas of the groundwater basin, groundwater quality is generally suitable for most purposes (KOMEX, 2007b). Locally elevated levels of certain chemicals restrict groundwater use in some areas and for some applications. Such chemicals include chloride, sodium, boron, nitrate, iron, and manganese (KOMEX, 2007b).

Water quality decreases south of Petaluma where seawater intrusion becomes a factor (CDWR, 2004). At the southern end of the Petaluma Valley, and perhaps under the Lakeville Site, a zone of poor quality groundwater has been identified at depths from approximately 150 to 700 feet. Seawater intrusion is the primary source of elevated chloride and sodium in the southern end of the Petaluma Valley (KOMEX, 2007b). In some areas of the Petaluma Valley, nitrate contamination is serious (CDWR, 2004). Nitrate concentrations, in the area northwest of Petaluma, are as high as three times the maximum allowed for drinking water (KOMEX, 2007b). Incidence of MTBE contamination is increasing in the basin (CDWR, 2004).

3.4 AIR QUALITY

This section presents a description of the existing air quality setting in the vicinity of the Wilfred, Stony Point, and Lakeville sites. A substantial portion of the following information is from the Bay Area Air Quality Management District (BAAQMD) website (http://www.baaqmd.gov).

3.4.1 AIR BASIN CHARACTERISTICS

To better manage common air quality problems, California is divided into 15 air basins. An air basin generally has similar meteorological and geographical conditions throughout. To the extent possible, the air basin boundaries follow along political boundary lines but in the case of Sonoma County, the northern portion of the County is in the North Coast Air Basin, where the southern part of the County is in the San Francisco Bay Area Air Basin. The Wilfred, Stony Point, and Lakeville sites are in the part of Sonoma County that is included in the nine-county San Francisco Bay Area Air Basin. The valley that stretches from Santa Rosa to the San Pablo Bay is known as the Cotati Valley at the north end, and the Petaluma Valley at the south end. The Lakeville site is southeast of Petaluma, at the southeast corner of the Petaluma Valley. The following is a description of climate as it affects air quality in the Bay Area, and the Cotati and Petaluma Valleys.

CLIMATE IN THE BAY AREA

Large Scale Influences

A semi-permanent high-pressure area centered over the northeastern Pacific Ocean dominates the summer climate of the West Coast. Because this high-pressure cell is quite persistent, storms rarely affect the California coast during the summer. Thus, the conditions that persist along the coast of California during summer are a northwest airflow and negligible precipitation. A thermal low-pressure area from the Sonoran-Mojave Desert also causes air to flow onshore over the San Francisco Bay Area much of the summer.

The steady northwesterly flow around the eastern edge of the Pacific high-pressure cell exerts a stress on the ocean surface along the west coast. This induces upwelling of cold water from below. Upwelling produces a band of cold water that is approximately 80 miles wide off San Francisco. During July, the surface waters off San Francisco are 3 degrees Fahrenheit (°F) cooler than those off Vancouver, more than 700 miles farther north. Air approaching the California coast, already cool and moisture-laden from its long trajectory over the Pacific, is further cooled as it flows across this cold bank of water near the coast, thus accentuating the temperature contrast across the coastline. This cooling is often sufficient to produce condensation – a high incidence of fog and stratus clouds along the Northern California coast in summer.

In winter, the Pacific High weakens and shifts southward, upwelling ceases, and winter storms become frequent. Almost all of the Bay Area's annual precipitation takes place in the November through April period. During the winter rainy periods, inversions are weak or nonexistent, winds are often moderate and air pollution potential is very low. During some periods in winter, when the Pacific high becomes dominant, inversions become strong and often are surface-based; winds are light and pollution potential is high. These periods are characterized by winds that flow out of the Central Valley into the Bay Area and often include tule fog[1].

Topography

The San Francisco Bay Area is characterized by complex terrain consisting of coastal mountain ranges, inland valleys and bays. Elevations of 1,500 feet are common in the higher terrain of this area. Normal wind flow over the area is distorted in the lowest levels. This is particularly true when the air mass is stable and the wind velocity is not strong. With stronger winds and unstable air masses moving over the area this distortion is reduced. The distortion is greatest when low-level inversions are present with the surface air beneath the inversion, flowing independently of the air above the inversion. This latter condition is very common in the summer, the surface air mass being the sea breeze.

Winds

In summer, the northwest winds to the west of the Pacific coastline are drawn into the interior through the Golden Gate and over the lower portions of the San Francisco Peninsula. Immediately to the south of Mount Tamalpais, the northwesterly winds accelerate considerably and come more nearly from the west as they stream through the Golden Gate. This channeling of the flow through the Golden Gate produces a jet that sweeps eastward but widens downstream producing southwest winds at Berkeley and northwest winds at San Jose; a branch curves eastward through the Carquinez Straits and into the Central Valley. Wind speeds may be locally strong in regions where air is channeled through a narrow opening such as the Carquinez Strait, the Golden Gate, or San Bruno Gap. For example, the average wind speed at San Francisco International Airport from 3 AM to 4 PM in July is about 20 miles per hour (mph), compared with only about 8 mph at San Jose and less than 7 mph at the Farallon Islands.

The sea breeze between the coast and the Central Valley commences near the surface along the coast in late morning or early afternoon; it may be first observed only through the Golden Gate. Later in the day, the layer deepens and intensifies while spreading inland. As the breeze intensifies and deepens, it flows over the lower hills farther south along the Peninsula. This process frequently can be observed as a bank of stratus "rolling over" the coastal hills on the west

[1] Tule fog is a dense night and morning valley fog that is commonly known as "tule fog" because of its prevalence in marshy areas populated by tule reeds or cattails. Technically it's a radiation fog, which forms as the ground cools off at night and radiates heat into space. (Null, 2001)

side of the Bay. The depth of the sea breeze depends in large part upon the height and strength of the inversion. The generally low elevation of this stable layer of air prevents marine air from flowing over the coastal hills. It is unusual for the summer sea breeze to flow over terrain exceeding 2000 feet in elevation.

In winter, the Bay Area experiences periods of storminess and moderate-to-strong winds and periods of stagnation with very light winds. Winter stagnation episodes are characterized by outflow from the Central Valley, nighttime drainage flows in coastal valleys, weak onshore flows in the afternoon and otherwise light and variable winds.

Temperature

In summer, the distribution of temperature near the surface over the Bay Area is determined in large part by the effect of differential heating between land and water surfaces. This process produces a large-scale gradient between the coast and the Central Valley as well as small-scale local gradients along the shorelines of the ocean and bays. The temperature contrast between coastal ocean water and land surfaces 15 to 20 miles inland reaches 35°F or more on many summer afternoons. At night this contrast usually decreases to less than 10°F.

The winter mean temperature maxima and minima reverse the summer relationship in that daytime variations are small while mean minimum (nighttime) temperatures show large differences and strong gradients. The moderating effect of the ocean influences warmer minimums along the coast and penetrating the Bay. Coldest temperatures are in the sheltered valleys, implying strong radiation inversions and very limited vertical diffusion. An anomaly of warmer temperatures in the Santa Clara Valley over San Jose is clearly an urban "heat island" effect, most pronounced on winter nights. Such heat islands are proportional to structure density, and appear also over San Francisco and Oakland.

Inversions

A primary factor in air quality is the mixing depth (i.e., the vertical dimension available for dilution of contaminant sources near the ground). Over the Bay Area, the frequent occurrence of temperature inversions limits mixing depth and consequently limits the availability of air for dilution. A temperature inversion may be described as a layer of warmer air over cooler air as is depicted in **Figure 3.4-1**.

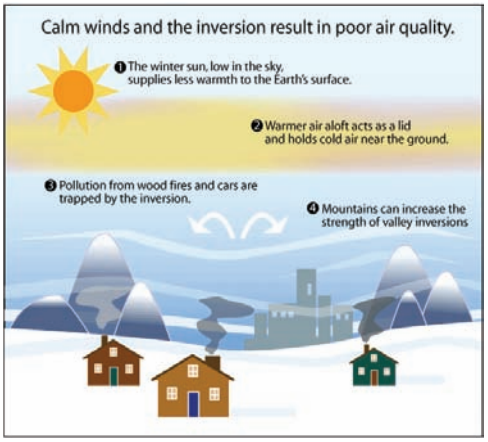


Figure 3.4-1 – Temperature inversions
(Source: AIRNow 2006)

On most days, higher altitudes mean lower air temperatures. This is because most of the sun's energy is converted to sensible heat at the ground, which in turn warms the air at the surface. The warm air rises in the atmosphere, where it

expands and cools. Sometimes, however, the temperature of air actually increases with height. This condition is known as *temperature inversion*, because the temperature profile of the atmosphere is "inverted" from its usual state. There are two major types of temperature inversion: "surface inversions," that occur near the Earth's surface, and "aloft inversions," that occur higher above the ground than surface inversions. Surface inversions are the most important in the study of air quality.

For the most part, surface inversion patterns correlate with seasonality. The strong inversions typical of summer are formed by subsidence, the heating of downward-moving air in the high-pressure anticyclone over the western Pacific. The surface inversions typical of winter are formed by radiation as air is cooled in contact with the earth's cold surface at night. While these seasonal correlations are most prevalent, both inversion mechanisms may operate at any time of the year. At times, surface inversions formed by radiational cooling may reinforce the subsidence inversion aloft, particularly in fall and winter. The thick, strong inversion resulting in this case is especially effective in trapping pollutants.

The vertical temperature structure over the Bay Area is taken by the National Weather Service (NWS) twice daily, at 4 AM and 4 PM, at Oakland International Airport. NWS reports that the inversion types found vary widely in seasonal patterns and over a 24-hour period. Localized inversion variations resulting from the numerous terrain types within the Bay Area have also been observed.

In the morning the seasonal variations are most dramatic. From June through September there are only two days per year, on average, with no inversion below 5,000 feet. March and April have fewer morning inversions. The occurrence of surface inversions is highest from October through January, when the characteristic radiation inversion predominates. A wide cluster of cases between 500 to 2,500 feet dominates from May through September, when the summer subsidence inversion over the marine layer dominates. There is substantial day-to-day variability in the depth of the marine layer.

In the afternoon data, two differences from the morning data are most striking and significant. First is the frequent disappearance of the surface radiation inversion that dominates the winter nights. In these months, a surface inversion observed in the morning persists through the afternoon less than 20% of the time. However, a corresponding afternoon increase may be noted in the cases from 500 to 2,500 feet. Thus the inversion is frequently raised and perhaps weakened, but not destroyed. Second is the afternoon lowering of the marine inversion that dominates the summer months. In July and August, the afternoon inversions are frequently in the 500 to 1,000 foot interval, compared with the 1,000 to 1,500 foot interval in the morning.

Precipitation

Moderately wet winters and dry summers characterize the San Francisco Bay Area climate. Winter rains (December through March) account for about 75 percent of the average annual rainfall; about 90 percent of the annual total rainfall is received in the November-April period; and between 15 June and 22 September, normal rainfall is typically less than 1/10 inch.

Annual precipitation amounts show great differences in short distances. Annual totals exceed 40 inches in the mountains and are less than 15 inches in the sheltered or 'shadowed' valleys. The frequency of winter rain is more uniform, however, with 10 days per month (December through March) being typical.

During rainy periods, ventilation and vertical mixing are usually high, and consequently pollution levels are low. However, there are frequent winter dry periods lasting over a week. It is during some of these periods that CO and particulate pollution episodes develop.

CLIMATE IN THE COTATI AND PETALUMA VALLEYS

The valley that stretches from Santa Rosa to the San Pablo Bay is known as the Cotati Valley at the north end, and the Petaluma Valley at the south end. Some maps show the whole area as the Petaluma Valley. The Wilfred and Stony Point sites are located in the Cotati Valley and the Lakeville site is in the Petaluma Valley. The largest city in the Cotati Valley area is Santa Rosa, and in the Petaluma Valley is Petaluma. To the east, the valley is bordered by the Sonoma Mountains, with the San Pablo Bay at the southeast end of the valley. To the immediate west are a series of low hills and further west are the Estero Lowlands, which open to the Pacific Ocean. The region from the Estero Lowlands to the San Pablo Bay is known as the Petaluma Gap. This low-terrain area is a major transport corridor allowing marine air to pass into the Bay Area.

Wind patterns in the Petaluma and Cotati Valleys are strongly influenced by the Petaluma Gap. The predominant wind pattern in this region is for marine air to move eastward through the Petaluma Gap, then to split into northward and southward paths as it moves into the Cotati and Petaluma valleys. The southward path crosses the San Pablo Bay and moves eastward through the Carquinez Straits. Consequently, although Santa Rosa and Petaluma are only 16 miles apart, their predominant wind patterns are quite different. Santa Rosa's prevailing winds are out of the south and southeast, while Petaluma's prevailing winds are out of the northwest. When the ocean breeze is weak, a bay breeze pattern can also occur, resulting in east winds near the bay. Strong winds from the east occur as part of a larger scale pattern and often carry pollutants picked up along the trajectory through the Central Valley and the Carquinez Straits. During these periods, upvalley flows can carry the polluted air as far north as Santa Rosa.

Winds are usually stronger in the Petaluma Valley than the Cotati Valley because it is part of the Petaluma Gap and readily escapes through the Carquinez Strait. The low terrain in the Petaluma

Gap does not offer much resistance to the marine air as it flows to the San Pablo Bay. Consequently, even though Petaluma is 28 miles from the ocean, its climate is similar to areas closer to the coast. Average annual wind speeds at the Petaluma Airport are 7 miles per hour (mph). This is almost identical to the average annual wind speed measured in Valley Ford, 5 miles from the coast. Winds are light in the morning in the Petaluma Valley, and become windy in the afternoon as the sea breeze arrives. The Cotati Valley, being slightly north of the Petaluma Gap experiences lower wind speeds. In Santa Rosa, the annual average wind speed is 5.4 mph.

During summer afternoons, the land over which the wind has blown before reaching the Petaluma Gap is sufficiently long so that the marine air is warmed and the fog evaporated before it reaches the Petaluma and Cotati valleys. As the surface heating weakens in the late afternoon, the marine layer becomes less heated with distance, and eventually fog is able to form in these valleys. The fog may then persist until late in the morning the next day.

Air temperatures are very similar in the two valleys. Average maximum temperatures in Santa Rosa are 1 degree higher than in Petaluma. Summer maximum temperatures for this region are in the low 80's, while winter maximum temperatures are in the high 50's to low 60's. The reverse is true for average minimum temperatures, with Petaluma being 1 degree warmer than Santa Rosa. Summer minimum temperatures are 50-51 degrees, and wintertime minimum temperatures are 36-40 degrees.

Rainfall averages are 24 inches per year at Petaluma, and 30 inches at Santa Rosa. Santa Rosa's rainfall is higher because the air is lifted and cooled in advance of the Sonoma Mountains, thereby causing condensation of the moisture. Consistent with the Bay Area Mediterranean climate, Santa Rosa receives 81% of its annual rainfall from November through March; and at Petaluma, 83% during that same period.

Generally, air pollution potential is low in the Petaluma Valley because of its link to the Petaluma Gap, and because of its low population density. However, there are two scenarios that could produce elevated pollutant levels. Stagnant conditions could occur in the morning hours with a weak ocean flow meeting a weak bay breeze flow. Another scenario can occur during the afternoon when a synoptically induced east wind pattern advects pollution from the Central Valley to Petaluma.

The Cotati Valley lacks a gap to the sea, accommodates a larger population, and has a natural barrier at its northern and eastern ends; therefore it has a higher pollution potential than does the Petaluma Valley. During stagnant conditions, polluted air carried up the Cotati Valley by diurnal upvalley flow, and added to by local emissions, could be trapped against the mountains to the north and east.

3.4.2 POLLUTANTS OF CONCERN

Pollutants are generally classified as either criteria pollutants or non-criteria pollutants. Federal ambient air quality standards have been established for criteria pollutants whereas no ambient standards have been established for non-criteria pollutants. For some criteria pollutants, separate standards have been set for different periods. Most standards have been set to protect public health. For some pollutants, standards have been based on other values (such as protection of crops, protection of materials, or avoidance of nuisance conditions). A summary of Federal ambient air quality standards, or National Ambient Air Quality Standards (NAAQS), for criteria pollutants and the attainment status of the San Francisco Bay Area Air Basin are shown in **Table 3.4-1**. EPA uses two categories to designate areas with respect to ozone, carbon monoxide, and nitrogen dioxide. These designation categories are nonattainment (N), when the area does not meet primary standards and unclassifiable/attainment (U/A), when the areas either cannot be classified or is better than national standards. EPA uses four categories to designate areas with respect to sulfur dioxide. These designation categories are nonattainment-primary (N-P), when an area does not meet the primary standards; nonattainment-secondary (N-S), when an area does not meet the secondary standards; unclassifiable (U), when an area cannot be classified; and attainment (A), when the area is better than the national standards. Finally, EPA uses two categories to designate areas with respect to suspended particulate matter (PM_{10} and $PM_{2.5}$). These designation categories are nonattainment (N), when the area does not meet standards and unclassifiable (U), when an area cannot be classified.

TABLE 3.4-1
NATIONAL AMBIENT AIR QUALITY STANDARDS FOR CRITERIA POLLUTANTS AND ATTAINMENT STATUS FOR THE BAY AREA AIR QUALITY MANAGEMENT DISTRICT

Pollutant	Averaging Time	National Standards	
		Concentration	Attainment Status
Ozone	8 Hour	0.08 ppm	N - Marginal
Carbon Monoxide	8 Hour	9 ppm	U/A - Maintenance
	1 Hour	35 ppm	U/A
Nitrogen Dioxide	Annual Average	0.053 ppm	U/A
Sulfur Dioxide	AAM	0.03 ppm	A
	24 Hour	0.14 ppm	A
Respirable Particulate Matter (PM_{10})	AAM	50 $\mu g/m^3$	U
	24 Hour	150 $\mu g/m^3$	U
Fine Particulate Matter ($PM_{2.5}$)	AAM	15 $\mu g/m^3$	U/A
	24 Hour	35 $\mu g/m^3$	U/A
Lead	Calendar Quarter	1.5 $\mu g/m^3$	A

NOTES: ppm = parts per million $\mu g/m^3$ = micrograms per cubic mete A = Attainment N = Nonattainment U = Unclassified U/A = Unclassifiable/Attainment AAM = Annual Arthmetic Mean EPA lowered the 24-hour $PM_{2.5}$ standard in December 2006.

SOURCE: BAAQMD 2004, AES 2005

For reasons described below, the criteria pollutants of greatest concern for the proposed project are carbon monoxide (CO), ozone (O_3), inhalable particulate matter less than 10 microns in diameter (PM_{10}), and fine particulate matter ($PM_{2.5}$).

CARBON MONOXIDE (CO)

Carbon monoxide (CO) is a colorless, odorless gas that is formed when carbon in fuel is not burned completely. It is a component of motor vehicle exhaust, which contributes about 56 percent of all CO emissions nationwide. Other non-road engines and vehicles (such as construction equipment and boats) contribute about 22 percent of all CO emissions nationwide. Higher levels of CO generally occur in areas with heavy traffic congestion. In cities, 85 to 95 percent of all CO emissions may come from motor vehicle exhaust. Other sources of CO emissions include industrial processes (such as metals processing and chemical manufacturing), residential wood burning, and natural sources such as forest fires. Woodstoves, gas stoves, cigarette smoke, and unvented gas and kerosene space heaters are sources of CO indoors. The highest levels of CO in the outside air typically occur during the colder months of the year when inversion conditions are more frequent. The air pollution becomes trapped near the ground beneath a layer of warm air.

CO is a public health concern because it combines readily with hemoglobin and thus reduces the amount of oxygen transported in the bloodstream. The health threat from lower levels of CO is most serious for those who suffer from heart disease, like angina, clogged arteries, or congestive heart failure. For a person with heart disease, a single exposure to CO at low levels may cause chest pain and reduce that person's ability to exercise; repeated exposures may contribute to other cardiovascular effects. High levels of CO can affect even healthy people. People who breathe high levels of CO can develop vision problems, reduced ability to work or learn, reduced manual dexterity, and difficulty performing complex tasks. At extremely high levels, CO is poisonous and can cause death.

Motor vehicles are the dominant source of CO emissions in most areas. CO is described as having only a local influence because it dissipates quickly. High CO levels develop primarily during winter when periods of light winds combine with the formation of ground level temperature inversions (typically from the evening through early morning). These conditions result in reduced dispersion of vehicle emissions. Because CO is a product of incomplete combustion, motor vehicles exhibit increased CO emission rates at low air temperatures. High CO concentrations occur in areas of limited geographic size, sometimes referred to as hot spots. Since CO concentrations are strongly associated with motor vehicle emissions, high CO concentrations generally occur in the immediate vicinity of roadways with high traffic volumes and traffic congestion, active parking lots, and in automobile tunnels. Areas adjacent to heavily traveled and congested intersections are particularly susceptible to high CO concentrations.

Federal CO standards have been set for both 1-hour and 8-hour averaging times. The federal 1-hour standard is 35 ppm and 9 ppm for the 8-hour averaging period. CO is a public health concern because it combines readily with hemoglobin and, thus, reduces the amount of oxygen transported in the bloodstream. As shown in **Table 3.4-1**, the SFBAAB is designated[2] attainment for CO, however portions of the air basin (delineated as "urbanized areas") were in non-attainment until 1998. In 1998 the SFBAAB was given a designation of maintenance. The SFBAAB will always have this designation and will have to prepare a maintenance plan every 10 years. Since an area-designated maintenance does not have to prepare a SIP, the maintenance plan takes its place as the equivalent document. The Wilfred and Stony Point Sites are within the urbanized area maintenance area. The Lakeville Site is outside of the urbanized area maintenance area.

OZONE (O_3)

Ozone is not emitted directly into the air, but is formed by a photochemical reaction in the atmosphere. Ozone precursors, which include reactive organic gases (ROG) and oxides of nitrogen (NO_X), react in the atmosphere in the presence of sunlight to form ozone. Because photochemical reaction rates depend on the intensity of ultraviolet light and air temperature, ozone is primarily a summer air pollution problem and often the effects of the emitted ROG and NO_X is felt a distance downwind of the emission sources. Ozone is subsequently considered a regional pollutant. Ground level ozone is a respiratory irritant and an oxidant that increases susceptibility to respiratory infections and can cause substantial damage to vegetation and other materials.

Ozone can irritate lung airways and cause inflammation much like a sunburn. Other symptoms include wheezing, coughing, pain when taking a deep breath, and breathing difficulties during exercise or outdoor activities. People with respiratory problems are most vulnerable, but even healthy people that are active outdoors can be affected when ozone levels are high. Chronic ozone exposure can induce morphological (tissue) changes throughout the respiratory tract, particularly at the junction of the conducting airways and the gas exchange zone in the deep lung. Anyone who spends time outdoors in the summer is at risk, particularly children and other people who are active outdoors. Even at very low levels, ground-level ozone triggers a variety of health problems including aggravated asthma, reduced lung capacity, and increased susceptibility to respiratory illnesses like pneumonia and bronchitis.

Ozone also damages vegetation and ecosystems. It leads to reduced agricultural crop and commercial forest yields, reduced growth and survivability of tree seedlings, and increased susceptibility to diseases, pests, and other stresses such as harsh weather. In the United States

[2] In April 1998, the Bay Area was redesignated to attainment for the national 8-hour carbon monoxide standard.

alone, ozone is responsible for an estimated $500 million in reduced crop production each year. Ozone also damages the foliage of trees and other plants, affecting the landscape of cities, national parks and forests, and recreation areas. In addition, ozone causes damage to buildings, rubber, and some plastics.

Ozone is a regional pollutant, as the reactions forming it take place over time, and downwind from the sources of the emissions. As a photochemical pollutant, ozone is formed only during daylight hours under appropriate conditions, but is destroyed throughout the day and night. Thus, ozone concentrations vary depending upon both the time of day and the location. Even in pristine areas there is some ambient ozone that forms from natural emissions that are not controllable. This is termed "background" ozone. The average "background" ozone concentrations near sea level are in the range of 0.015 to 0.035 ppm, with a maximum of about 0.04 ppm (CARB, 2005).

A federal standard for ozone had been set for a 1-hour averaging time of 0.12 ppm, not to be exceeded more than three times in any 3-year period but was officially revoked in June 2005. Presently, the federal ozone standard has been set at a concentration of 0.08 ppm measured over 8 hours. As shown in **Table 3.4-1**, the San Francisco Bay Area Air Basin is classified as a nonattainment area for the federal 8-hour ozone standard. Whereas the Air Basin had been designated nonattainment for the Federal 1-hour standard, that classification is no longer pertinent. The federal 8-hour nonattainment designation has been classified as "marginal", which requires a maximum attainment date of June 2007.

NITROGEN DIOXIDE (NO_2)

Nitrogen dioxide (NO_2) is a brownish, highly reactive gas that is present in all urban environments. The major artificial sources of NO_2 are combustion devices, such as boilers, gas turbines, and mobile and stationary reciprocating internal combustion engines. Combustion devices emit primarily nitric oxide (NO), which reacts through oxidation in the atmosphere to form NO_2. The combined emissions of NO and NO_2 are referred to as NO_X, which are reported as equivalent NO_2. Because NO_2 is formed and depleted by reactions associated with photochemical smog (ozone), the NO_2 concentration in a particular geographical area may not be representative of the local NO_X emission sources.

Inhalation is the most common route of exposure to NO_2. Because NO_2 has relatively low solubility in water, the principal site of toxicity is in the lower respiratory tract. The severity of the adverse health effects depends primarily on the concentration inhaled rather than the duration of exposure. An individual may experience a variety of acute symptoms during or shortly after exposure, including coughing, difficulty with breathing, vomiting, headache, and eye irritation. After a period of approximately 4–12 hours, an exposed individual may experience chemical pneumonitis or pulmonary edema with breathing abnormalities, cough, cyanosis, chest pain, and rapid heartbeat. Severe, symptomatic NO_2 intoxication after acute exposure has been linked on

occasion with prolonged respiratory impairment with such symptoms as chronic bronchitis and decreased lung functions.

The federal standard for an annual average is 0.053 ppm. As shown in **Table 3.4-1**, the San Francisco Bay Area Air Basin is classified as unclassifiable/attainment for the federal standard. However, since NO_2 is a component in the formation of ozone, it is considered a pollutant of concern for the proposed project.

PARTICULATE MATTER (PM_{10} AND $PM_{2.5}$)

Particle pollution is a mixture of microscopic solids and liquid droplets suspended in air. This pollution, also known as particulate matter, is made up of a number of components, including acids (such as nitrates and sulfates), organic chemicals, metals, soil or dust particles, and allergens (such as fragments of pollen or mold spores). The size of particles is directly linked to their potential for causing health problems. Small particles less than 10 micrometers (μm) in diameter pose the greatest problems, because they can get deep into lungs and the bloodstream. Exposure to such particles can affect both lungs and heart. Larger particles are of less concern, although they can irritate eyes, nose, and throat. **Figure 3.4-2** shows the relative sizes of particulate matter.

Particle exposure can lead to a variety of health effects. For example, numerous studies link particle levels to increased hospital admissions and emergency room visits—and even to death from heart or lung diseases. Both long- and short-term particle exposures have been linked to health problems. Long-term exposures, such as those experienced by people living for many years in areas with high particle levels, have been associated with problems such as reduced lung function and the development of chronic bronchitis and even premature death. Short-term exposures to particles (hours or days) can aggravate lung disease, causing asthma attacks and acute bronchitis, and may also increase susceptibility to respiratory infections. In people with heart disease, short-term exposures have

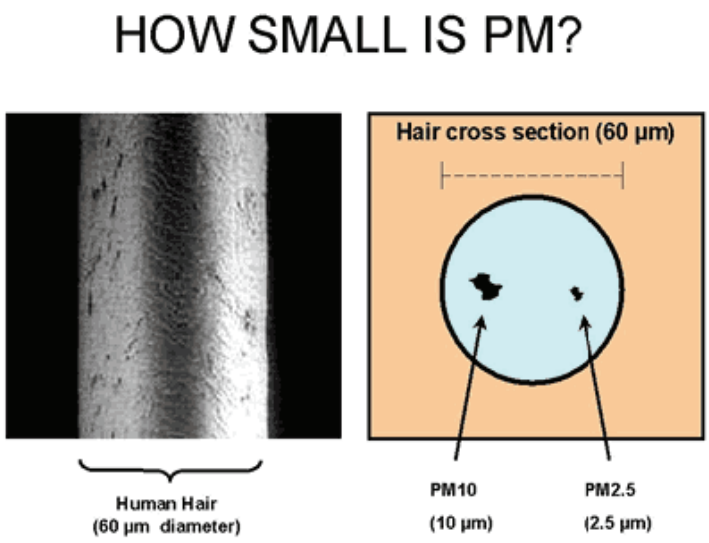


Figure 3.4-2 – Relative sizes of particulate matter pollution
Source: CARB, 2005

been linked to heart attacks and arrhythmias. Healthy children and adults have not been reported to suffer serious effects from short-term exposures, although they may experience temporary minor irritation when particle levels are elevated.

The current federal PM_{10} standards are 150 $\mu g/m^3$ as a 24-hour average, and 50 $\mu g/m^3$ as an annual arithmetic mean. In July 1997, while it was determined that the PM NAAQS should continue to focus on particles less than or equal to 10 µm in diameter, it was also determined that the fine and coarse fractions of PM_{10} should be considered separately. EPA promulgated a new standard for $PM_{2.5}$, or fine particulate matter. The new NAAQS was 65 $\mu g/m^3$, for a 24-hour sample, and 15 $\mu g/m^3$, for an annual arithmetic mean.

In 2005, BAAQMD released a Staff Report (BAAQMD 2005) that analyzes the sources of PM in the Bay Area. Based on 2000-2003 ambient air monitoring data, BAAQMD and the California Air Resources Board (CARB) estimated that the $PM_{2.5}$ fraction of total PM accounted for approximately 60% of PM_{10} during the winter and approximately 45% during the rest of the year. On days when the PM standards are exceeded, $PM_{2.5}$ can account for as much as 99.2% of PM_{10}. On an annual basis, CARB estimated that $PM_{2.5}$ comprised approximately 50% of the PM_{10} levels.

Based on the inventory data, BAAQMD has determined that combustion activities such as residential wood burning, construction/demolition activities, road dust, and emissions from on and off-road engines were identified as significant sources of PM_{10} emissions in the Bay Area. However, while the inventory was helpful in determining potential PM_{10} sources in the region, it did not provide the full picture of the makeup of the region's PM. The nature of particulates is that larger, coarser particles tend to settle out of the air closer to their emission source while smaller particles, such as the size of $PM_{2.5}$, tend to remain suspended in the air longer and travel further.

BAAQMD's analysis showed that, for annual average $PM_{2.5}$, the largest source categories are on and off road motor vehicle exhaust and carbon from cooking and wood-burning activities. These categories include both directly emitted PM and secondary PM, such as ammonium nitrate formed by atmospheric reactions of ammonia with nitrogen oxides from motor vehicles and other combustion sources. Geological dust was found to only be a minor component of ambient PM.

Subsequently, it was determined that during the winter, residential wood smoke and cooking were major contributors to ambient PM. Combustion $PM_{2.5}$, which includes vehicle exhaust, was the second major component of $PM_{2.5}$ and a significant component of PM_{10}. Ammonium nitrate was also a principal component of ambient PM. Road dust and other dust producing activities also contributed to ambient PM_{10}, but not significantly to $PM_{2.5}$, and had a more local impact.

As shown in **Table 3.4-1**, the San Francisco Bay Area Air Basin is designated unclassified for the federal PM_{10} and unclassifiable/attainment for the $PM_{2.5}$ standards.

OTHER CRITERIA POLLUTANTS

The standards for sulfur dioxide (SO_2) and lead are either being met or are unclassified in the San Francisco Bay Area Air Basin portion of Sonoma County, and the latest pollutant trends suggest that these standards will not be exceeded in the foreseeable future.

TOXIC AIR CONTAMINANTS

In addition to the above-listed criteria pollutants, Toxic Air Contaminants (TACs) are another group of pollutants of concern. Sources of TACs include industrial processes such as petroleum refining and chrome plating operations, commercial operations such as gasoline stations and dry cleaners, and motor vehicle exhaust. Cars and trucks release at least forty different toxic air contaminants. The most important, in terms of health risk, are diesel particulates, benzene, formaldehyde, 1,3-butadiene, and acetaldehyde. Public exposure to TACs can result from emissions from normal operations, as well as accidental releases. Health effects of TACs include cancer, birth defects, neurological damage, and death.

Toxic air contaminants are less pervasive in the urban atmosphere than the criteria air pollutants, but are linked to short-term (acute) or long-term (chronic or carcinogenic) adverse human health effects. There are hundreds of different types of toxic air contaminants, with varying degrees of toxicity. Sources of toxic air contaminants include industrial processes, commercial operations (e.g., gasoline stations and dry cleaners), and motor vehicle exhaust.

According to the 2005 California Almanac of Emissions and Air Quality, the majority of the estimated health risk from TACs can be attributed to relatively few compounds, the most important being diesel particulate matter (DPM). The identification of DPM as a toxic air contaminant in 1998 led CARB to adopt the *Risk Reduction Plan to Reduce Particulate Matter Emissions from Diesel-fueled Engines and Vehicles (Plan)* in September 2000. The Plan's goals are a 75 percent reduction in DPM by 2010 and an 85 percent reduction by 2020 from the 2000 baseline. Diesel engines emit a complex mixture of air pollutants, composed of gaseous and solid material. The visible emissions in diesel exhaust are known as particulate matter or PM, which includes carbon particles or "soot." Diesel exhaust also contains a variety of harmful gases and over 40 other cancer causing substances. California's identification of DPM as a toxic air contaminant was based on its potential to cause cancer, premature deaths, and other health problems. Exposure to DPM is a health hazard, particularly to children whose lungs are still developing and the elderly who may have other serious health problems. Overall, diesel engine emissions are responsible for the majority of California's potential airborne cancer risk from combustion sources (CARB 2000).

In January 2006, CARB officially identified environmental tobacco smoke (ETS) as a TAC. ETS is a complex mixture of thousands of gases and fine particulate matter emitted by the burning of tobacco products and from smoke exhaled by the smoker. The composition will vary depending on heat of combustion, tobacco content and additives present, and type of filter material used. Researchers distinguish cigarette smoke as being comprised of two main components: mainstream and sidestream smoke. ETS is a combination of exhaled mainstream smoke, sidestream smoke, and compounds that diffuse through the cigarette paper. According to the Surgeon General's 2006 Report on Exposure to Tobacco Smoke, there is no "risk-free" level of exposure to ETS (HHS, 2006).

ASBESTOS

Asbestos is the name given to a number of naturally occurring fibrous silicate minerals that have been mined for their useful properties such as thermal insulation, chemical and thermal stability, and high tensile strength. The three most common types of asbestos are: a) chrysotile, b) amosite, and c) crocidolite. Chrysotile, also known as white asbestos is the most common type of asbestos found in buildings. Chrysotile makes up approximately 90%-95% of all asbestos contained in buildings in the United States.

In addition asbestos is also found in it natural state. Exposure and disturbance of rock and soil that naturally contains asbestos can result in the release of fibers to the air and consequent exposure to the public. Asbestos most commonly occurs in ultramafic rock that has undergone partial or complete alteration to serpentine rock (serpentinite) and often contains chrysotile asbestos. In addition, another form of asbestos, tremolite, can be found associated with ultramafic rock, particularly near faults. Sources of asbestos emissions include: unpaved roads or driveways surfaced with ultramafic rock, construction activities in ultramafic rock deposits, or rock quarrying activities where ultramafic rock is present.

To address some of the health concerns associated with exposure to asbestos from these activities, CARB has adopted two Airborne Toxic Control Measures (ATCMs). CARB has an ATCM for construction, grading, quarrying, and surface mining operations requiring the implementation of mitigation measures to minimize emissions of asbestos-laden dust. This ATCM applies to road construction and maintenance, construction and grading operations, and quarries and surface mines when the activity occurs in an area where NOA is likely to be found. Areas are subject to the regulation if they are identified on maps published by the Department of Conservation as ultramafic rock units or if the APCO or owner/operator has knowledge of the presence of ultramafic rock, serpentine, or NOA on the site. The ATCM also applies if ultramafic rock, serpentine, or asbestos is discovered during any operation or activity.

In addition, CARB has an ATCM for surfacing applications. This ATCM applies to any person who produces, sells, supplies, offers for sale or supply, uses, applies, or transports any 1) aggregate material extracted from property where any portion of the property is located in a geographic ultramafic rock unit or 2) aggregate material extracted from property that is NOT located in a geographic ultramafic rock unit if the material has been evaluated at the request of the Air Pollution Control Officer (APCO) and determined to be ultramafic rock or serpentine; tested at the request of the APCO and determined to have an asbestos content of 0.25 percent or greater; or determined by the owner / operator of a facility to be ultramafic rock, or serpentine, or material that has an asbestos content of 0.25 percent or greater. The ATCM prohibits person from using, applying, selling, supplying, or offering for sale or supply any restricted material for surfacing unless it has been tested and determined to have an asbestos content that is less than 0.25 percent.

3.4.3 EXISTING AIR QUALITY

EMISSION SOURCES

California is a diverse state with many sources of air pollution. To estimate the sources and quantities of pollution, CARB, in cooperation with local air districts and industry, maintains an inventory[3] of California emission sources. Sources are subdivided into four major emission categories: stationary sources, area-wide sources, mobile sources, and natural sources. Stationary source emissions are based on estimates made by facility operators and local air districts. Emissions from specific facilities can be identified by name and location. CARB and local air district staffs estimate area-wide emissions. Emissions from area-wide sources may be either from small individual sources, such as residential fireplaces, or from widely distributed sources that cannot be tied to a single location, such as consumer products and dust from unpaved roads. CARB staff estimates mobile source emissions with assistance from districts and other government agencies. Mobile sources include on-road cars, trucks, and buses and other sources such as boats, off-road recreational vehicles, aircraft, and trains. CARB staff and the air districts also estimate natural sources. These sources include geogenic (petroleum seeps[4]) and biogenic (vegetation) sources, and wildfires.

Table 3.4-2 summarizes estimated 2005 emissions of key criteria air pollutants from major categories of air pollutant sources. For each pollutant, estimated emissions are presented for the portion of Sonoma County that is in the San Francisco Bay Area Air Basin (SFBAAB). No further spatial refinement is available (CARB, 2005).

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3 Inventory data can be retrieved from the CARB's Emission Inventory website http://www.arb.ca.gov/ei/ei.htm

4 Petroleum gas and oil seeps occur naturally in California and have been active for millennia. Oil and gas seeps form where oil or natural gas emerge from subsurface sources to the ground or water surface.

The SFBAAB portion of Sonoma County is similar to many other portions of California and the United States in general in that a large portion of the CO emissions comes from on-road mobile sources (72%), with the majority coming from passenger cars and trucks. NO_X is also dominated by on-road mobile sources (73%) still coming mostly from passenger cars and trucks, but heavy-duty diesel trucks supply a stronger portion (27%) of that on-road total. In the SFBAAB portion of Sonoma County two thirds of the total ROG are divided evenly between on-road vehicles and natural sources, which, in this case, is primarily biogenic sources emanating from the plant life in the area. Particulate matter is primarily coming from a category called "miscellaneous processes", which includes a variety of subcategories. In the case of the SFBAAB portion of Sonoma County's emissions, these subcategories are primarily paved road dust, construction and demolition, and residential fuel combustion.

TABLE 3.4-2
SFBAAB PORTION OF SONOMA COUNTY
2005 EMISSIONS INVENTORY
(TONS PER DAY)

Emission Category	ROG	CO	NO_X	PM_{10}	$PM_{2.5}$
Fuel Combustion	0	1.0	0.8	0.1	0.1
Waste Disposal	0.3	0	0	0	0
Cleaning & Surface Coatings	1.8	0	0	0	0
Petroleum Production & Marketing	0.9	0	0	0	0
Industrial Processes	0.6	0	0	0.6	0.3
Solvent Evaporation	4.5	0	0	0	0
Miscellaneous Processes	2.1	17.5	1.2	9.9	3.8
On-Road Motor Vehicles	10.1	97.1	17.0	0.5	0.4
Other Mobile Sources	2.6	18.6	4.3	0.4	0.3
Natural Sources	10.1	0.5	0	0.1	0
Total	**33.0**	**134.7**	**23.3**	**11.5**	**4.9**

NOTES: All values in tons per day. 2005 is estimated from a base year inventory for 2004 based on growth and control factors available from CARB. The sum of values may not equal total shown due to rounding.

SOURCE: CARB 2005.

INDUSTRIAL EMISSIONS SOURCES NEAR THE WILFRED SITE

An analysis of the area surrounding the Wilfred site using CARB's Facility Search Engine, which allows the user to find emissions data for more than 10,000 facilities in California, shows that there are 8 facilities within a 10-mile radius of the Wilfred site that emit more than 10 tons per year of any of the pollutants of concern (ROG, CO, NO_X, PM_{10}, or $PM_{2.5}$). These facilities, their

estimated emissions, and their relative distances from the Wilfred site are presented in **Table 3.4-3**.

INDUSTRIAL EMISSIONS SOURCES NEAR THE STONY POINT SITE

The Wilfred site and the Stony Point site are differentiated from each other by boundary configurations and total acreages. They do, however, share the same general location, and as such, their boundaries have considerable overlap as discussed in Section 2.0. Therefore, they are substantially similar in localized air quality issues, and identical in regional considerations. Thus, **Table 3.4-3** would also give an accurate representation of industrial emission sources near the Stony Point Site.

TABLE 3.4-3
EMISSION SOURCES GREATER THAN 10 TONS PER YEAR
WITHIN 10-MILE RADIUS OF WILFRED SITE

Facility Name / Address	Emissions in tons per year					Distance from Wilfred Site
	ROG	CO	NO_X	PM_{10}	$PM_{2.5}$	
Interior Finishing 137 Utility Court, Rohnert Park	13.1	0	0	0	0	1 mi E
Deas Custom Wood Finishing 2985 Dutton, Santa Rosa	12.9	0	0	0	0	3 mi N
Stony Point Rock Quarry, Inc 7171 Stony Point Road, Cotati	2.8	8.6	39.6	8.1	4.3	3 mi SSW
City Of Santa Rosa Wastewater 4300 Llano Road, Santa Rosa	11.1	43.2	12.5	0.4	0.4	3 mi WNW
Sonoma County Dept of PW 500 Mecham Road, Petaluma	85.7	180.6	85.9	17.3	17.2	4 mi SSW
Superior Supplies Inc 40 Ridgeway Avenue, Santa Rosa	0	0	0	30.9	20.8	6 mi N
Willowbrook Feeds 40 Ely Road N, Petaluma	0	0.2	0.8	25.5	7.7	6 mi SSE
Harding Lawson Associates 500 Hopper Street, Petaluma	15.2	0	0	0	0	10 mi SSE

Source: CARB, 2005. (http://www.arb.ca.gov/app/emsinv/facinfo/facinfo.php)

INDUSTRIAL EMISSIONS SOURCES NEAR THE LAKEVILLE SITE

An analysis of the area directly surrounding the Lakeville site using CARB's Facility Search Engine shows that there are 4 facilities within 10 miles of the Lakeville site that emit more than 10 tons per year of any of the pollutants of concern (ROG, CO, NO_X, PM_{10}, or $PM_{2.5}$). These facilities, their estimated emissions, and their relative distances from the Lakeville site are presented in **Table 3.4-4**.

TABLE 3.4-4
EMISSION SOURCES GREATER THAN 10 TONS PER YEAR
WITHIN 10-MILE RADIUS OF LAKEVILLE SITE

Facility Name / Address	Emissions in tons per year					Distance from Lakeville Site
	ROG	CO	NO_X	PM_{10}	$PM_{2.5}$	
Harding Lawson Associates 500 Hopper Street, Petaluma	15.2	0	0	0	0	10 mi NW
Carpenter Parmatech 2221 Pineview Way, Petaluma	15.6	0	0	0	0	8 mi NW
Sonoma Rock Co 26650 Arnold Drive, Sonoma	0.4	1.2	5.5	10.6	3.4	7 mi N
Redwood Landfill 8950 Redwood Hwy, Novato	73.1	0.9	1.6	13.5	12.9	4 mi WSW

Source: CARB, 2005. (http://www.arb.ca.gov/app/emsinv/facinfo/facinfo.php)

MONITORING DATA

Meteorology acts on the emissions released into the atmosphere to produce pollutant concentrations. These airborne pollutant concentrations are measured throughout California at air quality monitoring sites. CARB operates a statewide network of monitors. Data from this network are supplemented with data collected by local air districts, other public agencies, and private contractors. There are more than 250 criteria pollutant monitoring sites in California. Each year, more than ten million air quality measurements from all of these sites are collected and stored in a comprehensive air quality database maintained by CARB[5].

Air quality data for the period from 2002 through 2004 from the monitoring station nearest the project site are summarized in **Table 3.4-5**. The station closest to the Wilfred and Stony Point sites is the Santa Rosa station on 5th Street, which is located approximately 6 miles north of the Wilfred and Stony Point sites. The station closest to the Lakeview site is the San Rafael station on 4th Street, approximately 12 miles south of the Lakeview site.

Monitored CO levels at both stations have been well below the 9 ppm eight-hour average. As shown on **Table 3.4-5,** the highest monitored concentration during the three-year period at either station was 2.10 ppm. The 1-hour or 8-hour ozone standard, the 24-hour PM_{10} standard, the 24-hour $PM_{2.5}$ standard, or any of the particulate matter annual standards were not exceeded at either station during the three-year period.

[5] Air monitoring data can be retrieved from the CARB's Air Quality Data website http://www.arb.ca.gov/aqd/aqdpage.htm

TABLE 3.4-5
AIR MONITORING DATA FOR LATEST MONITORING YEARS IN PROJECT AREAS

Pollutant (Location)	NAAQS	2002	2003	2004
Ozone (Santa Rosa)				
Highest 1-Hour Average (ppm)	~~0.12~~*	0.077	0.096	0.076
Highest 8-Hour Average (ppm)	0.08	0.060	0.079	0.060
Days > 1-Hour Standard		0	0	0
Days > 8-Hour Standard		0	0	0
Ozone (San Rafael)				
Highest 1-Hour Average (ppm)	~~0.12~~	0.077	0.087	0.091
Highest 8-Hour Average (ppm)	0.08	0.056	0.067	0.063
Days > 1-Hour Standard		0	0	0
Days > 8-Hour Standard		0	0	0
Carbon Monoxide (Santa Rosa)				
Highest 8-Hour Average (ppm)	9	2.10	1.77	1.57
Days > Standard		0	0	0
Carbon Monoxide (San Rafael)				
Highest 8-Hour Average (ppm)	9	1.88	2.03	1.96
Days > Standard		0	0	0
PM_{10} (Santa Rosa)				
Highest 24-Hour Average	150	60.2	34.2	47.4
Days > Standard		0	0	0
National Annual Average	50	19.7	16.4	17.3
PM_{10} (San Rafael)				
Highest 24-Hour Average	150	69.6	39.1	51.0
Days > Standard		0	0	0
National Annual Average	50	21.4	17.0	17.4
$PM_{2.5}$ (Santa Rosa)				
Highest 24-Hour Average	65	50.7	38.8	26.6
Days > Standard		0	0	0
National Annual Average	15	10.5	8.8	8.3

Notes: The number of days that at least one measurement was greater than the level of the state or national standard is not necessarily the number of violations of the standard for the year since the hourly and eight-hour standards can be violated more than once per day.

* 1-hour federal ozone standard was in effect for these three monitoring years, even though it is now inapplicable. It was officially revoked June 15, 2005.

ppm = parts per million $\mu g/m^3$ = micrograms per cubic meter

SOURCE: CARB, 2005a.

ODORS

Existing odor sources in the area of the Wilfred and Stony Point sites are primarily limited to those associated with various agricultural activities, including fertilization and scattered cattle grazing activities. The BAAQMD has stated that there has been no major source of odor complaints in the vicinity within the last three years (personal communication with David Farr, Inspector with the BAAQMD, 1/31/06). During site visits, AES observed no detectable odors from the Wilfred and Stony Point site areas.

Existing odor sources in the area of the Lakeville site are rangeland and agricultural. During site visits, AES observed no detectable odors from the Lakeville site area.

TOXIC AIR CONTAMINANTS

A major source of toxics is defined as a source that emits 10 tons per year of any listed toxic air pollutant or 25 tons per year of any mixture of air toxics. An area source is defined as a source that emits less than these levels of air toxics and which is a concern because there are a large number of these small emitters within a single area. A search of the EPA Toxic Release Inventory shows no major sources of toxic emissions near the Wilfred, Stony Point, or Lakeville sites.

INDOOR AIR QUALITY

CARB, as the primary state regulatory agency with regards to air quality in California, has traditionally been involved in the ambient air, which Miriam-Webster defines as "existing or present on all sides or encompassing". Historically that has been traditionally the "outdoor" air. In fact, since 1992 there has been an Indoor Air Quality (IAQ) Program at CARB that is primarily designed "to conduct and promote the coordination of research, investigations, experiments, demonstrations, surveys, and studies relating to the causes, effects, extent, prevention, and control of indoor pollution in California."

Practical applications and solutions for IAQ concerns have been combined with other environmental concerns in an emerging concept of green or sustainable building designs. The State agency that has taken the lead in green buildings is the Integrated Waste Management Board (IWMB). In fact, the IWMB has developed a central informational web source at http://www.ciwmb.ca.gov/GreenBuilding/ where they discuss green building basics, supply a sustainable building tool kit, provide training programs for state and local government, and supply a sustainable building implementation plan.

On a national level, EPA completed, in 1999, an extensive modeling study to assess the compatibilities and trade-offs between energy, indoor air quality, and thermal comfort objectives for HVAC systems, and help formulate strategies to simultaneously achieve superior performance on each objective. To gain a better understanding of IAQ, EPA's Office of Radiation and Indoor Air also conducted a major study of IAQ in public and commercial office buildings. Most recently, EPA has expanded their existing Building Air Quality guidance with a practical tool designed to be comprehensive state-of-the-art guidance for managing IAQ in commercial buildings. This tool is called the IAQ Building Education and Assessment Tool (I-BEAM) and is designed to be used by building professionals and others interested in indoor air quality in commercial buildings.

In addition, the U.S. Green Building Council[6] (USGBC) was established as a coalition of leaders from across the building industry working to promote buildings that are environmentally responsible, profitable, and healthy places to live and work. The USGBC has developed the Leadership in Energy and Environmental Design (LEED) Green Building Rating System as a national consensus-based, market-driven building rating system designed to accelerate the development and implementation of green building practices. Based on well-founded scientific standards, LEED emphasizes state of the art strategies for sustainable site development, water savings, energy efficiency, materials selection, and indoor environmental quality. LEED recognizes achievements and promotes expertise in green building through a comprehensive system offering project certification, professional accreditation, training and practical resources.

LEED standards are currently available or under development for new commercial construction and major renovation projects; existing building operations; commercial interiors projects; core and shell projects; homes; and neighborhood development. The module for new commercial construction gives credits for categories entitled Sustainable Sites; Water Efficiency; Energy & Atmosphere; Materials & Resources; Innovation & Design Process; and Indoor Environmental Quality.

IAQ problems result from interactions between contaminant source, building site, building structure, activities within the building, mechanical equipment, climate, and occupants. Efforts to control indoor air contaminants change the relationships between these factors. There are many ways that people can intervene in these relationships to prevent or control indoor air contaminant problems. Control strategies can be categorized as source control, ventilation, air cleaning, or exposure control and successful mitigation often involves a combination of these strategies. A combination of I-BEAM and LEED factors and strategies were utilized to evaluate the IAQ concerns for this project and, where appropriate, to incorporate green building best practices for each alternative.

SENSITIVE RECEPTORS

Current land uses of the Wilfred and Stony Point sites are unirrigated pasture, grazing, and rye grass cultivation. Surrounding land uses consist mainly of pasture and rural residential units. Adjacent properties include large retail businesses to the east and south.

Several school facilities are within a 2-mile radius of the Wilfred site. Hahn Elementary School is approximately 1.6 miles east; Reed Elementary School is approximately 1.8 miles south-southeast; and Evergreen Elementary School is approximately 1.8 miles east-southeast.

[6] http://www.usgbc.org

For Alternative C, where construction activity would occur on the northeast corner of the Stony Point site, only Hahn Elementary is within 2 miles. For Alternatives B, D, and E, where construction activity would occur on the northwest corner of the Stony Point site, there are no schools within 2 miles.

Current land uses near the Lakeville site are largely open space. There are few rural residential land uses in the area of the Lakeville site.

3.4.4 REGULATORY CONTEXT

FEDERAL CLEAN AIR ACT

The federal Clean Air Act (CAA) was enacted for the purposes of protecting and enhancing the quality of the nation's air resources to benefit public health, welfare, and productivity.

In 1971, the EPA developed primary and secondary National Ambient Air Quality Standards (NAAQS). Six pollutants of primary concern were designated: CO, ozone, suspended particulate matter, sulfur dioxide, NO_X, and lead. The primary NAAQS must "protect the public health with an adequate margin of safety" and the secondary standards must "protect the public welfare from known or anticipated adverse effects (aesthetics, crops, architecture, etc.)". The primary standards were established, with a margin of safety, considering long-term exposures for the most sensitive groups in the general population. The EPA allows states the option to develop different (stricter) standards. California elected this option and adopted standards that are more stringent. **Table 3.4-1** shows the federal and state standards.

If an air basin is not in federal attainment (e.g. does not meet federal standards) for a particular pollutant, the basin is classified as a marginal, moderate, serious, severe, or extreme nonattainment area. Nonattainment areas must take steps towards attainment by a specific timeline. These steps include establishing a transportation control program and clean-fuel vehicle program, decreasing the emissions threshold for new stationary sources and for major sources, and increasing the stationary source emission offset ratio to at least 1.3:1 (federal Clean Air Act, 1990).

The FCAA establishes specific attainment dates for areas that are designated as nonattainment. Dates are determined by the degree of severity of the pollutant problem. For example, for the 1-hour ozone standard, if the design value, or the fourth highest value in three years of monitoring, of an area is from 0.180 ppm up to 0.190 ppm, the area is considered severe nonattainment and would be required to attain within 15 years after the enactment of the FCAA, which would translate to the year 2005.

The State Implementation Plan (SIP) is a number of documents that set forth the state's strategies for achieving federal air quality standards. The Code of Federal Regulations (CFR Title 40, Chapter I, Part 52, Subpart F, §52.220) lists all of the items that are included in the California SIP. The SIP is not a single document, but a compilation of new and previously submitted plans, programs (such as monitoring, modeling, permitting, etc.), district rules, State regulations, and Federal controls. Many of California's SIPs detail control strategies, including emission standards for cars and heavy trucks, fuel regulations and limits on emissions from consumer products. Local air districts and other agencies, such as the Bureau of Automotive Repair, prepare SIP elements and submit them to CARB for review and approval. State law makes CARB the lead agency for all purposes related to the SIP.

Federal Hazardous Air Pollutant Program

Title III of the CAA required EPA to promulgate national emissions standards for hazardous air pollutants (NESHAP). The NESHAP may differ between major sources and area sources of hazardous air pollutants (HAPs). Major sources are defined as stationary sources with potential to emit more than 10 tons per year (tpy) of any HAP or more than 25 tpy of any combination of HAPs; all other sources are considered area sources. The emissions standards were to be promulgated in two phases. In the first phase (1992–2000), EPA developed technology-based emission standards designed to produce the maximum emission reduction achievable. For area sources, the standards were different, based on generally available control technology. In the second phase (2001–2008), EPA is required to promulgate health risk–based emissions standards where deemed necessary to address risks remaining after implementation of the technology-based NESHAP standards.

The CAA required EPA to promulgate vehicle or fuel standards containing reasonable requirements that control toxic emissions, addressing at a minimum benzene and formaldehyde. Performance criteria were established to limit mobile-source emissions of toxics, including benzene, formaldehyde, and 1,3-butadiene. In addition, Section 219 required the use of reformulated gasoline in selected US cities (those with the most severe ozone nonattainment conditions) to further reduce mobile-source emissions.

Federal Clean Air Act and Indian Tribes

The federal Clean Air Act authorizes EPA to issue regulations specifying the provisions of the Act for which Indian tribes may be treated in the same manner as States. For those provisions specified, a tribe may develop and implement one or more of its own air quality programs under the Act. EPA issued its final rule on this issue in 1998. The rule provides that tribes will be treated in the same manner as States for virtually all federal Clean Air Act programs. The rule grants tribes with EPA-approved Clean Air Act programs authority over all air resources within the exterior boundaries of a reservation (including non-Indian owned fee lands). No such

program exists for the Federated Indians of Graton Rancheria, and thus EPA retains permitting authority for sources of air pollution located on the project site.

Federal General Conformity

The General Conformity Rule of the federal Clean Air Act (CAA) (42 USC 7401), implements Section 176(c) of the Act, and establishes minimum thresholds for volatile organic compounds (VOCs)[7] and NO_X (ozone precursors), CO, and other regulated constituents for non-attainment and maintenance areas.

Title 40 Part 93 of the Code of Federal Regulations (CFR) was promulgated in order to determine conformity of Federal actions to state or Federal implementation plans. Whereas Subpart A of Part 93 relates to transportation plans, Subpart B is directed to general Federal actions. A federal agency must make a determination that a federal action conforms to the applicable implementation plan before the action is taken. A conformity determination is required for each pollutant where a total of direct and indirect emissions in a nonattainment or maintenance area caused by the federal action are greater than *de minimis* thresholds as listed in CFR Section 93.153(b).

These thresholds provide simple and direct guidance for federal agencies to ensure that they comply with approved state implementation plans (SIP). The general conformity rule includes a procedure for determining whether the rule is applicable to the actions of a federal agency.

There are two phases to general conformity:

1) The Conformity Review process entailing a review of each analyzed alternative to assess whether a full conformity determination is necessary, and
2) The Conformity Determination process, which demonstrates how an action would conform with the applicable implementation plan (usually the SIP).

The first step compares emissions estimates for the project to the appropriate general conformity *de minimis* threshold based on nonattainment type. If the emission estimates from step one are below the thresholds, then a general conformity determination is not necessary and step two is not required.

The regulations apply to a proposed federal action that would cause emissions of criteria air pollutants above certain levels to occur in locations designated as nonattainment or maintenance areas for the emitted pollutants. If a federal action occurs in a location designated as attainment

[7] VOCs are any organic compound containing at least one carbon atom except for specific exempt compounds found to be non-photochemically reactive. In this document, VOC is synonymous with ROG.

or unclassified then the general conformity regulation does not apply to the project. See **Section 3.4.2** for a discussion of the San Francisco Bay Area Air Basin's attainment status. Because the San Francisco Bay Area Air Basin is listed as marginal nonattainment for ozone, the *de minimis* threshold for ozone precursors (VOC and NO_X) is 100 tons per year.

Federal Class I Areas

Title 1, Part C of the FCAA was established, in part, to preserve, protect, and enhance the air quality in national parks, national wilderness areas, national monuments, national seashores, and other areas of special national or regional natural, recreational, scenic, or historic value. The FCAA promised to prevent significant deterioration of air quality under the Prevention of Significant Deterioration (PSD) program. The FCAA designates all international parks, national wilderness areas, and memorial parks larger than 5,000 acres, and national parks larger than 6,000 acres as "Class I areas." There are 156 mandatory Class I areas nationwide.

Any major source of emissions within 100 kilometers (62.1 miles) from a federal Class I area is required to conduct a pre-construction review of air quality impacts on the area(s). The PSD Program protects Class I areas by allowing only a small increment of air quality deterioration in these areas by providing for assessment of potential impacts on air quality related values of Class I areas. A "major source" for the PSD program is defined as a facility that will emit (from direct stationary sources) 250 tons per year of regulated pollutant. For certain specific industries, the requirements apply to facilities that emit (through direct stationary sources) 100 tons per year or more of a regulated pollutant.

BAY AREA AIR QUALITY MANAGEMENT DISTRICT

At a local level, the BAAQMD has jurisdiction over all or portions of the nine counties in the Bay Area including the San Francisco Bay Area Air Basin portion of Sonoma County. The BAAQMD periodically prepares and updates plans to achieve the goal of healthy air. Typically, a plan will analyze emissions inventories and combine that information with air monitoring data and computer modeling simulations to test future strategies to reduce emissions in order to achieve state and federal air quality standards. Air quality plans usually include measures to reduce air pollutant emissions from industrial facilities, commercial processes, motor vehicles, and other sources. Bay Area plans are prepared with the cooperation of the Metropolitan Transportation Commission and the Association of Bay Area Governments.

BAAQMD has an Air Toxics Program that consists of several elements that are designed to identify and reduce public exposure to toxic air contaminants (TACs). The three primary control programs are 1) preconstruction review of new and modified sources, 2) the Air Toxics "Hot Spots" program, and 3) air pollution control measures designed to reduce emissions from

categories of sources of TACs, including BAAQMD rules, statewide Airborne Toxic Control Measures (ATCMs), and National Emission Standards for Hazardous Air Pollutants (NESHAPs).

In addition to the enhanced wood burning activities instituted in response to SB 656, the BAAQMD will also be implementing a number of additional activities to reduce emissions, gain a better understanding of the nature and severity of wood smoke in the Bay Area, and to help inform potential emission reduction strategies. These programs include:

- Focused wood smoke air monitoring study in specific neighborhoods;
- Financial incentives for residents to remove non-EPA certified wood burning devices and install EPA certified devices and to replace wood burning fireplaces with natural gas fireplaces; and
- Enhanced enforcement response when air pollution complaints about wood smoke occur;
- A 2005 Wintertime Survey to gather information about wood burning activities, including the quantities of wood being burned, the types of appliances being used, and the frequency of burning.

INDOOR AIR QUALITY

Indoor air quality (IAQ) refers to the quality of the air inside buildings as represented by concentrations of pollutants and thermal (temperature and relative humidity) conditions that affect the health, comfort, and performance of occupants.

Although the total quantity of air pollutants emitted indoors is less than that emitted by outdoor sources, once emitted, indoor air pollutants are diluted much more slowly, due to the partial trapping effect of the building shell. Additionally, indoor emissions occur in closer proximity to people. Californians spend most of their time indoors; adults spend an average of 87% of their time indoors, and children under 12 years of age spend about 86% of their time indoors. While most of the time spent indoors is spent in the home, working adults spend about 25% of their time at other indoor locations such as office buildings, stores, and restaurants, primarily for work, and children spend about 21% of their time in school on a school day. Because of these time budgets, the trapping effect of buildings, and people's proximity to indoor emissions, there is a much higher likelihood that people will be exposed to indoor pollutants than outdoor pollutants. Investigators have calculated that pollutants emitted indoors are 1,000 times more likely to be inhaled than those emitted outdoors (CARB, 2005b).

Chemicals found in indoor air pollution can cause a variety of impacts on human health, from irritant effects to respiratory disease, cancer, and premature death. Indoor air pollutants can be elevated to levels that may result in adverse health effects. The major indoor pollutants that can have a substantial impact on Californians' health are listed in **Table 3.4-6**, along with their sources and associated health impacts.

"Green" Buildings and Indoor Air Quality

Buildings exist to protect people from the elements and to otherwise support human activity. Buildings should not make people sick, cause them discomfort, or otherwise inhibit their ability to perform. How effectively a building functions to support its occupants and how efficiently the building operates to keep costs manageable is a measure of the building's performance.

The growing proliferation of chemical pollutants in consumer and commercial products, the tendency toward tighter building envelopes and reduced ventilation to save energy, and pressures to defer maintenance and other building services to reduce costs have fostered indoor air quality problems in many buildings.

Building Factors Affecting Indoor Air Quality

The thermal environment (temperature, relative humidity, and airflow) is an important dimension of indoor air quality for several reasons. First, many complaints of poor indoor air may be resolved by simply altering the temperature or relative humidity. Second, people that are thermally uncomfortable will have a lower tolerance to other building discomforts. Third, the

TABLE 3.4-6
SOURCES AND POTENTIAL HEALTH EFFECTS OF MAJOR INDOOR AIR POLLUTANTS

Pollutant	Major Indoor Sources	Potential Health Effects Associated with One or More of The Pollutants Listed*
Asbestos	Building materials in older homes disturbed during renovation. Naturally occurring in some soils.	Lung cancer, asbestosis, mesothelioma.
Biological Agents (bacteria, fungi, viruses, house dust mites, animal dander, cockroaches, microbial VOCs)	House and floor dust; bedding; poorly maintained air conditioners, humidifiers, dehumidifiers; moist structures; insect infestation; building occupants; pets.	Allergic reactions; asthma; eye, nose, and throat irritation; humidifier fever, influenza, other infectious diseases.
Carbon Monoxide	Unvented/malfunctioning gas and propane appliances, woodstoves, fireplaces, tobacco smoke, vehicles in garages.	Headache; nausea; angina; impaired vision and mental functioning; fatal at high concentrations.
Endocrine Disruptors (PBDEs, some phthalates, some pesticides)	Flame retardants, plastics, and pesticides.	Mimic or block natural effects of hormones (estrogen and others); developmental abnormalities.
Environmental Tobacco Smoke (ETS)	Cigarettes, cigars, and pipes.	Respiratory irritation, bronchitis and pneumonia in children; asthma in preschool children; lung cancer; heart disease; aggravated asthma; decreased lung function.
Formaldehyde, Other Aldehydes	Composite wood products such as plywood and particleboard, furnishings, wallpaper, durable press fabrics, paints, combustion appliances, and tobacco smoke.	Cancer; eye, nose, and throat irritation; headache; allergic reactions; aggravated asthma, decreased lung function.
Lead	Lead paint chips, contaminated soil.	Learning impairment.
Nitrogen Dioxide	Unvented or malfunctioning gas appliances, other combustion appliances.	Aggravated asthma; decreased lung function; eye, nose, and throat irritation; increased respiratory disease in children.
Organic Chemicals (benzene, chloroform, paradichlorobenzene, methylene chloride, perchloroethylene, others)	Solvents, glues, cleaning agents, pesticides, building materials, paints, treated water; moth repellents, dry-cleaned clothing, air fresheners.	Cancer; eye, nose, throat irritation; aggravated asthma; decreased lung function; at high levels: loss of coordination, damage to liver, kidney, brain.
Ozone	Infiltration of outdoor air, some air "purifiers", office machines.	Lung inflammation, aggravated asthma, cough, wheeze, chest pain.
Particulate Matter	Cigarettes, wood stoves, fireplaces, cooking, candles, aerosol sprays, house dust.	Increased mortality and hospital admissions; lung cancer; irritation; susceptibility to sinus and respiratory infections; bronchitis; aggravated asthma; decreased lung function.
Pesticides	Insecticides, herbicides, sanitizers, or disinfectants used indoors or tracked in or blown in from outdoors.	Neurological impairment; nausea, headache, dizziness; skin and eye irritation; hormone disruption.
Polycyclic Aromatic Hydrocarbons (PAH)	Cigarette smoke, cooking, wood burning.	Cancer, gene mutation.
Radon	Uranium-bearing soil under buildings, groundwater, construction materials.	Lung cancer (especially in smokers).

NOTE: *When multiple pollutants are listed in a group, each pollutant may not cause all of the health effects listed in the third column.
Source: CARB, 2005b.

rate at which chemicals are released from building materials is usually higher at higher building temperatures. Thus, if occupants are too warm, it is also likely that they are being exposed to higher pollutant levels.

Indoor thermal conditions are controlled by the heating, ventilating, and air conditioning (HVAC) system. How well the thermal environment is controlled depends on the design and operating parameters of the system, and on the heat gains and losses in the space being controlled. These gains and losses are principally determined by indoor sources of heat, the heat gains from sunlight, the heat exchange through the thermal envelope, and the outdoor conditions and outdoor air ventilation rate.

Additionally, much of the building fabric, its furnishings and equipment, its occupants, and their activities also produce pollution. In a well functioning building, some of these pollutants will be directly exhausted to the outdoors and some will be removed as outdoor air enters the building and replaces the air inside. The air outside may also contain contaminants that will be brought inside in this process. This air exchange is brought about by the mechanical introduction of outdoor air (outdoor air ventilation rate), the mechanical exhaust of indoor air, and the air exchanged through the building envelope (infiltration and exfiltration).

Pollutants inside can travel through the building as air flows from areas of higher atmospheric pressure to areas of lower atmospheric pressure. Some of these pathways are planned and deliberate so as to draw pollutants away from occupants, but problems arise when unintended flows draw contaminants into occupied areas. In addition, some contaminants may be removed from the air through natural processes, as with the adsorption of chemicals by surfaces or the settling of particles onto surfaces. Removal processes may also be deliberately incorporated into the building systems. Air filtration devices, for example, are commonly incorporated into building ventilation systems.

Thus, the factors most important to understanding indoor pollution are a) indoor sources of pollution, b) outdoor sources of pollution, c) ventilation parameters, d) airflow patterns and pressure relationships, and e) air filtration systems.

Green Buildings

As the environmental impact of buildings becomes more apparent, a new field called “green building” is gaining momentum. Green or sustainable building is the practice of creating healthier and more resource-efficient models of construction, renovation, operation, maintenance, and demolition. Research and experience increasingly demonstrate that when buildings are designed and operated with their lifecycle impacts in mind, they can provide great environmental, economic, and social benefits.

The building industry is increasingly focused on making its buildings greener, which includes using healthier, less polluting, and more resource-efficient practices. Indoor environmental quality (IEQ) refers to the quality of the air and environment inside buildings, based on pollutant concentrations and conditions that can affect the health, comfort, and performance of occupants – including temperature, relative humidity, light, sound, and other factors. Good IEQ is an essential component of any building, especially a green building.

Creating a better indoor environment can help building owners, managers, occupants, architects, and builders to minimize or eliminate the negative health effects, liability, bad publicity, and costly renovations and repairs often associated with IEQ problems. Improving IEQ involves designing, constructing, commissioning, operating, and maintaining buildings in ways that reduce pollution sources and remove indoor pollutants while ensuring that fresh air is continually supplied and properly circulated.

Tribal Response

As contemporary tribes work to achieve healthy and prosperous communities, they are presented with the challenge of reconciling their current needs with more traditional practices, particularly those that show respect for nature.

The Center for Indian Community Development, the Center for Environmental and Economic Development, and Boisson and Associates developed a green building Guide for California Indian tribes (*Building and Buying Green in Indian Country; a Practical Guide for California Tribes*, May 2004) that was developed to provide basic information about sustainable building practices, considerations, and planning for building projects in Indian Country. It was intended to:

1. Give Tribal project decision makers and planners an overview of sustainable and "green" building practices and options and
2. Serve as a tool to support those decision makers and planners in evaluating and choosing sustainable options as they develop projects with architects, contractors, suppliers, or other building professionals.

The Guide states, "sustainable building designs, options, and strategies are ultimately about resource efficiency, and can be incorporated in every building project within Tribal jurisdiction." Tribal residential, institutional, and commercial building projects can incorporate sustainable building options, strategies, and designs throughout or sustainable building options can influence only one or two components of a project. A building such as a casino might be limited in its use of day lighting and may not be able to use windows as a natural ventilation system but sustainable furnishings, flooring, and paint products can still be used.

Sustainable design involves a systematic effort to create a useful space that takes maximum advantage of the local climatic and geographic benefits while also efficiently compensating for its less beneficial aspects. Sustainable building integrates concerns over the environment, health, and comfort into the design, construction, and operation of buildings.

Sustainable building designs, plans, and strategies are based on lessening environmental and energy impacts while producing quality, attractive, useful, comfortable projects. These are goals that may be highly compatible with tribal values. In light of the opportunities tribes have as governments, developers, and consumers, California tribes have an opportunity to demonstrate how sustainable building policies can succeed in simultaneously achieving environmental and community development goals. Tribes can promote this philosophy by adopting tribal sustainable building planning, design and construction frameworks, and codes or policies.

The Guide explains that the sovereign status of California Indian nations presents exciting decision-making opportunities for tribal members, councils, planners, and staff when it comes to developing or adopting building codes and construction guidelines. Within Indian Country, tribes constitute the governing body or regulatory authority, and like the Federal or State government, may legislate to encourage sustainable development. Tribes are often the owner of much of the land area within a reservation. As both the governing authority and property owner, Tribes may be in a position to implement a comprehensive, long-range vision for a sustainable community. Outside of Indian Country, to the extent sustainable building principles are incorporated into tribal goals, tribes may find sustainable building principles and programs useful tools in achieving building development objectives.

3.5 BIOLOGICAL RESOURCES

The assessment of existing conditions and analysis of effects to biological resources was based upon biological field surveys conducted to document existing habitat types and determine the potential for occurrence of federally listed species within the Rohnert Park properties (Wilfred and Stony Point Sites) and the Lakeville Site; consultation with the U.S. Fish and Wildlife Service (USFWS); and a review of the California Department of Fish and Game (CDFG) Natural Diversity Data Base (CNDDB) for reported occurrences of federally listed species within the project vicinity (**Appendix I**). Biological surveys were conducted in 2003 at the Lakeville Site, and 2004 at the Rohnert Park properties (Huffman-Broadway Group, Inc., 2006; 2007). Biologists from Analytical Environmental Services surveyed the Rohnert Park properties site in 2004 and 2005, and obtained supplementary background information from another recent biological assessment of the Russian River watershed which shed light on the fishery resources of the Laguna de Santa Rosa (Entrix, 2004).

3.5.1 REGIONAL SETTING

WILFRED SITE

The Wilfred Site is located on agricultural land of the flat Santa Rosa Plain within portions an un-sectioned area of Township 6 North, Range 9 West, Mt. Diablo Baseline and Meridian, Cotati, California U.S. Geological Survey 7.5-minute quadrangle, at an elevation of approximately 85 feet. The site consists of three areas: the lower 182 acres of the 360 acre Stony Point Site; a 4-acre area west of Business Park Drive and northwest of the terminus of Park Court; and a 66-acre area bounded roughly by Langner Avenue on the west, Wilfred Avenue on the north, Dowdell on the east, and Business Park Drive on the south.

STONY POINT SITE

The 360-acre Stony Point Site is bounded on the north by Wilfred Avenue, on the west by Stony Point Road, on the east by Dowdell Avenue, and on the south by Rohnert Park Expressway, the Laguna de Santa Rosa, and Business Park Drive. This area is largely agricultural land, with the Bellevue-Wilfred Flood Control Channel bisecting the site north to south.

LAKEVILLE SITE

The Lakeville site consists of approximately 322 acres in southern Sonoma County in the "Sonoma Baylands" region north of San Pablo Bay where the Sonoma Mountains meet the coastal plain in an unsectioned area of Petaluma Point, California and Sears Point, California U.S. Geological Survey 7.5-minute quadrangle. The site consists of coastal salt marsh, diked ponds, grasslands, and hills, which afford habitat for several special status species, and other sensitive resources such as wildlife breeding areas and wetlands (Huffman-Broadway Group, Inc., 2007).

3.5.2 VEGETATION COMMUNITIES

WILFRED SITE

The northwest corner of the Wilfred Site is mainly ruderal annual grassland and cultivated fields, though areas supporting hydrophytic vegetation (wetlands) are scattered throughout. The area is cropped annually, resulting in a high level of disturbance in a high percentage of the site. Drainage ditches and the Bellevue-Wilfred Flood Control Channel occurs in the southwestern 182-acre area, along with cultivated fields, annual grassland, and seasonal wetlands. The 4-acre parcel has been graded and is composed of annual grassland habitat.

Annual Grassland

Annual grassland on the site covers the upland habitat of the northwest corner of the Wilfred Site. This habitat includes species typical of grazed annual grassland and grasslands subject to agricultural use. Species found on the site included Italian ryegrass (*Lolium multiflorum*) and various species of mustard (*Brassica nigra*, *Brassica rapa*, etc.). Other species common in the area include: canary grass (*Phalaris paradoxa*), Harding grass (*Phalaris aquatica*), ripgut brome (*Bromus diandrus*), bristly oxtongue (*Picris echioides*), vetch (*Vicia sativa* and *V. cracca*), wild and slender oats (*Avena fatua, Avena barbata*), hare barley (*Hordeum murinum*), six-weeks fescue (*Vulpia bromoides*), common groundsel (*Senecio vulgaris*), a variety of clovers (*Trifolium hirtum, T. subterraneum, T. dubium, T. variegatum*), plantain (*Plantago lanceolata*) and bur clover (*Medicago polymorpha*) (Huffman-Broadway Group, Inc., 2006; **Appendix J**).

The western portion of the 182-acre area, including the parcels south of Rohnert Park Expressway on either side of the Bellevue-Wilfred Channel, also contains ruderal annual grassland. This area is largely comprised of non-native, primarily annual grasses and associated weedy non-native herb species. The dominant grass in the area is Italian ryegrass, while meadow barley (*Hordeum brachyantherum*) and the native herb dwarf brodiaea (*Brodiaea terrestris*) are also relatively abundant. Species conspicuous in the southern third of this area are: hayfield tarplant (*Hemizonia congesta* ssp. congesta), spiny clotbur (Xanthium spinosum), bristly ox-tongue (*Picris echioides*), purple star thistle (*Centaurea calcitrapa*), and the late-flowering goosefoot (*Chenopodium strictum* var. *glaucophyllum*). These large herbs are uncommon the northern part of this area, though hayfield tarplant, bristly ox-tongue, and purple star thistle are scattered throughout. Other non-native grasses include: soft chess (*Bromus hordeaceus*), Mediterranean barley, six-weeks fescue, ripgut brome (*Bromus diandrus*), slender wild oat (*Avena barbata*), California oatgrass (*Danthonia californica*), and California semaphore grass (*Pleuropogon californicus*). Non-native herb species include: bindweed (*Convolvulus arvensis*), narrow-leaved vetch (*Vicia sativa* ssp. *nigra*), curly dock (*Rumex crispus*), Fiddle dock (*Rumex pulcher*), prickly lettuce (*Lactuca serriola*), wild radish (*Raphanus sativus*), and bur-clover (*Medicago polymorpha*). Meanwhile,

native species present in this area include: blue-eyed grass (*Sisyrinchium bellum*), California buttercup (*Ranunculus californicus*), cocklebur (*Xanthium strumarium*), and common fiddleneck (*Amsinckia menziesii* var. *intermedia*). (Huffman-Broadway Group, Inc., 2006; **Appendix J**)

Wetlands

Wetlands are defined as "areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions" (Braddock and Huppman, 1995). The wetlands between Labath Avenue and Langner Avenue contain, several obligate wetland species including: California semaphore grass (*Pleuropogon californicus*), miniature buttercup (*Ranunculus pusillus*), spiny-fruited buttercup (*Ranunculus muricatus*), fringed dowingia (*Dowingia concolor*), American pillwort (*Pilularia americana*), quillwort (*Isoetes* sp.), speedwell (*Veronica peregrina*), water starwort (*Callitriche marginata*), Douglas meadowfoam (*Limnanthes douglasii*), and Bloomer's buttercup (*Ranunculus orthorhynchus*). Other species found in the wetlands that are not obligate wetland plants but are adapted to frequently disturbed areas are: ryegrass (*Lolium* spp.), toad rush (*Juncus bufonius*) and hyssop loosestrife (*Lythrum hyssopifolium*).

The wetlands in the area between Labath and Dowdell Avenues support a combination of the following species: fringed dowingia, quillwort, flowering quillwort (*Lilaea scilloides*), water starwort, American pillwort, pennyroyal (*Mentha pulegium*), spike rush (*Eleocharis macrostachya*), California semaphore grass, miniature buttercup, and coyote thistle (*Eryngium aristulatum*). Some of the wetlands were subject to shorter periods of inundation, additional species found in these wetlands were: brown-headed rush (*Juncus phaeocephalus*), annual bluegrass (*Poa annua*), yampah (*Perideridia kelloggii*), Mediterranean barley (*Hordeum marinum* ssp *gussoneanum*), and curly dock (*Rumex crispus*). Additional seasonal wetlands are found west of Bellevue-Wilfred Channel. The species compositions vary considerably from pool to pool. The pool along the western border historically contained Sonoma sunshine (*Blennosperma bakeri*) and Burke's goldfields (*Lasthenia burkei*), though they were not found on site during any of the plant surveys. Instead, the area currently contains plants such as California semaphore grass, Jepson's coyote-thistle, pale spike-rush, brown-headed rush, smooth lasenthia (*Lasenthia glaberrima*), Lobb's aquatic buttercup (*Ranunculus lobbii*), Douglas' pogogyne (*Pogogyne dounglasii*), maroon-spotted dowingia (*Dowingia concolor* var. *concolor*), waxy manna grass (*Glyceria declinata*), pennyroyal (*Menthe pulegium*), annual beard grass (*Polypogon monspeliensis*), curly dock, and bindweed.

The wetlands occurring in the irrigated pastures have an altered wet season due to irrigation during the late spring and summer. Moreover, these pools have also been substantially impacted by grazing and trampling. Species common to these pools include: California semaphore grass,

tall cyperus (*Cyperus eragrostis*), water manna grass (*Glyceria occidentalis*), water foxtail (*Alopecurus geniculatus*), curly dock, waxy manna grass, strawberry clover, (*Trifolium fragiferum*), bristly ox-tongue, barnyard grass (*Echinochloa crusgalli*), small barnyard grass (*Echinochloa colona*), cocklebur, pale willow-weed (*Polygonum lapathifolium*), and western yellow-cress (*Rorippa curvisiliqua*) (Huffman-Broadway Group, Inc., 2006; **Appendix J**).

Drainage Ditches and Canals

Laguna de Santa Rosa and its tributary flood control channels and ditches are characterized as low gradient, and at times, intermittent waterbodies. Agriculture is common on the Santa Rosa Plain adjacent to the Laguna. A general lack of canopy cover results in high water temperature (Entrix, 2004). In an attempt to improve the habitat of the Laguna and its tributary flood control channels the Sonoma County Water Agency (SCWA) has planted container stock of native trees and shrubs to recreate vegetative cover. The channel is largely vegetated with emergent yellow water-weed (*Ludwigia peploides* ssp. *montevidensis*) with broad-leaved cattail (*Typha latifolia*) and tuberous bulrush (*Scirpus tuberosus*) along the margins. Other species occurring in the channel or on the margins include: tall cyperus, water smartweed (*Polygonum punctatum*), willow-herb (*Epilobium ciliatum* ssp *ciliatum*), white sweet clover (*Melilotus alba*) and curly dock. Trees include: arroyo willow (*Salix lasiolepis*), shining willow (*Salix lucida* ssp. *lasiandra*), Oregon ash (*Fraxinus latifolia*), valley oak, box elder (*Acer negundo* ssp *californicum*), and California black walnut (*Juglans californica* var. *hindsii*).

Several drainage ditches and the Wilfred-Bellevue Canal occur on the site. The ditches were up to six feet deep and had water evening primrose (*Ludwigia peploides*), eragrostoid sedge, water plantain (*Alisma plantago-aquatica*), spearscale (*Atriplex triangularis*), creeping wildrye (*Leymus triticoides*), bristly ox-tongue (*Picris echioides*), fuller's teasel (*Dipsacus fullonum*), poison hemlock (*Conium maculatum*), and fennel (*Foeniculum vulgare*) (Huffman-Broadway Group, Inc., 2006).

During periods when flow exists, the drainage channels represent habitat for warm water fish species commonly found in creeks in the area. Species that may use these habitats for breeding and/or migration corridors include Pacific chorus frog (*Pseudacris regilla*), bullfrog (*Rana catesbeiana*), western toad (*Bufo boreas*), western pond turtle (*Clemmys marmorata*), and northern rough-winged swallow (*Stelgidopteryx serripennis*). Isolated patches of woody riparian vegetation occurring along the creek channel provide forage, shelter, and nesting habitat for several birds and other wildlife species. The Wilfred-Bellevue Canal and one of the several drainage ditches of the site are shown in **Figure 3.5-4**.

A habitat map of the Wilfred site is shown as **Figure 3.5-1**.

Cultivated Fields

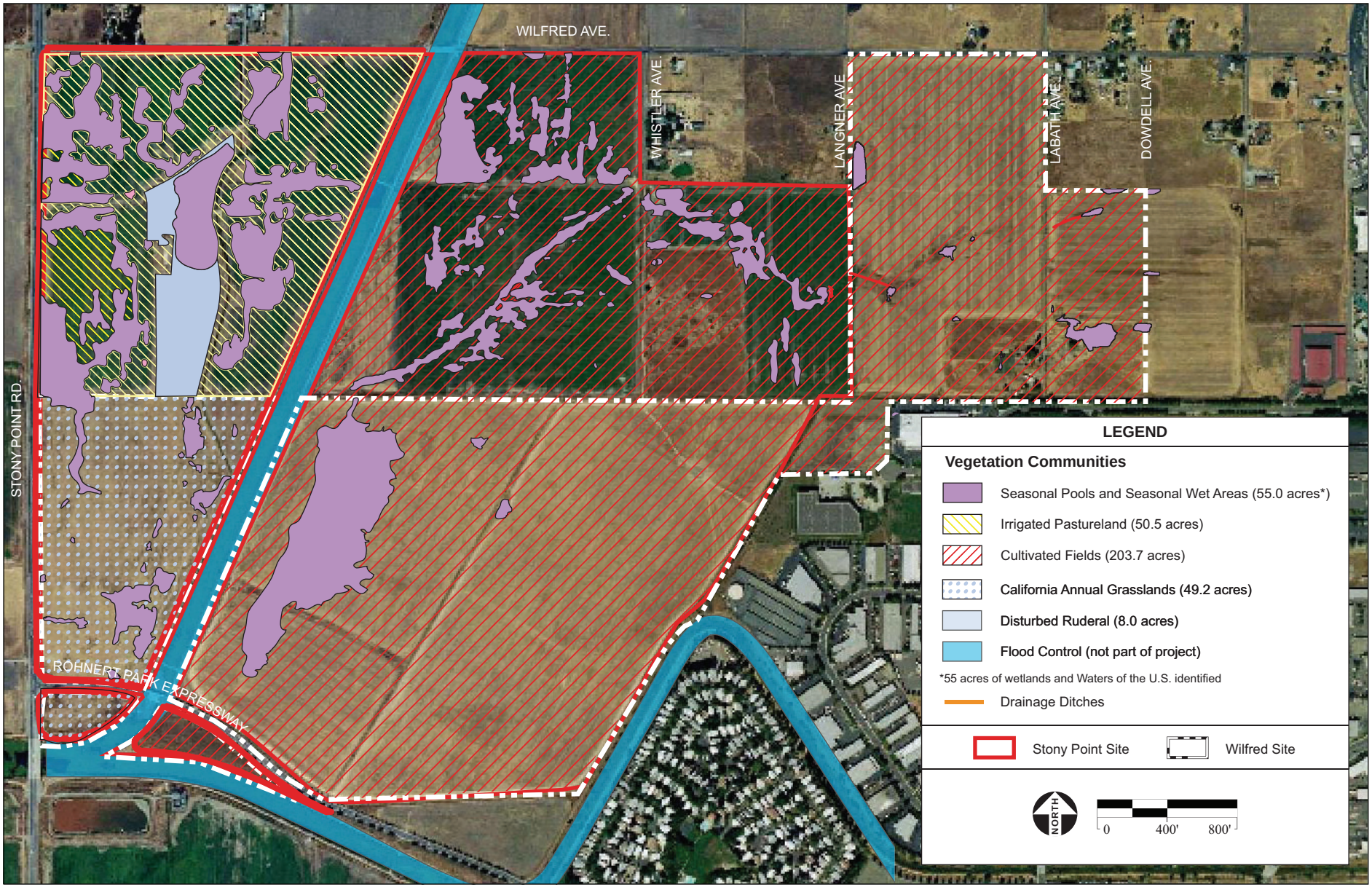
Portions of the property are regularly disked and plowed for purposes of hay production. Many of the grasses and forbs were the same as those found in the Ruderal annual grassland type and on the sides of ditches and canals. In addition, perennial ryegrass (*Lolium perenne*), clovers, bristly ox-tongue, curly dock, field mustard (*Brassica rapa),* orchard grass (*Dactylis glomerata*), and cheeses (*Malva parviflora*) were common species. While not common, smooth spike-primrose was also found in these areas. Wildlife known to use the cultivated fields are generally the same as those that use the Ruderal annual grassland habitat. (Huffman-Broadway Group, Inc., 2006; **Appendix J**)

STONY POINT SITE

Vegetation communities occurring within the Stony Point Site include irrigated pasture, cultivated fields, and disturbed/ruderal areas (Huffman-Broadway Group, Inc., 2006; **Appendix J**). Additional habitat types are canals, drainage ditches, California annual grassland, and seasonal pools and wetlands. These habitat types are discussed below. A vegetation map of the Stony Point Site is presented as **Figure 3.5-1**.

California Annual Grassland

California annual grassland on the site is similar to the California annual grassland series (Sawyer, 1995) and non-native grassland according to Holland (1986). California annual grassland occurs in two sizable areas of the property. One of the two areas is in the southwestern portion of the site while the other is in the northeastern corner of the property. Characteristic grasses included Italian ryegrass (*Lolium multiflorum*), slender wild oat (*Avena barbata*), Mediterranean barley (*Hordeum marinum* ssp. *gussoneanum*), and soft chess (*Bromus hordeaceus*). Hayfield tarplant (*Hemizonia congesta* ssp. *congesta*) was also found in these areas (Huffman-Broadway Group, Inc., 2006; **Appendix J**) (**Figure 3.5-2**). The southwestern area also contains dwarf brodiaea, spiny clotbur, bristly ox-tongue, purple star thistle, and late-flowering goosefoot. The northeastern section, on the other hand, contains Harding grass (*Phalaris aquatica*), Kellogg's yampah (*Perideridia kelloggii*), panicled willow-herb (*Epilobium brachycarpum*), white brodiaea (*Triteleia hyacinthine*), brown-headed rush, Jepson's coyote-thistle (*Eryngium aristulatum* var. *aristulatum*), bristly ox-tongue, prickly lettuce, curly dock, and bindweed.



SOURCE:Aerial Photography August 2002; Huffman Broadway, 2004; AES, 2006

Figure 3.5-1
Vegetation Map – Stony Point and Wilfred Sites

Photograph A
California annual grassland at the southern end of the site.
Common grasses are Harding grasss and wild oats.

Photograph B
California annual grassland at the southwestern side of the property.

SOURCE: AES, 2005

Figure 3.5-2
California Annual Grassland – Stony Point Site

Trees found on the Stony Point Site include three red willows (*Salix laevigata*) and a valley oak (*Quercus lobata*).

Grasslands provide resources for many different types of wildlife. Characteristic reptiles of open grassland habitats include western fence lizard (*Sceloporus occidentalis*), western rattlesnake (*Crotalis viridis*), gopher snake (*Pituophis melanoleucus*), and common garter snake (*Thamnophis sirtalis*). Common bird species that forage in grasslands include savanna sparrow (*Passerculus sandwichensis*), western kingbird (*Tyrannus verticalis*), western scrub jay (*Aphelocoma coerulescens*), northern mockingbird (*Mimus polyglottus*), barn swallow (*Hirundo rustica*), and other grassland species. A few bird species, such as western meadowlark (*Sturnella neglecta*), mourning dove (*Zenaida macroura*), killdeer (*Charadrius vociferus*), and lark sparrow (*Chondestes grammacus*), nest in grassland habitats.

In areas of open grassland characterized by deeper soils and thick grasses, the seeds and vegetative parts of grasses provide food and cover for the California vole (*Microtus californicus*), deer mouse (*Peromyscus maniculatus*), western harvest mouse (*Reithrodontomys megalotis*), California ground squirrel (*Spermophilus beecheyi*), Botta's pocket gopher (*Thomomys bottae*), black-tailed jackrabbit (*Lepus californicus*), and other small mammals. Rodents and other small mammals in the grasslands attract red-tailed hawk (*Buteo jamaicensis*), red-shouldered hawk (*Buteo lineatus*), American kestrel (*Falco sparverius*), barn owl (*Tyto alba*), white-tailed kite (*Elanus leucurus*), northern harrier (*Circus cyaneus*), great horned owl (*Bubo virginianus*), coyote (*Canis latrans*), and other predators.

Seasonal Pools and Wet Areas

Several areas of the site possess natural and man-made depressions that retain moisture relatively late in the season, including some low areas that were inundated. Some of the plants found in these seasonal pools and wet areas included field mint (*Mentha arvensis*), Jepson's coyote thistle (*Eryngium aristulatum* var. *aristulatum*), annual beard grass, eragrostoid sedge (*Cyperus eragrostis*), bindweed (*Convolvulus arvensis*), curly dock (*Rumex crispus*), Italian ryegrass, rose clover (*Trifolium hirta*), and white clover (*Trifolium repens*) (Huffman-Broadway Group, Inc., 2006).

Seasonal wetlands found west of Bellevue-Wilfred Channel in the southern part of the site historically contained Sonoma sunshine and Burke's goldfields, though they were not found on site during any of the plant surveys. Instead, the area currently contains plants such as California semaphore grass, Jepson's coyote-thistle, pale spike-rush, brown-headed rush, smooth lasenthia, Lobb's aquatic buttercup, Douglas' pogogyne, maroon-spotted dowingia, waxy manna grass, pennyroyal, annual beard grass, curly dock, and bindweed.

The wetlands occurring in the irrigated pastures have an altered wet season due to irrigation during the late spring and summer. Moreover, these pools have also been substantially impacted by grazing and trampling. Species common to these pools include: California semaphore grass, tall cyperus, water manna grass, water foxtail, curly dock, waxy manna grass, strawberry clover, bristly ox-tongue, barnyard grass, small barnyard grass, cocklebur, pale willow-weed (, and western yellow-cress.

Seasonal pools provide resources for wildlife and support a variety of sensitive plant and animal species, including federally listed species. Photographs of the seasonal pools and wet area habitat are presented in **Figure 3.5-3**.

Drainage Ditches and Canals

Laguna de Santa Rosa and its tributary flood control channels and ditches are characterized as low gradient, and at times, intermittent waterbodies. Agriculture is common on the Santa Rosa Plain adjacent to the Laguna. A general lack of canopy cover results in high water temperature (Entrix, 2004). In an attempt to improve the habitat of the Laguna and its tributary flood control channels the Sonoma County Water Agency (SCWA) has planted container stock of native trees and shrubs to recreate vegetative cover. The channel is largely vegetated with emergent yellow water-weed (*Ludwigia peploides* ssp. *montevidensis*) with broad-leaved cattail (*Typha latifolia*) and tuberous bulrush (*Scirpus tuberosus*) along the margins. Other species occurring in the channel or on the margins include: tall cyperus, water smartweed (*Polygonum punctatum*), willow-herb (*Epilobium ciliatum* ssp *ciliatum*), white sweet clover (*Melilotus alba*) and curly dock. Trees include: arroyo willow (*Salix lasiolepis*), shining willow (*Salix lucida* ssp. *lasiandra*), Oregon ash (*Fraxinus latifolia*), valley oak, box elder (*Acer negundo* ssp *californicum*), and California black walnut (*Juglans californica* var. *hindsii*).

Several drainage ditches and the Wilfred-Bellevue Canal occur on the site. The ditches are up to six feet deep and have water evening primrose (*Ludwigia peploides*), eragrostoid sedge, water plantain (*Alisma plantago-aquatica*), spearscale (*Atriplex triangularis*), creeping wildrye (*Leymus triticoides*), bristly ox-tongue (*Picris echioides*), fuller's teasel (*Dipsacus fullonum*), poison hemlock (*Conium maculatum*), and fennel (*Foeniculum vulgare*) (Huffman-Broadway Group, Inc., 2006).

During periods when flow exists, the drainage channels represent habitat for warm water fish species commonly found in creeks in the area. Species that may use these habitats for breeding and/or migration corridors include Pacific chorus frog (*Pseudacris regilla*), bullfrog (*Rana*

Photograph A
Seasonal pool at southern end of site showing the late spring drying phase. Dark brown plants are annual allocaryas and downingias.

Photograph B
Wet area in northern portion of the site. Dominant species is the eragrostoid sedge.

SOURCE: AES, 2005

Figure 3.5-3
Seasonal Pools and Wet Areas – Stony Point Site

catesbeiana), western toad (*Bufo boreas*), western pond turtle (*Clemmys marmorata*), and northern rough-winged swallow (*Stelgidopteryx serripennis*). Isolated patches of woody riparian vegetation occurring along the creek channel provide forage, shelter, and nesting habitat for several birds and other wildlife species. The Wilfred-Bellevue Canal and one of the several drainage ditches of the site are shown in **Figure 3.5-4**.

Irrigated Pasture

Four irrigated, fenced paddocks used for pasture occur on the site. Many of the grasses and forbs were the same as those found in the California annual grassland type and on the sides of ditches and canals. In addition, perennial ryegrass, clovers, bristly ox-tongue, curly dock, field mustard (*Brassica rapa),* orchard grass (*Dactylis glomerata*), and cheeses (*Malva parviflora*) were common associates of irrigated pasture on the property (Huffman-Broadway Group, Inc., 2006). Wildlife known to use irrigated pasture are generally the same as those that use the California annual grassland habitat.

Cultivated Fields

Portions of the property are regularly disked and plowed for purposes of hay production. Vegetation and wildlife was similar to that found in irrigated pasture. In addition, smooth spike-primrose was found in these areas (Huffman-Broadway Group, Inc., 2006). Wildlife known to use the cultivated fields are essentially identical to those that inhabit California annual grassland.

Disturbed/Ruderal

Disturbed/ruderal habitat within the Stony Point Site is subject to substantial human activity and contains existing barns and infrastructure such as farm roads and power lines. Vegetation and wildlife were similar to those found in the agricultural areas just described (Huffman-Broadway Group, Inc., 2006).

LAKEVILLE SITE

Consisting of approximately 322 acres of land straddling Lakeville Highway, the Lakeville Site contains two vegetation communities: annual grassland and seasonal wetland (Huffman-Broadway Group, Inc., 2007; **Appendix K**).

Photograph A
The Wilfred-Bellevue Canal showing its dense colonies of the water evening primrose. Note the restorative plantings of nursery-grown container stock on the canal bank.

Photograph B
An agricultural ditch on the site. Eragrostoid sedge lines the floor of the ditch.

SOURCE: AES, 2005

Figure 3.5-4
Drainage Ditches and Canals – Stony Point Site

Annual Grassland

The Lakeville Site primarily consists of annual grassland. The grassland comprises grass, weedy herbaceous, and other herbaceous species. The predominant species are non-native grass species that are common to the region, such as include wild oats, ripgut brome, Italian ryegrass, rattlesnake grass (*Briza maxima*), and hare barley. The grassland contains many weedy species common to grasslands, including Italian thistle (*Carduus pycnocephalus*), bellardia (*Bellardia trixago*), purple Jonnytuck (*Triphysaria* sp.), parentucellia (*Parentucellia viscose*), and various species of vetch (*Vicia* sp.). Grassland on both sides of Lakeville Highway contain showy wildflowers. East of the highway, however, plant diversity is greater and showy wildflowers are more prevalent. West of Lakeville Highway, wildflower species include lupine (*Lupinus nanus*, *Lupinus bicolor*, and others) and purple owl's clover (*Castilleja densiflora* ssp. *densiflora*). East of the highway, showy wildflower species include lupine, California poppy (*Eschscholzia californica*), purple owl's clover, valley-tassels (*Castilleja attenuata*), Johnny jump-up (*Viola pendunculata*), tidytips (*Layia chrysanthemoides*), larkspur (*Delphinium variegatum*), buttercup, and yellow Mariposa lily (*Calochortus luteus*) (Huffman-Broadway Group, Inc., 2007; **Appendix K**).

Seasonal Pools

Several seasonal pools are located in the Lakeville Site. These pools are shallow but distinct topographic depressions that hold water for varying lengths of time during the winter and spring, then dry out completely by late spring or summer. Most of the pools are located west of Lakeville Highway. The seasonal pools range in size from less than 0.1 acres to nearly 5 acres, though most of them occupy less than 0.4 acres (Huffman-Broadway Group, 2006).

Seasonal pools at the Lakeville Site support a variety of native and non-native species, most of which are indicators of seasonally wet or moist conditions. The composition of plant species is very similar from pool to pool. Native species found in most of the pools include California semaphore grass, Jepson's cocklebur, field mint, and cocklebur (*Xanthium strumarium*). Many of the pools are dominated by some combination of California semaphore grass, Jepson's coyote-thistle, field mint, annual beard grass, and pale spike-rush.

Drainageways

Discontinuously distributed areas along seasonal or permanent watercourses at the Lakeville Site support an assemblage of plants that are indicators of seasonally wet or moist conditions. Plant assemblages at these areas are distinctly different from the adjacent California annual grassland. These areas are all east of Lakeville Highway, typically in canyon bottoms. These areas are

typically dominated by some combination of the native species Baltic rush (*Juncus balticus*), brown-headed rush, and pale spike-rush.

Pond

One permanently inundated pond occurs immediately adjacent to the Lakeville Site east of Lakeville Highway. The margins of this pond are densely vegetated. Pale spike-rush is the most abundant species. Knot grass (*Paspalum distichum*) and tall cyperus are frequently occurring associated species.

3.5.3 WILDLIFE

WILFRED SITE

Raptors observed on the Wilfred Site included turkey vultures (*Cathartes aura*), barn owl (Ty*to alba*), American kestrel (*Falco sparverius*), merlin (*Falco columbarius*), red-tailed hawk (*Buteo jamaicensis*), red-shouldered hawk (*Buteo lineatus*), white-tailed kites (*Elanus leucurius*), and a western burrowing owl (*Athene cunicularia*). Birds were common in aquatic habitats of the property such as the Bellevue-Wilfred Channel. Species found on the site included pied-billed grebe (*Podilymbus podiceps*), great blue heron (*Ardea herodias*), great egret (*Ardea alba*), snowy egret (*Egretta thula*), mallard (*Anas platyrhynchos*), Wilson's snipe (*Gallinago delicata*), Virginia rail (*Rallus limicola*), sora (*Porzana carolina*), marsh wren (*Cistothorus palustris*), and Lincoln's sparrow (*Melospiza lincolnii*). Additional birds seen included Anna's hummingbird (*Calypte anna*), acorn woodpecker (*Melanerpes formicivorus*), European starling (*Sturnus vulgaris*), mourning dove (*Zenaida macroura*), black phoebe (*Sayornis nigricans*), Say's phoebe (*Sayornis saya*), ruby-crowned kinglet (*Regulus calendula*), northern mockingbird (*Mimus polyglottos*), loggerhead shrike (*Lanius ludovicianus*), American pipit (*Anthus rubescens*), common raven (*Corvus corax*), American crow (*Corvus brachyrhynchos*), yellow-rumped warbler (*Dendroica coronata*), western meadowlark (*Sturnella neglecta*), brown-headed cowbird (*Molothrus ater*), Brewer's blackbird (*Euphagus cyanocephalus*), red-winged blackbird (*Agelaius phoeniceus*), white-crowned sparrow (*Zonotrichia leucophrys*), golden-crowned sparrow (*Zonotrichia atricapilla*), savannah sparrow (*Passerculus sandwichensis*), song sparrow (*Melospiza melodia*), American goldfinch (*Carduelis tristis*), purple finch (*Carpodacus purpureus*), and house finch (*Carpodacus mexicanus*) (Huffman-Broadway Group, Inc., 2006; **Appendix J**).

Several mammals were recorded including Botta's pocket gopher (*Thomomys bottae*), California ground squirrel (*Otospermophilus beecheyi*), black-tailed jackrabbit (*Lepus californicus*), striped skunk (*Mephitis mephitis*), and red fox (*Vulpes vulpes*). In addition, a species of tree frog (an amphibian), and a western fence lizard (*Sceloporus occidentalis*) (a reptile) were observed on the site (Huffman-Broadway Group, Inc., 2006; **Appendix J**).

Attachment 2 of the Huffman-Broadway Group report (**Appendix J**) gives a complete list of plant, reptile, mammal, amphibian, and bird species either observed at the site during site visits or can be expected to occur on the site given the habitat conditions and proximity to corridors.

STONY POINT SITE

Raptors observed on the Stony Point Site included turkey vultures (*Cathartes aura*), barn owl (Ty*to alba*), American kestrel (*Falco sparverius*), merlin (*Falco columbarius*), red-tailed hawk (*Buteo jamaicensis*), and red-shouldered hawk (*Buteo lineatus*). White-tailed kites (*Elanus leucurius*) and a western burrowing owl (*Athene cunicularia*) were also seen (see next section). Birds were common in aquatic habitats of the property such as the Bellevue-Wilfred Channel. Species found on the site included pied-billed grebe (*Podilymbus podiceps*), great blue heron (*Ardea herodias*), great egret (*Ardea alba*), snowy egret (*Egretta thula*), mallard (*Anas platyrhynchos*), Wilson's snipe (*Gallinago delicata*), Virginia rail (*Rallus limicola*), sora (*Porzana carolina*), marsh wren (*Cistothorus palustris*), and Lincoln's sparrow (*Melospiza lincolnii*). Additional birds seen included Anna's hummingbird (*Calypte anna*), acorn woodpecker (*Melanerpes formicivorus*), European starling (*Sturnus vulgaris*), mourning dove (*Zenaida macroura*), black phoebe (*Sayornis nigricans*), Say's phoebe (*Sayornis saya*), ruby-crowned kinglet (*Regulus calendula*), northern mockingbird (*Mimus polyglottos*), loggerhead shrike (*Lanius ludovicianus*), American pipit (*Anthus rubescens*), common raven (*Corvus corax*), American crow (*Corvus brachyrhynchos*), yellow-rumped warbler (*Dendroica coronata*), western meadowlark (*Sturnella neglecta*), brown-headed cowbird (*Molothrus ater*), Brewer's blackbird (*Euphagus cyanocephalus*), red-winged blackbird (*Agelaius phoeniceus*), white-crowned sparrow (*Zonotrichia leucophrys*), golden-crowned sparrow (*Zonotrichia atricapilla*), savannah sparrow (*Passerculus sandwichensis*), song sparrow (*Melospiza melodia*), American goldfinch (*Carduelis tristis*), purple finch (*Carpodacus purpureus*), and house finch (*Carpodacus mexicanus*) (Huffman-Broadway Group, Inc., 2006; **Appendix J**).

Several mammals were recorded including Botta's pocket gopher (*Thomomys bottae*), California ground squirrel (*Otospermophilus beecheyi*), black-tailed jackrabbit (*Lepus californicus*), striped skunk (*Mephitis mephitis*), and red fox (*Vulpes vulpes*). In addition, a species of tree frog (an amphibian), and a western fence lizard (*Sceloporus occidentalis*)(a reptile) were observed on the site (Huffman-Broadway Group, Inc., 2006; **Appendix J**).

Attachment 2 of the Huffman-Broadway Group report (**Appendix J**) gives a complete list of plant, reptile, mammal, amphibian, and bird species either observed at the site during site visits or can be expected to occur on the site given the habitat conditions and proximity to corridors.

LAKEVILLE SITE

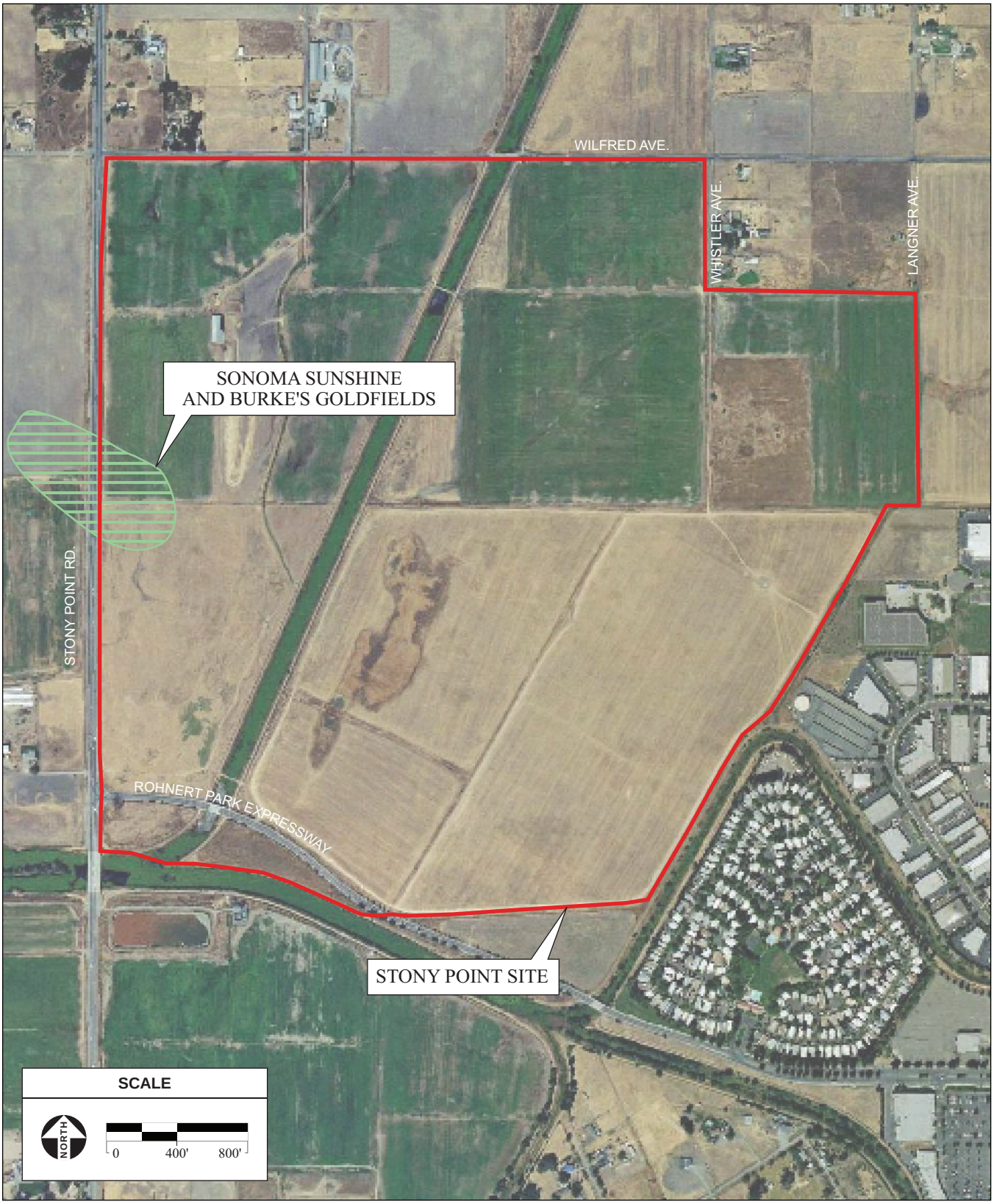
The Lakeville site supports many of the same raptors as the Stony Point Site. In addition, a golden eagle (*Aquila chrysaetos*) was sighted. In general, the bird fauna of the Lakeville site resembles the Stony Point Site, however, at Lakeville, horned larks (*Eremophila alpestris*), Vaux's swifts (*Ixoreus naevius*), western bluebirds (*Sialia mexicana*), long-billed curlews (*Numenius americanus*), killdeer (*Charadrius vociferous*), double crested cormorants (*Phalacrocorax auritus*), and Canadian geese (*Branta canadensis*) were observed. Mammals seen at Lakeville included California ground squirrels (*Otospermophilus beecheyi*), California voles (*Microtus californicus*), black-tailed jackrabbits (*Lepus californicus*), coyotes (*Canis latrans*), and mule deer (*Odocoileus Hemionus*) (Huffman-Broadway Group, Inc., 2007; **Appendix K**).

3.5.4 FEDERALLY LISTED AND OTHER SPECIAL STATUS SPECIES

For the purposes of this EIS, federally listed species include those plant and animal species that are listed as endangered or threatened under the Federal Endangered Species Act (FESA), formally proposed for listing, or listed by the Sacramento USFWS office as a Federal Species of Concern. The Sacramento USFWS office no longer maintains a list of Federal Species of Concern. However, since the USFWS maintained a list of Federal Species of Concern at the time of the issuance of the notice of intent to prepare an EIS, Federal Species of Concern were included in this EIS for a conservative analysis. A target species list of federally listed species that may potentially be affected by the Proposed Project and alternatives was compiled based upon a review of pertinent literature, aerial photographs, site topographic maps, consultation with the USFWS and other local experts, a query of the CNDDB for reported occurrences of federally listed species within the project vicinity, and the results of biological field surveys (Huffman-Broadway Group, Inc., 2006; **Appendix J**; Huffman-Broadway Group, Inc., 2007; **Appendix K**; USFWS, 2004; **Appendix I**).

WILFRED SITE

Based upon the review of regionally occurring special-status species (Huffman-Broadway Group, Inc., 2006) and their habitat requirements, and the results of the field assessment, the property and/or surrounding vicinity represents high-potential habitat for the following special-status species. Potentially occurring special-status plant species include: the Sonoma sunshine (*Blennosperma bakeri*) (**Figure 3.5-5**), Burke's goldfields (*Lasthenia burkei*), Sebastopol meadowfoam (*Limnanthes vinculans*), and the many-flowered navarretia (*Navarretia leucocephala* ssp. *plieantha*). Three years of species-specific surveys were conducted on most of the Wilfred Site, with four years of species-specific surveys on the portion of the site that overlaps the Northwest Specific Plan area. Species-specific surveys only found Sonoma sunshine and Lobb's aquatic buttercup (*Ranunculus lobbii*). The only portion of the Wilfred Site that has not been surveyed is a 4.7-acre site. This 4.7-acre site has previously been graded and very little



SOURCE: Aerial Photography August 2002; Huffman Broadway; AES, 2005

Figure 3.5-5

Locations of Special Status Plant Populations – Stony Point Site and Vicinity

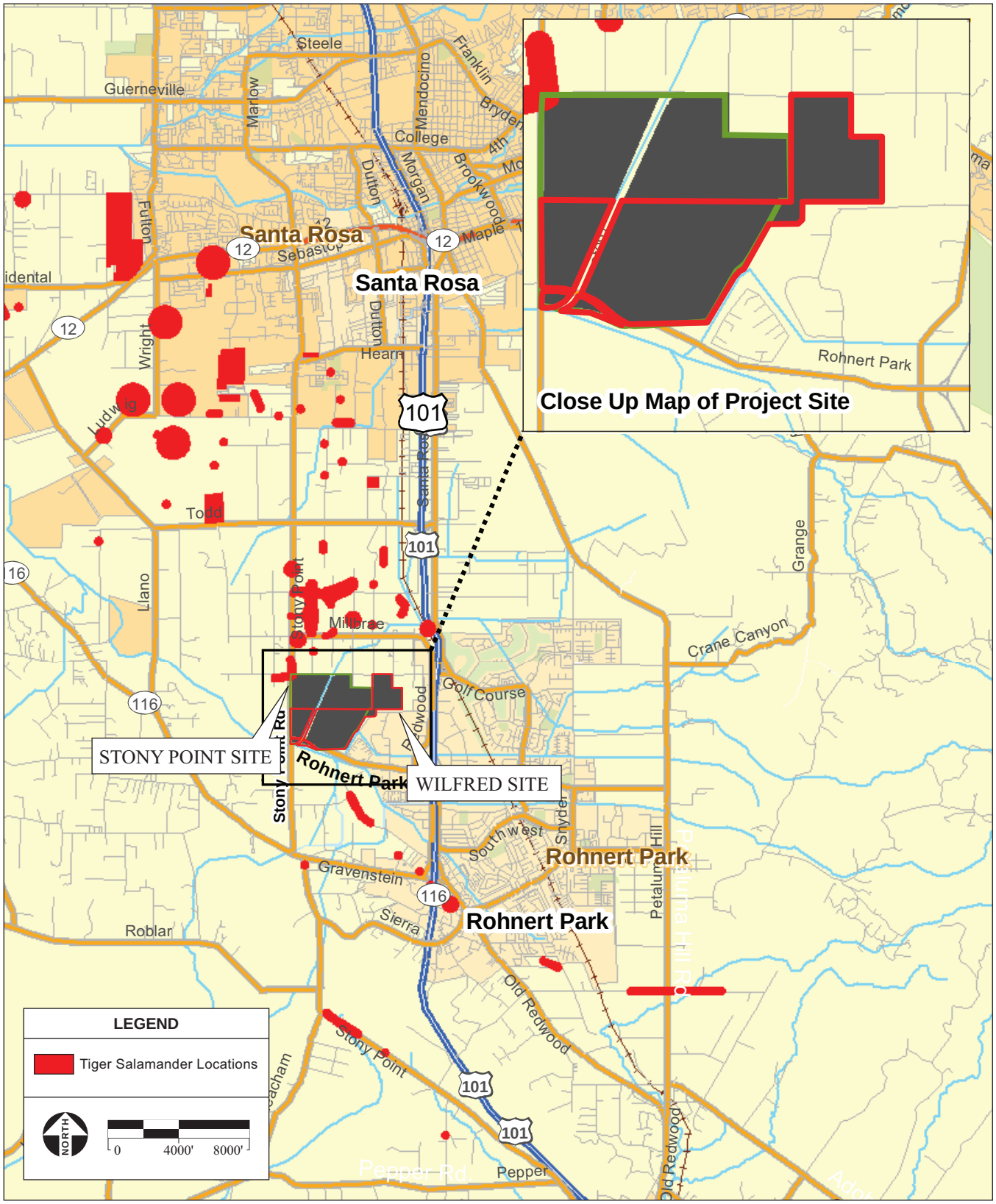
native vegetation remains; therefore, the existence of rare plants is considered remote. The 4.7-acre site is located west of Business Park Drive and northwest of the terminus of Park Court. It connects the northeastern corner of the Wilfred Site, on which the hardscape is proposed, with the southern portion of the Stony Point Site, on which sprayfields are proposed.

The name, regulatory status, habitat requirements, and period of identification for potentially occurring federally listed special-status species are identified below in **Table 3.5-1** and briefly discussed in the following paragraphs. Special-status animal species known to occur on the site include the California tiger salamander, northwestern pond turtle, white-tailed kite, ferruginous hawk, western burrowing owl, merlin, and loggerhead shrike (**Figure 3.5-6**; **Appendix J**). While the northern harrier (*Circus cyaneus*), Cooper's hawk (*Accipiter cooperii*), ferruginous hawk (*Buteo regalis*), golden eagle (*Aquila chrysaetos*), tri-colored blackbird (*Agelaius tricolor*), and sharp-shinned hawk (*Accipter striatus*) were not observed, suitable foraging habitat is present on site. Additionally, the yellow warbler (*Dendroica petechia brewsteri*) may use the site during its fall migration.

STONY POINT SITE

Based upon the review of regionally occurring special-status species (Huffman-Broadway Group, Inc., 2006) and their habitat requirements, and the results of the field assessment, the property and/or surrounding vicinity represents high potential habitat for the following special-status species. Potentially occurring special status plant species include: the Sonoma sunshine (*Blennosperma bakeri*) (**Figure 3.5-5**), Burke's goldfields (*Lasthenia burkei*), Sebastopol meadowfoam (*Limnanthes vinculans*), and the many-flowered navarretia (*Navarretia leucocephala* ssp. *plieantha*). Three years of species-specific surveys were conducted on the entire Stony Point Site. Species-specific surveys only found Sonoma sunshine and Lobb's aquatic buttercup (*Ranunculus lobbii*).

The name, regulatory status, habitat requirements, and period of identification for potentially occurring federally listed special-status species are identified below in **Table 3.5-1** and briefly discussed in the following paragraphs. Special-status animal species known to occur on the site include the California tiger salamander, northwestern pond turtle, white-tailed kite, ferruginous hawk, western burrowing owl, merlin, and loggerhead shrike (**Figure 3.5-6**; **Appendix J**). While the northern harrier (*Circus cyaneus*), Cooper's hawk (*Accipiter cooperii*), golden eagle (*Aquila chrysaetos*), tri-colored blackbird (*Agelaius tricolor*), and sharp-shinned hawk (*Accipter striatus*) were not observed, foraging habitat occurs on the site. Additionally, the yellow warbler (*Dendroica petechia brewsteri*) may use the site during its fall migration.



SOURCE: HydroScience Engineers, 2006; AES, 2006

Figure 3.5-6
Reported Locations of California Tiger Salamander in the Vicinity of the Wilfred and Stony Point Sites

TABLE 3.5-1
TARGET SPECIAL STATUS SPECIES LIST – WILFRED AND STONY POINT SITE

SCIENTIFIC NAME COMMON NAME	FEDERAL STATUS	DISTRIBUTION	HABITAT REQUIREMENTS	PERIOD OF IDENTIFICATION
PLANTS				
Alopecurus aequalis var. *sonomensis* Sonoma alopecurus	FE	Known from fewer than five native occurrences in Marin and Sonoma counties, California. Elevation 5 to 210 m.	Found in freshwater marshes and swamps, and riparian scrub.	May-July
Blennosperma bakeri Sonoma sunshine	FE	Known only from the Laguna de Santa Rosa and Sonoma areas of Sonoma County, California. Elevation 10 to 110 m.	Vernal pools, mesic valley and foothill grassland.	March-May
Carex albida White sedge	FE	Known only from the Pitkin Marsh, Sonoma County, California. Elevation 15 to 90 m.	Bogs and fens, freshwater marshes and swamps.	May-July
Chorizanthe valida Sonoma spineflower	FE	Known from a single locality at Point Reyes National Seashore, Marin County, California. Elevation 10 to 305 m.	Found in sandy coastal prairie.	June-August
Clarkia imbricata Vine Hill clarkia	FE	Known from fewer than three occurrences (one introduced, another recently extirpated; and a third, extant) in Sonoma County, California. Elevation 50 to 75 m.	Chaparral, valley and foothill grassland often on acidic, sandy loams.	June-August
Cordylanthus mollis ssp. *mollis* Soft bird's-beak	FE	Contra Costa, Napa, and Solano counties, California (extirpated from Marin, Sacramento, and Sonoma counties). Elevation 0 to 3 m.	Found in coastal marshes and swamps.	July-November
Delphinium bakeri Baker's larkspur	FE	Marin and Sonoma counties, California. Elevation 80 to 305 m.	Coastal scrub.	March-May
Delphinium luteum Yellow larkspur	FE	Marin and Sonoma counties, California. Elevation 0 to 100 m.	Found in chaparral, coastal prairie, and rocky coastal scrub.	March-May
Lasthenia burkei Burke's goldfields	FE	Southern Mendocino County, southern Lake County, and northeastern Sonoma County, California. Elevation 15 to 600 m.	Vernal pools, moist meadows.	April-June
Lilium pardalinum ssp. *pitkinense* Pitkin marsh lily	FE	Known only from two occurrences near Sebastopol, Sonoma County, California. Elevation 35 to 65 m.	Cismontane woodland, meadows and seeps, freshwater marshes and swamps with sandy substrate.	June-July
Limnanthes vinculans Sebastopol meadowfoam	FE	Sonoma County, California (and one occurrence in Napa County). Elevation 15 to 305 m.	Vernal pools, vernally moist sites in meadows, valley and foothill grassland.	April-May
Navarettia leucocephala ssp. *plieantha* Many-flowered navarettia.	FE	Known from seven occurrences in Lake and Sonoma County, California. Elevation 30 to 950 m.	Vernal pools.	May-June
Potentilla hickmanii Hickman's cinquefoil	FE	Known only from two occurrences in Monterey and San Mateo counties, California. Elevation 10 to 135 m.	Coastal bluff scrub, closed-cone coniferous forest, meadows and seeps, marshes and swamps.	April-August
Sidalcea oregana ssp. *valida* Kenwood Marsh checkerbloom	FE	Known only from three occurrences in Knights Valley, Sonoma County, California. Elevation 115 to150 m.	Marshes and swamps.	June-September

SCIENTIFIC NAME COMMON NAME	FEDERAL STATUS	DISTRIBUTION	HABITAT REQUIREMENTS	PERIOD OF IDENTIFICATION
Trifolium amoenum Showy Indian clover	FE	Extinct over much of its natural range from Santa Clara County north to Mendocino County, California. Rediscovered near Occidental in Sonoma County in 1993. Elevation 5 to 415 m.	Coastal bluff scrub, valley and foothill grassland (sometimes serpentinite).	April-June
ANIMALS				
Crustaceans				
Syncaris pacifica California freshwater shrimp	FE	Endemic to Marin, Napa, and Sonoma counties.	Found in low gradient, perennial coastal streams. Streams are typically 1-3 feet deep, with exposed live roots along undercut banks, also with overhanging woody debris or stream vegetation.	All year
Fish				
Oncorhynchus mykiss Steelhead – Central California Coast ESU	FT	Federal listing includes all runs in coastal basins from the Russian River south to Soquel Creek including San Francisco and San Pablo bays.	Associated with permanent or nearly permanent water in a wide variety of habitats.	Consult Agency
Amphibians				
Ambystoma californiense California tiger salamander	FT	Western California from Sonoma County in the north to Santa Barbara County in the south.	Breeds in vernal pools and ponds of grassland and open woodland of low hills and valleys. Will utilize burrows for refuge.	November-February (adults) March 15-May15 (larvae)
Rana aurora draytonii California red-legged frog	FT	Butte and Mendocino County, California southward to Baja California, Mexico west of the Sierra Nevada, Peninsular Mountain axis.	Lowlands and foothills in or near permanent or late-season sources of deep water with dense, shrubby, or emergent vegetation.	May-November
Rana boylii Foothill yellow-legged frog	FSC	Oregon Cascades south to the Sierra San Pedro Martir, Baja California, Mexico; including the Sierra Nevada, North Coast ranges, and San Gabriel Mountains.	Prefers partly shaded shallow streams and riffles with a rocky substrate.	May-November
Clemmys marmorata marmorata Northwestern pond turtle	FSC	Western Washington south to Baja California, Mexico west of the Cascade, Sierra Nevada, and Peninsular Mountain axis.	Associated with permanent or nearly permanent water in a wide variety of habitats. Requires basking sites. Nests found up to 0.5 miles from water.	Consult Agency
Birds				
Elanus leucurus White-tailed kite	FSC	Western Oregon and California; southern Texas, south to Mexico.	Nests in dense oak, willow, or other tree stands near open grasslands meadows, farmlands, and emergent wetlands.	February-September
Buteo regalis (wintering) Ferruginous hawk	FSC	Western United States and southern Saskatchewan, Canada, south to Mexico.	Found in dense coast scrub.	All year
Athene cunicularia hypugea Western burrowing owl	FSC	Western United States and Mexico.	Uses elevated rodent or other burrow for roosting and nesting. Frequents open grasslands and shrub-lands.	Dec. 1-Jan.31 & April 15-July15
Coccyzus americanus occidentalis Western yellow-billed cuckoo	FC	Isolated pockets in the San Francisco Bay region, Mojave Desert, and San Diego region of California; south to Mexico.	Found in lowland riparian habitats. Nest and seek cover in densely foliaged, deciduous trees and shrubs, especially willows.	June-September

SCIENTIFIC NAME COMMON NAME	FEDERAL STATUS	DISTRIBUTION	HABITAT REQUIREMENTS	PERIOD OF IDENTIFICATION
Lanius ludovicianus Loggerhead shrike	FSC	United States and western Canada.	Found in a variety of habitats with open areas, available perches, and dense shrubs for nesting.	March-August

FEDERAL STATUS CODES: (U.S. Fish and Wildlife Service or National Marine Fisheries Service)
FC = Federal Candidate for Listing
FD = Federal Delisted
FE = Listed as Endangered by the Federal Government
FLC = Federal species of local concern
FSC = Federal species of concern
FT = Listed as Threatened by the Federal Government

SOURCES: CDFG, 2004a, b, c, d; CNDDB, 2003; CNPS 2001, 2003; Huffman-Broadway Group, Inc., 2006, **Appendix J**; AES, 2004; USFWS, 2004; **Appendix I**.

Sonoma Sunshine

Sonoma sunshine (*Blennosperma bakeri*) is a small, annual member of the sunflower family indigenous to California. Within California, the species is listed as State Endangered. It is also a Federally Endangered Species. The species provides a yellow display in vernal pools and annual grasslands of the Santa Rosa Plain and Sonoma areas. The CNDDB maps Sonoma Sunshine at the Alton Lane Vernal Pool Preserve, a couple of miles to the north and east of the property (Huffman-Broadway Group, Inc., 2006; **Appendix J).** The best time to view the species is in April. The CNDDB reports that the Wilfred and Stony Point Sites support a documented population of Sonoma sunshine; however, this species was not found during spring 2004 surveys by Ecosystems West botanists (Huffman-Broadway Group, Inc. 2006; **Appendix J)**.

Burke's Goldfields

Goldfields belong to the genus of wildflowers known as *Lasthenia*, a group of plants in the sunflower family. Burke's goldfields (*Lasthenia burkei*), are known only from vernal pools and wet meadows of the region (Lake, Mendocino, and Sonoma counties) and are known from the northern reaches of the Santa Rosa Plain, including the Alton Lane Vernal Pool Preserve discussed above.

The CNDDB reports that the Wilfred and Stony Point Sites historically supported a Burke's Goldfields population; however no plants were found during spring surveys by Ecosystems West botanists (Huffman-Broadway Group, Inc. 2006; **Appendix J)**.

Sebastopol Meadowfoam

Meadowfoams belong to the family Limnanthaceae, a group of spring wildflowers often associated with wet meadows and the upper rim of vernal pools and swales. They are distant cousins of geraniums, and a source of natural oils. The Sebastopol meadowfoam is known only from a few localities in Sonoma County, principally in the Laguna de Santa Rosa area, and from a single known location in Napa County.

According to the CNDDB the Sebastopol meadowfoam is found about 1½ miles from the site. This species was not observed during 2004 field surveys conducted by Ecosystems West botanists (Huffman-Broadway Group, Inc. 2006; **Appendix J**).

Showy Indian Clover

The showy Indian clover is a robust, hairy annual member of the pea family that is a distant cousin of alfalfa. The flowers are purple with white tips. Once thought to be extinct, the species was rediscovered in 1993 near the community of Occidental in Sonoma County. This species has not been observed in recent years.

According to the CNDDB the Wilfred and Stony Point Sites contain marginal habitat for the showy Indian clover. This species was not observed during field surveys conducted in 2004 by Ecosystems West botanists (Huffman-Broadway Group, Inc. 2006; **Appendix J**).

Other Plant Species

Several other Federal Endangered plant species, including Sonoma alopecurus, white sedge, Sonoma spineflower, Vine Hill clarkia, soft bird's beak, Baker's larkspur, yellow larkspur, Pitkin Marsh lily, many-flowered navarettia, Hickman's cinquefoil, and Kenwood Marsh checkerbloom are known from the region. In most cases the species are known from very few localities and have been extirpated from most of the region, or are of limited distribution within Sonoma County.

Marginal to unsuitable habitat exists on the Wilfred and Stony Point Sites for the Sonoma alopecurus, white sedge, Sonoma spineflower, Vine Hill clarkia, soft bird's beak, Baker's larkspur, yellow larkspur, Pitkin Marsh lily, many-flowered navarettia, Hickman's cinquefoil, and Kenwood Marsh checkerbloom. Rare plant surveys conducted in the spring 2004 did not detect these species (Huffman-Broadway Group, Inc. 2006; **Appendix J**).

California Freshwater Shrimp

California freshwater shrimp is found in low-elevation, low gradient streams with gravelly or sandy bottoms. Riparian cover is moderate to heavy associated with undercut banks. Exposed roots are important as they create a microhabitat where shrimp may hide or cling. The species prefers shallow pools isolated from the main flow. Blucher Creek, located west of the site contains a population of California freshwater shrimp. The Bellevue-Wilfred Channel is unsuitable habitat for California freshwater shrimp. (Huffman-Broadway Group, Inc. 2006; **Appendix J**).

Steelhead Fish

Central California populations of steelhead trout (*Oncorhynchus mykiss*) have been divided into Evolutionarily Significant Units (ESUs). Steelhead in the Central Coast ESU occur from the Russian River south to Soquel Creek and to, but not including, the Pajaro River, and including San Francisco and San Pablo Bays. Steelhead require well-oxygenated streams with riffles and loose, silt-free gravel substrate for spawning.

Juvenile steelhead require a period of residency in a stream before migrating downstream to the ocean. The length of freshwater residency may vary from one to three years or more depending on the living conditions in the stream. The major downstream migration of juvenile steelhead

occurs during the period from February through June, depending on the water year and pattern of winter-spring runoff. Fish habitat is physically reduced to a minimum during the low-flow period of July through October. In the Russian River and its tributaries, adult steelhead begin their upstream migration during the first heavy rains of November and December and continue their upstream migration into March and April. Steelhead smolts migrate downstream to the Russian River and the Pacific Ocean during the winter and spring with fish movements tapering off in the middle of May.

The presence of steelhead fish in the Laguna de Santa Rosa has been reported in a recent Biological Assessment of the Russian River (Entrix, 2004). The National Marine Fisheries Service (NMFS, also known as NOAA Fisheries) reports that steelhead migrate upstream and downstream through the Laguna as they move into Santa Rosa and Mark West creeks, which join the Laguna de Santa Rosa downstream from the Wilfred-Bellevue Channel. In addition the NMFS survey reports juvenile steelhead in Copeland Creek, which joins the Laguna de Santa Rosa upstream from the Wilfred-Bellevue Channel (Jones, 2000).

California Tiger Salamander

The Sonoma County genetically distinct population of California tiger salamander (*Ambystoma californiense*) is listed as a Federally Endangered Species. The species is found in grassland, savanna, and oak woodlands often where stock ponds, natural ponds, vernal pools, and intermittent streams occur. California tiger salamander is threatened by the loss of breeding ponds and the conversion of upland aestivation habitat for agriculture and urban development (Huffman-Broadway Group, Inc., 2006). The Wilfred and Stony Point Sites are within the Santa Rosa Plain Conservation Planning Area for the Sonoma County genetic race.

California tiger salamander is found in the area according to the CNDDB, and presence is assumed on the property based on 2004 protocol level surveys. Egg sacs and larva of California tiger salamander were found in the Primrose Avenue ditch just north of the site. The closest known occurrence for the species is 150 feet from the edge of the property, and there are at least nine reported findings within 1.5 miles of the site. Suitable California tiger salamander habitat occurs on all sides of the property (Huffman-Broadway Group, Inc., 2006; **Appendix J**).

Western portions of the property provide highly suitable upland habitat for aestivating adult California tiger salamanders in the form of gopher burrows. Highly suitable aquatic habitat for California tiger salamander larvae is present in the drainage ditches of the study area. The highest potential for California tiger salamander occurrence is in the irrigated pasturelands of the site. Hay and silage areas of the site also provide suitable habitat for the species (Huffman-Broadway Group, Inc., 2006; **Appendix J**).

California Red-Legged Frog

California red-legged frogs are found in a variety of aquatic and terrestrial habitats including marshes, lakes, streams, reservoirs, ponds, and ephemeral streams, including the intervening upland areas between aquatic features. The species often favors dense, overhanging vegetation, which shades aquatic habitat. They have also been found in unvegetated stock ponds. California red-legged frogs can move more than a mile on land between water sources during the rainy season. Historically, California red-legged frogs were common on the Santa Rosa Plain. However, with channelization of major streams in the area since the 1960s and the introduction of many aquatic predatory species, red-legged frogs have disappeared from the Rohnert Park area.

Species expert Mark Jennings, Ph.D. of Rana Resources conducted an habitat assessment for the California red-legged frog. The assessment investigated the Stony Point and Wilfred Sites north of Rohnert Park Expressway, the Bellevue-Wilfred Channel, and the Laguna de Santa Rosa just south of the Rohnert Park Expressway. The condition of major aquatic habitats at the study area was as follows: Major aquatic habitats were channelized for flood control, resulting in creation of extensive warm water habitats that abounded with introduced species, including dozens of juvenile bullfrogs (*Rana castesbiana*), as well as hundreds of western mosquitofish (*Gambusia affinis*) and Louisiana red swamp crayfish (*Procambarus clarkii*). Smaller tributary stream channels were mostly dry at the time of the study and contained no ranid frogs (e.g., California red-legged frog, foothill yellow-legged frog, bullfrog), probably because of continual predation by raccoons in the shallow water habitats.

Based his observations and familiarity with the area since 2000, Dr. Jennings concluded that the site contains no suitable habitat for California red-legged frog. He concluded that California red-legged frogs do not inhabit the study area, and there is no chance for them to recolonize the site from adjacent drainages in the foothills to the east of the Plain (Huffman-Broadway Group, Inc., 2006; **Appendix J**).

Foothill Yellow-Legged Frog

Foothill yellow-legged frogs inhabit streams and rivers of the chaparral, foothill woodland, and forest. The species is often found near water, usually in riffles or near rocks where they shelter from potential predators. The species is known from Copeland Creek approximately 3 miles east of Rohnert Park. Suitable habitat for Foothill yellow-legged frogs does not occur at the site (Huffman-Broadway Group, Inc., 2006; **Appendix J**).

Northwestern Pond Turtle

According to the Huffman-Broadway Group Biological Assessment the northwestern pond turtle inhabits permanent or semi-permanent bodies of water in the region, including the Bellevue-

Wilfred Canal on the site. The turtle is both a Federal and State species of concern. The turtle needs both the aquatic habitat of the Laguna de Santa Rosa (and its tributaries such as the Bellevue-Wilfred Canal) and nearby upland basking sites for its survival (Huffman-Broadway Group, Inc., 2006; **Appendix J**).

Raptors

Two raptor species of Federal concern occur in the area, including white tailed kites and ferruginous hawks. Appropriate nesting habitat for white-tailed kites is not present on the site however the species likely forages on or near the site, especially during the winter. Individuals were observed on the site in 2003. Suitable foraging habitat for ferruginous hawks is found on the site although no ferruginous hawks were observed (Huffman-Broadway Group, Inc., 2006; **Appendix J**).

Western Burrowing Owl

Burrowing owls occur in open grasslands, especially prairie, plains, and savanna, sometimes in open areas such as vacant lots near human habitation or airports, nesting and roosting in burrows dug by mammals. In California, burrowing owls are often found in close association with California ground squirrels. They spend much time on the ground or on low perches such as fence posts or dirt mounds in search of prey that consists of insects, small mammals, birds, and carrion. Nesting is often in abandoned burrows (e.g., prairie dog, ground squirrel, fox, woodchuck, tortoise) and can be identified by the lining of feathers, pellets, debris, and grass. This species maintains a circadian rhythm and hunts day or night. They often take cover during the warmest part of the day. Burrowing owls use abandoned burrows of California ground squirrels for shelter and nesting (Huffman-Broadway Group, Inc., 2006; **Appendix J**).

Although California ground squirrel burrows have limited distribution on the site, habitat for burrowing owls is present. A burrowing owl was observed on the site in 2004 (Huffman-Broadway Group, Inc., 2006; **Appendix J**).

Western Yellow-Billed Cuckoo

This avian species is a Federal Candidate for listing. It occupies riparian forest, typically along the broad, lower flood bottoms of larger river systems. Preferred nesting habitats are riparian corridors of willow mixed with cottonwoods, and an understory of blackberry, nettles, or wild grape. The western yellow-billed cuckoo once nested in a riparian area of the Laguna de Santa Rosa, about 5 miles southeast of Sebastopol, however suitable riparian habitat is not present on the Wilfred and Stony Point Sites (Huffman-Broadway Group, Inc., 2006; **Appendix J**).

Loggerhead Shrike

The loggerhead shrike is a common resident and winter visitor in lowlands and foothills throughout California. This species prefers open habitats with scattered shrubs, trees, posts, fences, utility lines, or other perches. They are a year-round resident and breed from March to August. Nest sites are usually well concealed and can be up to 50 feet above ground. Perches are used to hunt insects, reptiles, and amphibians, although they will hunt small mammals and birds. A unique characteristic of the shrike's hunting technique is to skewer the prey on a sharp object. The shrike then either feeds or uses this method to cache prey.

Suitable habitat for loggerhead shrike occurs in grassland habitats of the Wilfred and Stony Point Sites. The species was observed in 2003 (Huffman-Broadway Group, Inc., 2006; **Appendix J**).

Tri-colored Blackbirds

A relative of the red-winged blackbird, tri-colored blackbirds breed and forage from central and southern Oregon south through interior California, and along the coast from central California south to northwestern Baja California. The species nests in large stands of cattails (*Typha* spp.) or tules (*Scirpus* spp.). Nesting colonies are usually located near flowing water or ponds.

No nesting colonies occur at the site, however, winter foraging by individuals is possible (Huffman-Broadway Group, Inc., 2006; **Appendix J**).

LAKEVILLE SITE

The Huffman-Broadway study (2007) reported several raptor nest sites, sightings of bird species of special concern, and potential habitat for several Threatened and Endangered species. Potential habitat for Threatened and Endangered species of the site included host plants for Myrtle's silverspot and Callippe silverspot butterflies, and California red-legged frog breeding ponds (**Table 3.5-2**). The property contains numerous jurisdictional waters including Section 10 Waters, tidal waters, coastal salt marsh, vernal pools, palustrine emergent wetland, seasonal channels, and stock ponds (**Figure 3.5-7; Appendix K;** Huffman-Broadway Group, Inc., 2007).

TABLE 3.5-2
TARGET SPECIAL STATUS SPECIES LIST – LAKEVILLE SITE

SCIENTIFIC NAME COMMON NAME	FEDERAL STATUS	DISTRIBUTION	HABITAT REQUIREMENTS	PERIOD OF IDENTIFICATION
PLANTS				
Alopecurus aequalis var. *sonomensis* Sonoma alopecurus	FE	Known from fewer than five native occurrences in Marin and Sonoma counties, California. Elevation 5 to 210 m.	Found in freshwater marshes and swamps, and riparian scrub.	May-July
Blennosperma bakeri Sonoma sunshine	FE	Known only from the Laguna de Santa Rosa and Sonoma areas of Sonoma County, California. Elevation 10 to 110 m.	Vernal pools, mesic valley and foothill grassland.	March - May
Castilleja affinis ssp. *neglecta* Tiburon Indian paintbrush	FE	Known from six occurrences in Marin, Napa, and Santa Clara counties, California. Elevation 60 to 400 m.	Found in valley and foothill grasslands on serpentine soils.	April-June
Castilleja ambigua ssp. *ambigua* Salt marsh owl's clover	FLC	Found in the North Coast ranges of California north to British Columbia. Elevation <100 m.	Found in coastal bluff and grassland habitats.	April-August
Chorizanthe valida Sonoma spineflower	FE	Known from a single locality at Point Reyes National Seashore, Marin County, California. Elevation 10 to 305 m.	Found in sandy coastal prairie.	June-August
Cordylanthus mollis ssp. *mollis* Soft bird's-beak	FE	Contra Costa, Napa, and Solano counties, California (extirpated from Marin, Sacramento, and Sonoma counties). Elevation 0 to 3 m.	Found in coastal marshes and swamps.	July-November
Delphinium luteum Yellow larkspur	FE	Marin and Sonoma counties, California. Elevation 0 to 100 m.	Found in chaparral, coastal prairie, and rocky coastal scrub.	March-May
Hesperolinon congestum Marin western flax	FT	Known from fewer than 20 occurrences in Marin, San Francisco, and San Mateo counties, California. Elevation 50 to 800 m.	Found in chaparral and valley and foothill grasslands on serpentine soils.	April-July
Lasthenia burkei Burke's goldfields	FE	Southern Mendocino County, southern Lake County, and northeastern Sonoma County, California. Elevation 15 to 600 m.	Vernal pools, moist meadows.	April-June
Limnanthes vinculans Sebastopol meadowfoam	FE	Sonoma County, California (and one occurrence in Napa County). Elevation 15 to 305 m.	Vernal pools, vernally moist sites in meadows, valley and foothill grassland.	April-May
Spartina foliosa Pacific cordgrass	FLC	Coastal California south to Mexico. Elevation <10 m.	Salt marshes, mudflats, and shorelines.	July-November
Trifolium amoenum Showy Indian clover	FE	Extinct over much of its natural range from Santa Clara County north to Mendocino County, California. Rediscovered near Occidental in Sonoma County in 1993. Elevation 5 to 415 m.	Occurs in coastal bluff scrub, valley and foothill grassland, sometimes on serpentinite.	April-June
ANIMALS				
Crustaceans				
Syncaris pacifica California freshwater shrimp	FE	Endemic to Marin, Napa, and Sonoma counties.	Found in low gradient, perennial coastal streams. Streams are typically 1-3 feet deep, with exposed live roots along undercut banks, also with overhanging woody debris or stream vegetation.	All year

SCIENTIFIC NAME COMMON NAME	FEDERAL STATUS	DISTRIBUTION	HABITAT REQUIREMENTS	PERIOD OF IDENTIFICATION
Insects and Spiders				
Adela oplerella Opler's longhorn moth	FSC	Marin, Santa Clara, Santa Cruz, and Sonoma counties, California.	Dependent on a host plant found typically in serpentine grasslands, cream cups (*Platystemon californicus*).	Insufficient data
Calicina diminua Marin blind harvestman	FSC	Marin County, California.	Only found in serpentine rock formations on Ring Mountain Preserve.	Insufficient data
Carterocephalus palaemon Sonoma Arctic skipper	FSC	Sonoma County, California.	Glades and openings in heavily forested woods, moist meadows, and streamsides. Requires host plant, purple reedgrass (*Calamagrostis purpurascens*).	May-July
*Hydrochara ricksecker*i Ricksecker's water scavenger beetle	FSC	Alameda, Marin, San Mateo, and Sonoma counties ringing San Francisco Bay, California.	Associated with vernal pools and ponds in the San Francisco Bay region and the westernmost Sacramento Valley.	Insufficient data
Speyeria callippe callippe Callipe silverspot butterfly	FE	Alameda, Napa, San Mateo, Solano, and Sonoma counties, California.	Found in native grassland and adjacent habitats. Females lay their eggs on the dry remains of the larval food plant, Johnny jump-up (*Viola pedunculata*), or on the surrounding debris.	May-July
Speyeria zerene myrtleae Myrtle's silverspot	FE	Marin and Sonoma counties, California (extirpated from San Mateo County)	Found in coastal dune and prairie habitat. Females lay their eggs in the debris and dried stems of violets (typically *Viola adunca)*.	June-September
Fish				
Acipenser medirostris Green sturgeon	FC	Coastal areas of North Pacific from Gulf of Alaska to southern California and Baja California, Mexico; spawns only in the Sacramento and Klamath river systems in California and the Rogue River in Oregon.	Found in marine waters, estuaries, lower reaches of large rivers, and salt or brackish water off river mouths.	February-July
Eucyclogobius newberryi Tidewater goby	FE	Coast of California.	Found in brackish shallow lagoons and lower stream reaches where the water is fairly still but not stagnant.	All year
Hypomesus transpacificus Delta smelt	FT	Sacramento and San Joaquin River deltas.	Euryhaline in open waters of bays, tidal rivers, channels, and sloughs.	All year
Lampetra ayresi River lamprey	FSC	Western half of North America, including Alaska, mainland British Columbia, and Vancouver island.	Lower Sacramento River, San Joaquin River, and Russian River. May also occur in coastal streams north of San Francisco Bay.	Insufficient data
Lampetra tridentata Pacific lamprey	FSC	Coasts of Asia and North America. In North America the species is distributed from Alaska to Baja California, Mexico.	Spawn in rivers in the Central Valley, in gravely riffles with swift currents.	July-October
Oncorhynchus kisutch Coho salmon - Central California ESU	FT	Humboldt County south to Santa Cruz County, California.	Found in coastal streams and rivers suitable for spawning and rearing.	August-February
Oncorhynchus mykiss irideus Steelhead - Central California coast ESA	FT	Federal listing includes all runs in coastal basins from the Russian River, south to Soquel Creek including San Francisco and San Pablo bays.	Sacramento and San Joaquin Rivers and their tributaries.	December-July

SCIENTIFIC NAME COMMON NAME	FEDERAL STATUS	DISTRIBUTION	HABITAT REQUIREMENTS	PERIOD OF IDENTIFICATION
Oncorhynchus tshawytscha Central Valley fall/late fall-run Chinook salmon	FC	Sacramento and San Joaquin rivers and their tributaries.	Sacramento and San Joaquin Rivers and their tributaries.	October-March
Oncorhynchus tshawytscha Central Valley spring-run Chinook salmon	FT	Sacramento River and its tributaries.	Sacramento and San Joaquin Rivers and their tributaries.	February-June
Pogonichthys macrolepidotus Sacramento splittail	FSC	Lakes and rivers of the Central Valley of California although presently limited to the Delta and Suisun Bay.	Sacramento-San Joaquin Delta and associated marshes. Requires flooded vegetation for spawning and juvenile foraging habitat.	All year
Spirinchus thaleichthys Longfin smelt	FSC	Pacific coast of North America from the Sacramento-San Joaquin estuary and Monterey Bay, California, north to Prince William Sound, Alaska.	Found in all major bays and estuaries from San Francisco Bay northward. Also known from portions of the Sacramento/San Joaquin Delta.	February-April (period of time found in the Sacramento/San Joaquin Delta for spawning)
Amphibians				
Ambystoma californiense California tiger salamander	FT	Western California from Sonoma County in the north to Santa Barbara County in the south.	Breeds in vernal pools and ponds of grassland and open woodland of low hills and valleys. Will utilize burrows for refuge.	November-February (adults) March 15-May15 (larvae)
Rana aurora aurora Northern red-legged frog	FSC	West of the Cascade and Sierra Nevada ranges from Butte and Mendocino counties, northward.	Found in lowlands and foothills of northern coast range in areas with late-season sources of deep water with dense, shrubby, or emergent vegetation.	May-November
Rana aurora draytonii California red-legged frog	FT	Butte and Mendocino County, California southward to Baja California, Mexico west of the Sierra Nevada, Peninsular Mountain axis.	Lowlands and foothills in or near permanent or late-season sources of deep water with dense, shrubby, or emergent vegetation.	May-November
Spea (= *Scaphiopus*) *hammondii* Western spadefoot toad	FSC	Alameda, Butte, Calaveras, Fresno, Kern, Kings, Los Angeles, Madera, Merced, Monterey, Orange, Placer, Riverside, Sacramento, San Benito, San Diego, San Joaquin, San Luis Obispo, Santa Barbara, Stanislaus, Tulare, Ventura and Yolo counties.	Occurs primarily in grassland habitats, but can be found in valley and foothill woodlands. Vernal pools are essential for breeding and egg laying.	November-March
Reptiles				
Clemmys marmorata marmorata Northwestern pond turtle	FSC	Western Washington south to Baja California, Mexico west of the Cascade, Sierra Nevada, and Peninsular Mountain axis.	Ponds, marshes, rivers, streams, and irrigation ditches with aquatic vegetation. Requires basking sites and suitable upland habitat for egg laying.	All year
Phrynosoma coronatum frontale California horned lizard	FSC	California and Baja California, Mexico.	Frequents a wide variety of habitats, most common in lowlands along sandy washes with scattered low bushes.	April-October
Birds				
Agelaius tricolor Tricolored blackbird	FSC	California and Baja California, Mexico.	Nests in dense thickets of cattails, tules, willow, blackberry, wild rose, and other tall herbs near fresh water.	April-July

SCIENTIFIC NAME COMMON NAME	FEDERAL STATUS	DISTRIBUTION	HABITAT REQUIREMENTS	PERIOD OF IDENTIFICATION
Amphispiza belli belli Bell's sage sparrow	FSC	Foothills of the Coast Ranges from northern California to northwestern Baja California and along the western slope of the central Sierra Nevada in California.	Chaparral dominated by chamise and/or California sagebrush.	Consult agency
Athene cunicularia hypugea Western burrowing owl	FSC	Western United States and Mexico.	Uses elevated rodent or other burrow for roosting and nesting. Frequents open grasslands and shrub-lands.	Dec. 1-Jan.31 & April 15-July15
Buteo regalis (wintering) Ferruginous hawk	FSC	Western United States and southern Saskatchewan, Canada, south to Mexico.	Found in dense coast scrub.	All year
Calidris canutus Red knot	FSC	Coastal regions of the world.	Found along the coast on sandy beaches.	November-March
Chaetura vauxi Vaux's swift	FSC	Southeastern Alaska, southern British Columbia, northern Idaho, and western Montana south to central California; south to Mexico and South America.	Nests in large, hollow trees and snags in coniferous forest habitats. Often nests in flocks.	May-August
Charadrius alexandrinus nivosus Western snowy plover	FT	Pacific coast from Washington south to San Francisco Bay and Mexico; inland to the Great Salt Lake, Utah and elsewhere.	Nests, feeds, and takes cover on sandy or gravelly beaches along the coast, on estuarine salt ponds, alkali lakes, and at the Salton Sea.	All year
Coccyzus americanus occidentalis Western yellow-billed cuckoo	FC	Isolated pockets in the San Francisco Bay region, Mojave Desert, and San Diego region of California; south to Mexico.	Found in lowland riparian habitats. Nest and seek cover in densely foliaged, deciduous trees and shrubs, especially willows.	June-September
Cypseloides niger Black swift	FSC	Southeastern Alaska, British Columbia, and southwestern Alberta south through the Pacific states to southern California; northwestern Montana, Colorado, Utah, northern New Mexico; south to the Caribbean Islands, Mexico, and South America.	Found in mountainous areas and coastal bluffs. Nest in moist crevices and caves on sea cliffs above surf, or on cliffs behind, or adjacent to, waterfall in deep canyon.	April-October
Elanus leucurus White-tailed kite	FSC	Western Oregon and California; southern Texas, south to Mexico.	Nests in dense oak, willow, or other tree stands near open grasslands meadows, farmlands, and emergent wetlands.	February-September
Empidonax traillii brewsteri Little willow flycatcher	FSC	Northwestern United States.	Inhabits wet meadow and riparian montane habitats.	May-August
Falco peregrinus anatum American peregrine falcon	FD	North America.	Forages in marshes and grasslands. Nesting habitat includes high, protected cliffs and ledges, also utilizes human-made structures.	All year
Geothlypis trichas sinuosa Salt marsh common yellowthroat	FSC	San Francisco Bay area, ranging from Tomales Bay to Carquinez Strait to San Jose.	Found in freshwater and brackish marshes. Nests over water, in emergent aquatic vegetation, dense shrubs, or other dense growth.	All year
Haliaeetus leucocephalus Bald eagle	FT	North America.	Ocean shorelines, lake margins, and river courses for both nesting and wintering habitat.	All year
Lanius ludovicianus Loggerhead shrike	FSC	United States and western Canada.	Found in a variety of habitats with open areas, available perches, and dense shrubs for nesting.	March-August

SCIENTIFIC NAME COMMON NAME	FEDERAL STATUS	DISTRIBUTION	HABITAT REQUIREMENTS	PERIOD OF IDENTIFICATION
Laterallus jamaicensis coturniculus Black rail	FSC	San Francisco Bay area south to Baja California, Mexico and east to Arizona.	Salt marsh bordering large bays with heavy pickleweed or emergent growth.	All year
Limosa fedoa Marbled godwit	FSC	North America.	Found in estuarine habitats in emergent wetlands above high water.	August-May
Melanerpes lewis Lewis' woodpecker	FSC	Western United States.	Open oak savannahs, broken deciduous, and coniferous habitats. Requires open habitats with scattered trees and snags with cavities.	May-July
Melospiza melodia samuelis San Pablo song sparrow	FSC	California.	Inhabit emergent wetlands along San Francisco Bay. Use dense vegetation for cover and nesting.	All year
Numenius americanus Long-billed curlew	FSC	North and Central America.	Breeds in upland shortgrass prairies and wet meadows in northeastern California.	April-September
Pelecanus occidentalis californicus California brown pelican	FE	Western North America.	Found in estuarine, marine sub-tidal, and marine pelagic waters along the California coast. May also use mudflats and beaches for roosting.	June-March
Rallus longirostris obsoletus California clapper rail	FE	San Francisco Bay region of California.	Found in San Francisco Bay Area. Salt marsh transversed by tidal sloughs, associated with abundant growth of pickleweed.	All year
Riparia riparia Bank swallow	FSC	North America.	Colonial nester; requires vertical banks/cliffs with fine-textured soils near streams, rivers, and lakes to excavate nest holes.	March-August
Rynchops niger Black skimmer	FSC	California, Texas, and the eastern seaboard south to Mexico and South America.	Roosts and nests on sandy beaches and gravel bars. Known from a few occurrences in the San Francisco Bay Area.	April-October
Selasphorus rufus Rufous hummingbird	FSC	Western North America and Mexico.	Found in a wide variety of habitats that provide nectar-producing flowers; uses valley foothill hardwood, valley foothill hardwood-conifer, riparian, and various chaparral habitats in both northward and southward migration; montane riparian, aspen, and high mountain meadows (to tree-line and above) used in southward migration.	April-July
Selasphorus sasin Allen's hummingbird	FSC	Western North America and Mexico.	Breeders are most common in coastal scrub, valley foothill hardwood, and valley foothill riparian habitats, but also are common in closed-cone pine-cypress, urban, and redwood habitats. Occurs in a variety of woodland and scrub habitats as a migrant.	February-August
Sterna antillarum browni California least tern	FE	Western North America and Mexico.	Found along marine and estuarine shores. Nest on barren to sparsely vegetated sites near water, usually on sandy or gravelly substrate.	May-October

SCIENTIFIC NAME COMMON NAME	FEDERAL STATUS	DISTRIBUTION	HABITAT REQUIREMENTS	PERIOD OF IDENTIFICATION
Strix occidentalis caurina Northern spotted owl	FT	Western North America.	In northern California, resides in dense, old growth, multi-layered mixed conifer, redwood, and Douglas-fir habitats.	All year
Mammals				
Aplodontia rufa phaea Point Reyes mountain beaver	FSC	Marin County, California.	Frequent open and intermediate-canopy coverage with a dense understory near water. Deep, friable soils are required for burrowing, along with a cool, moist microclimate.	All year
Corynorhinus (*Placates*) *townsendii townsendii* Pacific western big-eared bat	FSC	North America.	Humid coastal regions of northern and central California. Roost in limestone caves, lava tubes, mines, and buildings.	All year
Eumops perotis californicus Greater western mastiff bat	FSC	California and Arizona south to Mexico and Cuba, then discontinuously distributed to South America.	Occurs in many open, semi-arid to arid habitats. Crevices in cliff faces, high buildings, trees, and tunnels are required for roosting and nesting.	All year
Myotis evotis Long-eared myotis bat	FSC	Western North America and Mexico.	Found in brush, woodland, and forest habitats. Nursery colonies in buildings, crevices, spaces under bark, and snags; caves are used primarily as night roosts.	April-September
Myotis thysanodes Fringed myotis bat	FSC	Western North America.	Found in a wide variety of habitats. Use caves, mines, buildings, and crevices for maternity colonies and roosts.	April-September
Myotis volans Long-legged myotis bat	FSC	Western North America.	Primarily in woodland and forest habitats above 4000 feet. Trees are important day roosts; uses caves and mines for night roosts.	April-October
Myotis yumanensis Yuma myotis bat	FSC	Western North America, Texas, and Mexico.	Inhabits open forests and woodlands. Distribution is closely tied to bodies of water. Maternity colonies occur in caves, mines, buildings, or crevices.	April-October
Reithrodontomys raviventris Salt marsh harvest mouse	FE	San Francisco Bay region of California.	Salt marsh of San Francisco Bay and tributaries. Pickleweed is the primary habitat.	All year
Sorex ornatus sinuosus Suisun shrew	FSC	San Pablo and Suisun bays of California.	Tidal marshes of the northern shores of San Pablo and Suisun Bays. Requires dense low-lying cover and driftwood or other litter above the mean high tide line for nesting and foraging.	All year
Zapus trinotatus orarius Point Reyes jumping mouse	FSC	Marin County, California.	Found in wet coastal forests of coast redwood and Douglas fir.	March-November

FEDERAL STATUS CODES: (U.S. Fish and Wildlife Service or National Marine Fisheries Service)

FC	=	Federal Candidate for Listing
FD	=	Federal Delisted
FE	=	Listed as Endangered by the Federal Government
FLC	=	Federal species of local concern
FSC	=	Federal species of concern
FT	=	Listed as Threatened by the Federal Government

SOURCES: U.S. Fish and Wildlife Service; 2004; CDFG 2004a, b, c, d; CNDDB, 2004; CNPS Electronic Inventory, 2003; **Appendix I**; Huffman-Broadway Group, 2007; **Appendix K**; Analytical Environmental Services, 2004.

The final target special status species list contains those species that have suitable habitat on site. Special status species were also included in the list if the Lakeville Site was located within the species' known range and distribution. The status, biology, regional distribution, and site-specific discussion of the target species is discussed below.

Sonoma Alopecurus

Considered by some botanists to be synonymous with the short-awn foxtail grass, the Sonoma alopecurus is known from fewer than five native occurrences. However, the distinctness of this subspecies is clouded by the existence of morphologically similar races indigenous to the Sierra Nevada region.

Marginal to unsuitable habitat exists on the Lakeville Site for the Sonoma alopecurus. Rare plant surveys conducted in 2003 did not detect any of these species (Huffman-Broadway Group, Inc. 2007; **Appendix K)**.

Sonoma Sunshine

A discussion of the biology of this species appears on page 3.5-17. In 1990, Sonoma sunshine plants were found about 5 miles from the site. The species was also recorded in the CNDDB search of the surrounding quadrangles. Plant surveys conducted in May and June of 2003 were too late to detect this early-blooming species during its flowering period (Huffman-Broadway Group, Inc. 2007; **Appendix K**). If the Lakeville Site were pursued for development of the facility, rare plant surveys would be conducted during March or April.

Indian Paintbrush and Owl's Clover

The Tiburon Indian paintbrush is a yellowish to pinkish-flowered relative of snapdragons indigenous to serpentine slopes in chaparral at the southern end of the North Coast Ranges, and northern portions of the San Francisco Bay region. Salt marsh owl's clover, also known as Johnny-nip has pale yellow to rose-purple flowers. It is found on coastal bluffs and grassland of the north and central ranges. The species is in need of study as it consists of many local ecological forms (Hickman, 1993).

A biological assessment of the property did not report the likelihood of Tiburon Indian paintbrush or salt marsh owl's clover occurring on the site (Huffman-Broadway Group, Inc. 2007), **Appendix K**.

Sonoma Spineflower

Related to buckwheat, the Sonoma spineflower is known from only a single locality at the Point Reyes National Seashore. A biological assessment of the property did not report the likelihood of Sonoma spineflower occurring on the site (Huffman-Broadway Group, Inc. 2007; **Appendix K**).

Soft Bird's Beak

Soft bird's beak is a hemiparasitic herb indigenous to salt marsh and brackish marsh in the San Francisco Bay Region. The species is found primarily in the upper marsh, usually at or above the limits of the tidal prism. In 1986, the species was found in the salt marsh near Bentley Wharf.

It is unlikely that soft bird's beak plants occur on the property (Huffman-Broadway Group, Inc. 2007; **Appendix K**).

Yellow Larkspur

Yellow or golden larkspurs are showy-flowered members of the buttercup family. Unlike buttercups, larkspur flowers are bilaterally symmetrical. A biological assessment of the property did not report the likelihood of yellow larkspur occurring on the site (Huffman-Broadway Group, Inc. 2007; **Appendix K)**.

Marin Western Flax

Marin western flax is a native wildflower related to the commercially important flax plant. However, unlike the red, white, yellow, orange, or blue flowers of cultivated and native flax species, the Marin western flax has rose to pink flowers, and it favors serpentine outcrops. A biological assessment of the property did not report the likelihood of Marin western flax occurring on the site (Huffman-Broadway Group, Inc. 2007; **Appendix K**).

Burke's Goldfields

A discussion of the biology of this species appears above, under the discussion of special status species for the Stony Point Site. A biological assessment of the property did not report the likelihood of Burke's goldfields occurring on the site (Huffman-Broadway Group, Inc. 2007; **Appendix K**).

Sebastopol Meadowfoam

A discussion of the biology of this species appears above, under the discussion of special status species for the Stony Point Site. A biological assessment of the property did not report the

likelihood of Sebastopol meadowfoam occurring on the site (Huffman-Broadway Group, Inc. 2007; **Appendix K**).

Showy Indian Clover

A discussion of the biology of this species appears above, under the discussion of special status species for the Stony Point Site. A biological assessment of the property did not report the likelihood of showy Indian clover occurring on the site (Huffman-Broadway Group, Inc. 2007; **Appendix K**).

California Freshwater Shrimp

A discussion of the biology of this species appears above, under the discussion of special status species for the Stony Point Site. A biological assessment of the property did not report the likelihood of California freshwater shrimp occurring on the site (Huffman-Broadway Group, Inc. 2007; **Appendix K**).

Insects and Spiders

Several insects and a spider are known to occur in the region. The two federally endangered butterflies are discussed separately in the paragraph following this discussion. The federally listed insects include Opler's longhorn moth, the Sonoma Arctic skipper, and Ricksecker's water scavenger beetle. The federally listed spider is the Marin blind harvestman. Of these species the only one that could occur on the site is Opler's longhorn moth (Huffman-Broadway Group, Inc. 2007; **Appendix K**).

Opler's longhorn moth is known almost exclusively from serpentine grasslands of the region where its larvae feed on the native wildflower known as cream cups (*Platystemon californicus*). The moth is known from a site about 1 mile north of the Lakeville site (Huffman-Broadway Group, Inc. 2007; **Appendix K**).

Butterflies

Two federally endangered silverspot butterflies, Myrtle's silverspot and the Callippe silverspot occur in the area. Both silverspot butterflies are known from grasslands where their larvae feed on violets (*Viola* spp.). Myrtle's silverspot has been the subject of recent taxonomic studies and conclusions, which are at variance with information available from the USFWS (Huffman-Broadway Group, Inc. 2007; **Appendix K**).

The closest known populations of Myrtle's silverspot and the Callippe silverspot to the Lakeville Site are about ½ mile north of the Lakeville site. Potential habitat for both species occurs in the hills above the site (Huffman-Broadway Group, Inc. 2007; **Appendix K**).

Fish

Several species of federally listed fish occur in the region, principally due to the proximity of the site to San Pablo Bay and the Petaluma River. These include green sturgeon, tidewater goby, Delta smelt, river lamprey, Pacific lamprey, Coho salmon, steelhead, Chinook salmon, Sacramento splittail, and long-fin smelt.

A biological assessment of the property did not report the likelihood of green sturgeon, tidewater goby, Delta smelt, river lamprey, Pacific lamprey, Coho salmon, steelhead, Chinook salmon, Sacramento splittail, and long-fin smelt occurring on the site (Huffman-Broadway Group, Inc. 2007; **Appendix K**).

California Tiger Salamander

A discussion of the biology of this species appears above, under the discussion of special status species for the Stony Point Site. Potential aestivation habitat is limited on the site due to the scarcity of suitable burrows. In addition, there are no breeding ponds near the few burrows, which exist on the property (Huffman-Broadway Group, Inc. 2007; **Appendix K**).

Red-legged Frogs

Both California red-legged and northern red-legged frogs occur in the region; however, the latter species is generally found from Mendocino and Lake counties, northward, and has subtle differences from California red-legged frogs including less distinct dorsal markings, smoother skin, and longer limbs. A discussion of the biology of California red-legged frogs appears above, under the discussion of special status species for the Stony Point Site.

The north section of the Lakeville site has excellent habitat characteristics for the California red-legged frog. Wetland areas with inundation sufficient to support breeding populations are present in the northern and western portions of the site (Huffman-Broadway Group, Inc. 2007; **Appendix K**).

Western Spadefoot Toad

The western spadefoot toad is primarily a species of lowland toad but it also ranges into the foothills and mountains. It prefers sandy or gravelly soils of grasslands, open chaparral, or pine and oak woodlands. A biological assessment of the property did not report the likelihood of

western spadefoot toad occurring on the site (Huffman-Broadway Group, Inc. 2007; **Appendix K**).

Turtles and Lizards

Western pond turtles and California horned lizards are known to occur in the region. Western pond turtles occupy ponds or streams where upland basking sites exist, while California horned lizards frequent a variety of upland habitats, principally of the lowlands. A biological assessment of the property did not report the likelihood of Western pond turtles and California horned lizards occurring on the site (Huffman-Broadway Group, Inc. 2007; **Appendix K**).

Western Burrowing Owl

Burrowing owls occur in open grasslands, especially prairie, plains, and savanna, sometimes in open areas such as vacant lots near human habitation or airports, nesting and roosting in burrows dug by mammals. In California, burrowing owls are often found in close association with California ground squirrels. They spend much time on the ground or on low perches such as fence posts or dirt mounds in search of prey that consists of insects, small mammals, birds, and carrion. Nesting is often in abandoned burrows (e.g., prairie dog, ground squirrel, fox, woodchuck, tortoise) and can be identified by the lining of feathers, pellets, debris, and grass. This species maintains a circadian rhythm and hunts day or night. They often take cover during the warmest part of the day. Burrowing owls use abandoned burrows of ground squirrels for shelter and nesting. Habitat for western burrowing owl is present on the site and they are known to occur in the region (Huffman-Broadway Group, Inc. 2007; **Appendix K**).

Loggerhead Shrike

The loggerhead shrike is a common resident and winter visitor in lowlands and foothills throughout California. This species prefers open habitats with scattered shrubs, trees, posts, fences, utility lines, or other perches. They are a year-round resident and breed from March to August. Nest sites are usually well concealed and can be up to 50 feet above ground. Perches are used to hunt insects, reptiles, and amphibians, although they will hunt small mammals and birds. A unique characteristic of the shrike's hunting technique is to skewer the prey on a sharp object. The shrike then either feeds or uses this method to cache prey.

Habitat for loggerhead shrike is present on the site and they are known to occur in the region. A pair of birds, presumed to be a nesting pair, was observed in one of the nearby riparian canyons (Huffman-Broadway Group, Inc. 2007; **Appendix K**).

Bald Eagle

In the latter part of the 20th century, the USFWS reclassified under the Endangered Species Act of 1973, as amended, the bald eagle from endangered to threatened in the lower 48 states, excluding Michigan, Minnesota, Wisconsin, Oregon and Washington where it is currently listed as threatened. In the mid-1970's the USFWS established five recovery programs based on geographical distribution of the species, the Lakeville Site being located in the Pacific Recovery Region. Because recovery goals were met, the bald eagle was federally reclassified to the threatened status in California. In the Pacific Recovery Region, habitat conservation efforts, including laws and management practices at Federal, state and community levels have helped facilitate increases in the bald eagle population. A biological assessment of the property did not report the likelihood of bald eagle occurring on the site (Huffman-Broadway Group, Inc. 2007; **Appendix K**).

Shore and Salt Marsh Birds

Several shorebirds have the potential or are known to occur in the region although none have been found on the site. These include red knots, western snowy plovers, salt marsh common yellowthroats, black rails, California clapper rails, California brown pelicans, and California least terns. However California clapper rails are known to occur on Lower Tubbs Island and in the adjacent marshes south of State Highway 37 south of the site. Potentially suitable habitat for California black rail is present in the tidal marshes to the south of the site (Huffman-Broadway Group, Inc. 2007; **Appendix K**).

A biological assessment of the property did not report the likelihood of red knots, western snowy plovers, salt marsh common yellowthroats, black rails, California clapper rails, California brown pelicans, and California least terns occurring on the site (Huffman-Broadway Group, Inc. 2007; **Appendix K**).

Bird Species of Federal Concern

There are numerous bird species of Federal concern known from the region. These include tri-colored blackbird, Bell's sage sparrow, Vaux's swift, black swift, white-tailed kite, ferruginous hawk, marbled godwit, San Pablo song sparrow, Rufous hummingbird, Allen's hummingbird, Lewis' woodpecker, bank swallow, and black skimmer.

A biological assessment of the property did not report tri-colored blackbirds, Bell's sage sparrows, Vaux's swifts, black swifts, white-tailed kites, ferruginous hawks, marbled godwits, San Pablo song sparrows, Rufous hummingbirds, Allen's hummingbirds, Lewis' woodpeckers, bank swallows, and black skimmers occurring on the site. A documented tricolored blackbird

nesting colony known from the area was not active during the 2003 surveys. Appropriate nesting habitat for white-tailed kites is not present on the site, although the species may forage in the vicinity during the winter. Tricolored blackbirds and ferruginous hawks may also forage on the site (Huffman-Broadway Group, Inc. 2007; **Appendix K**).

Bat Species of Federal Concern

Several bat species of Federal concern occur in the region including Pacific western big-eared bat, greater western mastiff bat, long-eared myotis bat, fringed myotis bat, and long-legged myotis bat. A biological assessment of the property did not report the likelihood of Pacific western big-eared bats, greater western mastiff bats, long-eared myotis bats, fringed myotis bats, and long-legged myotis bats occurring on the site (Huffman-Broadway Group, Inc. 2007; **Appendix K**).

Salt Marsh Harvest Mouse

The salt marsh harvest mouse is only found in saline emergent wetlands of San Francisco Bay and its tributaries. The nearest known population is on San Pablo Bay at Lower Tubbs Island and in adjacent marshes. A biological assessment of the property did not report the likelihood of salt marsh harvest mouse occurring on the site however potential habitat is present south of State Highway 37 (Huffman-Broadway Group, Inc. 2007; **Appendix K**).

Other Mammal Species of Federal Concern

The Suisun shrew and Point Reyes jumping mouse are known from the region. The Suisun shrew occurs in the tidal marshes along San Pablo and Suisun bays, and the species is known from the Sears Point area. The Point Reyes jumping mouse is found elsewhere in the region and is not likely to occur on the site (Huffman-Broadway Group, Inc. 2007; **Appendix K**).

3.5.5 WATERS OF THE UNITED STATES

The term "Waters of the United States" is defined as:

- All waters which are currently used, or were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters which are subject to the ebb and flow of the tide;
- All interstate waters including interstate wetlands; or
- All other waters such as intrastate lakes, rivers, streams (including intermittent streams), mudflats, sand flats, wetlands, sloughs, prairie potholes, wet meadows, playa lakes, or natural ponds, the use or degradation of which could affect interstate or foreign commerce including any such waters.

"Wetlands" are defined as:

> Waters of the U.S. that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands that meet these criteria during only a portion of the growing season are classified as seasonal wetlands.

WILFRED SITE

A Corps verified delineation identified 18.44 acres of "waters of the U.S." on the 253-acre Wilfred site (The Huffman-Broadway Group, Inc., 2004a) (**Appendix L**). These features are subject to USACE jurisdiction under the Clean Water Act and any discharge of dredged or fill material within the "waters of the U.S." would require a Clean Water Act, Section 404 permit. Anticipated direct effects to jurisdictional "waters of the U.S." total 2.07 acres with the development of Option 2 and 2.37 acres with the development of Option 3 (**Figure 28** and **Figure 29** of **Appendix J; Table 2-2**). Under Option 2, a 78-acre sprayfield area will be installed with a minimum of 250-foot setback from all wetlands. Option 3 includes an 11.4-acre sprayfield with a 50-foot setback from all wetlands on site.

STONY POINT SITE

A Corps verified delineation identified more than 61.77 acres of "waters of the U.S." on the Stony Point site (The Huffman-Broadway Group, Inc., 2006) (**Appendix L**). These features are subject to USACE jurisdiction under the Clean Water Act and any discharge of dredged or fill material within the "waters of the U.S." would require a Clean Water Act, Section 404 permit. Development of Variation B1 would impact 21.87 acres of seasonal pools and wetlands; development of Variation B2 would impact 27.16 acres of seasonal pools and wetlands (**Figure 30** and **Figure 31** of **Appendix J**). Seasonal pools and seasonal wet areas are subject to USACE regulation if these features are hydrological connection to navigable waters.

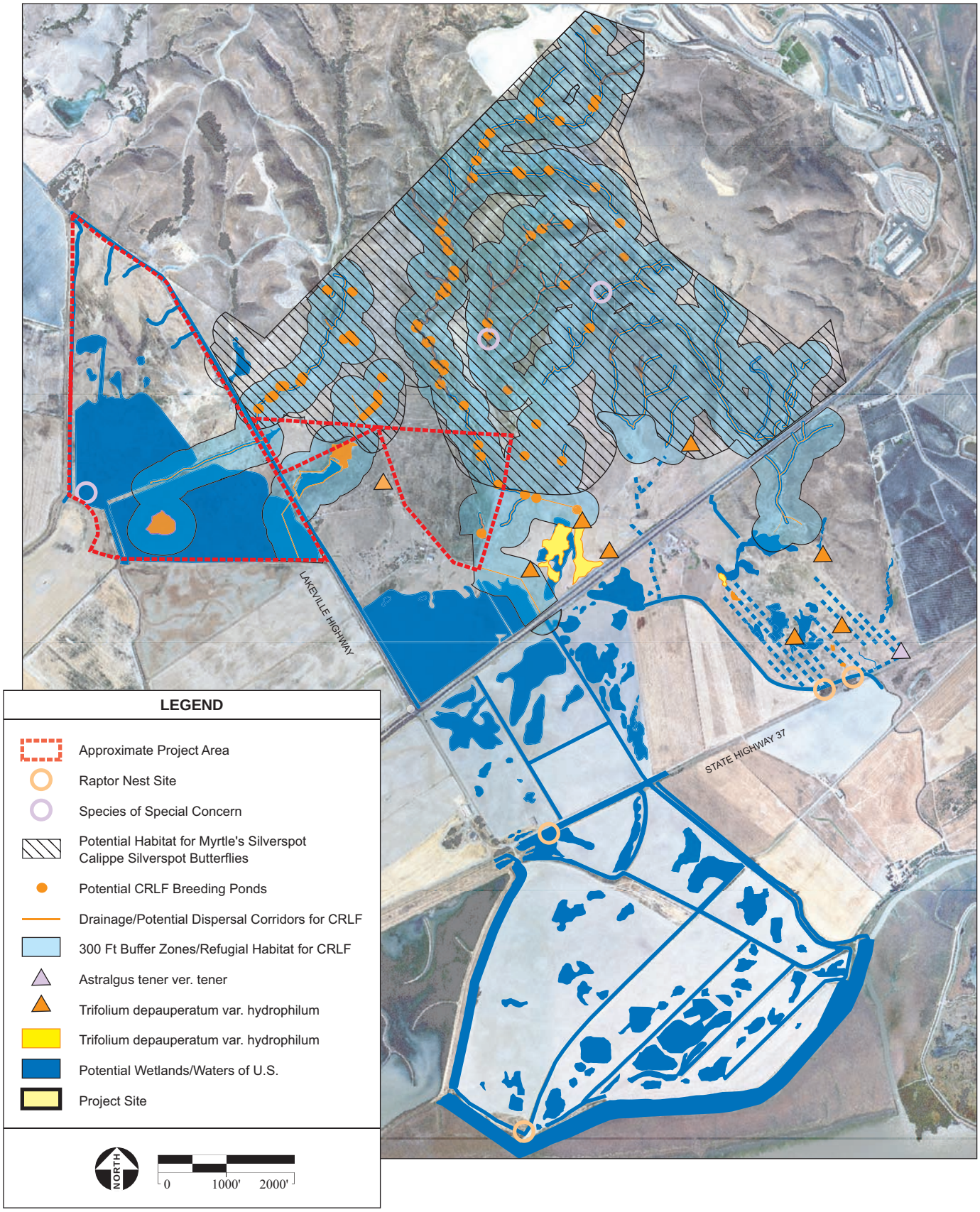
A "waters of the U.S." delineation map is presented as **Figure 3.5-7**. The waters of the U.S. map encompass all the parcels, approximately 460 acres, within the Wilfred and Stony Point sites.

LAKEVILLE SITE

An unverified delineation of "waters of the U.S." at the Lakeville site identified areas that are potentially subject to USACE regulation under Section 404 of the Clean Water Act, including marshes and streams totaling approximately 125 acres (**Figure 3.5-8**) (Huffman-Broadway Group, Inc., 2007; **Appendix L**).

SOURCE: Huffman-Broadway Group, Inc., 2006; AirPhoto USA Aerial Photograph, 12/1/2003; AES, 2006

Figure 3.5-7
Waters of the US – Wilfred and Stony Point Sites



SOURCE: Huffman Broadway Group; AES, 2005

Figure 3.5-8

Summary of Biological Resources - Lakeville Site and Vicinity

3.5.6 LAGUNA DE SANTA ROSA

The Laguna de Santa Rosa at the south end of the Wilfred and Stony Point Sites is a broad, shallow, excavated channel more than 300 feet wide and less than 40 feet deep (see Section 3.3). Flow as observed on June 9, 2004 was negligible and the water depth was about 4 feet. According to a recent Biological Assessment, the Laguna de Santa Rosa is seasonally eutrophic (Entrix, 2004). A Total Maximum Daily Load (TMDL) for ammonia and dissolved oxygen (DO) was proposed in 1995 (Morris, 1995), and was established by the RWQCB and USEPA (for total nitrogen and ammonia) in 2004 (Santa Rosa, 2004e). However, the nutrient-rich bottom deposits in the Laguna de Santa Rosa continue to decrease DO (Entrix, 2004).

Public concern for the protection and management of biological resources of the Laguna de Santa Rosa and adjacent Santa Rosa Plain has resulted in several planning efforts culminating with the establishment of the Laguna de Santa Rosa Protection Plan. The Laguna de Santa Rosa Protection Plan is a partnership of the Sonoma Land Trust and the Laguna de Santa Rosa Foundation, together with the California State Coastal Conservancy (Sonoma Land Trust and Laguna de Santa Rosa Foundation, 2003). The Wilfred and Stony Point Sites are within the core study area of the Laguna de Santa Rosa Protection Plan (**Figure 3.5-9**).

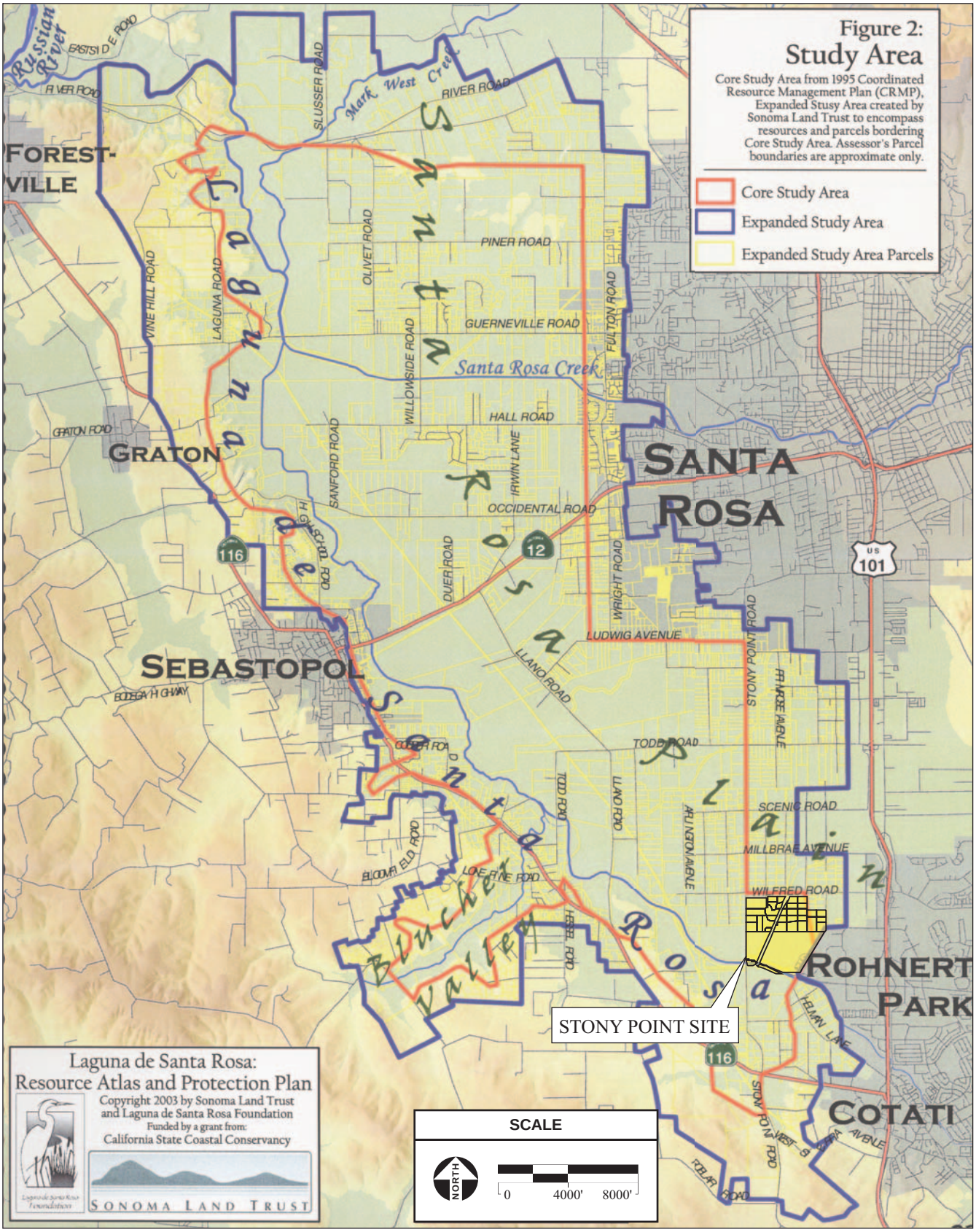
The stakeholders in the region have a stated interest in preserving wetlands, including seasonal wetlands, perennial wetlands and vernal pools, valley oak savannah, riparian woodlands, and special status species including Sonoma sunshine, Burke's goldfields, and Sebastopol meadowfoam. This led to the formulation of the 1995 Santa Rosa Plain Vernal Pool Ecosystem Preservation Plan and Coordinated Resource Management Plan; the Sonoma County Agricultural and Open Space District's Acquisition Plan 2000; creation of the Laguna de Santa Rosa National Wildlife Refuge; and the Laguna de Santa Rosa Foundation.

SANTA ROSA PLAIN VERNAL POOL ECOSYSTEM PRESERVATION PLAN

The Santa Rosa Plain Vernal Pool Ecosystem Preservation Plan was a multi-agency project undertaken in response to the USACE suspension of nationwide permit availability on the Santa Rosa Plain. The vernal pool plan outlined a process to preserve high quality vernal pool habitat and to develop low quality vernal pool areas. The plan was not adopted.

COORDINATED RESOURCE MANAGEMENT PLAN

The planners of the Laguna de Santa Rosa Foundation brought together a task force of private organizations and public agencies. The job of the task force was to develop management guidelines within a 21,000-acre core planning area (**Figure 3.5-9**).



SOURCE: Sonoma Land Trust, 2003; Laguna de Santa Rosa Foundation, 2003; AES, 2005

Figure 3.5-9

Laguna de Santa Rosa Resource Atlas and Protection Plan Study Area

SONOMA COUNTY AGRICULTURAL PRESERVATION AND OPEN SPACE DISTRICT'S ACQUISITION PLAN 2000

In 2000 the Sonoma County Agricultural Preservation and Open Space District (SCAPOSD) adopted a plan to purchase land and easements. The Laguna de Santa Rosa was determined by SCAPOSD to represent a priority riparian and wetland area. In addition the SCAPOSD recognized the Santa Rosa Plain as a priority greenbelt area.

3.5.7 SONOMA BAY LANDS

The Lakeview site is located within the Sonoma Baylands region (see **Section 3.5.1**). The SCAPOSD has recently announced plans to restore those portions of the site belonging to the Sonoma Baylands.

3.6 CULTURAL AND PALEONTOLOGICAL RESOURCES

Five cultural resources surveys were prepared by Tom Origer & Associates (Origer et al. 2003a, 2003b, 2005, 2006, 2007) encompassing all of the land for the Wilfred, Stony Point, and Lakeville sites. As noted in **Section 2.0**, the Wilfred Site is adjacent to the Stony Point Site, with substantial portions of overlap. With the incorporation of the Wilfred Site as the site for the present Alternative A, the previous Alternatives A through D became Alternatives B through E. The archaeological Area of Potential Effects (APE) for the Proposed Project consists of the Area of Direct Effect, defined as the construction footprint for each alternative, which includes all areas of construction, equipment storage, and lay-down areas. All other areas within the confines of the site boundaries are considered areas of indirect effect and are outside the APE. The architectural APE included the site boundaries for each of the three sites (Wilfred, Stony Point, and Lakeville) plus "one parcel beyond."

A preliminary assessment of paleontological sensitivity for the Stony Point Site was prepared by Dr. Thomas B. Anderson (2004a), with a second assessment done in January of 2006 on the remainder of parcels comprising the Wilfred Site (Anderson 2006). A separate preliminary assessment of paleontological sensitivity for the Lakeville Site was also prepared by Dr. Anderson (2004b). These studies are also summarized below.

3.6.1 GENERAL SETTING

AGENCY RESPONSIBILITIES UNDER SECTION 106

The National Indian Gaming Commission (NIGC) is the Lead Federal agency for the purpose of compliance with Section 106 of the National Historic Preservation Act (NHPA) as amended, and its implementing regulations found at 36 Code of Federal Regulations (CFR) Part 800.

As Lead Federal Agency, the NIGC must take into account the effects of its undertakings on historic properties. In accordance with 36 CFR Part 800.4, Identification of Historic Properties, the Agency Official must identify historic properties within the APE, evaluate the identified historic properties for historic significance, apply the National Register criteria, and make a finding of effects. Findings can either be 1) *No Historic Properties Affected*, or 2) *Historic Properties Affected*. If the latter of the two, the Agency Official must then apply the criteria of adverse effects found at 36 CFR Part 800.5(a). If the Agency Official determines that the undertaking's effects would not be adverse to the historic properties, or if the undertaking is modified so as to mitigate the adverse effects, then a *Finding of No Adverse Effect* can be made and the State Historic Preservation Officer (SHPO) is asked to concur in the finding. The SHPO has 30 days in which to respond. If the Agency Official determines that the project would have

an adverse effect on historic properties, or if the SHPO disagrees with the Agency's findings of no adverse effects, procedures at 36 CFR Part 800.6 Resolution of Adverse Effects, provide guidance on how the Agency and SHPO are to proceed.

National Register of Historic Places Eligibility

The NHPA authorizes the National Register of Historic Places (NRHP), a program for the preservation of historic properties ("cultural resources") throughout the Nation. The eligibility of a resource for listing in the NRHP is determined by evaluating the resource using criteria defined in 36 CFR 60.4 as follows:

> The quality of significance in American history, architecture, archaeology, and culture is present in districts, sites, buildings, structures, and objects of state and local importance that possess integrity of location, design, setting, materials, workmanship, feeling, association, and
>
> A. that are associated with events that have made a significant contribution to the broad patterns of our history;
> B. that are associated with the lives of persons significant in our past;
> C. that embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or
> D. that have yielded, or may be likely to yield, information important to prehistory or history.

Sites younger than 50 years, unless of exceptional importance, are not eligible for listing in the NRHP.

All properties change over time, therefore, it is not necessary for a property to retain all its historic physical features or characteristics in order to be eligible for listing on the NRHP. The property must, however, retain enough integrity to enable it to convey its historic identity; in other words, to be recognizable to a historical contemporary. The National Register recognizes seven aspects or qualities that, in various combinations, define integrity (National Park Service 1990). These seven qualities are listed below:

1. **Location** – the place where the historic property was constructed or the place where the historic event occurred.
2. **Design** – the combination of elements that create the form, plan, space, structure, and style of a property.
3. **Setting** – the physical environment of a historic property.

4. **Materials** – the physical elements that were combined or deposited during a particular period of time and in a particular pattern or configuration to form a historic property.
5. **Workmanship** – the physical evidence of the crafts of a particular culture or people during any given period in history or prehistory.
6. **Feeling** – a property's expression of the aesthetic or historic sense of a particular period of time.
7. **Association** – the direct link between an important historic event or person and a historic property.

To retain historic integrity a property will always possess several, and usually most, of these aspects. In order to properly assess integrity, however, significance (why, where, and when a property is important) must first be fully established. Therefore, the issues of significance and integrity must always be considered together when evaluating a historic property.

3.6.2 REGULATORY BACKGROUND

PREHISTORY

Archaeological evidence indicates that human occupation of California began at least 12,000 years ago (Fredrickson, 1984). Early inhabitants appear to have had an economy based largely on hunting, with limited exchange, and social structures based on extended family units. Later, milling technology and an inferred acorn economy were introduced. This diversification of economy appears contemporary with the development of sedentism, population growth, and expansion. Sociopolitical complexity and status distinctions based on wealth are also observable in the archaeological record, as evidenced by an increased range and distribution of trade goods (e.g., shell beads, obsidian tool stone), which are possible indicators of both status and increasingly complex exchange systems.

An understanding of the region's archaeology began with Meighan's 1955 synthesis of research in the North Coast Ranges. Meighan's (1955) work suggested a regional span of occupation extending back at least 2,500 years. Later, Fredrickson (1984), suggested that initial occupation could date to 7,000 years ago, and proposed a chronology for the north coastal region showing that time depth. Fredrickson's regional chronology is summarized below.

Based on previous research, Fredrickson (1984) described the earliest documented period as marked by milling equipment (handstones and grinding slabs) and large, concave-based projectile points. Later, middle-period assemblages are marked by lanceolate projectile points, grinding and mashing tools (mortars and pestles), and certain types of *Olivella* shell beads. Approximately 1,000 years ago, the introduction of the bow and arrow gave rise to a distinctive projectile point that was small and lightweight. It had a straight to slightly expanding stem and serrated edges. This period is also marked by particular types of *Olivella* beads, distinct from those of the middle

period. The final period, extending to the historic period, was marked by projectile points with expanding stems with notched corners and entire, straight blade edges. During this period, clamshell disk beads were common. Although a number of other diagnostic artifacts mark chronological periods of the region, those listed above are common, and typically are used to determine the temporal placement of prehistoric archaeological sites. Ongoing research provides further information and helps to refine the cultural chronology.

Previous research has been conducted at four sites along the Laguna de Santa Rosa, west-northwest of the Wilfred and Stony Point sites. Investigations that began in 1977 by archaeologists from Sonoma State University found a rich and diverse array of prehistoric artifacts that proved invaluable to the understanding of native inhabitants of the Laguna (Origer and Fredrickson, 1980). Information that was collected set a tentative beginning date for habitation of the Santa Rosa Plain at approximately 5,000 B.C.

A local (Santa Rosa area) chronology was proposed by Wickstrom (1986) in his Master's thesis. Wickstrom assumed five local phases corresponding to the periods and patterns of Fredrickson's regional chronology. The earliest phase of Wickstrom's Santa Rosa chronology, called the Spring Lake Phase, was thought to span from about 4,000 to 7,000 years ago.

Ten years later, Dowdall and Origer (1997) presented evidence that the Santa Rosa area, and especially the Laguna de Santa Rosa locale was in use earlier than the 7,000 years proposed by Fredrickson and Wickstrom. Based on obsidian hydration measurements secured from an obsidian crescent scraper, Dowdall and Origer (1997) placed the time depth at approximately 11,000 years ago.

ETHNOGRAPHY

At the time of European contact, typical Native American occupation throughout the State was characterized by separate and politically autonomous nations first referred to by ethnologist A.L. Kroeber as "tribelets" (Kroeber,1925; Moratto, 1984). Tribelets were typically governed by a chief and tended to have one or more permanent village sites with smaller seasonal/temporary camps scattered throughout the tribelet territory for food procurement. Tribelets sharing similar cultural elements and linguistic traits comprised "nonpolitical ethnic groups" and have been grouped by ethnologists into language families.

The alternative project sites are in a region that was traditionally controlled by the Coast Miwok, though Rohnert Park was near a traditional language boundary shared with the Southern Pomo. The Coast Miwok are differentiated from other nearby ethnographic groups based on the language they spoke. Linguists consider the Coast Miwok language to be of the Penutian linguistic stock, which is believed to have entered the lower Sacramento Valley about 4,500 years ago. This language stock is further divided, and the family to which Coast Miwok belongs is the

Utian language family. Linguistic evidence suggests that Utian speakers spread to occupy the marshlands surrounding San Francisco Bay between 4,000 and 2,500 years ago, displacing older groups in the area (Moratto, 1984). Moratto notes that the early Utian settlement pattern matches the distribution of historic marshlands, with most Utian villages located at marsh margins prior to 200 B.C.

The Coast Miwok economy reflected this early focus on marsh resources, with added emphasis on hunting and gathering in the hills of the North Coast Ranges. A typical Coast Miwok tribe inhabited a semi-permanent village from which trips were made to temporary, seasonal camps to obtain locally available resources (Kelly, 1978).

Drawing from Franciscan mission registers and other historical documents, Milliken (1995) compiled an encyclopedia of San Francisco Bay tribal groups and their geographic distribution. Milliken attributes "lands from the Cotati area west as far as Bloomfield and Two Rock" to the Licatiut tribe of the Coast Miwok. The nearest reported ethnographic sites are the villages of *kōta 'tī*, described as being "just north of the town of Cotati," and *ūlī'yōmi* (or *atcamōtcō 'tcawi*), thought to be about 4 miles west of Cotati (Barrett, 1908).

HISTORICAL CONTEXT

The following information on the history of the area Rohnert Park area, and specifically the Wilfred and Stony Point sites) has been condensed from the Tom Origer & Associates reports prepared for this project (2003a, 2005, 2006, 2007) (**Appendix M**). The reader is referred to those reports for more detail and a list of the references used by the authors. Additional information was drawn from resources on file at AES, Sacramento, California.

Early Euro-American Settlement

Historically, the Wilfred and Stony Point sites were once part of the 13,316-acre Rancho Llano de Santa Rosa granted to Joaquin Carillo in 1844. Carillo was the son of Maria Carillo, grantee of the Rancho Cabeza de Santa Rosa, whose family had the first permanent, non-native residence in the area. The residential focus of the Llano de Santa Rosa grant centered on present-day Sebastopol where Carillo's adobe house was located. The Wilfred and Stony Point sites border the Cotate Rancho granted to Juan Castañeda in 1844 (Hoover *et al*., 1990). Castañeda failed to finalize the grant, and in 1857, the U.S. Land Commission patented the 17,238-acre rancho to Thomas S. Page. Page arrived in California in 1847, and with his six sons, ran a stock ranch on the Cotate Rancho from 1858 until his death in the late 1890s.

By 1877, William Hill and James McNear acquired nearly 900 acres within the Llano de Santa Rosa land grant, abutting the western edge of the Cotate Rancho. William Hill obtained full interest in the property and purchased additional land to the east from the Page heirs. In 1910, acting as president of the William Hill Company, Hill filed a subdivision map with the County for

Santa Rosa Farms No. 2. Most of the "farms" were 5-acre parcels laid out on a grid. Farms that varied from the 5-acre norm were primarily situated along a creek flowing northeast to southwest through the subdivision. This creek has since been channelized and is known as the Bellevue-Wilfred Ditch or Flood Control Channel.

Records at the Sonoma County Recorder's Office (SCRO) show that it took a few years before any of the lots were sold, and in 1913, Sine and Kendrick purchased all of the unsold lots. Sales were more brisk after 1913, but the last parcels were not sold until about 1922. Review of the initial purchase of lots within the current Wilfred and Stony Point sites show that a few, single parcels were sold between 1912 and 1915, but that most of the farms were sold in multiple lots of from 10 to 45 acres. By about 1920, four families owned most of the Wilfred Site. Most notable of these was dairyman Louis Pedrotti, who purchased a 160-acre farm on the west side of Stony Point Road in 1882. Between 1884 and 1921, Pedrotti acquired 245 acres on the east side of Stony Point Road that included what is now the southern half and northwestern corner of the Stony Point Site. Others who owned significant portions of the Wilfred Site were the Pedranzini, Correia, Sartorelli, and Leis families.

Dairy Farming

The cattle and dairy industries historically have been important factors in Sonoma County's economy. In his history of four northern California counties, newspaper publisher C.A. Menefee (1873:275) writes:

> Next to the cultivation of the soil the greatest source of wealth [in Sonoma County] is stock-raising the Northwestern part of the county is principally devoted to this industry. [. . .] Most of these stock ranges are so far removed from the roads and markets that no attempt is made at dairying. [. . .] Along the Northern Coast where the roadsteads offer shipping facilities, considerable attention is given dairying, but it is not till [sic] we get to [the] Russian River that we come into the chief dairy districts of the county. All along down the Coast from this point to Marin are large dairies, where nothing else is attended to but butter and cheese making.

In 1872, Sonoma County produced more than 762,000 pounds of butter and 356,000 pounds of cheese (Menefee 1873:352), some 62 percent and 77 percent more, respectively, than neighboring Napa, Lake, and Mendocino counties combined. By 1877, more than two million pounds of butter and 250,000 pounds of cheese were reportedly produced in the county (Thompson 1877:16). The growth of the dairy industry during the 1870s and 1880s was unparalleled by other Sonoma County agricultural industries (LeBaron *et al.* 1985:58). While the production of butter and cheese decreased around the turn of the twentieth century, milk production increased. Seemingly, "Dairying was destined to remain the chief money crop of Sonoma County well into

the next century (LeBaron *et al.* 1985:58). By 1936, poultry farming overtook dairying as the county's leading agricultural industry. Still, revenue from the estimated 52,000 dairy cows reported in the county in 1936 was nearly three million dollars, keeping the dairy industry high on the county's economic ladder (Finley 1937:370).

Rural Subdivisions

During a previous architectural survey completed in 1986 for the Stony Point Road widening project, the historical theme was described for Sonoma County that is commonly known as "Rural Subdivisions," a term applied to the historical phenomenon of the late nineteenth and early twentieth centuries when large parcels were divided into progressively smaller holdings (Praetzellis *et al.* 1989). Division of rural lands occurred at varying times in different parts of the county and in some areas, never at all. During the latter part of the nineteenth century, there was a notable trend toward division of large holdings, in the area southwest of Santa Rosa (including the Cotati and present-day Rohnert Park areas). In contrast, the area south of Lakeville has generally avoided the rural subdivision trend.

The earliest of the subdivisions broke large tracts of land into smaller farm parcels "large enough to accommodate a successful farming venture" (Praetzellis *et al.* 1989:18). The Santa Rosa Farms Company, Union Trust Company, and Cotati Company were a few of the businesses that capitalized on this trend, purchasing many large holdings in the area and dividing them into small farm lots. As the twentieth century progressed, lots created through these subdivisions were generally too small to provide a family's primary source of income. Work outside the home became increasingly necessary to sustain a family's economic viability, and there was greater reliance on goods sold at retail outlets. Where, in the past, large farms and ranches were relatively self sufficient, families living on these small farms could not meet all their own needs.

Division of rural lands also brought with it an increase in the number of people living in areas isolated from amenities readily found in town. As families began moving into the newly created rural subdivisions, the need for nearby groceries and supplies also grew. It was during this time frame that many small rural stores and shops opened their doors to provide needed supplies and services.

3.6.3 WILFRED SITE

RECORDS AND LITERATURE SEARCH

Methodology

Archival research included examination of the library and project files at the offices of Tom Origer & Associates, which include local histories, census data, and extensive collection of historical maps, and previous archaeological, historical, and ethnographic reports for the region. Research was also completed in 2003 and 2006 at the Northwest Information Center (NWIC),

Sonoma State University (NWIC File Nos. 03-140 and 06-302) (Origer, et al. 2003a and 2006). Archaeological site base maps and records, survey reports, and other pertinent materials were reviewed.

The records searches and literature reviews for this study were done to (1) determine whether known cultural resources had been recorded within or adjacent to the study area; (2) assess the likelihood of unrecorded cultural resources based on archaeological, ethnographic, and historical documents and literature; and (3) review the distribution of nearby archaeological sites in relation to their environmental setting. Sources of information included, but were not limited to, the listings of properties on the NRHP, *California Historical Landmarks*, *California Register of Historical Resources*, and *California Points of Historical Interest* as listed in the Office of Historic Preservation's (OHP) Historic Property Directory for Sonoma County.

The Office of Historic Preservation has determined that structures in excess of 45 years of age (for purposes of this report, structures that pre-date 1961) should be considered potentially important historical resources, and former building and structure locations could be potentially important historic archaeological sites. Therefore, archival research included an examination of historical atlases and maps to gain insight into the nature and extent of historical development in the general vicinity. Maps ranged from hand-drawn maps of the 1800s (e.g., General Land Office) to topographic quadrangles issued by the United States Geological Survey (USGS). County records for each parcel were obtained via ParcelQuest.com, an on-line property information service. Following the field survey, research focused on parcels where buildings and/or structures were present that appeared to be older than 45 years, or for which there was archival evidence suggesting that a building was older than its outward appearance.

In addition, ethnographic literature that describes local Native American groups, county histories, and other primary and secondary sources were also reviewed.

Results

As the record search and archival research for the Wilfred Site overlaps the Stony Point Site, the reader is directed to Tom Origer & Associates' 2003a and 2007 reports for more detailed discussion of the findings.

In summary, a search of the archival data found that portions of the Wilfred Site have been subjected to previous cultural resources studies and that there have been multiple surveys conducted adjacent to the Site. None of these surveys identified prehistoric or historic-period resources within the Wilfred Site. Review of historical maps found a possible homestead located within the Wilfred Site. Review of County parcel data found an additional nine properties constructed prior to circa 1961 located within the Wilfred Site Architectural APE.

Review of ethnographic literature found that there are no ethnographic sites reported on the Wilfred Site (Barrett, 1908; Kelly, 1978; Kroeber, 1925 and 1932). The nearest reported ethnographic sites are the villages of *kōta 'tī*, north of the town of Cotati, and *ūlī'yōmi* (or *atcamōtcō 'tcawi*), about 4 miles west of Cotati (Barrett, 1908).

NATIVE AMERICAN CONSULTATION

A letter requesting a check of the sacred lands file for the project area (the Stony Point and Wilfred sites and surrounding areas) was sent to the Native American Heritage Commission (NAHC) in September 2003. The NAHC responded indicating that they have no record of sacred lands within or near the project area. The NAHC also supplied a list of Native American individuals and groups that have expressed interest in projects in Sonoma County. Tom Origer & Associates sent contact letters on September 9, 2003, to the Native American individuals and groups identified by the NAHC, requesting information relevant to the prehistoric, historic, and ethnographic land uses in the project area. No responses were received. Follow-up calls were made and consultation logs were maintained (**Appendix M**).

FIELD SURVEY

Methodology

Field inspection of the Wilfred Site included monitoring and archaeological and historic architectural surveys. Initially, staff from Tom Origer & Associates observed as biologists hand excavated small pits for wetland studies and monitored soil samples taken from within the study area. No indications of cultural materials were observed during these periods of observation. Intensive field surveys of the Wilfred Site were completed by Tom Origer & Associates over several visits as detailed in their reports (Origer, et al. 2003a, 2005, 2006, 2007). Previously surveyed portions of the study area were examined. Zig-zag transects spaced 15 to 25 meters apart were walked where topography and vegetation allowed. Areas considered to be more archaeologically sensitive (i.e., along natural watercourses, on high spots, and in places where archival research suggests the presence of features), the width of the transects was reduced. Surface visibility ranged from poor to excellent, with vegetation being the chief hindrance. Hand tools were used, as necessary, to clear small patches so that the soil could be inspected. In addition, existing pits, road cuts, and other soil exposures were sought out to allow an examination of subsoils. Cultural resources located during the field survey were photographed, mapped, and recorded on Department of Parks and Recreation (DPR) 523-series site record forms.

Based on archival review, it was anticipated that prehistoric and historic-period archaeological resources and historic architectural structures would be identified within the study area. Prehistoric archaeological site indicators expected to be found in the region include but are not limited to: obsidian and chert flakes and chipped stone tools; grinding and mashing implements

such as slabs and handstones, and mortars and pestles; bedrock outcrops and boulders with mortar cups; and locally darkened midden soils containing some of the previously listed items plus fragments of bone, shellfish, and fire-affected stones. Historic period site indicators generally include: fragments of glass, ceramic, and metal objects; milled and split lumber; and structure and feature remains such as building foundations and discrete trash deposits (e.g., wells, privy pits and dumps).

Results

One historic archaeological site (RPC-5) was located during Tom Origer & Associates' surveys of the Wilfred Site. Based on available data, the NIGC *recommends, for management purposes, that RPC-5 be treated as eligible for the NRHP* under criteria A (events) and D (information potential) for its association with the themes of early Euro-American settlement. The reader is directed to Tom Origer & Associates, 2003a for a more detailed discussion of the evaluation of this resource. DPR 523 forms (site recordation forms) are located in **Appendix M**.

Nine properties were identified within the Wilfred Site architectural APE as a result of the archival and field surveys. Of these nine, one site, 5151 Stony Point Road, a house and dairy constructed circa 1915, is recommended significant under NRHP criteria A (events) and B (people). The reader is directed to Tom Origer & Associates, 2007 for a more detailed discussion of the evaluation of this resource. DPR 523 forms are located in **Appendix M**. The remaining eight sites have been determined ineligible for listing on the NRHP.

PALEONTOLOGICAL RESOURCES

Introduction

Paleontological resources are defined as the traces or remains of prehistoric plants and animals. Such remains often appear as fossilized or petrified skeletal matter, imprints or endocasts, and reside in sedimentary rock layers. Fossils are important resources, due to their scientific and educational value. Fossil resources are non-renewable.

This section presents documentation on reported paleontological deposits on the Wilfred Site and surrounding region, as well as an analysis on the potential for unreported paleontological resources to be present on the Wilfred Site.

Typologies and Formation Processes

The processes involved in the preservation of paleontological resources result in several types of remains. It is noted that only a small percentage of ancient life forms and their traces have been exposed to conditions favorable to preservation (Encyclopedia Britannica, 1966). Factors affecting the persistence of paleontological resources vary between species, and broadly include geological formation processes, climate, soil and rock chemistry, and organism morphology.

Paleontological resources are discussed here as fossil remains, although other types of remains occur elsewhere.

Fossils are the remains of plants and animals embedded in layers of rock, which have retained some degree of their original characteristics over a long period of time. Remains are buried under layers of sediment, which under building pressure become sedimentary rock. Paleontological remains can be those of organism structure, such as skeletal parts, shell, tree trunks, pollen, endocasts or imprints, or they can be remnants of activity, such as footprints or tunnels of burrowing organisms. Soft tissues are less frequently fossilized, because they usually decay before fossilization processes take place. Since fossil remains occur in sedimentary rock formations, they tend to persist unless the rock has undergone significant changes. Fossils, therefore, do not occur in metamorphic rock formations.

Fossils of considerable age may be subject to varying degrees of mineralization, at times resulting in the total replacement of original, organic matter by minerals. The agents of mineralization are most commonly comprised of calcium carbonates, such as calcite and aragonite, and silicates, such as quartz, opal and chalcedony. Less common materials are iron disulfides such as pyrite and marcasite; limonite; sulphates such as gypsum; phosphates such as calcium phosphate and vivianite; and glauconite. These minerals are typically transported in minute quantities by seeping water, with aggregation over time.

Regulatory Background

The Antiquities Act of 1906 (PL 59-209; 16 United States Code 431 et seq.; 34 Stat. 225) calls for the protection of historic landmarks, historic and prehistoric structures, and other objects of historic or scientific interest on Federal land. Additional provisions appear in the Archaeological and Historic Data Preservation Act of 1974, as amended, for the survey, recovery, and preservation of significant scientific, prehistoric, historic, archaeological, or paleontological data, in such cases wherein this type of data might be otherwise destroyed or irrecoverably lost as a result of Federal projects.

Plant fossils, shell fossils, pollen and microfossils are generally more frequent than fossils of vertebrates. Thus, vertebrate fossils are considered significant. Invertebrate fossils are considered significant if they are scarce or diagnostic of date range, or if they constitute a segment of a unique paleoenvironmental framework. Paleontologists may additionally determine significance on a case-by case basis.

All surficial deposits on the Wilfred Site are Pleistocene to Recent in age. Weaver (1949) completed initial mapping of these deposits. He classified all deposits as Quaternary alluvium. Cardwell (1958) mapped almost the entire Wilfred Site as younger Quaternary alluvium. The exception was a small area near the junction of Stony Point Road and Wilfred Avenue where his

map showed an outcrop of Glen Ellen Formation, a unit composed of lenticular deposits of poorly sorted silty clay, sand, and poorly cemented conglomerate and gravel. Mapping by Fox *et al.* (1973) and Herbst and Miyazaki (1979) rejected the use of Glen Ellen Formation for these deposits and mapped them as alluvial fan deposits. Weaver (1949) mentions no fossil localities in the Glen Ellen Formation.

More recent mapping by Fox *et al.* (1973) subdivided the surficial deposits into three units: alluvial fans, which crop out along the western margin of the area, a narrow V-shaped zone open to the north of fluvial deposits which occur to the east of the alluvial fan deposits, and basin deposits, which crop out in the eastern two thirds of the area. The unit that underlies the majority of the Wilfred Site was mapped as basin deposits by Herbst and Miyazaki (1979). These basin deposits are part of a very large outcrop area that includes the entire central part of the southern Santa Rosa Plain with Rohnert Park in the center. The deposits were interpreted by both Fox *et al.* (1973) and Herbst and Miyazaki (1979) as marsh-like deposits. A recent map by Allen (2004) shows the Wilfred Site to be underlain by Quaternary alluvium, which includes undifferentiated Pleistocene and Holocene alluvial and fluvial deposits. None of the authors in any of their maps and publications report any fossil localities from the surficial units in the immediate project vicinity.

Potential for Fossil Discovery

The environments of deposition of the surficial sediments underlying the Wilfred Site were alluvial fans and marshes. Fossil occurrences are not usually common in alluvial fan deposits because of the high probability of reworking and damage of any skeletal and plant material as it is transported and deposited.

The basin deposits on the Wilfred Site have the most potential for yielding fossils. These deposits occurred in a low energy marshy environment where fine sediment accumulated. The fact that no fossils have been reported from these beds suggests that conditions favorable for preservation were not common.

Based on the absence of fossils for this area in the published record and lack of reported findings during construction of sites in the Rohnert Park area in similar materials, it is not likely that fossils are present on the Wilfred Site.

3.6.4 STONY POINT SITE

RECORDS AND LITERATURE SEARCH

Methodology

Archival research for the Stony Point Site was conducted as part of the record search for the Wilfred Site (NWIC File No. 03-140). Refer to **Section 3.6.3** above for more detail.

Results

As the record search and archival research for the Stony Point Site overlaps the Wilfred Site, the reader is directed to Tom Origer & Associates' 2003a and 2007 reports for more detailed discussions of the findings.

In summary, a search of the archival data found that portions of the Stony Point Site has been subjected to previous cultural resources studies and that there have been multiple surveys conducted adjacent to the Site. One prehistoric isolate was located within the Stony Point Site during a survey conducted by Origer in 1988. No other prehistoric or historic-period resources were identified as a result of these surveys.

Review of historical maps found several buildings and structures depicted within the Stony Point Site. These resources include a homestead (identified in the Wilfred Site discussion above [**Section 3.6.3**]), two houses with outbuildings, two barns, and a water tank. Review of County parcel data found an additional nine properties constructed since circa 1961 located within the Stony Point Site Architectural APE.

Review of ethnographic literature found that there are no ethnographic sites reported on the Stony Point Site (Barrett, 1908; Kelly, 1978; Kroeber, 1925 and 1932). The nearest reported ethnographic sites are the villages of *kōta 'tī*, north of the town of Cotati, and *ūlī'yōmi* (or *atcamōtcō 'tcawi*), about 4 miles west of Cotati (Barrett, 1908).

NATIVE AMERICAN CONSULTATION

Native American Consultation for the Stony Point Site was conducted as part of the consultation for the Wilfred Site. Refer to **Section 3.6.3** above for more detail.

FIELD SURVEY

Methodology

An intensive cultural resources survey of the Stony Point Site was completed by Tom Origer & Associates and a Tribal Representative during October 2003 (Origer, et al. 2003a). An additional field survey for architectural resources was conducted by Origer in 2007. Field survey methodology for the Stony Point Site was the same as described above for the Wilfred Site. Refer to **Section 3.6.3** above for more detail.

Results

One prehistoric isolate and four historic-period archaeological sites (RPC-1, -2, -4, -5) were located and recorded during Tom Origer & Associates' field survey of the Stony Point Site in October 2003. Based on available data, the NIGC *recommends, for management purposes, that*

RPC-1 and RPC-5 be treated as eligible for the NRHP under criteria A (events) and D (information potential) for their association with the themes of early Euro-American settlement. The prehistoric isolate and remaining two historic-period sites are determined ineligible to the NRHP. The reader is directed to Tom Origer & Associates, 2003a for a more detailed discussion of the evaluation of these resources. DPR 523 forms are located in **Appendix M**.

Nine properties were identified within the Stony Point architectural APE as a result of the archival and field surveys. Of these nine, two sites are recommended as significant to the NRHP. These two properties include 597 Wilfred Avenue, a circa 1910 house with dairy, and 605 Wilfred Avenue, a circa-1949 house and outbuildings. 597 Wilfred Avenue is considered significant under NRHP criteria A (events), B (people), and C (workmanship). 605 Wilfred Avenue is considered significant under NRHP criteria A (events) and B (people). The reader is directed to Tom Origer & Associates, 2007 for a more detailed discussion of the evaluation of this resource. DPR 523 forms are located in **Appendix M**. The remaining eight sites have been determined ineligible for listing on the NRHP.

PALEONTOLOGICAL RESOURCES

Refer to **Section 3.6.3** above for a general discussion of paleontological resources, including typologies and formation processes, and the regulatory background.

Background Research

All surficial deposits on the Stony Point Site are Pleistocene to Recent in age. Weaver (1949) completed initial mapping of these deposits. He classified all deposits as Quaternary alluvium. Cardwell (1958) mapped almost the entire Stony Point Site as younger Quaternary alluvium. The exception was a small area near the junction of Stony Point Road and Wilfred Avenue where his map showed an outcrop of Glen Ellen Formation, a unit composed of lenticular deposits of poorly sorted silty clay, sand, and poorly cemented conglomerate and gravel. Mapping by Fox *et al.* (1973) and Herbst and Miyazaki (1979) rejected the use of Glen Ellen Formation for these deposits and mapped them as alluvial fan deposits. Weaver (1949) mentions no fossil localities in the Glen Ellen Formation.

More recent mapping by Fox *et al.* (1973) subdivided the surficial deposits into three units as described in the previous section for the Wilfred Site. The unit that underlies the majority of the Stony Point Site was mapped as basin deposits by Herbst and Miyazaki (1979). These basin deposits are part of a very large outcrop area that includes the entire central part of the southern Santa Rosa Plain with Rohnert Park in the center. The deposits were interpreted by both Fox *et al.* (1973) and Herbst and Miyazaki (1979) as marsh-like deposits. A recent map by Allen (2004) shows the Stony Point Site to be underlain by Quaternary alluvium, which includes undifferentiated Pleistocene and Holocene alluvial and fluvial deposits. None of the authors in

any of their maps and publications report any fossil localities from the surficial units in the immediate project vicinity.

Potential for Fossil Discovery

The environments of deposition of the surficial sediments underlying the Stony Point Site were alluvial fans and marshes. Fossil occurrences are not usually common in alluvial fan deposits because of the high probability of reworking and damage of any skeletal and plant material as it is transported and deposited.

The basin deposits on the Stony Point Site have the most potential for yielding fossils. These deposits occurred in a low energy marshy environment where fine sediment accumulated. The fact that no fossils have been reported from these beds suggests that conditions favorable for preservation were not common.

Based on the absence of fossils for this area in the published record and lack of reported findings during construction of sites in the Rohnert Park area in similar materials, it is not likely that fossils are present on the Stony Point Site.

3.6.5 LAKEVILLE SITE

PREHISTORY

Nels Nelson was a significant figure in Bay Region archaeology. He conducted a survey of the San Francisco Bay area in 1906 and 1908 and documented hundreds of archaeological sites. His survey focused on marsh margins and adjacent lands surrounding the bay, including the current Lakeville Site.

Among the earliest large-scale projects in the North Bay was research conducted by University of California archaeologists focusing initially on the Napa Valley region. In 1953, R.E. Heizer and several of his University of California at Berkeley students published the findings of their archaeological survey and site investigations in the Napa Valley. Their report is a good summary of the archaeology, as it was known at that time.

The work of Heizer and his students helped form the basis for the understanding of the region's prehistory by other researchers. Meighan's (1955) work suggested a regional span of occupation extending back at least 2,500 years. Fredrickson (1984) suggests that initial occupation of the region could date to 7,000 years ago.

In addition to numerous archaeological surveys conducted in this area, research close to the Lakeville Site includes investigations at Tolay Valley, a notable and unique archaeological resource area where abundant charmstones have been found in the now-dry, prehistoric lakebed. Tolay Valley is situated in the hills, a short distance north of the Lakeville Site. This

phenomenon was first described by University of California archaeologist Albert Elsasser (1955). Elsasser recorded the charmstone site and three midden/habitation sites. The charmstone site covers the bed of a reported 300-acre lake drained during the 1870s to create additional agricultural fields. Once the lake was drained, large numbers of plummet-shaped charmstones were exposed, which Elsasser remarked upon as being crudely manufactured. He posited that because of the shallowness of the lake, these items were not used as net weights but rather were used as slingstones for hunting waterfowl (Elsasser, 1955).

In 1990, George Phebus reported on archaeological investigations conducted at nine sites in the Tolay Valley during the 1950s and 1960s (Phebus, 1990). No map accompanies this report so it is unclear whether the seven sites later recorded by David Chavez (1979) are some of the same sites where Phebus worked years earlier.

East of the Lakeville Site, two archaeological sites were investigated in 1998 by Tom Origer & Associates (Origer and Beard, 1998). Site CA-SON-227, a shell midden, yielded abundant shellfish and bone dietary debris, shell and bone artifacts, fragments, and a few projectile points and other stone tools. Diagnostic artifacts and tests conducted on obsidian flakes suggested that the site was inhabited during the Emergent Period from about 900 years ago to the time of Euroamerican contact. This site also contained human remains. Site CA-SON-2226 was a highly disturbed site thought possibly to have been a camp because of the lack of midden development. Materials found at this site were diverse but limited in numbers and included such artifacts as projectile points and other stone tools, grinding implements, charmstones, hammerstones, and chipped stone debris. Analysis of materials from this site, and especially from obsidian hydration, suggested that initial use of this site began about 3,100 years ago and that it was in use as late as 150 years ago; however, occupation appeared to have occurred during three distinct time-frames.

ETHNOGRAPHY

A detailed discussion of the ethnography of the Coast Miwok Tribe appears in **Section 3.6.1** above.

HISTORICAL CONTEXT

The Lakeville Site is at the southern edge of the Rancho Petaluma granted in 1843 to Marianno Vallejo, and the grant boundary marks the edge of the historical marsh margin. Agriculture has been the chief economic endeavor in this area since the time of Vallejo, and relatively easy access to San Francisco down the navigable waters of the Petaluma River (then Creek), resulted in rapid development of the area after 1849. Prior to the 1900s, most of the Lakeville Site was part of the marsh.

During the late 1800s, entrepreneurs began reclamation of marshlands along the margins of the San Pablo Bay, and large tracts of land were created that extended the shoreline well beyond its historical reach. Levee building, to reclaim swamp and marshlands, commenced in the 1850s and 1860s along the Sacramento and San Joaquin rivers. Much of this labor was undertaken by Chinese workers returning from the gold fields (Chinn *et al*., 1984). On San Pablo Bay, the Pacific Reclamation Company and the San Pablo Land Company financed a series of levees along the bay's north shore, initially planning to use Chinese laborers. However, this method proved ineffective because the strong tidal action of the bay outpaced the workers and eventually, a floating dredge was used to complete the levees (Wilson, 1997).

As the marsh was drained, thousands of acres of fertile agricultural lands were created and put toward hay production and ranching. Crops were shipped to market on the steamers that plied San Pablo Bay, the Petaluma River, and Sonoma Creek.

Eventually, transportation alternatives were made available by fledgling railroad companies hoping to gain a toehold in the area north of San Francisco. Chief among the railroad promoters was Peter Donahue, whose San Francisco & North Pacific (SF&NP) Railroad came to dominate rail transportation in this region. Early on, Donahue had a rail line that extended from Petaluma to Donahue's Landing on the Petaluma River, where goods and passengers could connect with steamers to San Francisco.

East of the Lakeville Site, investors hoped to build a railroad from near the embarcadero on Sonoma Creek to the town of Sonoma but met with a series of setbacks. By 1880, the Sonoma Valley Railroad Company had succeeded in constructing a line from Sonoma to Sonoma Landing on San Pablo Bay (at the south end of the Lakeville Site). Sonoma Landing provided a ¼-mile long wharf for steamers to on- and off-load cargo and passengers.

The Marin & Napa Railroad Company was formed in 1886 to construct a line across the Petaluma River to Pacheco (now Ignacio). The new line departed from the Sonoma Valley Railroad south of Sears Point and traveled north of the line that terminated on San Pablo Bay. Thereafter, Sonoma Landing was used chiefly for freight while Ignacio provided for passenger services. Donahue purchased the holdings of Sonoma Valley Railroad and the Marin & Napa Railroad in 1889, broadening the reach of his SF&NP Railroad.

In 1887, Monroe Greenwood sold a 100 foot wide strip of land to the Marin & Napa Railroad Company with the provision that the railroad company construct and maintain a station with stockpens and siding on the land of James Tatterson, near the head of Duncan's Slough (SCRO Deeds 107:607). Tatterson and J. Rose also sold land to the railroad company at that time with the same provision (SCRO 107:609, 611). The station provided for in the Greenwood, Tatterson, and Rose deeds became the Reclamation Station. The new Marin & Napa Railroad line joined with the San Francisco & North Pacific (SF&NP) Railroad at Ignacio where travelers could board

trains going north as far as Cloverdale and south to Tiburon. Peter Donahue purchased both the Sonoma Valley Railroad and Marin & Napa Railroad properties in 1896 bringing them into the SF&NP fold. In 1906, the Northwestern Pacific (NWP) Railroad was formed and absorbed the SF&NP line (Kniess 1956).

RECORDS AND LITERATURE SEARCH

A search of the archival data found that, in addition to Nelson's early bay survey, portions of the Lakeville Site have been subjected to previous cultural resources studies, and that one prehistoric archaeological site and one prehistoric isolate have been located within the Lakeville Site. Review of historical maps found no structures depicted within the Lakeville Site that might be found during the field study. Review of County parcel data found an additional three properties constructed since circa 1961 located within the Lakeville Site architectural APE.

Review of ethnographic literature found that there are no ethnographic sites reported on the Lakeville Site (Barrett 1908; Kelly 1978: Kroeber 1925, 1932). The nearest ethnographic site is the village of *wotōkī*, which Barrett's (1908:310) description places about 3.25 miles northwest of the Lakeville Site.

NATIVE AMERICAN CONSULTATION

A letter requesting a check of the sacred lands file for the Lakeville Site was sent to the NAHC in May 2003. The NAHC responded indicating that they have no record of sacred lands within or near the Lakeville Site and supplied a list of Native American individuals and groups that have expressed interest in projects in Sonoma County. Tom Origer & Associates sent contact letters on June 27, 2003, to the Native American individuals and groups identified by the NAHC, requesting information relevant to the prehistoric, historic, and ethnographic land uses on the Lakeville Site. No responses were received. Follow-up calls were made and consultation logs were maintained (**Appendix M)**.

FIELD SURVEY

Methodology

Field inspection included monitoring and archaeological survey. A mixed-strategy, archaeological survey of the Lakeville Site was completed by teams of three to five people from Tom Origer & Associates during the months of June and July of 2003. Survey coverage varied depending upon whether the area had been surveyed previously, the presence or absence of environmental variables that tend to be associated with prehistoric and historic-period resources, and the presence of buildings or structures on historical maps.

Previously surveyed portions of the Lakeville Site were not resurveyed; however, the locations of recorded sites were revisited to assess the current conditions of the resources. Those portions of

the Lakeville Site that had not been surveyed in the past were examined for the presence of prehistoric and historic-period resources.

An additional field survey for architectural resources was conducted by Origer in 2007.

Results

One previously recorded prehistoric archaeological site (CA-SON-204) and one prehistoric isolate were located and recorded during Tom Origer & Associates' field survey of the Lakeville Site in October 2003. Based on available data, the NIGC *recommends, for management purposes, that the CA-SON-204 be treated as eligible for the NRHP* under criterion D for its potential to yield information important in our prehistory. The prehistoric isolate is determined ineligible to the NRHP. The reader is directed to Tom Origer & Associates, 2003a for a more detailed discussion of the evaluation of these resources. DPR 523 forms are located in **Appendix M**.

Three properties were identified within the Lakeville Site architectural APE as a result of the archival and field surveys. Of these, only one, 7697 Lakeville Highway, a house with outbuildings constructed circa 1902, is recommended significant under NRHP criteria A (events), B (people), and C (workmanship). The reader is directed to Tom Origer & Associates, 2007 for a more detailed discussion of the evaluation of this resource. DPR 523 forms are located in **Appendix M**. The remaining two sites have been determined ineligible for listing on the NRHP.

PALEONTOLOGICAL RESOURCES

Refer to **Section 3.6.3** above for a general discussion of paleontological resources, including typologies and formation processes, and the regulatory background.

Background Research

The topography of the Lakeville Site is generally a flat alluvial plain sloping down to the south and east to San Pablo Bay and to the west to the floodplain of the Petaluma River. The area is underlain by one geologic material; Quaternary alluvium.

The Quaternary alluvium is composed of young (Pleistocene and Holocene) gravels, sands, and clays that were deposited in the valley by streams draining the higher ridge to the northeast. To date, no fossil localities have been reported from the alluvium.

Potential for Fossil Discovery

Fossils are usually rare in Quaternary alluvial deposits and, if present, are likely to be broken remains of vertebrates and plant debris. Therefore, it is not likely that fossils are present on the Lakeville Site.

3.7 SOCIOECONOMIC CONDITIONS AND ENVIRONMENTAL JUSTICE

3.7.1 SOCIOECONOMIC CHARACTERISTICS OF SONOMA COUNTY

POPULATION

Regional Population

As shown in **Table 3.7-1**, the 2004 population of Sonoma and Marin Counties is estimated to be about 722,900. A large proportion of the regional population resides in unincorporated Sonoma

TABLE 3.7-1
REGIONAL POPULATION

Location	Population		
	1990	2000	2004*
Sonoma County (total)	**388,222**	**458,614**	**472,700**
Cloverdale	4,924	6,831	7,925
Cotati	5,714	6,471	7,025
Healdsburg	9,469	10,722	11,600
Petaluma	43,166	54,548	55,900
Rohnert Park	36,326	42,236	42,150
Santa Rosa	113,261	147,595	154,400
Sebastopol	7,008	7,774	7,750
Sonoma	8,168	9,128	9,675
Windsor	0	22,744	24,800
Unincorporated County	160,186	150,565	151,600
Marin County (total)	**230,096**	**247,289**	**250,200**
Belvedere	2,147	2,125	2,130
Corte Madera	8,272	9,100	9,350
Fairfax	6,931	7,319	7,300
Larkspur	11,068	12,014	12,000
Mill Valley	13,029	13,600	13,600
Novato	47,585	47,630	49,400
Ross	2,136	2,329	2,350
San Anselmo	11,735	12,378	12,350
San Rafael	48,410	56,063	56,900
Sausalito	7,152	7,330	7,325
Tiburon	7,554	8,666	8,775
Unincorporated County	64,077	68,735	68,700
Sonoma and Marin Counties (total)	**618,318**	**705,903**	**722,900**
State of California (total)	**29,758,213**	**33,871,648**	**36,144,000**

NOTES: * Projected estimate.
SOURCE: California Department of Finance, 2004b, 2004d, 2004e.

County, with the City of Santa Rosa ranking as the largest city by a large margin, more than double the population of the next largest city. The Wilfred site, Stony Point site and the Lakeville site are located in unincorporated Sonoma County. The Wilfred site and Stony Point site are located adjacent to the City of Rohnert Park and near the Cities of Cotati, Santa Rosa, and Sebastopol. The Cities of Novato, Petaluma, and Sonoma are located closest to the Lakeville site, although all are located more than five miles from the site.

Population Trends

The population of Sonoma County grew from 388,222 people in 1990 to about 458,614 people in 2000, an increase of 18.1 percent. As of January 2004, the County's population has grown to 472,700, an increase of approximately 3 percent since 2000. Marin County has grown more slowly than Sonoma County, growing from 230,096 people in 1990 to 247,289 people in 2000, an increase of 7.5 percent. The County's population increase has slowed further in recent years, increasing approximately 1 percent since 2000.

The populations of Rohnert Park, Cotati, and Sebastopol increased moderately, but at a slower rate than Sonoma County as a whole from 1990 to 2000. Rohnert Park grew from 36,326 people in 1990 to about 42,236 people in 2000, an increase of 16.3 percent. During the same time period, Cotati's population increased by 13.2 percent and Sebastopol's population increased by 10.9 percent. The population of Santa Rosa has increased at a faster rate than Sonoma County from 1990 to 2000. Santa Rosa's population grew from 113,261 to 147,595 from 1990 to 2000, an increase of approximately 30 percent. As of January 2004, the population of Cotati, Sebastopol, and Santa Rosa has continued to grow, while Rohnert Park's populations have decreased slightly.

HOUSING

As shown in **Table 3.7-2**, there are currently about 297,422 housing units in Sonoma and Marin Counties. Of the 297,422 regional housing units, 15,426 were vacant in 2004. Regional vacancy rates ranged from 1.80 to 11.94 and averaged 5.19. As shown in **Table 3.7-3**, 2004 vacancy rates are generally low, when compared with historical rates since 1990. The Cities of Rohnert Park, Cotati, Santa Rosa, and Sebastopol have some of the lowest housing vacancy rates in the region, ranging from 1.93 to 2.68 in 2004. A total of 2,074 housing units were vacant in these four cities in 2004.

The 2000 Census provides Journey to Work data, which estimates the county of residence for employees that work in Rohnert Park, as well as other locations within the Bay Area. According to the Census data, approximately 33 percent of all Rohnert Park employees live within Rohnert Park, and 28 percent of employees live within Santa Rosa, with the remainder living elsewhere in the Bay Area. Additionally, within Rohnert Park there are approximately 1.46 jobs per household

TABLE 3.7-2
2004 REGIONAL HOUSING ESTIMATES

Location	Total Housing Units*	Percent Vacant*	Estimated Vacant Units*
Sonoma County (total)	**190,591**	**5.79**	**11,026**
Cloverdale	3,088	4.73	146
Cotati	2,842	2.08	59
Healdsburg	4,515	4.08	184
Petaluma	21,087	1.84	387
Rohnert Park	15,977	1.93	308
Santa Rosa	61,130	2.68	1,636
Sebastopol	3,351	2.12	71
Sonoma	5,018	6.30	316
Windsor	8,534	1.80	154
Unincorporated County	65,049	11.94	7,765
Marin County (total)	**106,831**	**4.12**	**4,400**
Belvedere	1,065	9.67	103
Corte Madera	3,974	1.91	76
Fairfax	3,421	3.27	112
Larkspur	6,424	4.22	271
Mill Valley	6,318	2.20	139
Novato	19,852	2.79	553
Ross	814	5.41	44
San Anselmo	5,412	2.61	141
San Rafael	23,398	2.51	588
Sausalito	4,529	5.67	257
Tiburon	3,952	4.66	184
Unincorporated County	27,672	6.98	1,932
Regional Total	*297,422*	*5.19*	*15,426*

NOTES: * Projected estimate. These figures do not include seasonal, recreational, or occasional use residences.
SOURCE: California Department of Finance, 2004c.

(jobs/housing ratio). The jobs/housing ratio for Santa Rosa and Sonoma County is 1.20 and 1.45 (Bay Area Economics, 2006).

EMPLOYMENT AND INCOME

Employment

Table 3.7-4 displays labor force participation and employment rates for Sonoma County, Marin County, and the San Francisco Metropolitan Statistical Area (MSA) (now known as the San Francisco-San Mateo-Redwood City Metropolitan Division of the San Francisco-Oakland-Fremont MSA). The labor force is generally defined as those employed workers and unemployed

TABLE 3.7-3
HISTORICAL VACANCY RATES

	Housing Vacancy Rate														
Location	**1990**	**1991**	**1992**	**1993**	**1994**	**1995**	**1996**	**1997**	**1998**	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**
Sonoma County	**6.97**	**7.48**	**7.46**	**7.43**	**7.45**	**7.42**	**7.40**	**7.38**	**7.37**	**7.34**	**5.87**	**5.84**	**5.82**	**5.80**	***5.79***
Cloverdale	8.12	8.11	8.11	8.12	8.13	8.11	8.13	8.13	8.14	8.15	4.73	*4.72*	*4.72*	4.74	4.73
Cotati	6.25	6.23	6.26	6.26	6.23	6.23	6.25	6.23	6.22	6.23	*2.05*	*2.05*	*2.05*	2.07	2.08
Healdsburg	4.06	4.06	4.07	4.07	4.07	4.05	4.05	4.05	4.05	*4.04*	4.06	4.05	4.06	4.07	4.08
Petaluma	2.93	2.92	2.92	2.93	2.93	2.92	2.92	2.92	2.92	2.92	*1.83*	*1.83*	*1.83*	*1.83*	1.84
Rohnert Park	3.64	3.64	3.64	3.64	3.64	3.63	3.63	3.63	3.63	3.64	*1.93*	*1.93*	*1.93*	*1.93*	*1.93*
Santa Rosa	4.23	4.23	4.23	4.23	4.23	4.23	4.23	4.23	4.20	4.20	*2.68*	*2.68*	*2.68*	*2.68*	*2.68*
Sebastopol	3.13	3.12	3.12	3.13	3.12	3.13	3.11	3.13	3.12	3.12	2.14	2.13	2.13	*2.12*	*2.12*
Sonoma	8.30	8.31	8.30	8.29	8.30	8.30	8.31	8.31	8.30	8.30	*6.29*	*6.29*	*6.29*	*6.29*	6.30
Windsor	0.00	0.00	0.00	7.81	7.81	7.81	7.81	7.81	7.82	7.82	*1.80*	*1.80*	*1.80*	1.81	*1.80*
Unincorporated County	12.05	12.05	12.05	12.39	12.48	12.48	12.48	12.48	12.72	12.72	*11.94*	*11.94*	11.95	11.95	*11.94*
Marin County	**4.76**	**4.78**	**4.78**	**4.81**	**4.91**	**5.07**	**5.70**	**6.20**	**5.94**	**5.93**	**4.13**	***4.12***	**4.13**	***4.12***	***4.12***
Belvedere	7.04	7.03	7.03	7.03	7.03	7.03	7.02	7.00	6.99	*6.97*	9.73	9.70	9.68	9.67	9.67
Corte Madera	3.77	3.76	3.76	3.76	3.78	3.77	3.75	3.75	3.75	3.75	1.92	1.92	*1.91*	*1.91*	*1.91*
Fairfax	4.12	4.11	4.13	4.13	4.13	4.12	4.11	4.11	4.11	4.10	3.28	3.28	*3.27*	*3.27*	*3.27*
Larkspur	4.09	4.09	4.09	4.09	4.09	*4.08*	*4.08*	4.09	4.09	4.09	4.23	4.22	4.22	4.22	4.22
Mill Valley	3.00	3.01	3.00	3.00	3.00	3.00	2.99	2.99	2.98	2.98	2.21	2.21	*2.20*	*2.20*	*2.20*
Novato	2.91	3.00	2.97	2.98	3.31	4.20	7.59	10.31	8.93	8.86	2.47	*2.41*	2.53	2.75	2.79
Ross	5.68	5.66	5.66	5.65	5.64	5.64	5.62	5.62	5.61	5.57	5.47	5.46	5.43	*5.41*	*5.41*
San Anselmo	3.76	3.75	3.75	3.75	3.77	3.75	3.75	3.74	3.73	3.73	*2.61*	*2.61*	*2.61*	*2.61*	*2.61*
San Rafael	3.99	3.99	3.99	3.99	3.99	3.99	3.99	3.99	3.99	3.99	*2.51*	*2.51*	*2.51*	*2.51*	*2.51*
Sausalito	6.51	6.51	6.50	6.50	6.52	6.52	6.53	6.53	6.52	6.53	5.70	5.69	5.68	5.68	*5.67*
Tiburon	4.65	4.66	4.64	4.64	4.64	4.64	4.63	*4.62*	*4.62*	4.63	4.65	4.64	4.65	4.66	4.66
Unincorporated County	7.35	7.36	7.39	7.51	7.64	7.60	7.60	7.59	7.59	7.59	7.19	7.19	7.19	*6.98*	*6.98*

NOTES: All rates are based on California Department of Finance estimates except for 1990 and 2000, which are based on U.S. Census counts. These figures do not include seasonal, recreational, or occasional use residences. Historically low rates during the shown time period are italicized.

SOURCE: California Department of Finance, 2004a, 2004c.

workers actively looking for work. The San Francisco MSA includes Marin, San Francisco, and San Mateo Counties. San Francisco and San Mateo Counties are located south of Marin County. A substantial portion of the working labor force in Sonoma County and particularly Marin County commutes to jobs to the south and east.

Sonoma County had a labor force of 257,544 in 2003, approximately 70 percent of the total population over age 16. Unemployment rates are relatively low throughout the region, albeit somewhat higher than historically low levels. The 2003 unemployment rate in Sonoma County was 4.9 percent, 2.3 percent higher than the 2000 unemployment rate, which was the lowest unemployment rate since 1990.

TABLE 3.7-4
LABOR FORCE PARTICIPATION AND UNEMPLOYMENT RATES

	Sonoma County (2003)	Sonoma County Peak (1990-2003)	Sonoma County Peak (year)	Rohnert Park (2003)	Rohnert Park Peak (1990-2003)	Rohnert Park Peak (year)	Marin County (2003)	Marin County Peak (1990-2003)	Marin County Peak (year)	Novato (2003)	Novato Peak (1990-2003)	Novato Peak (year)	San Fran. MSA[3] (2003)	San Fran. MSA[3] Peak (1990-2003)	San Fran. MSA[3] Peak (year)
Total Population Over 16[1]	366,732			32,288			205,988			38,047			5,506,184		
Labor Force	257,544			25,791			129,749			25,836			3,607,246		
Labor Force Participation Rate[2]	70%	72%	2001-2002	80%	82%	2002	63%	69.7%	1990	67.9%	75.3%	2000	66%	69%	2001
Unemployment Rate	4.9%	2.6%	2000	5.5%	2.6%	1999-2000	3.9%	1.6%	2000	3.5%	1.5%	2000	6.5%	2.5%	2000

NOTES: [1] Assumes that the age distribution is not changing for the percent of the population over age 16.
[2] Labor force participation rate equals the labor force divided by the total population over age 16.
[3] San Francisco Metropolitan Statistical Area (MSA) includes San Francisco, San Mateo, and Marin Counties.
SOURCE: U.S. Bureau of Labor Statistics, 2004; U.S. Census Bureau, 1990, 2000; Bay Area Economics, 2006.

As shown in **Table 3.7-5**, Sonoma County mirrors employment by industry for the State of California. Sonoma County is similar to the San Francisco MSA as well, except for two industries: manufacturing and professional and business services. Manufacturing represents 14 percent of Sonoma County employment, compared to 5 percent for the San Francisco MSA. Professional and business services represents 19 percent of San Francisco MSA employment, compared to 10 percent for Sonoma County.

Income

Table 3.7-6 displays key income and poverty data for Sonoma County, San Francisco MSA, and California. As shown, median household income for Sonoma County was $54,614 in 2003, which is slightly greater than the State, at $50,220. The median household income within the San Francisco MSA was $80,323 in 2003, which is much higher than the State. The relatively high median household income levels that are present in Sonoma County and the San Francisco MSA indicate both a robust economy and a high cost of living.

Poverty level information is also shown in **Table 3.7-6**. As shown, both Sonoma County and the San Francisco MSA rank below the State in percent of population below the poverty level. The poverty level is uniform throughout the United States and is not adjusted regionally for cost of living (U.S. Census Bureau, 2005). Thus, Sonoma County and the San Francisco MSA's relatively low percentages of people below the poverty level may be somewhat misleading given the high cost of living in the region.

TABLE 3.7-5
EMPLOYMENT BY INDUSTRY (2003)

Industry	Sonoma County		San Francisco MSA		California	
	No. Employed	Percent of Total	No. Employed	Percent of Total	No. Employed	Percent of Total
Total, All Industries	186,300	100	956,300	100	14,785,200	100
Total Farm	5,700	3	3,600	<1	375,000	3
Total Nonfarm	180,600	97	952,800	99	14,410,200	97
Goods Producing	38,200	21	89,300	9	2,355,700	16
Natural Resources and Mining	300	<1	200	<1	22,000	<1
Construction	12,800	7	43,600	5	788,800	5
Manufacturing	25,200	14	45,500	5	1,544,900	10
Service Providing	142,400	76	863,400	90	12,054,400	82
Trade, Transportation and Utilities	33,700	18	169,100	18	2,722,000	18
Information	3,900	2	47,000	5	471,400	3
Financial Activities	10,400	6	90,700	9	886,800	6
Professional and Business Services	18,800	10	177,700	19	2,108,100	14
Educational and Health Services	22,700	12	97,800	10	1,536,300	10
Leisure and Hospitality	19,700	11	112,300	12	1,397,600	10
Other Services	6,400	3	37,900	4	505,800	3
Government	26,800	14	131,000	14	2,426,500	16

NOTES: Data is not adjusted for seasonality. Percentages may not add to 100 percent due to rounding. Percentages rounded to nearest one percent.
SOURCE: California Economic Development Department, 2005; AES, 2005.

TABLE 3.7-6
REGIONAL INCOME AND POVERTY (2003)

	Median Household Income (dollars)	Number Below Poverty Level*			Percent of Population Below Poverty Level* (Individuals)
		Families	Families with Female Householder, No Husband Present	Individuals	
Sonoma County	54,614	7,258	3,886	40,641	8.9
San Francisco MSA	80,323	19,777	9,158	126,536	7.7
California	50,220	848,512	402,224	4,610,036	13.4

NOTES: * In determining the poverty level, the U.S. Census Bureau uses income thresholds that vary from $9,060 to $42,039 based on age and family size.
SOURCE: U.S. Census Bureau, 2003, 2004.

3.7.2 SOCIOECONOMIC CHARACTERISTICS OF THE TRIBE

The Federated Indians of Graton Rancheria are comprised of 1,076 individuals. The Tribe has grown rapidly over the past few years, primarily due to new enrollment. An estimate of the geographical distribution of Tribal members is shown in **Table 3.7-7**. As shown, a majority of Tribal members have moved out of the Tribe's ancestral territory. However, approximately 42 percent of Tribal members continue to live in either Sonoma or Marin County. Approximately 13 percent of Tribal members reported living with multiple families (Federated Indians of Graton Rancheria, 2004a). In a 2002 Tribal survey, 16 percent of members reported living in overcrowded residences (Federated Indians of Graton Rancheria, 2002).

TABLE 3.7-7
FEDERATED INDIANS OF GRATON RANCHERIA –
TRIBAL LOCATION BY COUNTY (2004)

County	Percent of Tribe
Sonoma	38
Marin	4
Lake	3
Mendocino	1
Sacramento	3
Solano	2
Yolo	4
Other	46

SOURCE: Federated Indians of Graton Rancheria, 2004a.

In general, the economy of the Tribe lags well behind the economy of the local community. According to a 2002 Tribal survey, the Tribal unemployment rate was approximately 13 percent, about double the unemployment rates of Sonoma County, Rohnert Park, and the San Francisco MSA (see **Table 3.7-4**) (Federated Indians of Graton Rancheria, 2002). Tribal household income distribution is shown in **Table 3.7-8**. As shown, 72 percent of Tribal households had household incomes of less than $50,000 in 2004. Twenty percent of Tribal households had household incomes ranging from $10,000 to $20,000 (Federated Indians of Graton Rancheria, 2004a). By comparison, median household incomes for Sonoma County, the San Francisco MSA, and the State were, $54,614, $80,323, and $50,220 in 2003. Six percent of Tribal members reported that their rental payment exceeds 30 percent of their monthly income. Six percent also reported rental payments exceeding 50 percent of their monthly income (Federated Indians of Graton Rancheria, 2002). These are indicators of high incidences of poverty within the Tribe.

Another indicator of economic health is rate of homeownership. Tribal homeownership rates are low, with approximately 61 percent of Tribal members reporting that they do not own a home. Twenty-five percent of Tribal members reported that their house is in need of repairs (Federated Indians of Graton Rancheria, 2004a).

TABLE 3.7-8
FEDERATED INDIANS OF GRATON RANCHERIA –
HOUSEHOLD INCOME (2004)

Annual Household Income (dollars)	Percent of Tribe
0-10,000	16
10-20,000	21
20-30,000	14
30-40,000	11
40-50,000	10
50-60,000	7
60-70,000	6
70-80,000	4
80,000+	11

SOURCE: Federated Indians of Graton Rancheria, 2004a.

3.7.3 TRIBAL ATTITUDES, EXPECTATIONS, LIFESTYLE AND CULTURE

Both the Tribal government and individual Tribal members participate in area political and social activities. Tribal children attend local area schools and adult Tribal members are employed by local businesses. Altogether, Tribal attitudes and expectations favor increasing participation in, and benefit from, the regional economy, with continuation of the long tradition of comfortable coexistence and cooperation with their non-Indian neighbors.

3.7.4 ENVIRONMENTAL JUSTICE

POLICY/REGULATORY CONSIDERATIONS

Executive Order 12898, Federal Actions to Address Environmental Justice in Minority and Low-Income Populations, as amended, directs Federal agencies to develop an Environmental Justice Strategy that identifies and addresses disproportionately high and adverse human health or environmental effects of their programs, policies, and activities on minority populations and low-income populations. The Council on Environmental Quality (CEQ) has oversight responsibility of the Federal Government's compliance with Executive Order 12898 and NEPA. The CEQ, in consultation with the USEPA and other agencies, has developed guidance to assist Federal agencies with their NEPA procedures so that environmental justice concerns are effectively identified and addressed.

According to guidance from the CEQ (1997b) and the U.S. Environmental Protection Agency (USEPA, 1998), agencies should consider the composition of the affected area, to determine whether minority populations, low-income populations, or Indian tribes are present in the area affected by the proposed action, and if so whether there may be disproportionately high and

adverse environmental effects. Communities may be considered "minority" under the executive order if one of the following characteristics apply:

- The cumulative percentage of minorities within a census tract is greater than 50 percent (primary method of analysis) or
- The cumulative percentage of minorities within a census tract is less than 50 percent, but the percentage of minorities is meaningfully greater than the minority population percentage in the general population or other appropriate unit of geographic analysis (secondary method of analysis).

According to the USEPA, either the county or the state can be used when considering the scope of the "general population." A definition of "meaningfully greater" is not given by the CEQ or USEPA, although the USEPA has noted that any affected area that has a percentage of minorities that is above the state's percentage is a potential minority community and any affected area with a minority percentage double that of the state's is a definite minority community under Executive Order 12898.

Communities may be considered "low-income" under the executive order if one of the following characteristics applies:

- The median household income for a census tract is below the poverty line (primary method of analysis) or
- Other indications are present that indicate a low-income community is present within the census tract (secondary method of analysis).

In most cases, the primary method of analysis will suffice to determine whether a low-income community exists in the affected environment. However, when a census tract income may be just over the poverty line or where a low-income pocket within the tract appears likely, the secondary method of analysis may be warranted. Other indications of a low-income community under the secondary method of analysis include limited access to health care, overburdened or aged infrastructure, and dependence on subsistence living.

AFFECTED ENVIRONMENT

To determine whether a proposed action is likely to have disproportionately high and adverse effects, agencies must identify a geographic scale for which they will obtain demographic information.

Census tracts are a small, relatively permanent statistical subdivision of a county delineated by a local committee of census data users for the purpose of presenting data. Census tract boundaries

normally follow visible features, but may follow governmental unit boundaries or other features. They are designed to be relatively homogeneous units with respect to population characteristics, economic status, and living conditions at the time of establishment.

For the Wilfred and Stony Point sites, the following census tracts were analyzed for characteristics relevant to an environmental justice analysis:

- the census tract that includes the Wilfred and Stony Point sites (tract 1512.01),
- tracts adjacent to tract 1512.01 (except to the south, where tract 1512.01 extends as far south as the City of Petaluma), and
- census tracts where substantial project-generated traffic effects are expected.

Figure 3.7-1 displays the census tracts in the vicinity of the Wilfred and Stony Point sites.

For the Lakeville site, the following census tracts were analyzed for characteristics relevant to an environmental justice analysis:

- the census tract that includes the Lakeville site (tract 1506.06), and
- census tracts where substantial project-generated traffic effects are expected.

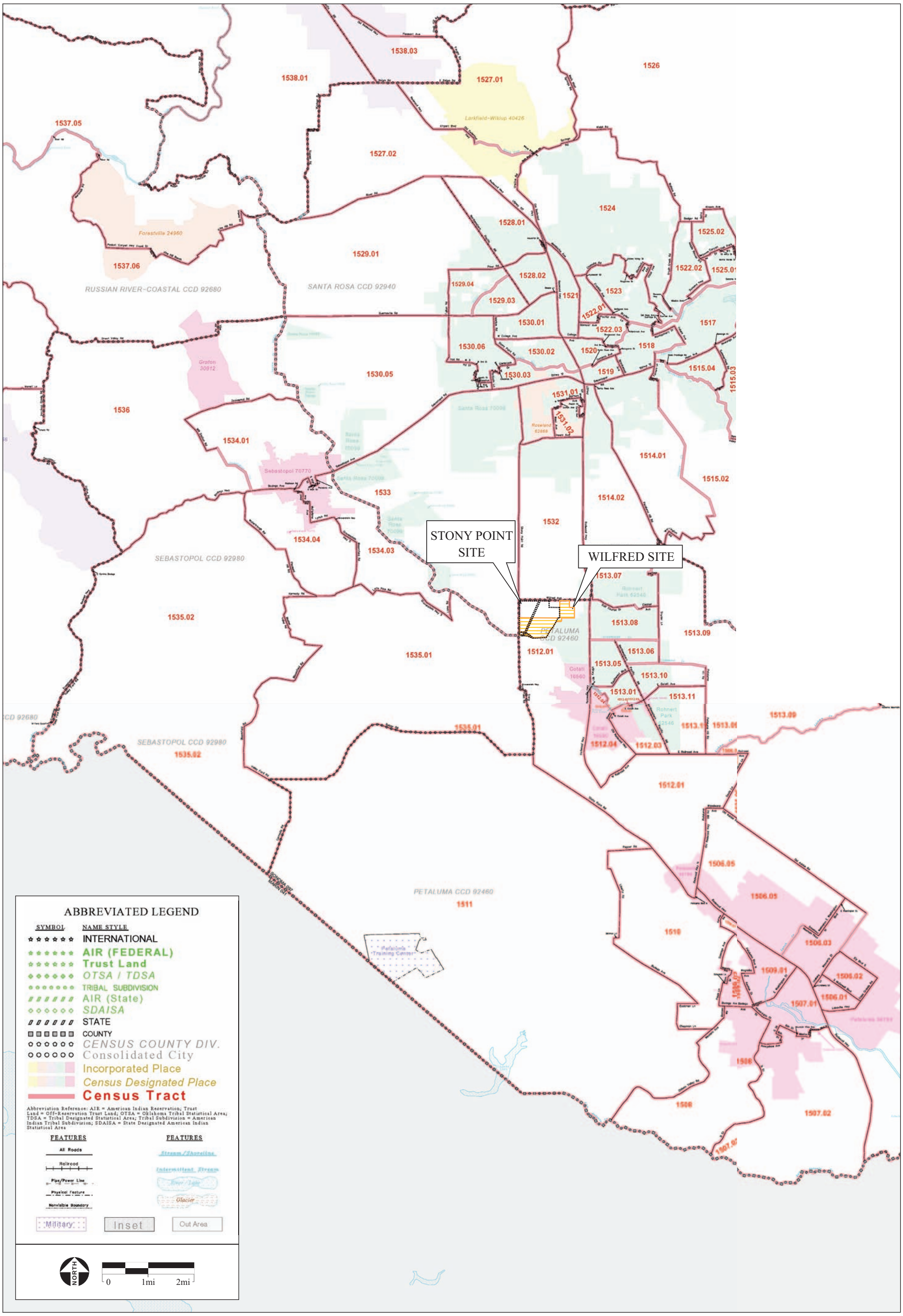
In addition, census tracts that are adjacent to tract 1506.06 and relatively close to the Lakeville site were included in the environmental justice analysis. Adjacent census tracts were not necessarily included for the Lakeville site due to the expansive area covered by tract 1506.06. **Figure 3.7-2** displays the census tracts in the vicinity of the Lakeville site.

RACE

According to the 2000 Census (U.S. Census Bureau, 2003), the Sonoma County region and Rohnert Park area have a predominately Caucasian ethnic composition. However a significant Latino population also exists in the region, with correspondingly smaller numbers of Native Americans, Asians, and Pacific islanders. The following races are considered minorities under the executive order:

- American Indian or Alaskan Native,
- Asian or Pacific Islander,
- Black, not of Hispanic origin, and
- Hispanic.

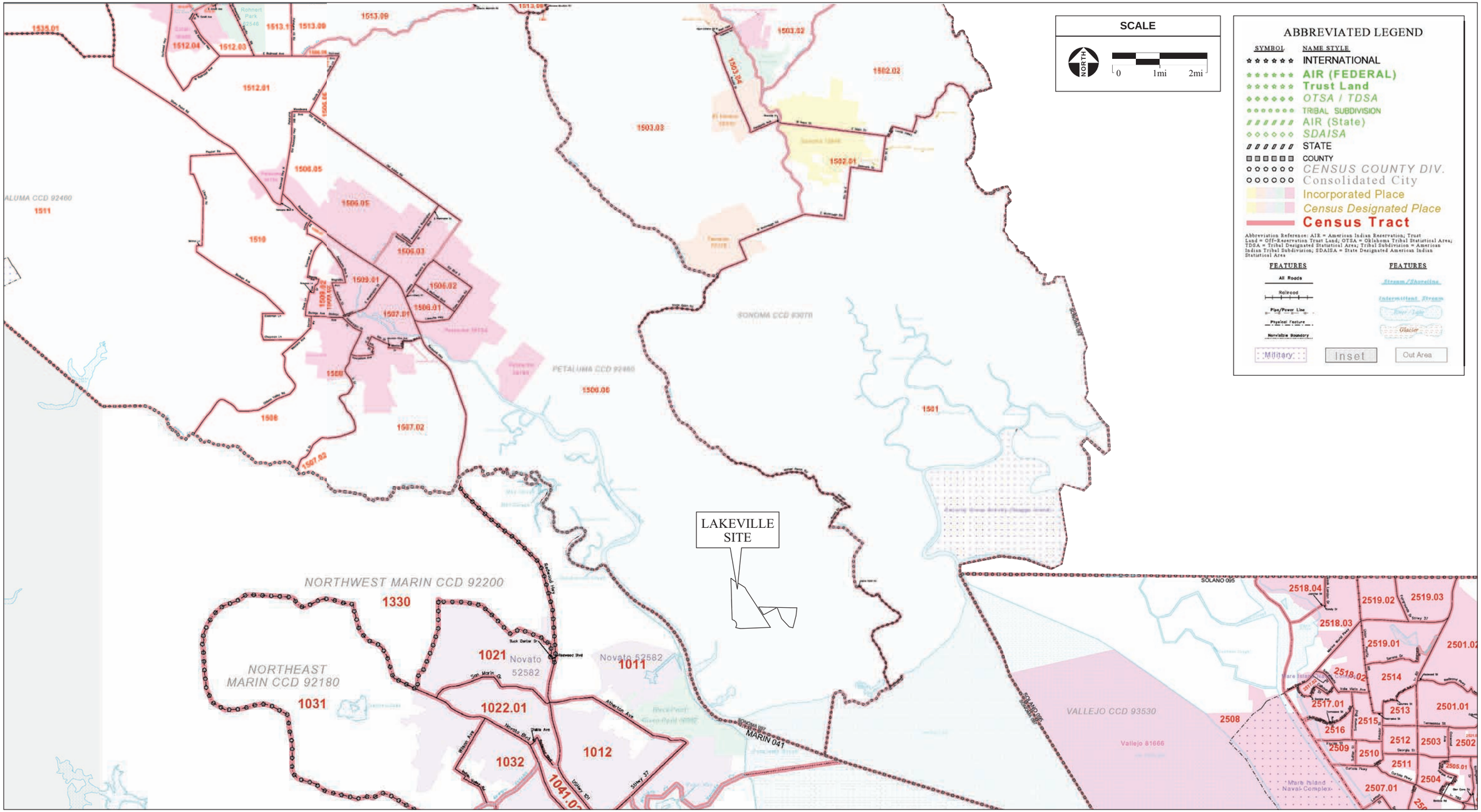
Populations of two or more races were also considered to be a minority race for the purpose of environmental justice analysis.



SOURCE: U.S. Census Bureau, 1/1/2000; AES, 2005

Figure 3.7-1

Census Tract Map – Wilfred Site and Stony Point Site and Vicinity



SOURCE: U.S. Census Bureau, 1/1/2000; AES, 2005

Figure 3.7-2
Census Tract Map – Lakeville Site and Vicinity

Census 2000 data represents the most current racial data available by census tract. Although this data is more than five years old, the racial composition of census tracts is not expected to have changed substantially. Conservative assumptions will be applied to any borderline situations where a minor change in racial composition could affect the minority status of a census tract. **Tables 3.7-9** and **3.7-10** display the population of each minority race according to census tract for the vicinity of the Wilfred site, the Stony Point site, and the Lakeville site.

As shown in **Table 3.7-9**, all census tracts in the vicinity of the Wilfred and Stony Point sites are below the 50 percent minority threshold. The highest percentage minority of the census tracts in the vicinity of the Wilfred and Stony Point sites is found in tract 1532, which is 47 percent minority. Tract 1532 has a lower percentage minority when compared to the State (56%) (U.S. Census Bureau, 2000). Thus, tract 1532 is not considered a minority tract under the primary or secondary methods of analysis, as outlined above.

Tract 1532 is a relatively large tract that is adjacent to the northern boundary of the Wilfred and Stony Point sites. This tract is primarily rural residential just north of the Wilfred and Stony Point sites, but includes a portion of urban southern Santa Rosa in the northern portion of the tract most distant from the Wilfred and Stony Point sites. The census tract does not correlate with any communities, but there are no minority communities within it and there are no minority communities in the vicinities of the Wilfred site, the Stony Point site, nor the Lakeville site.

As shown in **Table 3.7-10**, all census tracts in the immediate vicinity of the Lakeville site are well below the 50 percent minority threshold. All of the census tracts in Solano County (outside of the immediate vicinity of the Lakeville site but in an area of potential traffic impacts from a project on the Lakeville site), however, are above the 50 percent minority threshold. These four tracts are located primarily in the City of Vallejo and range from 58 to 80 percent minority. The census tracts in Solano County are therefore considered minority communities. There are no other minority communities present in the vicinity of the Lakeville site.

TRIBAL GAMING

A number of local tribes have been able to improve the socioeconomic conditions of their tribes through gaming. The two Indian gaming casinos that are located nearest to the Wilfred, Stony Point, and Lakeville sites are the River Rock Casino in Geyserville (pop. 2,400), and Twin Pine Casino in Middletown (pop. 1,000). River Rock Casino is in Sonoma County and is approximately 31 miles from the Wilfred site and Stony Point site and 43 miles from the Lakeville site. Twin Pine Casino is in Lake County and is approximately 37 miles from the Wilfred and Stony Point sites and 47 miles from the Lakeville site. With the exception of these two casinos, there are no other casinos within 75 miles (driving distance) of the Wilfred and Stony Point sites and within 100 miles (driving distance) of the Lakeville site.

TABLE 3.7-9
MINORITY POPULATION BY CENSUS TRACT – WILFRED SITE, STONY POINT SITE AND VICINITY

	Total population: Total	Total population: Hispanic or Latino	Total population: Not Hispanic or Latino; Population of one race; Black or African American alone	Total population: Not Hispanic or Latino; Population of one race; American Indian and Alaska Native alone	Total population: Not Hispanic or Latino; Population of one race; Asian alone	Total population: Not Hispanic or Latino; Population of one race; Native Hawaiian and Other Pacific Islander alone	Total population: Not Hispanic or Latino; Population of one race; Some other race alone, other than white	Total population: Not Hispanic or Latino; Population of two–six races	Total population: Minority	Percent Minority*
Census Tract 1512.01, Sonoma County	6,106	845	63	66	168	7	17	208	1374	23
Census Tract 1512.04, Sonoma County	3,409	391	79	20	120	1	5	145	761	21
Census Tract 1513.01, Sonoma County	4,521	863	105	33	187	26	2	245	1461	32
Census Tract 1513.05, Sonoma County	5,165	1,111	148	34	237	21	10	257	1818	35
Census Tract 1513.07, Sonoma County	5,337	536	62	16	308	23	11	189	1145	21
Census Tract 1513.08, Sonoma County	4,695	391	61	23	207	13	28	180	903	19
Census Tract 1532, Sonoma County	5,014	1,728	96	88	248	8	16	191	2375	47
Census Tract 1533, Sonoma County	6,845	1,874	213	120	305	17	13	251	2793	41
Census Tract 1535.01, Sonoma County	4,612	340	42	19	68	3	15	149	636	14

NOTES: * Rounded to the nearest one percent.
SOURCE: U.S. Census Bureau, 2000; AES, 2005.

TABLE 3.7-10
MINORITY POPULATION BY CENSUS TRACT – LAKEVILLE SITE AND VICINITY

	Total population: Total	Total population: Hispanic or Latino	Total population: Not Hispanic or Latino; Population of one race; Black or African American alone	Total population: Not Hispanic or Latino; Population of one race; American Indian and Alaska Native alone	Total population: Not Hispanic or Latino; Population of one race; Asian alone	Total population: Not Hispanic or Latino; Population of one race; Native Hawaiian and Other Pacific Islander alone	Total population: Not Hispanic or Latino; Population of one race; Some other race alone	Total population: Not Hispanic or Latino; Population of two–six races	Total population: Minority	Percent Minority*
Census Tract 1011, Marin County	2,539	88	18	3	78	10	7	66	270	11
Census Tract 2508, Solano County	149	11	30	0	30	0	3	16	90	60
Census Tract 2517.01, Solano County	4,068	739	960	35	599	56	3	232	2,624	65
Census Tract 2517.02, Solano County	2,073	360	622	3	445	8	1	119	1,558	75
Census Tract 2518.02, Solano County	1,537	364	188	27	246	7	3	61	896	58
Census Tract 2518.03, Solano County	5,242	1,135	803	15	1,793	115	14	291	4,166	80
Census Tract 1501, Sonoma County	2,670	401	3	20	35	1	2	32	494	19
Census Tract 1506.06, Sonoma County	7,210	945	67	23	371	5	19	202	1,632	23

NOTES: * Rounded to the nearest one percent.
SOURCE: U.S. Census Bureau, 2000; AES, 2005.

River Rock Casino

River Rock Casino in Geyserville has been open since 2002 and is owned by the 768-member Dry Creek Rancheria Band of Pomo Indians. The River Rock Casino facility is a 70,000 square foot sprung tent structure that includes 35,500 square feet of gaming space. The estimated construction cost for the casino facility was $40 million. In addition, River Rock is spending an

estimated $37 million to construct a seven-level parking structure with 1,354 spaces (Bay Area Economics, 2006).

The River Rock facility includes 1,600 slot machines, 16 gaming tables, two restaurants, a wine tasting room, a small gift shop, and a large outdoor patio with a view that overlooks the Alexander Valley. Since it is located 75 miles from San Francisco, the River Rock Casino marketing campaign highlights the facility's status as "The Bay Area's Closest Casino" (Bay Area Economics, 2006).

Published reports quoting statements from River Rock's general manager indicate that 40 percent of the daily visitorship to River Rock arrives by passenger vehicle and 60 percent is brought to the site by River Rock-operated tour buses. According to River Rock's general manager, the casino is visited by 1,200 cars per day with an average of 1.5 patrons per car. Based on these figures, it can be estimated that 1,800 patrons arrive at River Rock each day by car, and another 4,500 arrive via the casino-operated tour buses. This makes a total of 6,300 River Rock patrons per day, and 2,299,500 patrons per year (Bay Area Economics, 2006).

The 2003 operating results for River Rock Casino show annual casino revenues of $67.1 million. Of this amount, $60.1 million is generated by slot revenue, and $7 million is generated by table games revenue. With 1,600 slots and 16 tables, these figures translate to $103 per slot per day ($37,563 per slot per year), and $1,199 per table per day ($437,500 per table per year) (Bay Area Economics, 2006).

Twin Pine Casino

Twin Pine Casino has direct frontage along Highway 29 in Middletown. The casino displays prominent signage and offers an ample parking area. Middletown is known as "The Gateway to Lake County" and is situated half way between Calistoga and Clear Lake. According to the California Department of Transportation (Caltrans), the section of Highway 29 that passes through Middletown has an average daily traffic volume of 9,100 vehicles (Bay Area Economics, 2006).

Twin Pine Casino opened in 1995 and is owned and operated by the Middletown Rancheria Band of Pomo Indians. The new Twin Pine Casino facility is a sprung tent structure that has replaced the original 2,500 square foot casino building. With approximately 5,000 square feet of gaming space, 500 slot machines, eight gaming tables, a café that does not serve alcohol, and a location that is not in itself a destination, Twin Pine Casino cannot be viewed as a significant tourist attraction in comparison to the River Rock Casino. Rather, Twin Pine Casino takes advantage of its Highway 29 location by catering mainly to passing motorists, travelers driving to Clear Lake, and the resident market within a 30-minute drive (Bay Area Economics, 2006).

No financial data are available for Twin Pine Casino; however, given its smaller size, fewer amenities, and location that is further away from a substantial population base as compared to River Rock, it is likely that Twin Pine generates substantially less revenue overall than River Rock and it is also likely that Twin Pine generates lower revenues than River Rock on an average per slot machine basis (Bay Area Economics, 2006).

INCOME

Census 2000 data represents the most current household income data available by census tract. The use of older income data is expected to result in a conservative estimate of income, given that income levels tend to rise over the years due to inflation. The Census 2000 income data is compared to 2004 poverty levels, which also results in a conservative comparison of income levels to the poverty level.

As shown in **Table 3.7-11**, median household income in census tracts in the vicinity of the Lakeville site is, in all cases, well above the poverty level. Thus, no low-income communities are present in the vicinity of the Lakeville site. As shown in **Table 3.7-12**, median household income in census tracts in the vicinity of the Lakeville site is well above the poverty level, except for census tract 2508 in Solano County. The median household income level for this tract is $17,188, just above the Federal poverty level. Given Solano County's relatively high median household income level ($62,742), cost of living is assumed to be relatively high in the County. Thus, the Federal poverty level is probably set too low to replicate actual poverty conditions in Solano County. Therefore, although median household income for tract 2508 is above the Federal poverty level, it will be considered a low-income community for the purposes of environmental justice analysis. No other low-income communities are present in the vicinity of the Lakeville site.

TABLE 3.7-11
HOUSEHOLD INCOME DATA BY CENSUS TRACT – LAKEVILLE SITE AND VICINITY

	Households: Median household income in 1999 (dollars)	Occupied housing units: Average household size; Total	2004 Poverty Level (dollars) *
Census Tract 1512.01, Sonoma County	42,635	2.47	15,210
Census Tract 1512.04, Sonoma County	52,193	2.41	15,210
Census Tract 1513.01, Sonoma County	43,631	2.82	15,210
Census Tract 1513.05, Sonoma County	38,324	2.35	15,210
Census Tract 1513.07, Sonoma County	66,600	2.76	15,210
Census Tract 1513.08, Sonoma County	54,750	2.46	15,210
Census Tract 1532, Sonoma County	53,088	3.38	19,803
Census Tract 1533, Sonoma County	48,926	3.01	19,803
Census Tract 1535.01, Sonoma County	60,647	2.62	15,210

NOTES: * Assumes average household size, conservatively rounded up to the nearest person and with a conservative assumption with regards to the number of children under 18 years.
SOURCE: U.S. Census Bureau, 2000, 2004; AES, 2005.

TABLE 3.7-12
HOUSEHOLD INCOME DATA BY CENSUS TRACT – LAKEVILLE SITE AND VICINITY

	Households: Median household income in 1999 (dollars)	**Occupied housing units: Average household size; Total**	**Poverty Level (dollars) ***
Census Tract 1011, Marin County	99,899	2.61	15,210
Census Tract 2508, Solano County	17,188	2.58	15,210
Census Tract 2517.01, Solano County	37,484	2.60	15,210
Census Tract 2517.02, Solano County	43,693	3.00	15,210
Census Tract 2518.02, Solano County	28,750	2.01	15,210
Census Tract 2518.03, Solano County	56,071	3.57	19,803
Census Tract 1501, Sonoma County	55,000	2.57	15,210
Census Tract 1506.06, Sonoma County	77,281	2.79	15,210

NOTES: * Assumes average household size, conservatively rounded up to the nearest person and with a conservative assumption with regards to the number of children under 18 years.
SOURCE: U.S. Census Bureau, 2000, 2004; AES, 2005.

3.8 RESOURCE USE PATTERNS

3.8.1 TRANSPORTATION

Wilfred and Stony Point Sites

Both the Wilfred and the Stony Point sites are located in central Sonoma County, CA. The western boundary of the City of Rohnert Park is adjacent to both sites.

The Wilfred Site is bordered by Wilfred Avenue to the north, Stony Point Road to the west, Business Park Drive and Rohnert Park Expressway to the south, and a business park and farmland to the east. Local access to the Wilfred Site is provided from Business Park Drive and Wilfred Avenue.

The Stony Point Site is bordered by Wilfred Avenue to the north, Stony Point Road to the west, Rohnert Park Expressway to the south, and a mobile home park, a business/industrial park, and farmland to the east. Access to the Stony Point Site is provided from Stony Point Road and Wilfred Avenue.

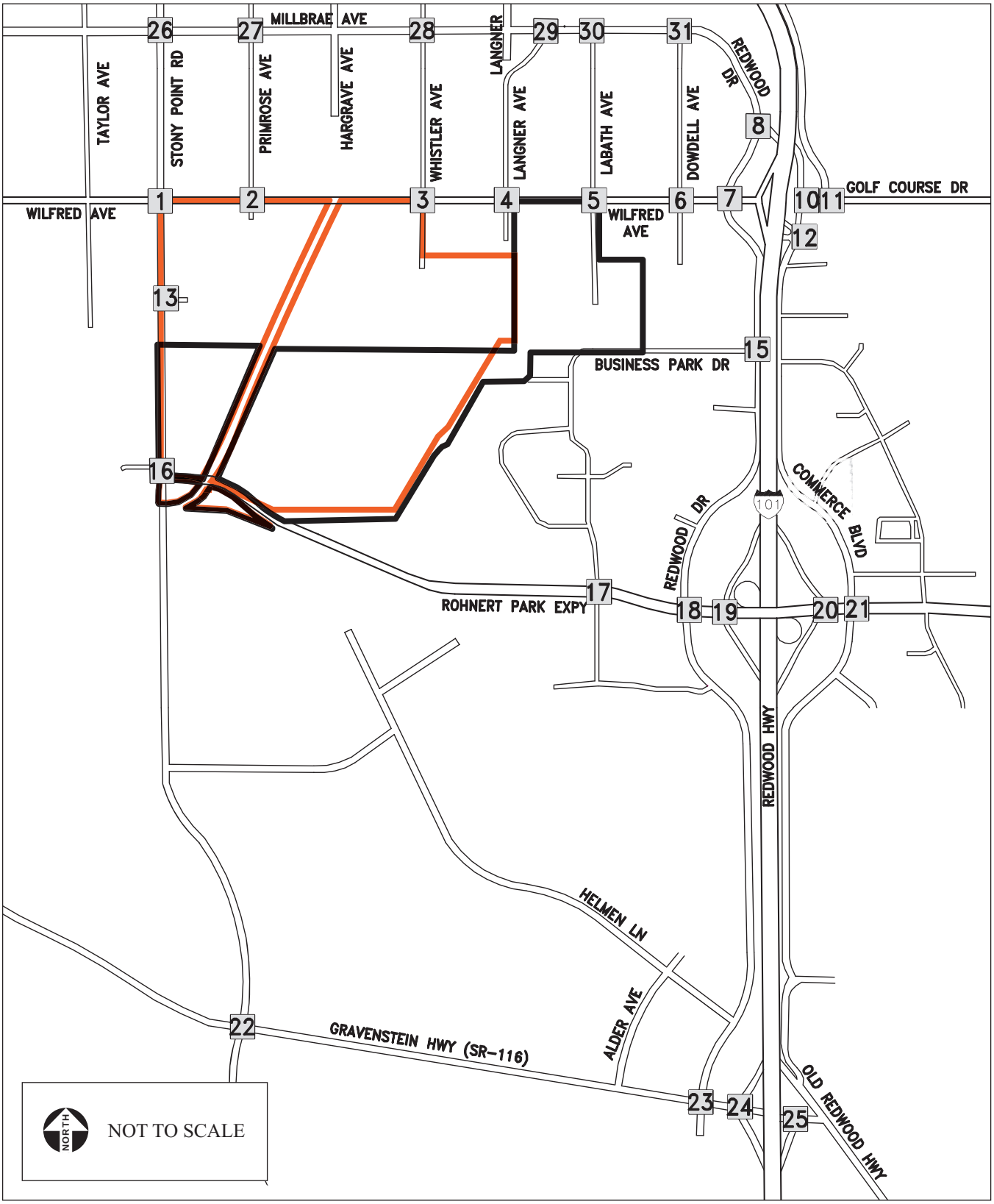
The same existing circulation network is analyzed for both sites.

Existing Circulation Network

The main transportation route through Sonoma County is US Route 101 (US-101), a north-south route connecting the San Francisco area and Marin County to the south with Mendocino County to the north. Streets and highways in the vicinity of the Wilfred and Stony Point sites include Wilfred Avenue, Stony Point Road, Redwood Drive, Commerce Boulevard, Rohnert Park Expressway, Primrose Avenue, and US-101. **Figure 3.8-1** shows the existing area roadway network and **Figure 3.8-2** shows the existing lane geometry and traffic control in the area. A traffic study prepared by Kimley-Horn and Associates, Inc. (2007) is included in **Appendix O**, and is incorporated by reference into this environmental document. The following is a description of the roadway facilities, freeway segments, and ramps included in the traffic impact study.

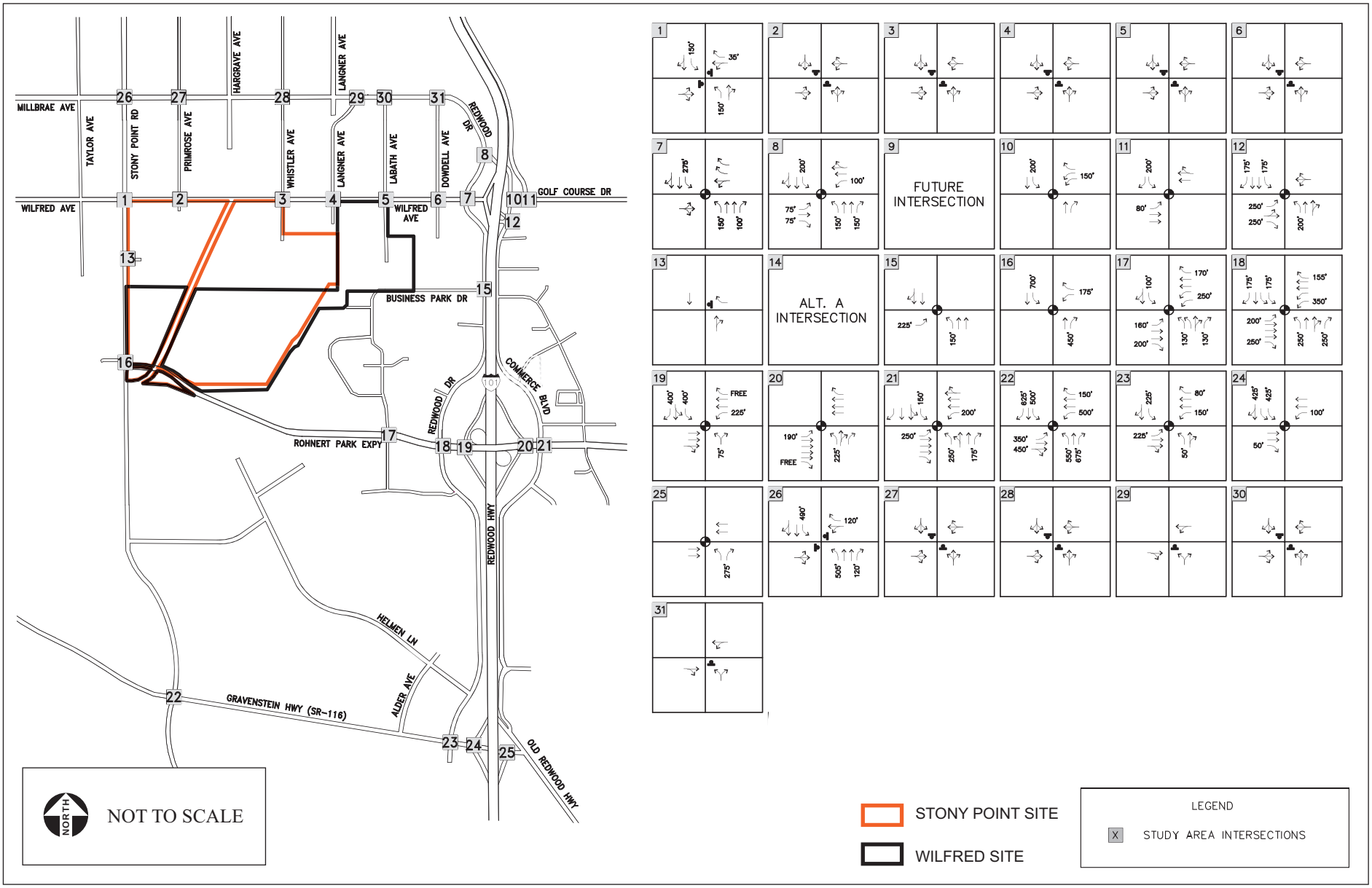
Roadways

Wilfred Avenue is a rural two-lane roadway with open roadside ditches and no shoulders. The road is classified in the Rohnert Park General Plan as a Major Arterial and is planned to be expanded in the future to four lanes within the city limits. Within the County the roadway is classified as a Rural Major Collector.



SOURCE: Kimley Horn & Associates, 2006; AES, 2006

Figure 3.8-1
Area Road Network - Alternatives A,B,C,D and E



SOURCE: Kimley Horn & Associates, 2006; AES, 2006

Figure 3.8-2

Existing Lane Geometry and Traffic Control – Alternatives A,B,C,D, and E

Stony Point Road is a two-lane rural roadway with open roadside ditches, wide shoulders, and left turn bays at major intersections. The road is shown as a Minor Arterial in the Rohnert Park General Plan.

Rohnert Park Expressway is an urban roadway with curbs and gutters and is classified as a Major Arterial in the Rohnert Park General Plan. The road is six lanes wide (with turn lanes) near US-101 but narrows to two lanes at the city limit. Between the city limit and Stony Point Road, Rohnert Park Expressway is a two-lane roadway with wide paved shoulders.

Business Park Drive is a two-lane roadway with curbs and gutters and no parking. The road is classified in the Rohnert Park General Plan as a Minor Collector.

Commerce Boulevard is an urban roadway with curbs and gutters and is classified as a Major Arterial in the Rohnert Park General Plan. The road width varies from two lanes to five lanes wide with left (and sometimes right) turn lanes at major intersections.

Dowdell Avenue is a narrow two-lane roadway with open roadside ditches and no shoulders from south of Wilfred to 385 feet north of Wilfred Avenue where the roadway widens slightly and curbs and gutters are present. The road is classified in the Rohnert Park General Plan as a Minor Collector in the future.

Labath Avenue is classified as a Minor Collector in the Rohnert Park General Plan (between Rohnert Park Expressway and Wilfred Avenue). Other segments of Labath Avenue are classified as Local Roads. This two-lane wide road has on-street parking, curbs, and gutters south of Business Park Drive. Between Business Park Drive and Wilfred Avenue, the road is unimproved and varies in width from one to two lanes. North of Wilfred Avenue the road is a narrow two-lane roadway with open roadside ditches and no shoulders. Currently there is a missing segment north of Business Park Drive but the Rohnert Park General Plan shows the completion of the segment as lands in the vicinity are developed.

Langner Avenue is not classified in the Rohnert Park General Plan. The roadway establishes a western boundary of urban growth and sphere of influence for the City of Rohnert Park. It is proposed to be developed as a local street with two travel lanes; it may be connected to Labath Avenue through a local cross street.

Millbrae Avenue is a narrow two-lane roadway with open roadside ditches and no shoulders. The road is classified as a Rural Minor Collector in the Draft 2020 Sonoma County General Plan.

Primrose Avenue is a narrow two-lane roadway with open roadside ditches and no shoulders. The road is not classified in the Rohnert Park General Plan.

Redwood Drive is an urban roadway with curbs and gutters and is classified as a Major Arterial in the Rohnert Park General Plan. The road is five lanes wide with left (and sometimes right) turn lanes at major intersections.

Whistler Avenue is a narrow two-lane roadway with open roadside ditches and no shoulders. The road is not classified in the Rohnert Park General Plan.

State Route 116 (SR -116 /Gravenstein Highway) is an urban roadway with curbs and gutters and is classified in the Rohnert Park General Plan as a Minor Arterial west of Redwood Drive and as a Major Arterial east of Redwood Drive. The road is four lanes wide with left turn lanes at major intersections.

US –101 is a freeway with a posted speed limit of 65. North of Wilfred Avenue there are three lanes in each direction and K-Rail in the median. One lane in each direction is designated for high occupancy vehicles. South of Wilfred Road there are two lanes in each direction and a grassy median with a guard rail.

Pedestrian, Bicycle, and Public Transportation Facilities

Rohnert Park's General Plan makes a commitment to improving pedestrian and bicycle circulation as an alternative to automobile use. Sonoma County has adopted a master bikeways plan. Both jurisdictions use designated bikeways: Class I- Paved paths on separate rights-of-way; Class II- Striped lanes within roadways, separate from vehicular travel lanes; or Class III- Designated bicycle routes within roadways, shared with either pedestrians or motorists.

In the vicinity of the Wilfred and Stony Point sites, a Class I bikeway exists on Rhonert Park Expressway (with exception of the section between Business Park Drive and Commerce Boulevard) and Class III bikeways exist along Business Park Drive and Langner Avenue, south of Business Park Drive. According to the Rohnert Park General Plan, Class I bikeways are proposed for Wilfred Avenue, Dowdell Avenue, and Commerce Boulevard from Rhonert Park Expressway to Golf Course Drive, and Class II bicycle lanes are planned for Redwood Drive and Stony Point Road.

Public transportation in the larger area includes several intra-city routes operated by Sonoma County Transit that pass through a transfer station near the intersection of Commerce Drive and Rohnert Park Expressway (immediately east of the US-101/Rohnert Park Expressway interchange). Intra-city routes include #10, #11, #12, and #14. Buses pass through the transfer

station approximately every 30-40 minutes on weekdays and approximately every hour on weekends.

Sonoma County Transit also provides several inter-city routes that serve Sebastopol and Santa Rosa. Inter-city routes include #26, #44, and #48 and connect to a separate transfer station near the intra-city station. Bus frequencies are similar to intra-city service.

Golden Gate Transit operates routes along US-101 that pass through Rohnert Park and connect with cities including San Francisco, San Rafael, Petaluma, and Santa Rosa. During the weekday, routes #72, #74, #75, and #76 operate in the AM and PM peak travel directions and stop at the Rohnert Park inter-city transfer station. Route #80, which offers service throughout the day , also stops at the Rohnert Park station.

Sonoma County Transit (SCT) service area does not include the Wilfred or Stony Point sites. Routes 12 and 14 operate on Rohnert Park Expressway as far west as Labath Avenue, and there are no plans to extend SCT service routes at this time.

A future opportunity for a connection to transit service is with Sonoma-Marin Area Rail Transit (SMART). The proposed rail service would connect San Francisco Bay ferry service terminals to Cloverdale (north of Santa Rosa). If implemented, the proposed rail corridor will pass through Rohnert Park with a stop at a station adjacent to the Wilfred Avenue interchange. The SMART project is planned to add a second track near the Wilfred interchange station. Trains could serve up to 13 other stations, 8 in Sonoma County and 5 in Marin, running every 30 minutes during peak periods, with up to 16 trains per day. A bicycle corridor is also proposed on the SMART right-of-way, which parallels US-101 for most of the distance. An Environmental Impact Report (EIR) is currently being prepared to evaluate the impacts of the commuter rail service. If funding is secured, service could begin as early as 2007; however, voters rejected the proposed project in November of 2006, so the actual service start is uncertain.

Analysis Methodologies

Operating conditions experienced by drivers are described in terms of Level of Service (LOS). This term is a qualitative measure that includes factors such as speed, travel time, delay, freedom to maneuver, and driving comfort and convenience. Level of Service is represented as letters ranging from A to F, whereby LOS A represents the best traffic flow driving conditions and LOS F represents the worst traffic flow driving conditions. **Table 3.8-1** relates the operational characteristics associated with each level of service category for both signalized and unsignalized intersections.

TABLE 3.8-1
INTERSECTION LEVEL OF SERVICE DEFINITIONS

Level of Service	Description	Signalized (Avg. control delay per vehicle; sec/veh.)	Unsignalized (Avg. control delay per vehicle; sec/veh.)
A	Free flow with no delays. Users are virtually unaffected by others in the traffic stream.	≤ 10	≤ 10
B	Stable traffic. Traffic flows smoothly with few delays.	> 10 – 20	> 10 – 15
C	Stable flow but the operation of individual users becomes affected by other vehicles. Modest delays.	> 20 – 35	> 15 – 25
D	Approaching unstable flow. Operation of individual users becomes significantly affected by other vehicles. Delays may be more than one cycle during peak hours.	> 35 – 55	> 25 – 35
E	Unstable flow with operating conditions at or near the capacity level. Long delays and vehicle queuing.	> 55 – 80	> 35 – 50
F	Forced or breakdown flow that causes reduced capacity. Stop and go traffic conditions. Excessive long delays and vehicle queuing.	> 80	> 50

SOURCE: Transportation Research Board, 2000.

LOS Standards

The minimum standard LOS, as established in the Rohnert Park General Plan (July 2000), allows an LOS C for all arterial and collector roadway segments and intersections. Some roadway segments and intersections are allowed to operate at a lower LOS; these segments and intersections are identified in the General Plan. **Table 3.8-2** describes the criteria (acceptable) LOS standards for each jurisdiction, as well as potential exceptions to those criteria.

TABLE 3.8-2
LOS STANDARDS – WILFRED AND STONY POINT SITES

Jurisdiction	Acceptable Standard	Exceptions
City of Rohnert Park	LOS C or better	LOS D at the intersection of Wilfred Avenue / Redwood Drive, Wilfred Avenue / US-101 SB Ramps, Golf Course Drive / Commerce Boulevard, and US-101 NB Ramps / Commerce Boulevard.
		Intersections that are already operating at LOS D or lower are permitted if no feasible improvements exist to improve the LOS, and provided the LOS is not permitted to deteriorate further due to the proposed development project. Rohnert Park considers a project to be significant if a project causes LOS to fall below the city established levels.
Sonoma County	LOS D or better	Project intersections currently operating below the county standard are considered to be significantly impacted if the average delay per vehicle increases by 5 seconds or more.
Caltrans	LOS E or better for freeways and LOS D or better for highways and intersection	If the LOS is already E or F, then a quantitative measure of increased queue lengths and delay should be utilized.

SOURCE: Rohnert Park, 2000; Sonoma County Guidelines for Traffic Studies; Caltrans 2002; Kimley-Horn and Associates, 2007; and AES, 2007.

Existing Condition

This condition is based on intersection traffic counts taken in July and August 2005, 24-hour freeway volumes collected in May and June 2004, existing roadway geometry, and existing development conditions. It serves as a baseline from which projections for the 2008 and 2020 year are derived. This condition is reported without the project added into the condition.

Data Collection

Existing US-101 traffic data was collected using digital wave radar technology to measure vehicle volume and speed per lane for roadway segment analysis.

Weekday intersection turning movement volumes were manually collected in July and August 2005. Turning movement volumes at intersections along Millbrae Avenue were collected in November 2006. Volumes were collected during the AM and PM peak periods of the day in the middle of the week.

Twenty-four hour freeway volumes were collected in May and June 2004. Volumes were collected in each direction and for US-101 segments north of the Wilfred interchange, south of the Rohnert Park Expressway interchange, and between the two interchanges.

Freeway Segment and Ramp Performance

Traffic analyses were completed to evaluate the existing weekday operation of the following freeway segments and ramps:

Segments

- Northbound US-101 south of SR-116
- Northbound US-101 between SR-116 and Rohnert Park Expressway
- Northbound US-101 between Rohnert Park Expressway and Wilfred Avenue
- Northbound US-101 between Wilfred Avenue and Santa Rosa Avenue
- Northbound US-101 north of Santa Rosa Avenue
- Southbound US-101 north of Santa Rosa Avenue
- Southbound US-101 between Wilfred Avenue and Santa Rosa Avenue
- Southbound US-101 between Rohnert Park Expressway and Wilfred Avenue
- Southbound US-101 between SR-116 and Rohnert Park Expressway
- Southbound US-101 south of SR-116

Ramps

- Northbound SR-116 on-ramp
- Northbound Rohnert Park Expressway loop on-ramp

- Northbound Rohnert Park Expressway on-ramp
- Northbound Wilfred Avenue on-ramp
- Southbound Wilfred Avenue on-ramp
- Southbound Santa Rosa Avenue on-ramp
- Southbound Rohnert Park Expressway on-ramp
- Southbound Rohnert Park Expressway loop-on ramp
- Southbound SR-116 on-ramp
- Northbound SR-116 off-ramp
- Northbound Rohnert Park Expressway off-ramp
- Northbound Wilfred Avenue off-ramp
- Northbound Santa Rosa Avenue off-ramp
- Southbound Wilfred Avenue off-ramp
- Southbound Rohnert Park Expressway off-ramp
- Southbound SR-116 off-ramp

The southbound Rohnert Park Expressway loop on-ramp is currently under construction and could not be evaluated under existing conditions. **Table 3.8-3** summarizes the results of this daily freeway segment and ramp analysis for the existing level of service conditions, showing existing unacceptable operations at one on-ramp.

PM Peak Hour Intersection Performance

The following intersections, shown in **Figure 3.8-3**, were evaluated in the traffic study (**Appendix O**):

- Wilfred Avenue/Stony Point Road
- Wilfred Avenue/Primrose Avenue
- Wilfred Avenue/Whistler Avenue
- Wilfred Avenue/Lagner Avenue
- Wilfred Avenue/Labath Avenue
- Wilfred Avenue/Dowdell Avenue
- Wilfred Avenue/Redwood Drive
- Millbrae Ave and Stony Point Rd
- Millbrae Ave and Primrose Avenue
- Millbrae Ave and Whistler Avenue
- Millbrae Ave and Langner Avenue
- Millbrae Ave and Labath Avenue
- Millbrae Ave and Dowdell Avenue
- Redwood Drive/Commerce Boulevard
- Wilfred Avenue/US-101 SB Ramps (future intersection)

TABLE 3.8-3
EXISTING FREEWAY SEGMENT AND RAMP PERFORMANCE – WILFRED AND STONY POINT SITES

US-101 Section/Ramp	Criteria LOS	Existing LOS	Density (pc/mi/ln)[a]
Northbound			
US-101 South of SR-116	E	C	22.2
SR-116 Off-ramp	E	D	30.8
SR-116 On-ramp	E	D	34.5
US-101 between SR-116 and Rohnert Park Expressway (NB)	E	D	28.1
Rohnert Park Expressway NB Off-Ramp	E	D	33.6
Rohnert Park Expressway NB On-Ramp (Loop Ramp)	E	D	32.1
Rohnert Park Expressway NB On-Ramp	E	D	32.5
US-101 between Rohnert Park Expressway and Wilfred Ave (NB)	E	D	28.9
Wilfred Ave NB Off-Ramp	E	E	35.4
Wilfred Ave NB On-Ramp	E	**F**	**42.0**
US-101 between Wilfred Ave and Santa Rosa Avenue	E	D	26.7
Santa Rosa Avenue NB Off-ramp	E	E	37.2
US-101 North of Santa Rosa Avenue	E	C	20.3
Southbound			
US-101 North of Santa Rosa Avenue	E	C	22.9
Santa Rosa Avenue On-ramp	E	D	31.2
US-101 between Santa Rosa Avenue and Wilfred Ave (SB)	E	D	31.5
Wilfred Ave SB Off-Ramp	E	E	38.0
Wilfred Ave SB On-Ramp	E	D	33.7
US-101 between Rohnert Park Expressway and Wilfred Ave (SB)	E	E	35.2
Rohnert Park Expressway SB Off-Ramp	E	E	38.0
Rohnert Park Expressway SB On-Ramp (Loop Ramp)	E	E	36.0
Rohnert Park Expressway SB On-Ramp	E	E	35.1
US-101 between Rohnert Park Expressway and SR –116 (SB)	E	D	27.1
SR-116 SB Off-ramp	E	D	33.9
SR-116 SB On-ramp	E	D	33.7
US-101 South of SR-116	E	C	24.7

NOTE: [a] pc = passenger cars mi = mile ln = lane
Bold text denotes unacceptable LOS.
SOURCE: Kimley-Horn and Associates, 2007; AES, 2007.

- Golf Course Drive/Commerce Boulevard
- Golf Course Drive/Roberts Lake Road
- US-101 NB Ramps/Commerce Boulevard
- Rohnert Park Expressway/Commerce Boulevard
- Rohnert Park Expressway/US-101 NB Ramps
- Rohnert Park Expressway/US-101 SB Ramps
- Rohnert Park Expressway/Redwood Drive
- Rohnert Park Expressway/Labath Avenue
- Rohnert Park Expressway/Stony Point Road
- Stony Point Project Driveway/Stony Point Road
- Business Park Drive/Labath Avenue
- Business Park Drive/Redwood Drive
- SR-116/Stony Point Road
- SR-116/Redwood Drive
- SR-116/ SB US-101 Ramps
- SR-116/NB US-101 Off-ramp

Table 3.8-4 summarizes the results of daily intersection analysis for the existing level of service conditions and shows the intersection delay experienced per vehicle. The signal control is listed as TS for a signalized intersection and TWSC for a two-way stop-controlled intersection. The overall intersection LOS is reported for signalized intersections. For unsignalized intersections only the worst approach LOS is reported. Thus, for TWSC intersections, the overall intersection may operate acceptably but the worst approach unacceptably (**Appendix O**). Additional detail is provided in **Appendix O**. As shown in **Table 3.8-4**, the following intersections and approaches currently operate at an unacceptable LOS:

- Wilfred Avenue/Stony Point Road
- Redwood Drive/Commerce Boulevard
- Golf Course Drive/Commerce Boulevard
- Millbrae Avenue/Stony Point Road

Figure 3.8-4 shows the existing peak hour turning volumes at each of the study intersections.

Traffic Signal Warrant Analysis

Traffic signals may be justified when traffic operations fall below acceptable thresholds and when one or more signal warrants are satisfied. Existing traffic volumes at the unsignalized study intersections were compared against the peak hour warrant in the *2003 Manual on Uniform Traffic Control Devices (MUTCD)* and the *California Supplement*. Traffic Signal Warrant #3 – Peak Hour Volume Warrant (formerly know as Warrant #11) is satisfied when traffic volumes on

the major and minor approaches exceed thresholds for one hour of the day. As specified in the *MUTCD* and *California Supplement,* predetermined minimum thresholds for intersections include volume on the minor street of 100 vehicles per hour for one moving lane of traffic and 150 vehicles per hour for two moving lanes of traffic as well as the total entering volume serviced during the hour equals or exceeds 650 vehicles per hour for intersections with three approaches and 800 vehicles per hour for intersections with four or more approaches.

This warrant is generally the first warrant to be satisfied. The warrant applies to traffic conditions during a one hour peak that are sufficiently high such that minor street traffic experiences excessive delay in entering and crossing the street due to the high traffic volumes on the main street.

Results of the analysis showed that the following intersections currently satisfy Warrant #3, Peak Hour Volume.

- Stony Point Road/Wilfred Avenue
- Stony Point Road/Millbrae Avenue

LAKEVILLE SITE

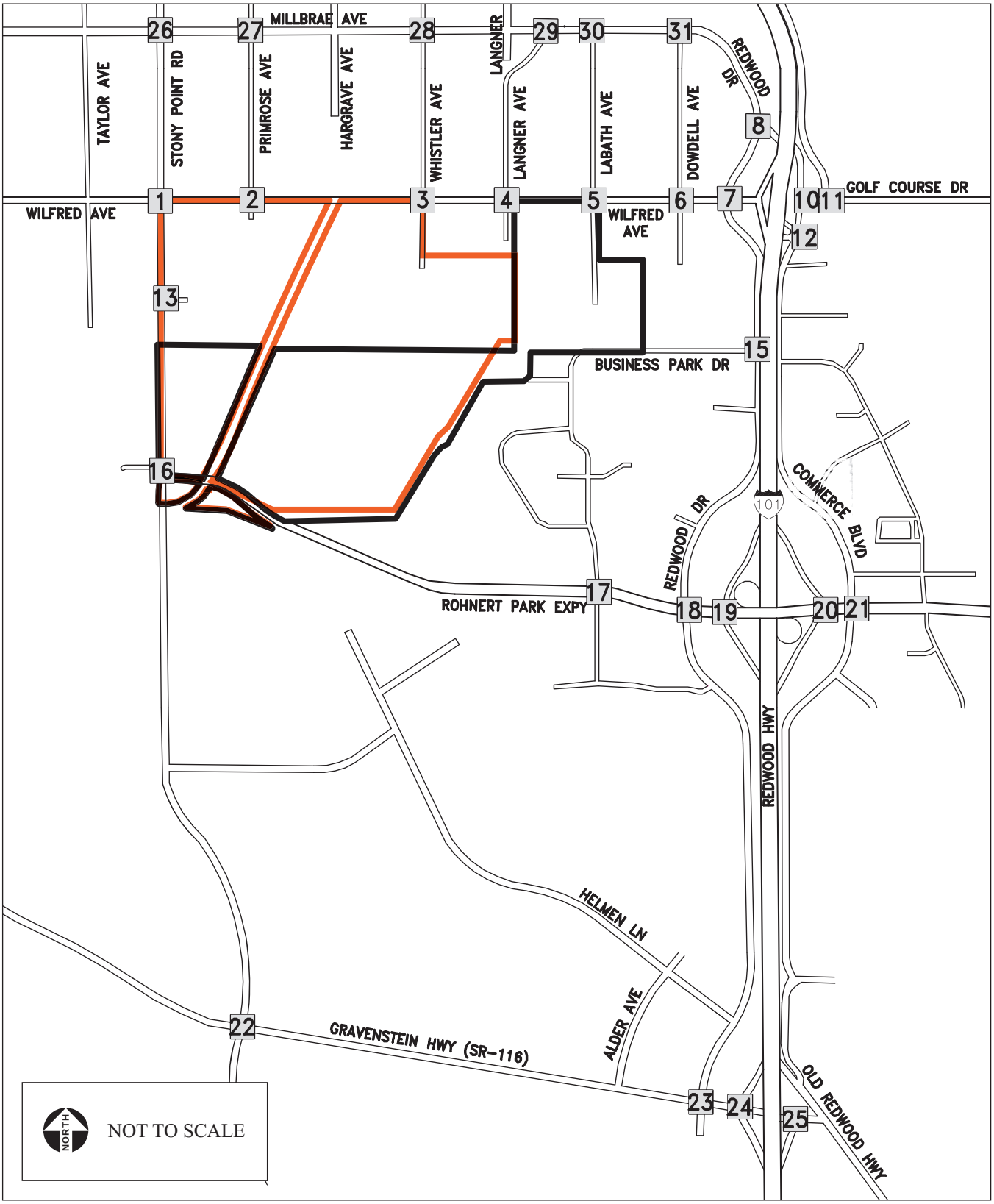
The Lakeville Site is located north of SR-37 and immediately west of Lakeville Highway in southern Sonoma County, CA.

Existing Circulation Network

Streets and highways in the vicinity of the Lakeville site include Lakeville Highway, SR-37, SR-121 and Atherton Avenue. **Figure 3.8-5** shows the existing road network around the Lakeville site and **Figure 3.8-6** shows the existing lane geometry and traffic control in the area. The Lakeville site is located on the west and east side of Lakeville Highway, north of SR-37. The following is a description of the principal roadways near the Lakeville site.

Atherton Avenue is a two-lane roadway with turn lanes at some intersections. Atherton Avenue provides access to SR-37 in the east and to Novato to the west.

State Route 37 (SR-37) is a four-lane highway near Lakeville Highway with at-grade intersections at Lakeville Highway and at State Route 121 (SR-121). West of Lakeville Highway, SR-37 becomes a grade-separated facility. East of SR- 21, SR-37 narrows to a two-lane highway until reaching Vallejo where it expands back to four lanes. The highway is classified in the Sonoma County General Plan as a Primary Arterial.



SOURCE: Kimley Horn & Associates, 2006; AES, 2006

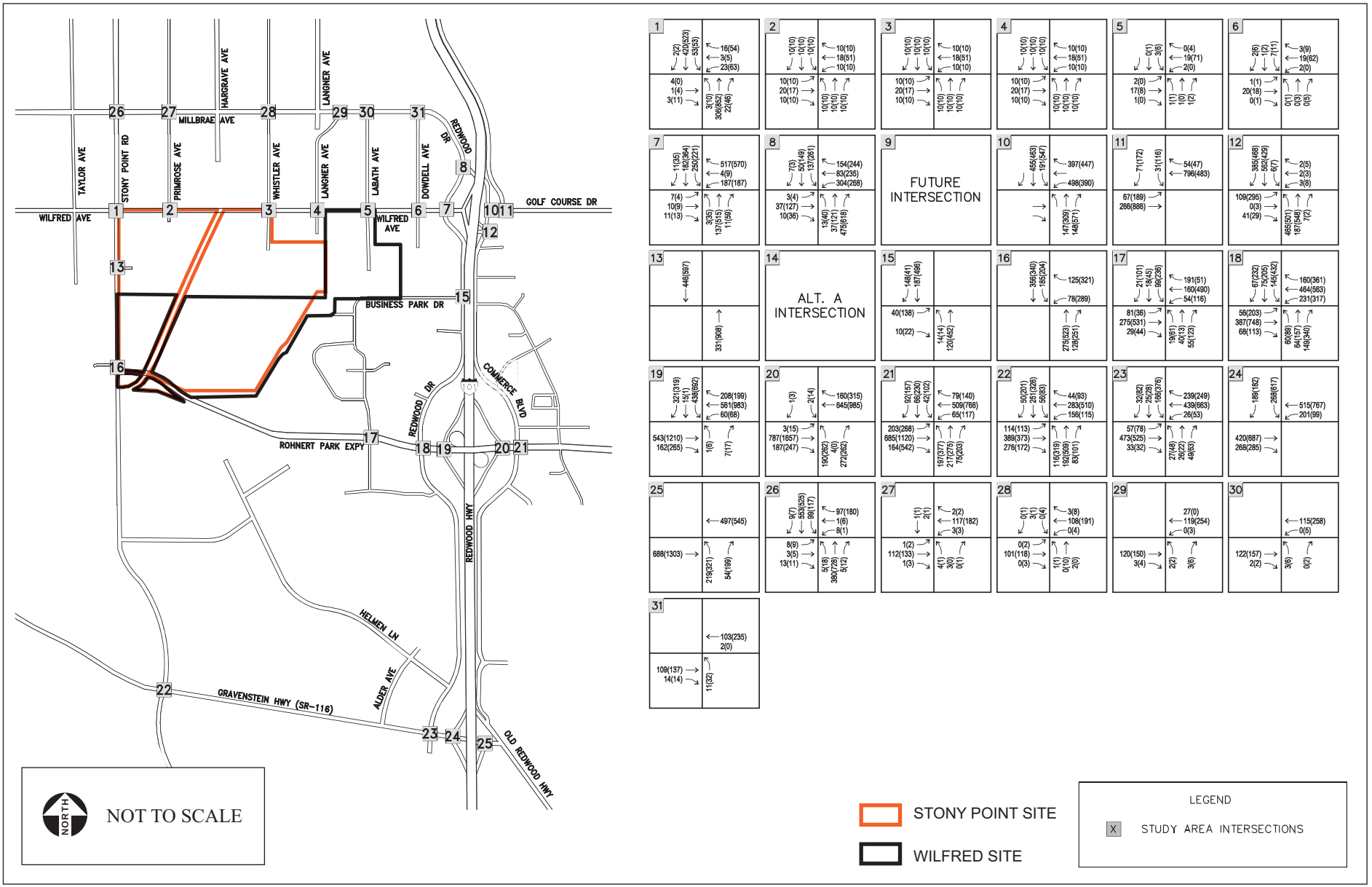
Figure 3.8-3

Project Study Intersections - Alternatives A,B,C,D and E

TABLE 3.8-4
EXISTING PEAK HOUR INTERSECTION PERFORMANCE
WILFRED AND STONY POINT SITES

Intersection	Signal Control	Criteria	2005	
			LOS	Delay[1]
Wilfred Avenue/Stony Point Road	TWSC	D	**F**	**109.1**
Wilfred Avenue/Primrose Avenue	TWSC	D	A	9.4
Wilfred Avenue/Whistler Avenue	TWSC	D	A	9.4
Wilfred Avenue/Redwood Avenue	TS	D	C	27.9
Wilfred Avenue/Lagner Avenue	TWSC	D	A	9.4
Wilfred Avenue/Labath Avenue	TWSC	D	A	9.1
Wilfred Avenue/Dowdell Avenue	TWSC	D	A	9.1
Millbrae Ave and Stony Point Rd	TWSC	D	**E**	**38.3**
Millbrae Ave and Primrose Ave	TWSC	D	B	11.1
Millbrae Ave and Whistler Ave	TWSC	D	B	11.3
Millbrae Ave and Langner Ave	TWSC	D	A	9.6
Millbrae Ave and Labath Ave	TWSC	D	B	10.8
Millbrae Ave and Dowdell Ave	TWSC	D	B	11.2
Redwood Drive/Commerce Boulevard	TS	C	**D**	**44.3**
Golf CourseDrive/Commerce Boulevard	TS	D	**E**	**57.7**
Golf Course Drive/Roberts Lake Road	TS	C	B	18.3
US-101 NB Ramps/Commerce Boulevard	TS	D	C	27.9
Rohnert Park Exp/Commerce Boulevard	TS	C	C	31.1
Rohnert Park Exp/US-101 NB Ramps	TS	D	B	14.7
Rohnert Park Exp./US-101 SB Ramps	TS	D	C	22.9
Rohnert Park Exp/Redwood Drive	TS	C	C	33.2
Rohnert Park Exp/Labath Avenue	TS	C	C	27.4
Rohnert Park Exp/Stony Point Road	TS	D	C	24.8
Project Driveway/Stony Point Road	TWSC	D	A	0.0
Business Park Drive/Labath Avenue	-	D	-[2]	-[2]
Business Park Drive/Redwood Drive	TWSC	D	C	21.1
SR-116/Stony Point Road	TS	D	C	34.3
SR-116/Redwood Drive	TS	D	C	29.3
SR-116/ SB US-101 Ramps	TS	D	C	20.9
SR-116/NB US-101 Off-ramp	TS	D	B	16.0

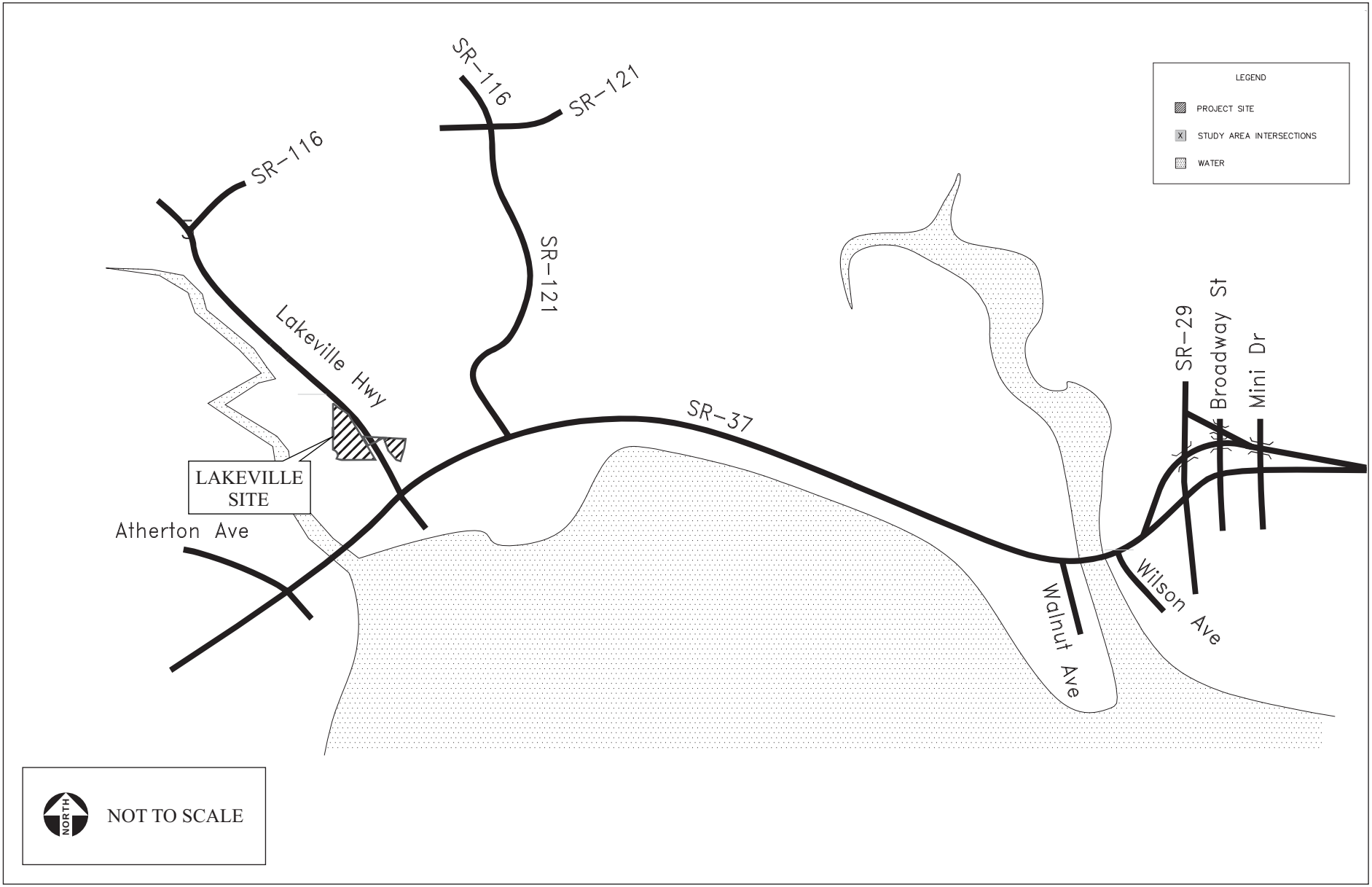
NOTE: [1]Delay in seconds.
[2]Intersection only exists under Alternative A with project.
Bold text denotes unacceptable LOS.
SOURCE: Kimley-Horn and Associates, 2007; AES, 2007.



SOURCE: Kimley Horn & Associates, 2006; AES, 2006

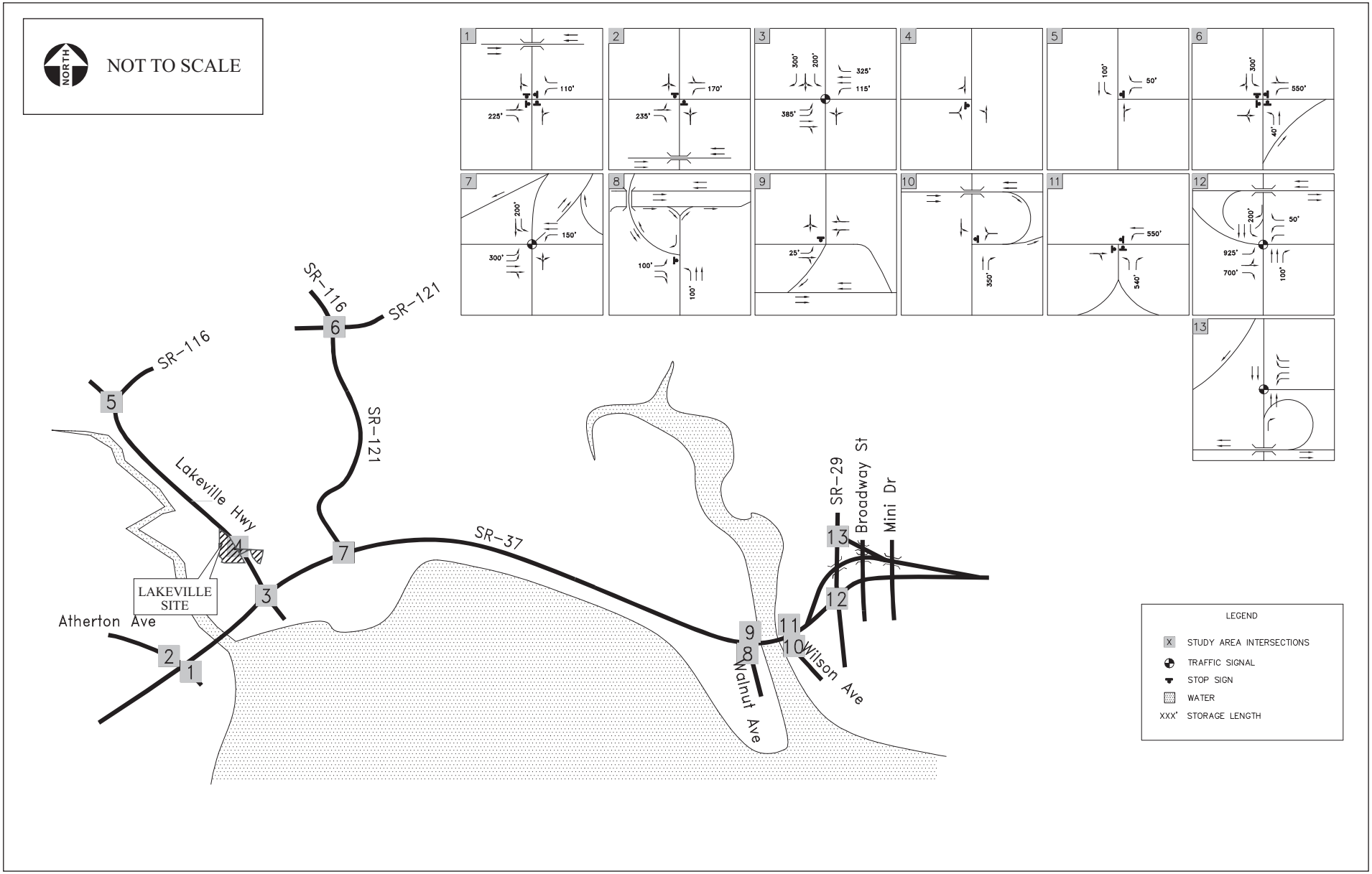
Figure 3.8-4

Existing Peak Hour Turning Movement Volumes - Alternatives A,B,C,D and E



SOURCE: Kimley Horn & Associates, 2006; AES, 2006

Figure 3.8-5
Area Roadway Network - Alternative F



SOURCE: Kimley Horn & Associates, 2006; AES, 2006

Figure 3.8-6

Existing Lane Geometry and Traffic Control – Alternative F

Lakeville Highway is a two-lane rural roadway with open roadside ditches, narrow shoulders, and left turn bays at some intersections. The road is classified as a Primary Arterial in the Sonoma County General Plan and is planned to be widened to four lanes in the next 20 years.

State Route 116 (SR-116) is a two-lane rural roadway with open roadside ditches, narrow shoulders, and left turn bays at some intersections. Near Lakeville Highway, SR-116 is classified as a major collector but further to the east near SR-121, it is classified as a Secondary Arterial.

State Route 29 (SR-29) is a four-lane divided roadway in the City of Vallejo with at-grade intersections and turn bays at some intersections providing access between Vallejo and destinations to the north.

State Route 121 (SR-121) is a two-lane rural roadway with turn bays at some intersections. SR-121 provides access from SR-37 to the north and connects with SR-116 in the north of the project area.

Walnut Avenue is a four-lane roadway providing access between Mare Island and SR-37.

Wilson Avenue is a two-lane roadway with turn lanes at some intersections. The roadway provides direct access to SR-37 and downtown Vallejo.

Pedestrian, Bicycle, and Public Transportation Facilities

Designated bikeway facilities do not exist in the vicinity of the Lakeville site, but SR-37 has wide shoulders. Sonoma County Transit Authority does not provide service near the site and has no plans to provide service (Kimley-Horn and Associates, Inc., 2007).

Analysis Methodologies

The analysis methodologies, as discussed for the Wilfred and Stony Point sites are the same for the Lakeville site.

Existing Condition

This condition is based on traffic counts taken in February 2006 and August 2003, existing roadway geometry, and existing development conditions. It serves as a baseline from which projections for the 2008 and 2020 year are derived. This condition is reported without the project generated trips added into the condition.

Analysis Methodologies

The analysis methods used for the Lakeville Site were the same as those used for Wilfred and the Stony Point Sites.

LOS Standards

The minimum standard LOS, as established by Sonoma County is LOS D. Caltrans' minimum standard for satisfactory operation is LOS C. The exceptions to the standards are listed in **Table 3.8-5**.

Data Collection

Weekday intersection turning movement volumes were collected at study area intersections in February 2006. Volumes were collected during the AM and PM peak periods of the day. In addition to the turning movement counts, 24-hour highway volumes were collected in May 2003. Volumes were collected on SR-37, SR-121, and Lakeville Highway.

TABLE 3.8-5
LOS STANDARDS – LAKEVILLE SITE

Jurisdiction	Acceptable Standard	Exceptions
Caltrans	LOS C or better at intersections, freeway ramp terminals, freeway segments and ramps	Intersections currently operating less than the LOS C are expected to maintain the existing measure of effectiveness (i.e. delay per vehicle at intersections and density for ramps and freeway segments).
Sonoma County	LOS D or better	Project intersections currently operating below the county standard are considered to be significantly impacted if the average delay per vehicle increases by 5 seconds or more.

SOURCE: 2000; Sonoma County Guidelines for Traffic Studies; Caltrans, 2002; Kimley-Horn and Associates, 2007; and AES, 2007.

Freeway Segment and Ramp Performance

Traffic analyses were completed to evaluate the existing weekday operation of the following freeway segments and ramps:

Segments

- Eastbound SR-37 between Atherton Avenue and Lakeville Highway
- Northbound Lakeville Highway between SR-37 and SR-116
- Eastbound SR-37 between Lakeville Highway and SR-121
- Northbound SR-121 between SR-37 and SR-116
- Southbound SR-121 between SR-116 and SR-37
- Westbound SR-37 between SR-121 and Lakeville Highway
- Southbound Lakeville Highway between SR-116 and SR-37
- Westbound SR-37 between Lakeville Highway and Atherton Avenue

Ramps

- Eastbound Atherton Avenue off-ramp
- Eastbound Walnut Avenue off-ramp

- Eastbound Walnut Avenue on-ramp
- Eastbound Wilson Avenue off-ramp
- Eastbound Wilson Avenue on-ramp
- Eastbound SR-29 off-ramp
- Westbound SR-29 off-ramp
- Westbound SR-29 loop on-ramp
- Westbound SR-29 on-ramp
- Westbound Wilson Avenue off-ramp
- Westbound Wilson Avenue on-ramp
- Westbound Walnut Avenue off-ramp
- Westbound Walnut Avenue on-ramp
- Westbound Atherton Avenue off-ramp
- Westbound Atherton Avenue on-ramp

Table 3.8-6 summarizes the results of daily highway segment and ramp analysis for the existing

TABLE 3.8-6
EXISTING FREEWAY SEGMENT AND RAMP PERFORMANCE – LAKEVILLE SITE

Highway Section/Ramp	Criteria LOS	Existing LOS	MOE*
Eastbound/Northbound			
Atherton Avenue EB Off- Ramp	C	C	23.1
SR-37 between Atherton Avenue and Lakeville Highway (EB}	C	C	22.2
Lakeville Highway between SR-37 and SR-116 (NB)	C	**E**	**90.8% 40.0**
SR-37 between Lakeville Highway and SR-121 (EB)	C	C	20.5
SR-121 between SR-37 and SR-116 (NB)	C	**E**	**88.2% 40.5**
Walnut Avenue EB Off-Ramp	C	B	15.1
Walnut Avenue EB On- Ramp	C	B	14.1
Wilson Avenue EB Off- Ramp	C	B	14.0
Wilson Avenue EB On- Ramp	C	B	15.9
SR-29 EB Off- Ramp	C	B	10.9
Westbound/Southbound			
SR-29 WB Off- Ramp	C	A	-4.9
SR-29 WB On- Ramp (loop)	C	B	11.1
SR-29 WB On- Ramp	C	B	12.2
Wilson Avenue WB Off- Ramp	C	B	10.2
Wilson Avenue WB On- Ramp	C	B	13.8
Walnut Avenue WB Off- Ramp	C	A	3.7
Walnut Avenue WB On- Ramp	C	B	15.0
SR-121 between SR-116 and SR-37 (SB)	C	**E**	**87.5% 40.7**
SR-37 between SR-121 and Lakeville Hwy (WB)	C	B	15.8
Lakeville Highway between SR-116 and SR-37 (SB)	C	**E**	**86.0% 40.6**
SR-37 between Lakeville Highway and Atherton (WB)	C	A	10.9
Atherton Avenue WB Off- Ramp	C	B	13.4
Atherton Avenue WB On- Ramp	C	B	12.9

NOTE: *Measure of Effectiveness (MOE) for two lane highways = percent time following & average travel speed (mi/hr). MOE for multi-lane highways & ramps = density (pc/mi/ln) Bold text denotes unacceptable LOS.
SOURCE: Kimley-Horn & Associates, 2007; AES, 2007.

LOS conditions. As shown below, based on existing level of service, the following segments currently operate at an unacceptable LOS:

- Lakeville Highway between SR-37 and SR-116 (NB)
- SR-121 between SR-37 and SR-116 (NB)
- SR-121 between SR-116 and SR-37 (SB)
- Lakeville Highway between SR-116 and SR-37 (SB)

Peak Hour Intersection Performance

The proposed project would generate new vehicular trips that would increase traffic volumes on the nearby street network. To assess changes in traffic conditions associated with the project, the traffic study evaluated the following intersections:

- Atherton Avenue / Harbor Drive & SR-37 EB Off-Ramp
- Atherton Avenue / Glen Lane & SR-37 WB Ramps
- Lakeville Highway / SR-37
- Lakeville Highway / Main Project Access
- Lakeville Highway / SR-116
- SR-121 / SR-116
- SR-121 / SR-37
- Walnut Avenue / SR-37 EB Ramps
- Mare Island / SR-37 WB Ramps
- Wilson Avenue / SR-37 EB Ramps
- Wilson Avenue / SR-37 WB Off-Ramp
- SR-29 / SR-37 EB Off-Ramp
- SR-29 / SR-37 WB Off-Ramp

The intersections are shown in **Figure 3.8-7.**

The intersection delay experienced per vehicle is summarized in **Table 3.8-7.** The signal control is listed as TS for a signalized intersection, AWSC for an all-way stop-controlled intersection and TWSC for a two-way stop-controlled intersection. The overall intersection LOS is reported for signalized and all-way stop-controlled intersections. The LOS for the worst approach is reported for TWSC intersections. Thus, for TWSC intersections, the overall intersection may operate acceptably but the worst approach unacceptably (**Appendix O**). The results of this daily intersection analysis of the existing level of service conditions shows the following intersections and approaches currently operate at an unacceptable LOS:

- Lakeville Highway/SR-116
- SR-116/SR-121
- SR-29 / SR-37 EB Off-Ramp

Traffic Signal Warrant Analysis

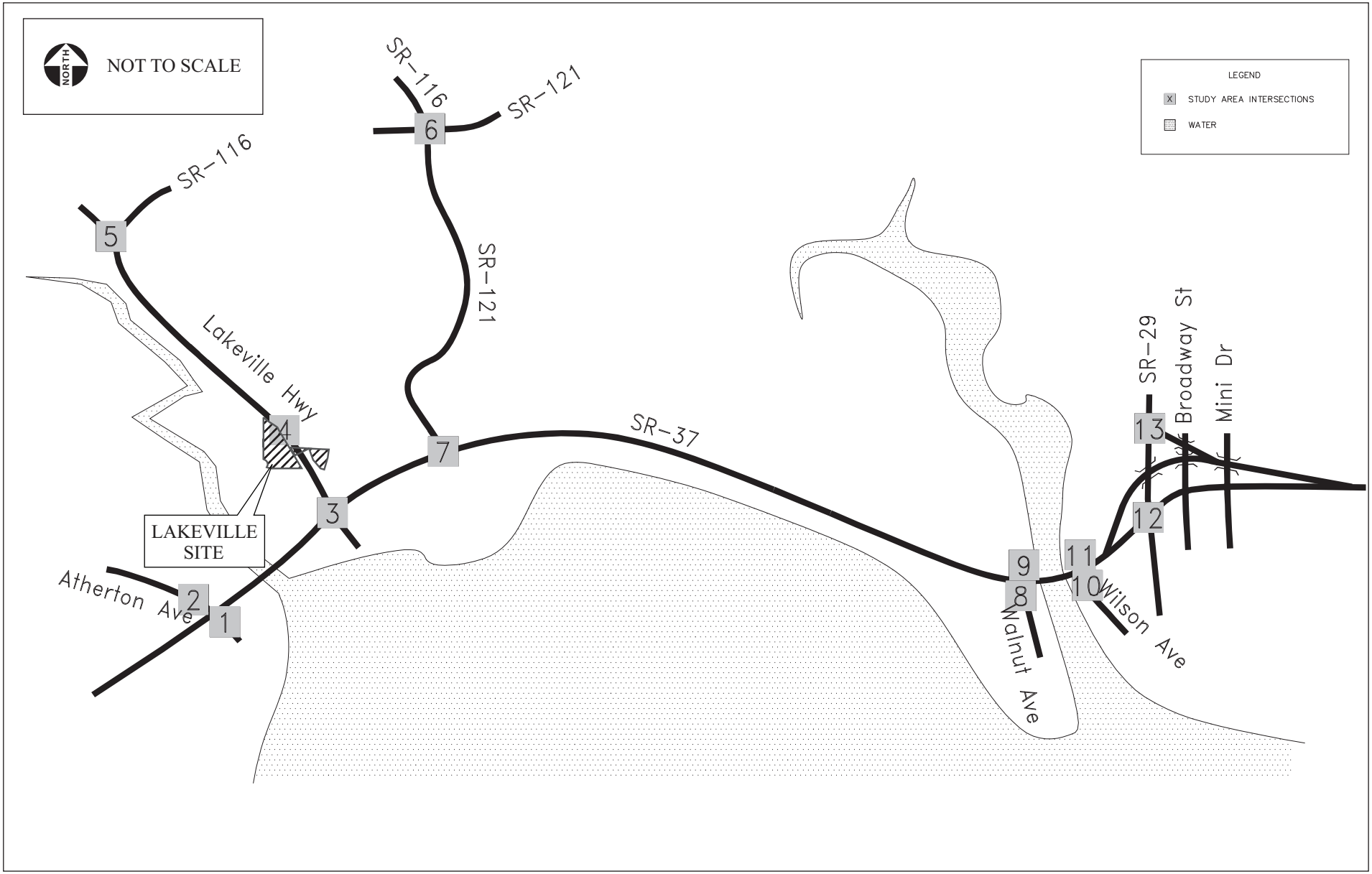
Traffic warrant signal analysis conducted on project intersections under existing conditions revealed that SR-121/SR-116 satisfies the Peak Hour Volume warrant analysis criteria.

TABLE 3.8-7
EXISTING PM PEAK HOUR INTERSECTION PERFORMANCE - LAKEVILLE SITE

Intersection	Signal Control	Criteria	LOS	Delay[1]
Atherton Avenue/Harbour Drive & SR-37 EB Off-Ramp	AWSC	C	B	10.3
Atherton Avenue/Glen Lane& SR-37 WB Ramps	TWSC	C	C	16.1
Lakeville Highway/SR-37	TS	C	C	22.4
Lakeville Highway / Main Project Access	TWSC	D	A	0.0
Lakeville Highway/SR-116	TWSC	C	**D**	**30.4**
SR-116/SR-121	AWSC	C	**F**	**69.6**
SR-121 / SR-37	TS	C	C	20.1
Walnut Avenue / SR-37 EB Ramps	TWSC	C	A	9.3
Mare Island / SR-37 WB Ramps	TWSC	C	A	9.0
Wilson Avenue / SR-37 EB Ramps	TWSC	C	B	13.6
Wilson Avenue / SR-37 WB Off-Ramp	AWSC	C	A	10.0
SR-29 / SR-37 EB Off-Ramp	TS	C	**E**	**65.7**
SR-29 / SR-37 WB Off-Ramp	TS	C	C	23.6

NOTE: [1]Delay in seconds.
Bold text denotes unacceptable LOS.
SOURCE: Kimley-Horn and Associates, 2007; AES, 2007.

Figure 3.8-8 shows the existing peak hour turning volumes at each of the study intersections for the Lakeville site.



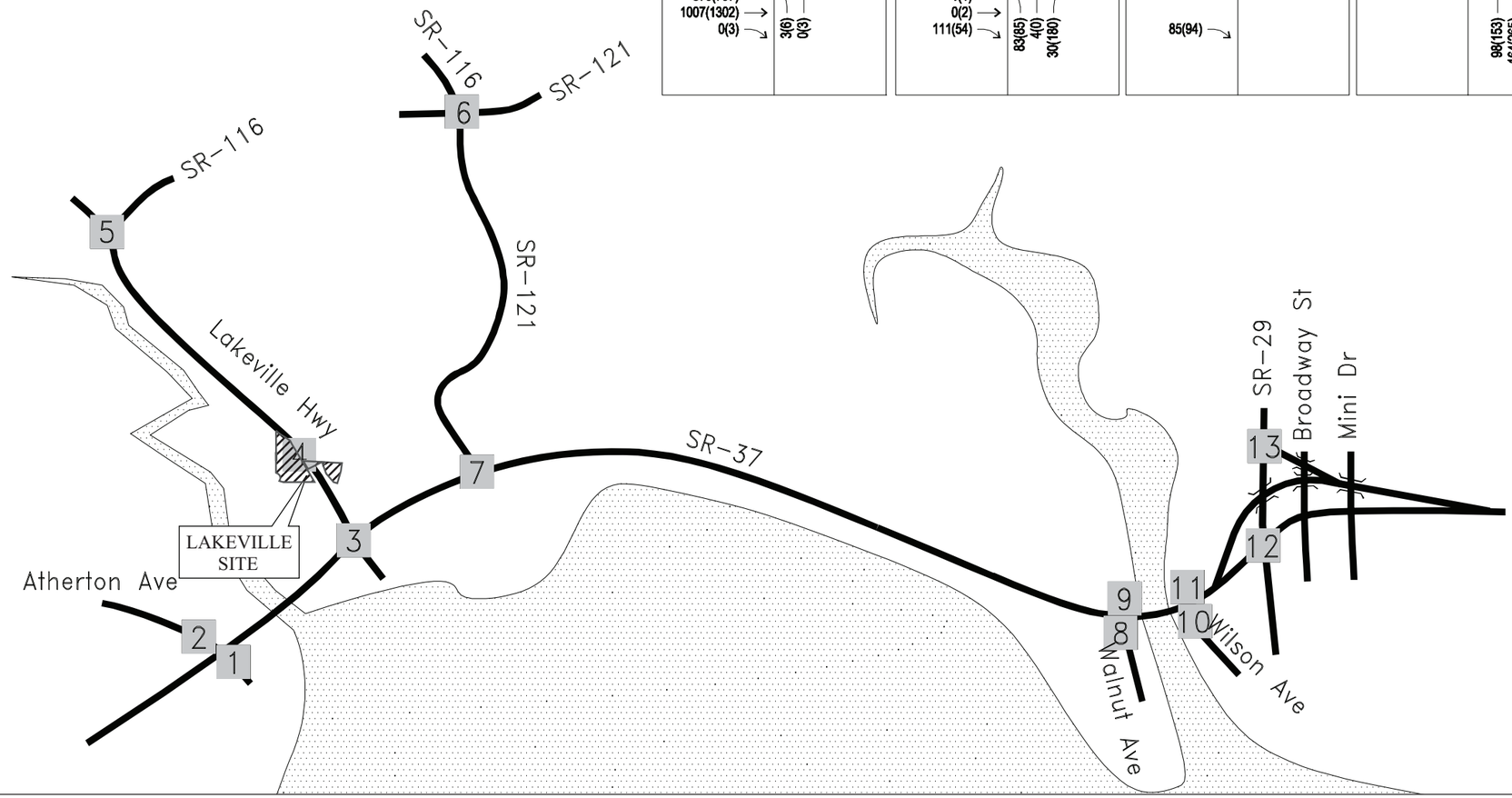
SOURCE: Kimley Horn & Associates, 2006; AES, 2006

Figure 3.8-7
Project Study Intersections - Alternative F

NOT TO SCALE

1	2	3	4	5	6
17(8) → 149(247) → 45(45) ← 1(0)	0(1) → 1(2) → 1(2) ← 39(95) ← 40(59)	274(56) → 5(2) → 473(382) → 398(568) ← 1338(1064) ← 6(0)	788(422) →	799(396) → 48(119) → 53(31) ← 24(9)	22(13) → 398(254) → 499(371) → 319(496) ← 21(11) ← 351(336)
34(69) → 20(75) → 18(11) → 18(42) ← 3(9)	3(2) → 149(248) → 44(36) → 201(137) ← 1(0) ← 20(7)	18(565) → 919(1722) → 14(3) → 1(0) ← 0(5)	429(1123) ←	432(1032) ← 11(80) ←	14(50) → 36(42) → 13(8) → 9(8) ← 104(408) ← 227(556)

7	8	9	10	11	12	13
472(473) → 0(1) → 78(195) → 68(98) ← 1257(1122) ← 0(1)	2(9) →	193(40) ←	157(150) → 42(39) → 31(51) ← 159(162)	38(51) ← 59(63) ←	976(926) → 130(200) → 215(423) ← 93(99) ←	290(214) → 1303(1382) → 910(882) ← 338(340) ←
370(797) → 1007(1302) → 0(3) → 3(6) ← 0(3) ←	1(1) → 0(2) → 111(54) → 83(85) ← 4(0) ← 30(180) ←	85(94) →	98(153) ← 164(265) ←	36(70) → 106(152) → 151(138) ← 130(160) ←	176(272) → 54(96) → 97(116) → 641(1449) ← 46(127) ←	616(1252) ← 83(99) ←



SOURCE: Kimley Horn & Associates, 2004; AES, 2006

Figure 3.8-8
Existing Peak Hour Turning Volumes - Alternative F

3.8.2 LAND USE

REGIONAL SETTING

Sonoma County is home to approximately 459,000 people, accounting for 1.35 percent of the total population in California (2000 Census). Spanning 1,500 square miles, Sonoma County is the largest of nine counties in the San Francisco Bay Region. The County is bounded by Mendocino County to the north, Pacific Ocean to the west, Napa and Lake Counties to the east, and Marin County and San Pablo Bay to the south. Sonoma County consists of nine planning areas, Sonoma Coast/Gualala Basin, Cloverdale/Northeast County, Healdsburg and environs, Russian River Area, Santa Rosa and environs, Sebastopol and environs, Rohnert Park-Cotati and environs, Petaluma and environs, and Sonoma Valley. Nine cities (Santa Rosa, Petaluma, Rohnert Park, Healdsburg, Sonoma, Sebastopol, Cotati, Windsor and Cloverdale) and unincorporated areas make up the setting of this County (Sonoma County General Plan, 1989). The main transportation route through the County is US Route 101, a north-south route connecting the San Francisco area and Marin County to the south with Mendocino County to the north.

Guidance documents relevant to the County (regional) and City (local) growth and development visions offer a framework for the regulatory aspect of the affected environment. The Sonoma County General Plan, Sonoma County Zoning Ordinance, City of Rohnert Park General Plan and Northwest Specific Plan comprise the relevant framework for analysis of the impacts from the project alternatives discussed herein. California State law requires cities to adopt general plans for physical development within, as well as land outside city boundaries bearing relation to planning. The result is a nested boundary system, in which actual city limits are encompassed within the city's larger Sphere of Influence. This in turn lies within a larger Planning Area for the city. Planning decisions within city boundaries are controlled by the city, however planning in the city's Sphere of Influence or in the Planning Area outside of city limits is coordinated with adjacent or abutting local or regional jurisdictions, such as the City of Cotati or Sonoma County.

SONOMA COUNTY GENERAL PLAN

The Sonoma County General Plan is currently in the process of being updated and may be adopted in 2007, until which time the County's general development guidance continues to be derived from the 1989 General Plan and supporting policies. For the purpose of this analysis, the pertinent General Plan Elements are the Open Space Element and the Land Use Element. These Elements are discussed below.

Open Space Element

The Open Space Element of the Sonoma County General Plan addresses open space for the preservation of natural resources, for the managed production of resources, for outdoor recreation, and for public health and safety. As such, this Element is formatted to be consistent

with other Elements of the General Plan, specifically Land Use, Public Safety, Public Facilities, Agricultural Resources and Resource Conservation. The Land Use element, described below, supports the goals and policies of the Open Space Element by including provisions for the preservation of open space lands.

Land Use Element

The Land Use Element and its policies guide the growth and development and use of land as envisioned in the General Plan. Portions of the Wilfred site, as well as the entirety of both the Stony Point site and the Lakeville site are subject to the provisions of the Land Use Element, as well as the Sonoma County Zoning Regulations, described below. The Land Use Element provides the distribution, location and extent of uses of land for housing, business, industry, open space, agriculture, natural resources, recreation and enjoyment of scenic beauty, education, public buildings and grounds, solid and liquid waste disposal facilities, and other uses (Sonoma County General Plan, 1989). Therefore, the Land Use Element supports the Open Space Element, as stated above, in part through one of its specified goals of community-centered growth and development as envisioned by the countywide growth framework expounded in the Land Use Element. The Land Use Element of the Sonoma County General Plan further allows establishment of hierarchically arranged land use categories and zoning districts to regulate development potential. Land use categories and zoning districts as they relate to the sites of the project alternatives are described further below.

Sonoma County Zoning Regulations

While the Sonoma County General Plan defines Use Areas to guide community-centered growth as a part of the County's general goals. Sonoma County Zoning Regulations (Chapter 26 of the Sonoma County Code) set forth the types of development that may occur within the General Plan's Use Areas. More specifically, the Zoning Ordinance establishes various districts that determine which land uses are permitted or prohibited, designates permitted use, and through the use of permit process, approves the use for a district (Sonoma County, 2004). These districts allow for more specific definitions of permissible land uses for the purpose of planned development. Site-specific districts as related to use areas are described below.

WILFRED SITE

Existing Land Uses

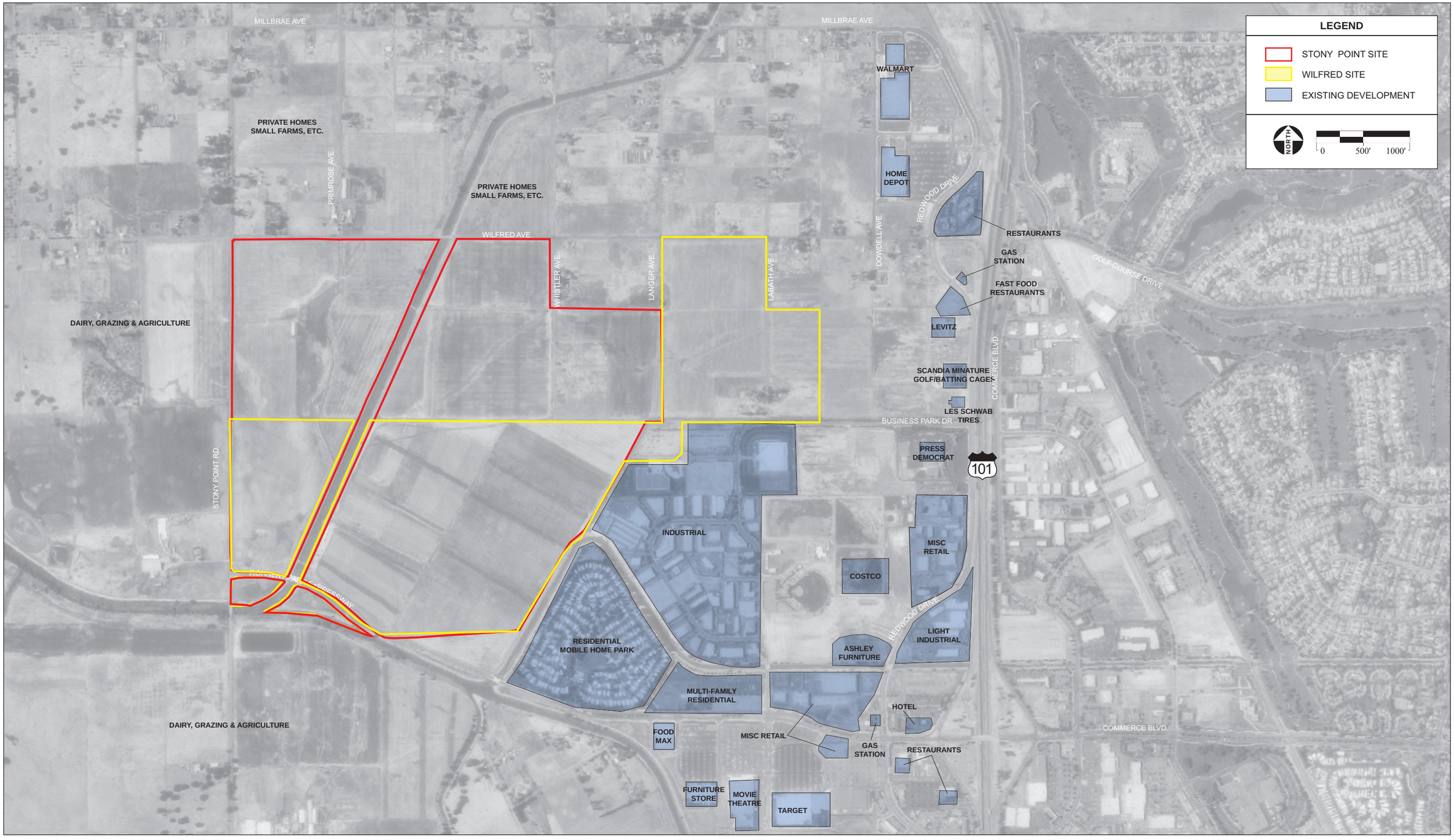
The Wilfred site is located on 11 parcels totaling approximately 252 acres of land. The parcels in the northeastern section of the Wilfred site, totaling 7 parcels and approximately 70 acres, are described by the City of Rohnert Park (2004) as largely "unimproved and vacant." The southwestern portion of the Wilfred site, totaling four parcels and approximately 182± acres, are unirrigated pasture. The parcel on the southeast corner of Stony Point Road and Rohnert Park Expressway is currently used for grazing, while the remaining parcels grow rye grass. These four

southern parcels are currently under a Williamson Act contract, as discussed further below, in **Section 3.8.3**.

The Wilfred site is bordered by Wilfred Avenue, residences, and farmland to the north; Stony Point Road, residences, farmland, and a dairy to the west; Business Park Drive, light industrial land uses, Rohnert Park Expressway, farmland, and the Laguna de Santa Rosa to the south; and a business park, the Rancho Verde Mobile Home Park, and farmland to the east. **Figure 3.8-9** shows existing development in the immediate vicinity of the Wilfred site, which includes large retail stores (including WalMart, Home Depot, Costco, and Target), a movie theatre, a miniature golf course with batting cages, gas stations, a mobile home park, multi-family residential, and multiple commercial and industrial developments.

Wilfred Site and Regional Planning

For the purpose of discussion on land use and planning, the Wilfred site is consists of three sections divided by local jurisdictional boundaries. The largest of these sections consists of 182± acres in the southwestern portion of the site, which is overlapped with the Stony Point Site (described further on). This section of the site is outside of the Rohnert Park sphere of influence and as such, planning authority for this portion rests exclusively with Sonoma County. The second and smallest section is a single parcel of 3.86± acres, to the east of and adjacent to the southwestern portion described above. This parcel is the only portion of the Wilfred site within the current city limits as delineated in the City of Rohnert Park General Plan, adopted July 2000 and discussed below. The remaining section consists of six parcels totaling approximately 66 acres within unincorporated Sonoma County. Although this portion is outside Rohnert Park's city limits, it is within the LAFCO recognized sphere of influence for the City, and the City's designated 20 year Urban Growth Boundary. The City has identified this portion of the Wilfred Site for future annexation into the city limits, and has designated it for inclusion within Southern Area (Part "B") of the Northwest Specific Plan. Annexation of this land into the City limits would require environmental review under the California Environmental Quality Act (CEQA), and project approval from the City Council, County Board of Supervisors, and LAFCO. Adoption of the proposed Sonoma County General Plan update would amend the designated



SOURCE: Aerial Photograph dated August 2002; AES, 2007

Figure 3.8-9
Existing Development Surrounding the Wilfred and Stony Point Sites

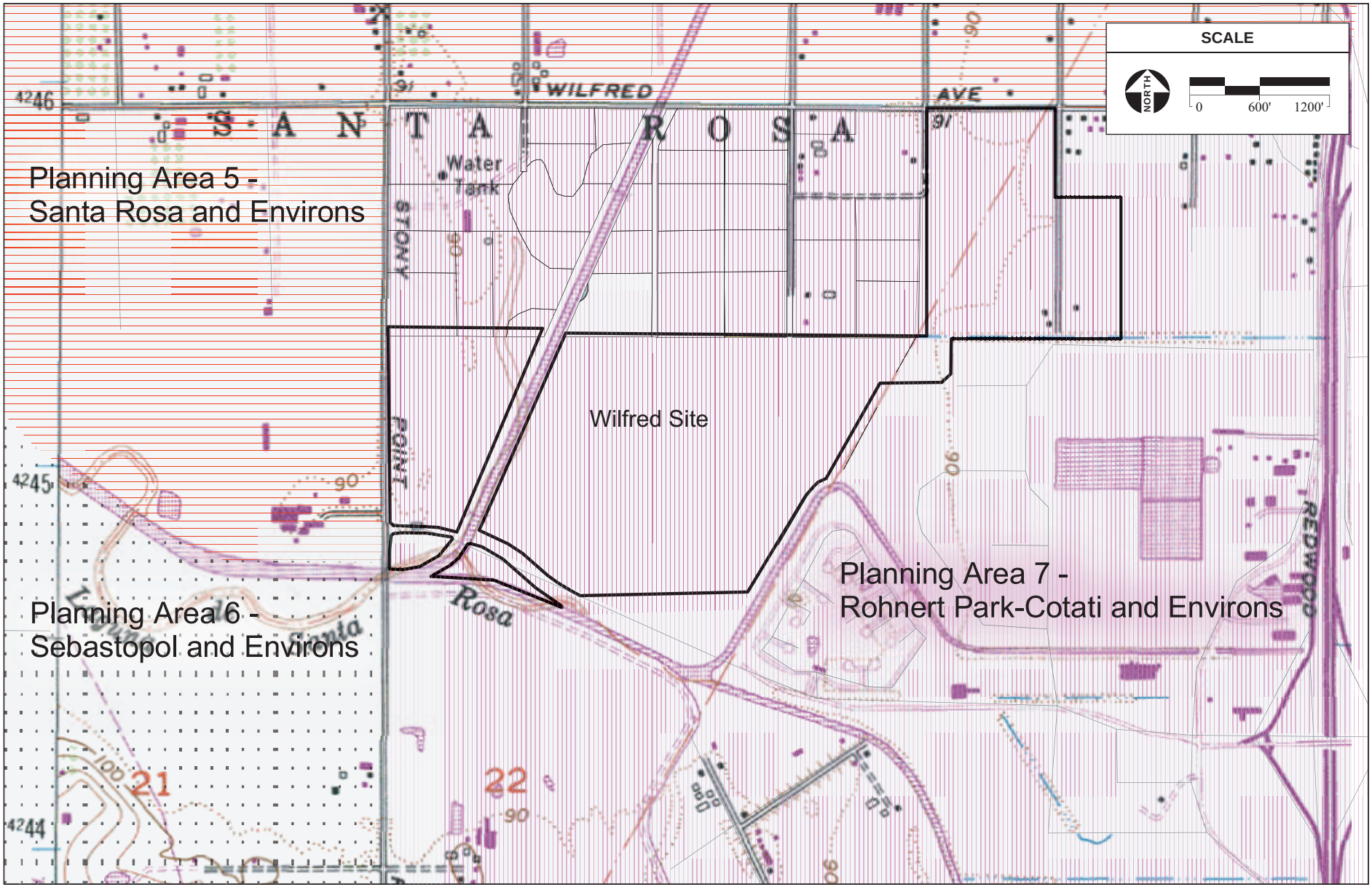
Urban Service Area identified within the County General Plan to include the entire 66-acre northeastern section of the Wilfred site. Discussion on the Wilfred site's relation to Sonoma County and City of Rohnert Park planning considerations appears below.

Sonoma County General Plan

The Wilfred Site is within the Rohnert Park – Cotati and Environs planning area as delineated by the Sonoma County General Plan. **Figure 3.8-10** shows this in relation to other planning areas surrounding the Wilfred site. The Rohnert Park – Cotati and Environs planning area is located in central Sonoma County and includes Rohnert Park, Cotati, and Penngrove, and is the smallest of the nine total planning areas, but has highest population density (Sonoma County, 1989).

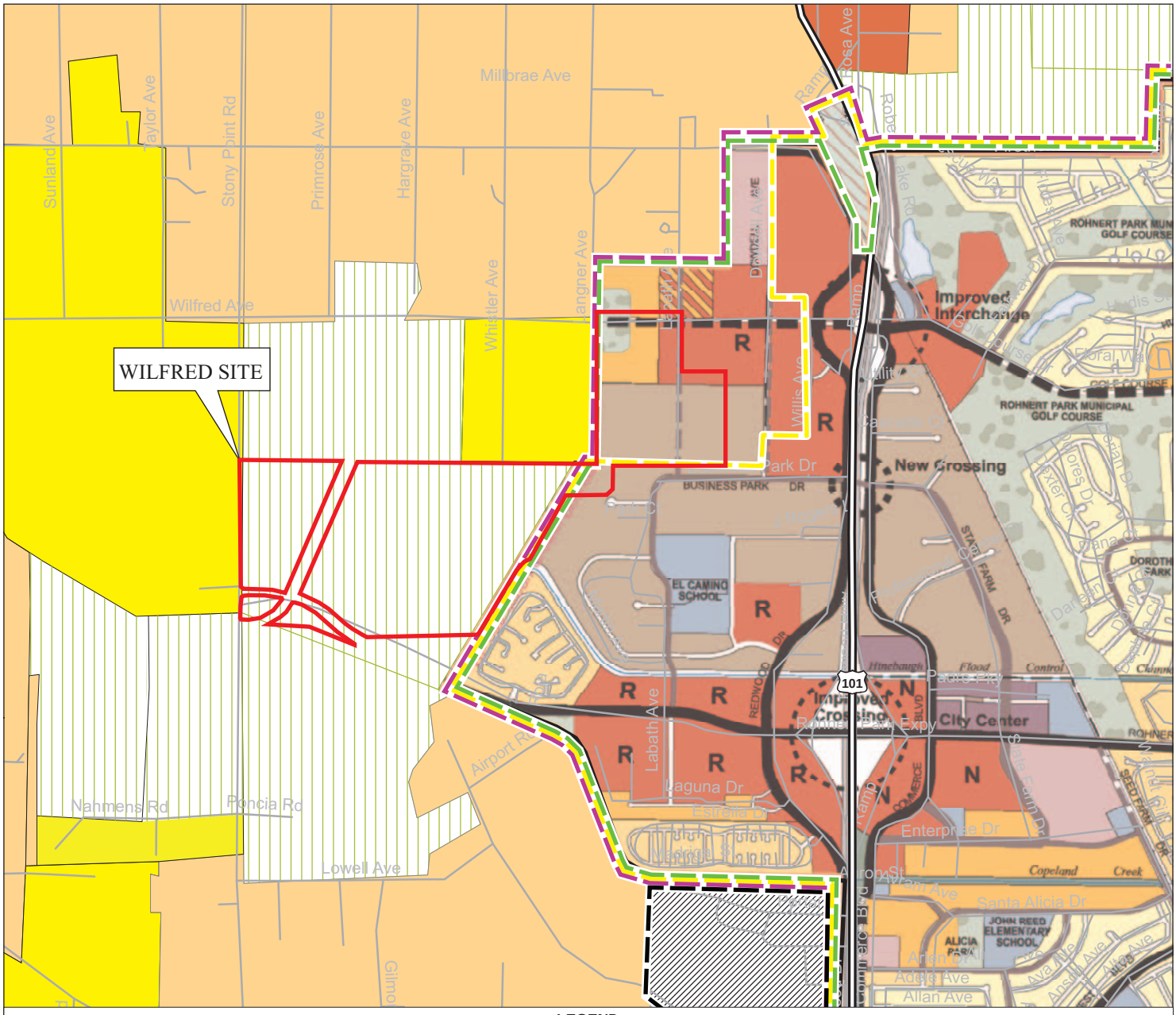
The southwestern portion of the Wilfred site is located in a Land Extensive Agriculture District, according to the Sonoma County General Plan's Land Use Plan Map, and overlapped by the Rohnert Park/Santa Rosa Community Separator designation, as shown on the Open Space Plan Map. It is outside of the 20-year Urban Growth Boundary for the City of Rohnert Park, and outside of the City of Rohnert Park's proposed sphere of influence (City of Rohnert Park, 2000). The northeastern portion of the Wilfred Site is also located within the Land Extensive Agriculture District, according to the Sonoma County General Plan's Land Use Plan Map, and overlapped by the Rohnert Park/Santa Rosa Community Separator, as designated on the Open Space Plan Map. Although not within the County's currently recognized Urban Service Area boundary, this portion of the project site is within the City of Rohnert Park's sphere of influence, as well as the City's designated 20 year Urban Growth Boundary. As previously discussed, adoption of the proposed Sonoma County General Plan Update would amend the designated Urban Service Area identified within the County General Plan to include the entire 66 acre northeastern portion of the Wilfred site. **Figure 3.8-11** shows the Sonoma County General Plan's Land Use designations in relation to the Wilfred site as well as the City of Rohnert Park General Plan Land Use Designations for land located with the City's sphere of influence.

Community Separator - The Community Separator designation is applied to ensure the long-term preservation of open space. As agricultural uses are converted by increasing growth to subdivision or non-agricultural uses, the community separator preserves this open space from development. Two goals set by the County that apply to the Community Separator designation include Goal LU-5 of the Land Use Element, which identifies the importance of preserving open space between the County's cities and communities and maintaining them in a largely open or natural character with low intensities of development, and Goal OS-1 of the Sonoma County General Plan Open Space Element which identifies the need to preserve the visual identities of communities by maintaining open space areas between cities and communities. A Community



SOURCE: "Cotati, CA" USGS 7.5 Minute Topographic Quadrangle,Un-sectioned Area "Llano De Santa Rosa", T6N, R8W, Mt. Diablo Baseline and Meridian ; General Plan Land Use Data, Sonoma County Permit and Resource Management Department, January 1, 2004 ; AES, 2005

Figure 3.8-10
County Planning Areas Surrounding Wilfred Site



LEGEND

- Wilfred Site
- City Limits of Rohnert Park
- City of Rohnert Park 20 Year Urban Growth Boundary
- City of Rohnert Park Sphere of Influence
- City of Cotati

NORTH

0 1000' 2000'

CITY OF ROHNERT PARK GENERAL PLAN LAND USE DEFINITIONS

- Rural Estate Residential (up to 2 un/ac)
- Low Density Residential (4-6 un/ac)
- Medium Density Residential (6-12 un/ac)
- High Density Residential (12-30 un/ac)
- Commercial
  - N Neighborhood Commercial
  - R Regional Commercial
- Industrial
- Mixed Use
- Office
- Public/Institutional
- Parks
- Open Space-Environmental Conservation
- High Desity Residential / Commercial
- Open Space-Agriculture and Resource Management
- EXISTING / PROPOSED
  - Major Arterial (4-6 lanes)
  - Minor Arterial (2 lanes)
  - Major Collector (4 lanes)
  - Minor Collector (2 lanes)

COUNTY OF SONOMA GENERAL PLAN LAND USE DEFINITIONS

- Diverse Agricultural District
- Land Extensive Agriculture
- Rural Residential
- General Commercial
- Medium Density Residential
- Light Density Residential
- Mixed Use

CITY OF COTATI GENERAL PLAN LAND USE DEFINITIONS

- Industrial

SOURCE: Dyett & Bhatia, October, 2002; AES, 2007

Figure 3.8-11

General Plan Land Use Areas - Wilfred Site and Vicinity

Separator designation is implemented by the provisions in the Scenic Resources (SR) zoning district (see below).

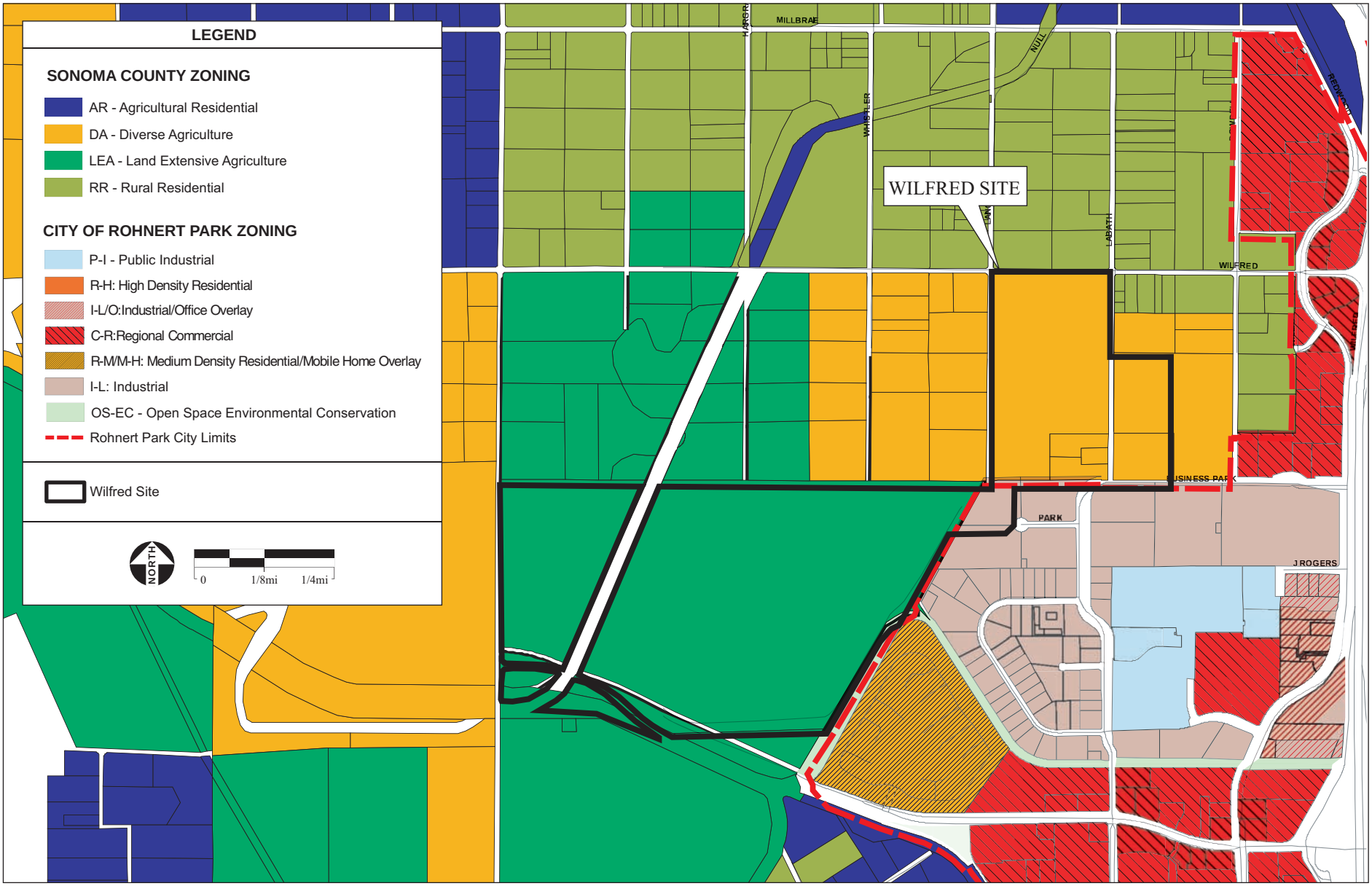
The County controls development decisions within community separators, unless specific exceptions requiring coordination with municipalities are made. On lands under County jurisdiction, the Board of Supervisors, through a development agreement, may allow additional or varied development within a community separator if at least the following mandatory criteria are met:

- permanent open space preservation is provided through open space grants to the County and/or third party land trust,
- development is clustered to maintain the visual quality of the separator,
- in addition to permanent open space dedication, the public benefits outweigh the impacts of placing development within the separator,
- a visual analysis demonstrates that the development is not detrimental to, or enhances the visual quality of the separator,
- adequate additional public services or infrastructure will serve the development,
- the development is compatible with surrounding properties, especially those that are used for agriculture, and
- the development includes a landscaping and maintenance plan that retains or enhances the visual integrity of the permanent open space in cases where open space grants are made by way of easements, as opposed to fee title.

There are eight community separators in Sonoma County. The majority of the Wilfred site (the portions of the site not located within the City of Rohnert Park) is located in the Rohnert Park/Santa Rosa Community Separator, which encompasses approximately 1,700 acres.

Zoning Districts: Sonoma County Zoning Regulations

Applicable County and City designated base zoning districts for the Wilfred Site and vicinity are illustrated in **Figure 3.8-12**. Specific County zones and combining district zone overlays applicable to each parcel within the Wilfred Site and vicinity are described in **Appendix Q**. The Wilfred site includes the following zoning districts under the Sonoma County Zoning Regulations, Chapter 26 of the Sonoma County Code:



SOURCE: "Cotati, CA" USGS 7.5 Minute Topographic Quadrangle,
Un-sectioned Area "Llano De Santa Rosa", T6N, R8W,
Mt. Diablo Baseline and Meridian ; zoning data obtained from the Sonoma
County Permit and Resource Management Department, October 2004; AES, 2007

Figure 3.8-12

Applicable County and City Zoning Designations – Wilfred Site and Vicinity

Diverse Agriculture District (DA) - The purpose of this district is "to enhance and protect those land areas where soil, climate and water conditions support farming but where small acreage intensive farming and part-time farming activities are predominant, but where farming may not be the principal occupation of the farmer; and to implement the provisions of the diverse agriculture land use category (Section 2.7.3) of the general plan and the policies of the agricultural resource element. (Ord. No. 4643, 1993)."

Land Extensive Agriculture District (LEA) - The purpose of this district is "to enhance and protect lands best suited for permanent agricultural use and capable of relatively low production per acre of land; and to implement the provisions of the land extensive agriculture land use category (Section 2.7.2) of the [Sonoma County] general plan and the policies of the agricultural resources element (Ord. No. 4643, 1993)."

B Combining District 6 (B 6) - The purpose of this zone is "to specify the residential density and/or minimum parcel or lot size for a particular parcel, lot, or area. The adopted zoning maps shall specify the maximum permitted density, determined by gross acreage for all residential uses. Minimum front, side, and rear yard requirements and the minimum parcel or lot size, if not otherwise specified, shall conform to the base district with which the B 6 district is combined unless specifically approved otherwise by the planning commission (Ord. No. 4643, 1993)."

Floodplain Combining District (F2) - The purpose of this district is "to provide for the protection from hazards and damage which may result from flood waters. This district shall be combined with other districts as provided in this chapter (Ord. No. 4643, 1993)."

Scenic Resources Combining District (SR) - The purpose of this district is "to preserve the visual character and scenic resources of lands in the county and to implement the provisions of Sections 2.1, 2.2, and 2.3 of the general plan open space element (Ord. No. 4643, 1993)."

Valley Oak Habitat Combining District (VOH) - The purpose of this district is "to protect and enhance valley oaks and valley oak woodlands and to implement the provisions of Section 5.1 of the general plan resource conservation element (Ord. No. 4991 § 1(h), 1996.)."

Second Unit Exclusion Combining District (Z) - The purpose of this district "is to provide for the exclusion of second units in the following areas:

A) Areas where there is an inadequate supply of water for drinking or firefighting purposes;
B) Areas where there are inadequate sewer services or danger of groundwater contamination;

C) Areas where the addition of second units would contribute to existing traffic hazards or increase the burden on heavily impacted streets, roads or highways; and
D) Areas where, because of topography, access or vegetation, there is a significant fire hazard (Ord. No. 4643, 1993)."

The immediate area around the Wilfred site includes the following County zone designations:

Agriculture and Residential District (AR) - The purpose of this district is to "preserve the rural character and amenities of those lands best utilized for low density residential development pursuant to Section 2.2.2 of the general plan. Rural residential uses are intended to take precedence over permitted agricultural uses, but the district does not allow agricultural service uses. The rural residential district may also be applied to lands in other land use categories where it is desirable to use zoning to limit development (Ord. No. 4643, 1993).

Manufactured Home Exclusion Combining District (J) - The purpose of this district is to "provide for the exclusion of manufactured homes in areas where the residents wish to preserve the aesthetic and economic integrity of established rural agricultural and residential areas of the county (Ord. No. 4643, 1993)."

Rural Residential District (RR) - The purpose of this zone is to "preserve the rural character and amenities of those lands best utilized for low density residential development pursuant to Section 2.2.2 of the general plan. Rural residential uses are intended to take precedence over permitted agricultural uses, but the district does not allow agricultural service uses. The rural residential district may also be applied to lands in other land use categories where it is desirable to use zoning to limit development (Ord. No. 4643, 1993)."

Biotic Resource Combining District (BR) - The purpose of this zone is to "protect biotic resource communities including critical habitat areas and riparian corridors for their habitat and environmental value and to implement the provisions of Sections 3.1 and 3.2 of the general plan open space element (Ord. No. 4643, 1993)."

Floodway Combining District (F1) - The purpose of this district is to "provide land use regulations for properties situated in floodways, to safeguard against the effects of bank erosion, channel shifts, increased runoff or other threats to life and property and to implement the provisions of the general plan public safety element. The application of this district shall be based upon data from the Federal Emergency Management Agency. Additional more detailed engineering analysis of flooding, erosion or other conditions may be necessary so as to prevent

property damage and safeguard the health, safety and general welfare of people (Ord. No. 4643, 1993)."

City of Rohnert Park General Plan

Adopted in July 2000, the General Plan of the City of Rohnert Park provides guidance for development through the year 2020. Specifically, the document outlines a vision of development and resource conservation, expounds implementation guidelines for development and conservation, provides a basis for public and private entities to design projects that enhance community character, conserve resources and minimize hazards, and sets a basis to establish priorities for detailed plans and implementation programs, such as zoning and specific plans. As described above, portions of the Wilfred site are located within the sphere of influence of the City of Rohnert Park. The City's adopted General Plan designations for areas of the Wilfred site located within the City's sphere of influence are illustrated in **Figure 3.8-11**. The City of Rohnert Park has generally designated the northeastern portion of the Wilfred site as Commercial, High Density Residential, Industrial and Parks. The southwestern portion of the Wilfred site is within the jurisdictional area of Sonoma County, as it is outside of the City's adopted Sphere of Influence. However, the City has included this area within planning considerations and has designated it as Open Space-Agriculture and Resource Management, and Community Separator, in concurrence with the goals of the Sonoma County General Plan Land Use Element.

Additional guidance on land use is provided for certain areas in the form of the Zoning Ordinance and area-specific plans as they relate to Specific Plan Districts identified in the General Plan. Six of the seven Wilfred site parcels within the City of Rohnert Park sphere of influence lie within one of these Specific Plan Districts, known as the "Northwest Specific Plan Area."

City of Rohnert Park, Northwest Specific Plan, Southern Area (Part "B")

The Northwest Specific Plan (NWSP), Southern Area (**Appendix X**) was adopted by the City of Rohnert Park in December 2004 as an extension of the General Plan. This Plan was drafted with the goal of ensuring that development in the specific area is master planned, and to ensure that the phasing and development of the District is consistent with and responsive to the community and the vision of the General Plan.

Elements of the NWSP include Land Use, Circulation, Design Guidelines and Implementation. The Land Use element establishes land use patterns and standards permissible in the plan area. The Circulation Element, discussed above, establishes a circulation system to accommodate vehicular and pedestrian traffic requirements generated by land uses within the Plan area. The Design Guidelines address site planning, and incorporate building and open space relationships as achieved through architecture, land design and public access.

The NWSP defines the use areas for the northeastern Wilfred site, as designated in the General Plan and NWSP (**Figure 2-32**):

High Density Residential—for this area, NWSP envisions residential land use density of 12 to 13 units per acre. The City's established High Density range for the purpose of the Northwest Specific Plan is 12-30 units per acre.

Commercial—intended to provide sites for businesses such as retail, food and beverage, service stations auto sales and repair, hospitalities, educational and social services, financial, business and personal services. The southeast portion of the NWSP area is further designated "R," indicating the potential to develop regional commercial attractions.

Industrial—NWSP envisions industrial development within this designation to be for uses such as light manufacturing and assembly, general services and warehousing, storage and distribution, service and commercial uses as well as retail on an ancillary basis.

STONY POINT SITE

Existing Land Uses

The Stony Point site is adjacent to the Wilfred site, with substantial portions of overlap. This overlap occurs in the southern half of the Stony Point site. The site is comprised of 37 parcels totaling approximately 360 acres of land. In contrast with the Wilfred site, the Stony Point site is located outside of and adjacent to the western boundary of the City of Rohnert Park. As discussed above, however, the site does lie within the Planning Area for Rohnert Park, calling for coordination between the City and Sonoma County in planning as required by state law. The Stony Point site is currently in use as unirrigated pasture. The southern parcels are currently under a Williamson Act contract, as discussed further below, in **Section 3.8.3**.

The Stony Point site is bordered by Wilfred Avenue, residences, and farmland to the north; Stony Point Road, farmland, and a dairy to the west; Rohnert Park Expressway, farmland, and the Laguna de Santa Rosa to the south; and the Rancho Verde Mobile Home Park, a business/industrial park, and farmland to the east. **Figure 3.8-9** shows existing development in the immediate vicinity of the Stony Point site, which includes large retail stores (including WalMart, Home Depot, Costco, and Target), a movie theatre, a miniature golf course with batting cages, gas stations, a mobile home park, multi-family residential, and multiple commercial and industrial developments.

Stony Point Site and Regional Planning

As stated above, the Stony Point site is adjacent to the Wilfred site, above, with substantial portions of overlap as shown in **Section 2.0**. As such, the regional setting of the Stony Point site

is considered identical to that of the Wilfred site for the purpose of this discussion. The Stony Point site is in an unincorporated area of Sonoma County, west of the City of Rohnert Park and north of the City of Cotati. The site is in the Rohnert Park – Cotati and Environs planning area, as described above, and is subject to designations set forth in the Sonoma County General Plan. A description of the Sonoma County General Plan and applicable elements is provided above. Sonoma County Planning Areas in relation to the Stony Point site are shown on **Figure 3.8-13**.

Sonoma County General Plan

The Stony Point Site is in the Rohnert Park – Cotati and Environs planning area as delineated by the Sonoma County General Plan and is completely contained within the Rohnert Park/Santa Rosa Community Separator. The Sonoma County Land Use Areas as they relate to the Stony Point Site are shown on **Figure 3.8-14**.

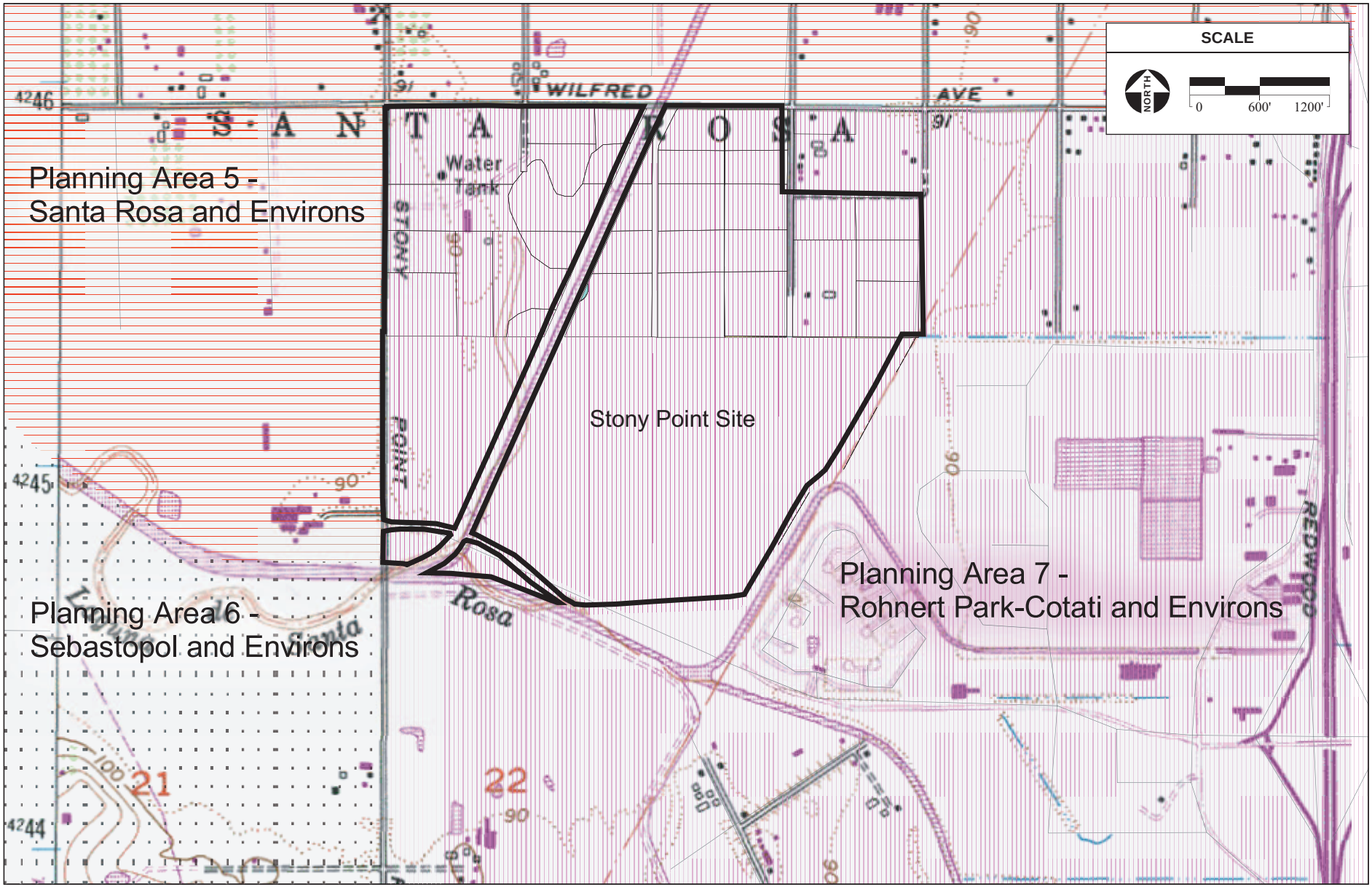
Zoning Districts: Sonoma County Zoning Regulations

Sonoma County Zoning in relation to the Stony Point site is shown on **Figure 3.8-15**. The Stony Point site contains parcels designated as follows:

Diverse Agriculture District (DA) - The purpose of this district is "to enhance and protect those land areas where soil, climate and water conditions support farming but where small acreage intensive farming and part-time farming activities are predominant, but where farming may not be the principal occupation of the farmer; and to implement the provisions of the diverse agriculture land use category (Section 2.7.3) of the general plan and the policies of the agricultural resource element (Ord. No. 4643, 1993)."

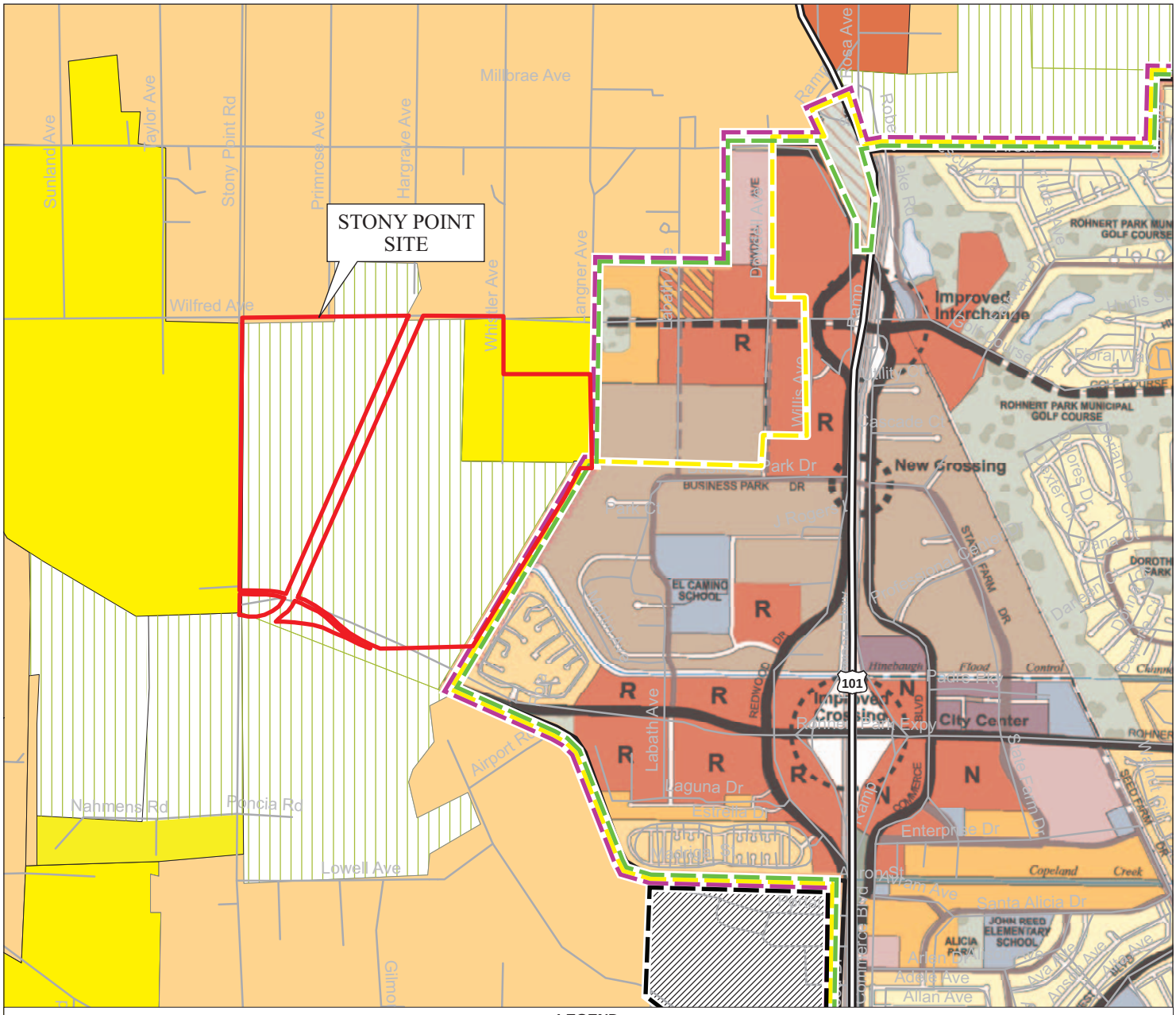
Land Extensive Agriculture District (LEA) - The purpose of this district is "to enhance and protect lands best suited for permanent agricultural use and capable of relatively low production per acre of land; and to implement the provisions of the land extensive agriculture land use category (Section 2.7.2) of the [Sonoma County] general plan and the policies of the agricultural resources element (Ord. No. 4643, 1993)."

B Combining District 6 (B 6) - The purpose of this zone is "to specify the residential density and/or minimum parcel or lot size for a particular parcel, lot, or area. The adopted zoning maps shall specify the maximum permitted density, determined by gross acreage for all residential uses. Minimum front, side, and rear yard requirements and the minimum parcel or lot size, if not



SOURCE: "Cotati, CA" USGS 7.5 Minute Topographic Quadrangle,Un-sectioned Area "Llano De Santa Rosa", T6N, R8W, Mt. Diablo Baseline and Meridian ; General Plan Land Use Data, Sonoma County Permit and Resource Management Department, January 1, 2004 ; AES, 2005

Figure 3.8-13
County Planning Areas Surrounding Stony Point Site



LEGEND

- Stony Point Site
- City Limits of Rohnert Park
- City of Rohnert Park 20 Year Urban Growth Boundary
- City of Rohnert Park Sphere of Influence
- City of Cotati

NORTH

0 1000' 2000'

CITY OF ROHNERT PARK GENERAL PLAN LAND USE DEFINITIONS

- Rural Estate Residential (up to 2 un/ac)
- Low Density Residential (4-6 un/ac)
- Medium Density Residential (6-12 un/ac)
- High Density Residential (12-30 un/ac)
- Commercial
  - N Neighborhood Commercial
  - R Regional Commercial
- Industrial
- Mixed Use
- Office
- Public/Institutional
- Parks
- Open Space-Environmental Conservation
- High Desity Residential / Commercial
- Open Space-Agriculture and Resource Management
- EXISTING / PROPOSED
  - Major Arterial (4-6 lanes)
  - Minor Arterial (2 lanes)
  - Major Collector (4 lanes)
  - Minor Collector (2 lanes)

COUNTY OF SONOMA GENERAL PLAN LAND USE DEFINITIONS

- Diverse Agricultural District
- Land Extensive Agriculture
- Rural Residential
- General Commercial
- Medium Density Residential
- Light Density Residential
- Mixed Use

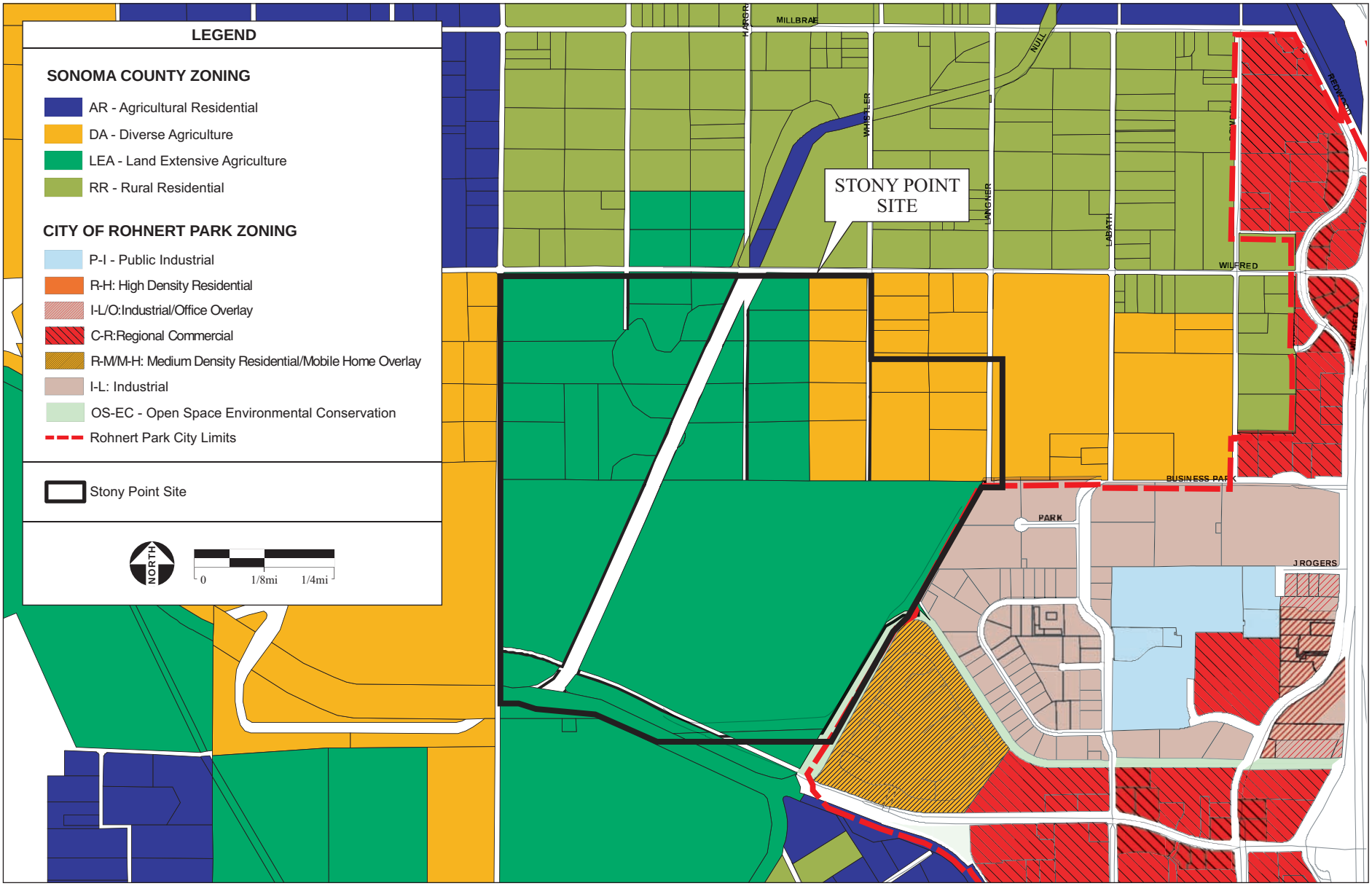
CITY OF COTATI GENERAL PLAN LAND USE DEFINITIONS

- Industrial

SOURCE: Dyett & Bhatia, October, 2002; AES, 2007

Figure 3.8-14

General Plan Land Use Areas - Stony Point Site and Vicinity



SOURCE: "Cotati, CA" USGS 7.5 Minute Topographic Quadrangle,
Un-sectioned Area "Llano De Santa Rosa", T6N, R8W,
Mt. Diablo Baseline and Meridian ; zoning data obtained from the Sonoma
County Permit and Resource Management Department, October 2004; AES, 2007

Figure 3.8-15

Applicable County and City Zoning Designations – Stony Point Site and Vicinity

otherwise specified, shall conform to the base district with which the B 6 district is combined unless specifically approved otherwise by the planning commission (Ord. No. 4643, 1993)."

Floodplain Combining District (F2) - The purpose of this district is "to provide for the protection from hazards and damage which may result from flood waters. This district shall be combined with other districts as provided in this chapter (Ord. No. 4643, 1993)."

Scenic Resources Combining District (SR) - The purpose of this district is "to preserve the visual character and scenic resources of lands in the county and to implement the provisions of Sections 2.1, 2.2, and 2.3 of the general plan open space element (Ord. No. 4643, 1993)."

Valley Oak Habitat Combining District (VOH) - The purpose of this district is "to protect and enhance valley oaks and valley oak woodlands and to implement the provisions of Section 5.1 of the general plan resource conservation element (Ord. No. 4991 § 1(h), 1996.)."

Second Unit Exclusion Combining District (Z) - The purpose of this district "is to provide for the exclusion of second units in the following areas:

E) Areas where there is an inadequate supply of water for drinking or firefighting purposes;
F) Areas where there are inadequate sewer services or danger of groundwater contamination;
G) Areas where the addition of second units would contribute to existing traffic hazards or increase the burden on heavily impacted streets, roads or highways; and
H) Areas where, because of topography, access or vegetation, there is a significant fire hazard (Ord. No. 4643, 1993)."

The immediate area around the Stony Point site includes the same county zone designations as provided in the Wilfred site discussion, above.

The Rohnert Park Expressway and Bellevue Wilfred Channel are located within privately owned parcels that divide the southern portion of the Stony Point Site.

LAKEVILLE SITE

Existing Land Uses

The Lakeville site is in an unincorporated area of Sonoma County in its southern end, southeast of the City of Petaluma and east of the City of Novato in Marin County. The Lakeville site is located on five parcels totaling approximately 322 acres of land. One parcel (238.52 acres) is

located west of Lakeville Road and north of State Route 37, while the remaining four parcels (18.92, 3.88, 53.83, and 6.68 acres) that comprise the Lakeville site are located approximately opposite of the first parcel east of Lakeville Road and north of State Route 37. All five parcels are currently used for cattle ranching.

The Lakeville site is bisected by Lakeville Highway and bordered on all sides by rural residential/grazing land. Intensive development is not present in the immediate vicinity of the Lakeville site.

Lakeville Site and Regional Planning

The Lakeville site is in Sonoma County's Petaluma and environs planning area. This planning area is located in southwest Sonoma County and extends from Penngrove to the Marin County line and from the Sonoma Mountains to Two Rock with population concentrated in Petaluma and rural residential areas adjoining the city limits (Sonoma County, 1989). **Figure 3.8-16** shows the planning areas surrounding the Lakeville site and General Plan land uses for the site and vicinity. **Figure 3.8-17** shows the zoning designations for the Lakeville site and immediate vicinity. The combining districts are not shown in **Figure 3.8-17** due to the complexity of mapping these districts. **Figure 3** in **Appendix Q** maps the combining districts for each of the Lakeville site parcels and the parcels immediately surrounding the Lakeville site within a 1/8-mile radius.

The surrounding land uses are mostly agricultural with a few rural homesteads, a dairy, equestrian center, and the Sears Point Raceway. Access to one of the parking lots for the raceway is off Lakeville Road, northeast of the Lakeville site.

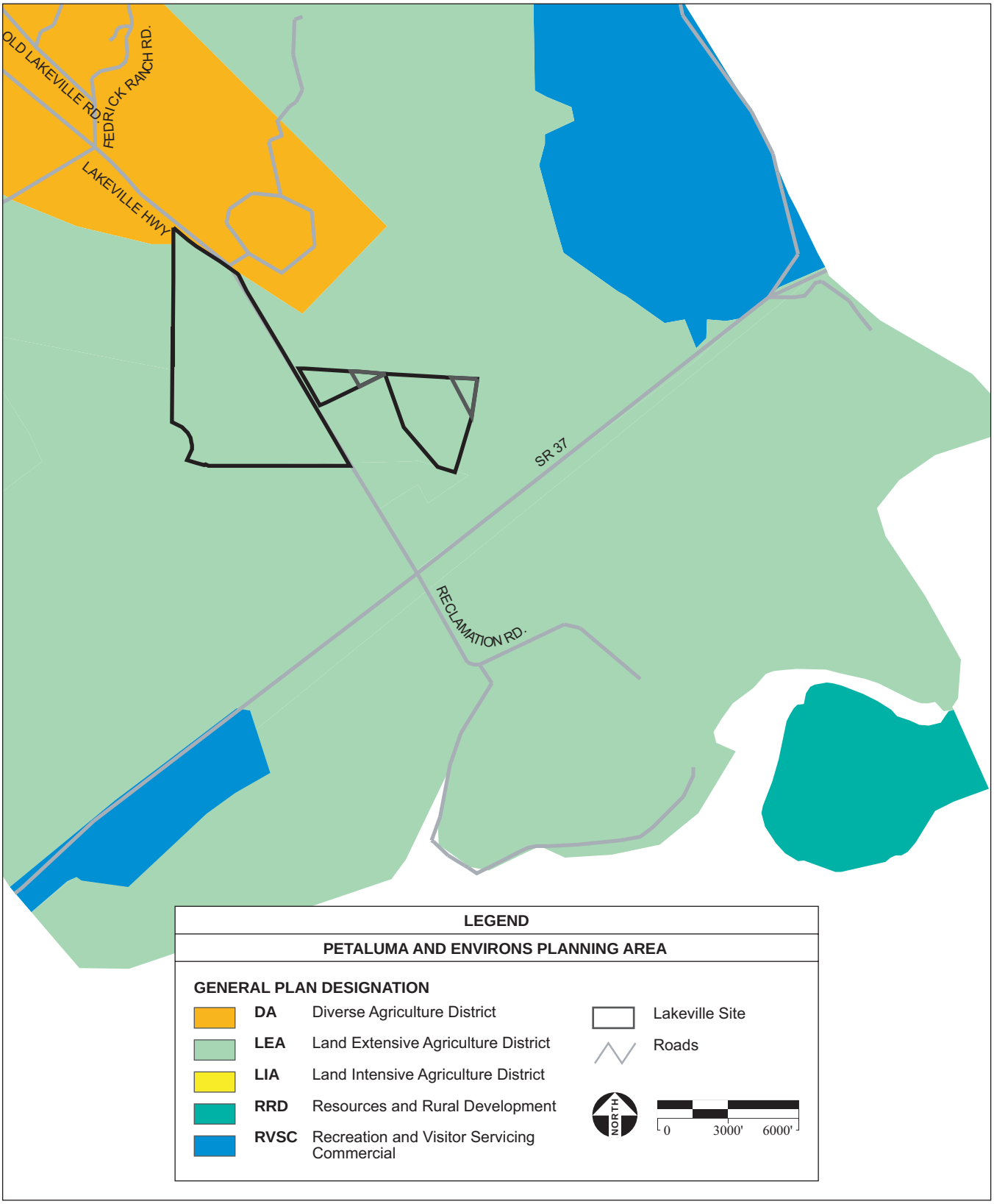
Sonoma County General Plan

The Lakeville site's parcels are within the Land Extensive Agriculture District. All of the Lakeville site but the north half of parcel 068-150-010 is contained within the South Sonoma Mountains Scenic Landscape Unit as contained in the Sonoma County General Plan Open Space Plan Map.

Zoning Districts: Sonoma County Zoning Regulations

The five parcels that make up the Lakeville site are zoned as Land Extensive Agriculture, 60 acres, and Scenic Resource designation. The zone designations described for the Stony Point site are the same as those included in the Lakeville site. The immediate area around the Lakeville site includes the following zone designations:

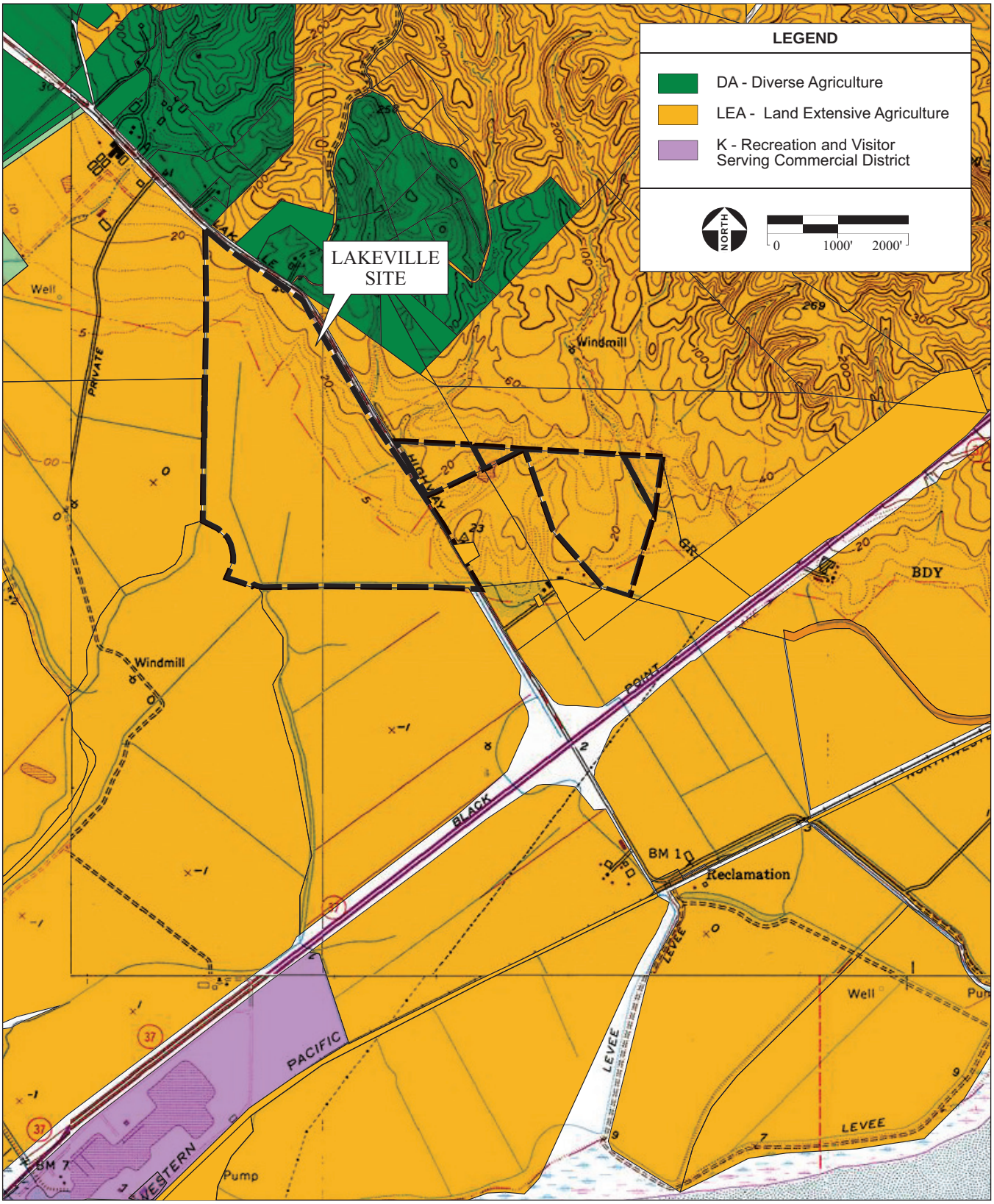
Resources and Rural Development (Agricultural Preserve) District (RRDWA) - The purpose of this district is to "implement the provisions of the resources and rural development land use category (Section 2.8.1) of the general plan in a manner consistent with the provisions of Section



SOURCE: General Plan Land Use Data, Sonoma County Permit and Resource Management Department, January 1, 2004; AES, 2005

Figure 3.8-16

County General Plan Land Use Areas - Lakeville Site and Vicinity



SOURCE: "Sears Point, CA" USGS 7.5 Minute Topographic Quadrangle, Unsectioned areas of "San Pablo Mountains", T4N, R5W; Mt. Diablo Baseline & Meridian ; zoning data obtained from the Sonoma County Permit and Resource Management Department, October 2004 ; AES, 2005

Figure 3.8-17
County Zoning Designations Lakeville Site and Vicinity

51200 et seq. of the Government Code and the Land Conservation Act of 1965. (Ord. No. 4643, 1993.)."

B Combining Districts, 7 (B 7) - The purpose of this district is "to specify the residential density and/or minimum parcel or lot size for a particular parcel, lot, or area (Ord. No. 4643, 1993). Minimum parcel or lot size shall be as specified on the recorded final or parcel maps and the parcels or lots shall not be further subdivided. The B7 combining district signifies that the lot has been frozen in order to restrict further subdivision of large remaining parcels left after approval of a clustered subdivision as provided in general plan Policy LU-6c. A lot line adjustment may be applied for, processed, and approved pursuant to Chapter 25 of the Sonoma County Code and this chapter. Minimum front, side and rear yard requirements shall conform to the base district with which the B7 district is combined unless specifically approved otherwise by the planning commission."

Biotic Resource Combining District (BR) - The district is described under the list of zoning for the Stony Point site.

Resources and Rural Development (RRD) - The purpose of this zone is to "provide protection of lands needed for commercial timber production, geothermal production, aggregate resources production; lands needed for protection of watershed, fish and wildlife habitat, biotic resources, and for agricultural production activities that are not subject to all of the policies contained in the agricultural resources element of the general plan. The resources and rural development district is also intended to allow very low-density residential development and recreational and visitor-serving uses where compatible with resource use and available public services. (Ord. No. 4643, 1993.)."

3.8.3 AGRICULTURE

REGULATORY SETTING

Farmland Protection Policy Act

The 1981 Congressional report, *Compact Cities: Energy-Saving Strategies for the Eighties*, identified the need for Congress to implement programs and policies to protect farmland and combat urban sprawl and the waste of energy and resources that accompanies sprawling development. The report indicated that much of the sprawl was the result of programs funded by the Federal Government. With this in mind, Congress passed the Agriculture and Food Act of 1981, which contained the Farmland Protection Policy Act (FPPA) (7 U.S.C. § 4201). The FPPA is intended to minimize the impact Federal programs have on the unnecessary and irreversible conversion of farmland to nonagricultural uses. It assures that Federal programs are administered

to be compatible with state and local units of government, and private programs and policies to protect farmland (NRCS, 2004).

The Natural Resource Conservation Service (NRCS) is responsible for the implementation of the FPPA and categorizes farmland in a number of ways. These categories include: prime farmland, farmland of statewide importance, and unique farmland. Prime farmland is considered to have the best possible features to sustain long-term productivity. Farmland of statewide importance includes farmland similar to prime farmland but with minor shortcomings, such as greater slopes or less ability to store soil moisture. Unique farmland is characterized by inferior soils and generally needs irrigation depending on climate. The designated farmlands must also have been in production four years prior to the mapping date.

The Land Evaluation and Site Assessment (LESA) is a numeric rating system used by the NRCS to evaluate the relative agricultural importance of farmlands. This evaluation is completed on Form AD 1006, the Farmland Conversion Impact Rating Form. This form is used by federal agencies in cooperation with the NRCS to assess the impacts of farmland conversion on proposed sites of Federally funded and assisted projects. Form AD-1006 uses criteria developed by the Secretary of Agriculture, in cooperation with other Federal agencies, pursuant to the Farmland Protection Policy Act. Federal agencies are required to use these criteria to identify and take into account the adverse effects of their programs on the preservation of farmland. The land evaluation (LE) component of the LESA system is completed by the NRCS and is based on information from several sources including soil surveys, NRCS field office technical guides, soil potential/productivity ratings, land capability classifications, and important farmland determinations. Based on this information, farmland proposed for conversion is assigned a rating between 0 and 100 points, representing the relative value, for agricultural production, of the farmland to be converted compared to other farmland in the same local government jurisdiction. Based on these findings, federal agencies may proceed with the completion of the site assessment (SA) component of the LESA system, which rates other factors that contribute to the site's agricultural importance, such as parcel size and on farm investments. The Federal agency must assign a rating for each of the twelve FPPA-defined site assessment criteria (see Part VI of Form AD-1006, contained in **Appendix P**). Maximum points for each criterion ranges from 5 to 20 points, for a maximum total site assessment rating of 160 points.

The FPPA recommends that the Federal agency combine the land evaluation rating with the site assessment rating to identify the effect of its proposed action on farmland, and make a determination as to the suitability of the site for protection as farmland. Once the combined score is computed, the U.S. Department of Agriculture (USDA) recommends that sites receiving a total score of less than 160 not be given further consideration for protection and no additional sites need to be evaluated (in an attempt to reduce impacts by protecting the site in question). Sites

receiving scores totaling 160 or more should be given increasingly higher levels of consideration for protection (7 C.F.R. § 658.4).

California Land Conservation Act

The California Land Conservation Act (LCA) of 1965, also known as the Williamson Act (Government Code §51200 *et. seq*.), is designed to preserve farmlands and open space lands by discouraging premature and unnecessary conversion to urban uses. The Williamson Act is a voluntary State program, administered by counties and cities, for the preservation of agricultural land. Under the provisions of the Williamson Act, landowners contract with the county to restrict the use of land to productive agricultural or open space use of their lands in return for reduced property tax assessment. The contract is a 10-year agreement that automatically renews each year. The landowner may file a notice of non-renewal that involves a ten-year phase-out period where the tax assessments are adjusted to full market value before the restrictions are no longer in effect. Consequently, land under a Williamson Act contract can be in either a renewal status or a non-renewal status. Lands with a non-renewal status indicate the farmer has withdrawn from a Williamson Act contract and is waiting for a period of tax adjustment for the land to reach its full market value. Non-renewal lands are still subject to the terms of the contract until the contract is completely phased out. Lands that are no longer under contract are still subject to local land use and zoning regulations, but are not limited by the contract to maintain productive agricultural use (DOC, 2005).

Agriculture and open space must be the primary use of lands under Williamson Act contracts. Land uses that are "compatible" with agricultural production are also allowed and determined by the county administering the contract. According to the Department of Conservation "Any development on property subject to a Williamson Act contract must be incidental to the primary use of the land for agricultural purposes and in compliance with local uniform rules or ordinances." The Department of Conservation has defined "incidental to" as follows: "A use is incidental when it is required for or is part of the agricultural use."

Sonoma County Right to Farm Ordinance

The Sonoma County Right to Farm Ordinance was adopted in 1999 by the Board of Supervisors to support County policies regarding the conservation and enhancement of agricultural operations in unincorporated County lands. The stated purpose and intent of the Right to Farm Ordinance is to reduce impacts to County agricultural resources "by limiting the circumstances under which properly conducted agricultural operations on agricultural land may be considered a nuisance." The ordinance promotes a good-neighbor policy by requiring that users of property adjacent to or near agricultural operations be notified of the inherent potential problems associated with being located near such operations, including noise, odors, dust, operation of machinery, application of fertilizers, soil amendments, seeds and pesticides and other potential effects. Through

notification, it is intended that property owners will better understand the potential consequences of being located near agricultural operations. The ordinance states that attendant conditions from properly conducted agricultural operations shall not be considered a nuisance to adjacent property owners and shall be accepted as being a normal and necessary aspect of being located in a rural area (Sonoma County, 1999).

EXISTING CONDITIONS

Sonoma County

The California Department of Conservation, Division of Land Resource Protection, maintains the Farmland Mapping and Monitoring Program (FMMP), which monitors the conversion of the state's farmland to and from agricultural use. **Table 3.8-7** provides a summary of agricultural land within Sonoma County converted to non-agricultural uses during the time frame from 2000 to 2002. Between these years, approximately 3.8% of the agricultural land in Sonoma County was converted to non-agricultural uses.

Wilfred Site

As determined by the NRCS, the Wilfred site does not contain prime farmland, farmland of statewide importance, or unique farmland. The northeastern parcels are non-irrigated and are composed mainly of native vegetation. The four parcels in the southern portion of the project site are unirrigated pasturelands. Cattle are located on the southwestern parcel adjacent to Stony Point Road while the remaining parcels grow rye grass to be used as forage. These four parcels, totaling approximately 182 acres in the southern portion of the Wilfred site, are currently under Williamson Act contracts (**Figure 3.8-18**). To date, no applications have been filed for the non-renewal or other cancellation of the Williamson Act contracts.

TABLE 3.8-8
FARMLAND CONVERSION IN SONOMA COUNTY

Land Use Category	Total Acres Inventoried		2000-2002 Acreage Changes		
	2000	2002	Acres Lost	Acres Gained	Net Change
Prime Farmland	37,035	36,377	3,227	2,569	-658
Farmland of Statewide Importance	18,921	19,747	1,966	2,792	826
Unique Farmland	30,289	31,173	4,218	5,102	884
Farmland of Local Importance	87,661	74,851	16,300	3,490	-12,810
Important Farmland Subtotal	**173,906**	**162,148**	**25,711**	**13,953**	**-11,758**
Grazing Land	432,724	421,126	14,427	2,829	-11,598
Agricultural Land Subtotal	**606,630**	**583,274**	**40,138**	**16,782**	**-23,356**

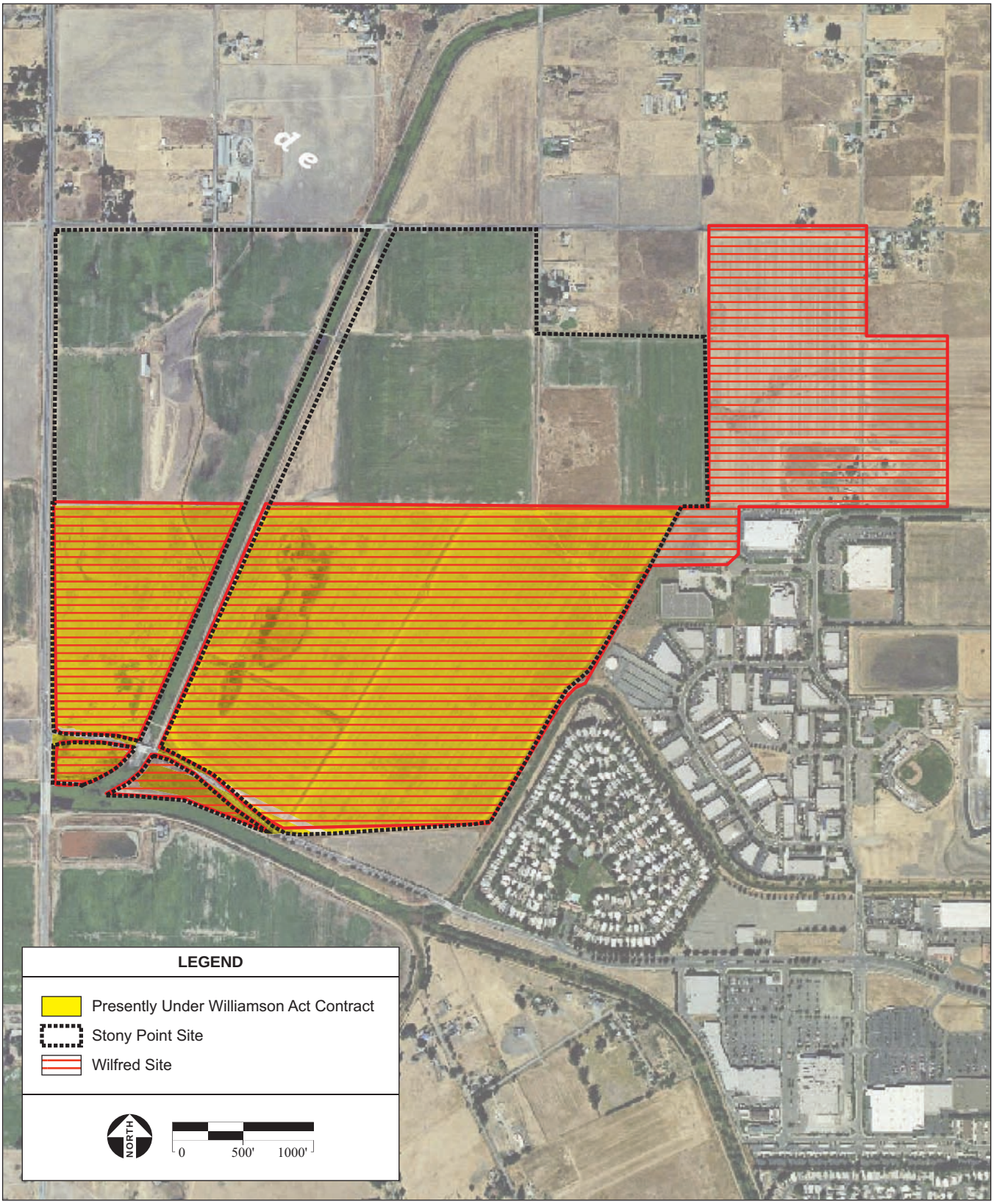
SOURCE: California Department of Conservation, Division of Land Resource Protection, 2006; (Table A-37)

Stony Point Site

According to the NRCS, the Stony Point site contains prime farmland, farmland of statewide and local importance, and unique farmland. This farmland is located in the northern portion of the site. The northern parcels are used for cattle grazing. Rye grass is irrigated with recycled wastewater to be used as forage for the milk cows. The parcels in the southern section of the Stony Point site are also included in a portion of the Wilfred site. As with the Wilfred site, the four parcels in the southern portion of the project site do not contain prime farmland or farmland of statewide or local importance. They are unirrigated pasturelands consisting mainly of rye grass. These four parcels total approximately 182 acres and are currently under Williamson Act contracts (**Figure 3.8-18**). To date, no applications have been filed for the non-renewal or other cancellation of the Williamson Act contracts.

Lakeville Site

The NRCS determined that the Lakeville site does not contain unique, prime or statewide or locally important farmland (Sternfels, 2004). The five parcels that make up the Lakeville site total approximately 322 acres. All of these parcels are unirrigated and currently used for cattle ranching. In addition, none of the parcels comprising the Lakeville site are under a Williamson Act contract.



SOURCE: Aerial Photography August 2002; AES, 2006

Figure 3.8-18
Williamson Act Parcels

3.8.4 OTHER RESOURCE USES

Except for public recreational uses of the Laguna de Santa Rosa, which flows through the southwestern corner of the project site, neither the Wilfred, Stony Point nor the Lakeville sites are used for hunting, fishing, gathering, timber harvesting, mining, or recreational activities.

3.9 PUBLIC SERVICES

This section addresses existing public services relating to the Wilfred Site, Stony Point Site, and Lakeville Site. The issues that are addressed include: water supply, wastewater, solid waste, energy, telecommunications, law enforcement, fire protection, and emergency medical services.

3.9.1 WATER SUPPLY

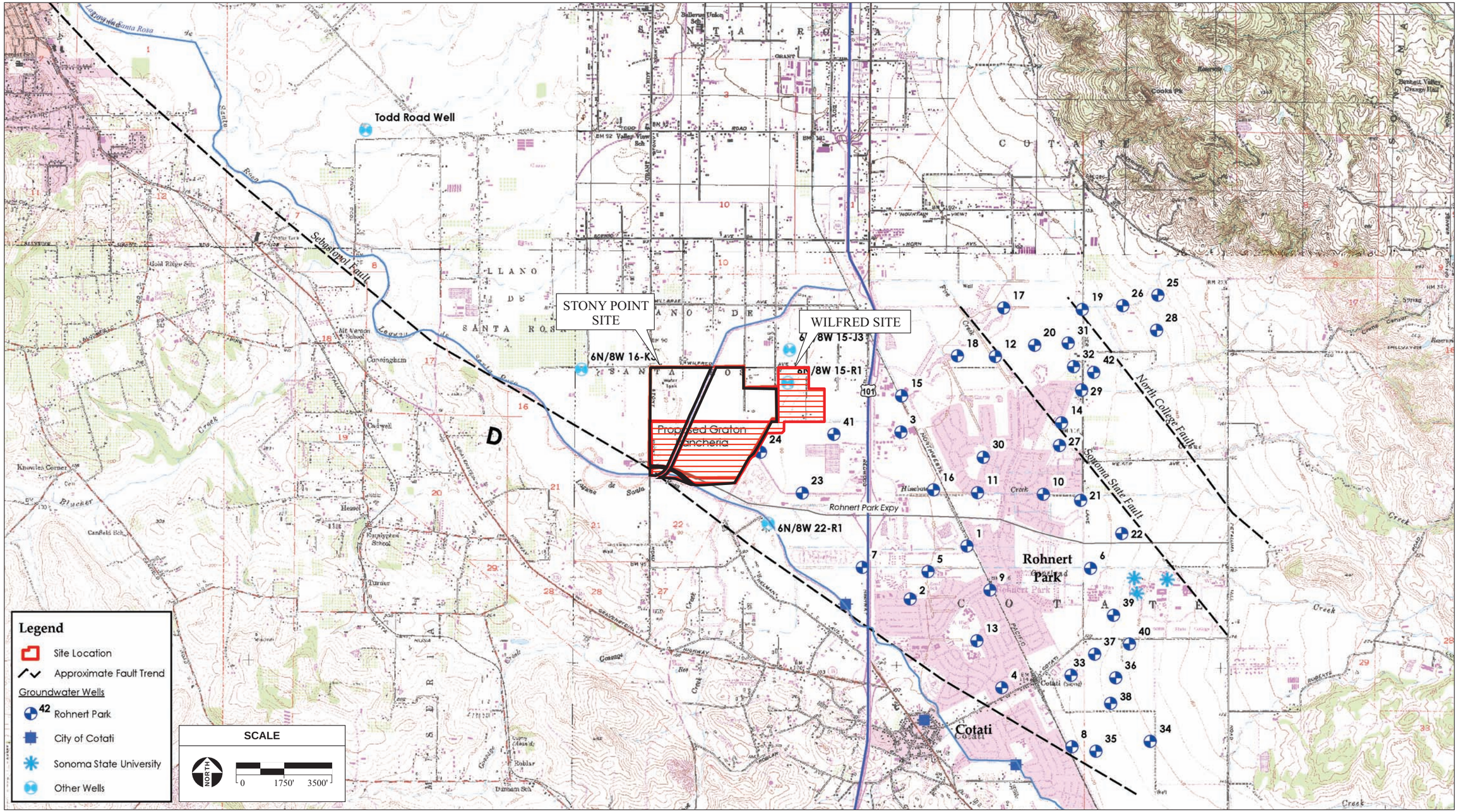
Please see **Section 3.3 Water Resources** for a detailed discussion of existing on-site surface water and groundwater resources.

WILFRED SITE

Water is supplied in the vicinity of the Wilfred Site by private domestic wells, irrigation wells, the City of Rohnert Park, Sonoma State University, the City of Cotati, Penngrove Water Company, and Sonoma County Water Agency (SCWA). Most wells in the region serve domestic supply purposes with a smaller number operating for irrigation, stock, municipal, and industrial purposes. The site is within an agricultural area where irrigation pumping is substantial. Within a 1.5-mile radius of the site, 193 shallower wells (up to 200 feet deep) and 61 deeper wells (over 200 feet deep) were identified. These wells are shown on Figures 10 and 11 of the Groundwater Study prepared for the Wilfred and Stony Point Sites (**Appendix G**). Private wells in west Rohnert Park are typically 100-200 feet in depth (HydroScience, 2006). The City of Rohnert Park's municipal wells generally pump from aquifers between 200 and 1,200 feet below ground surface (KOMEX, 2007a). **Figure 3.9-1** displays the location of the City's well field as well as a selection of other large local wells.

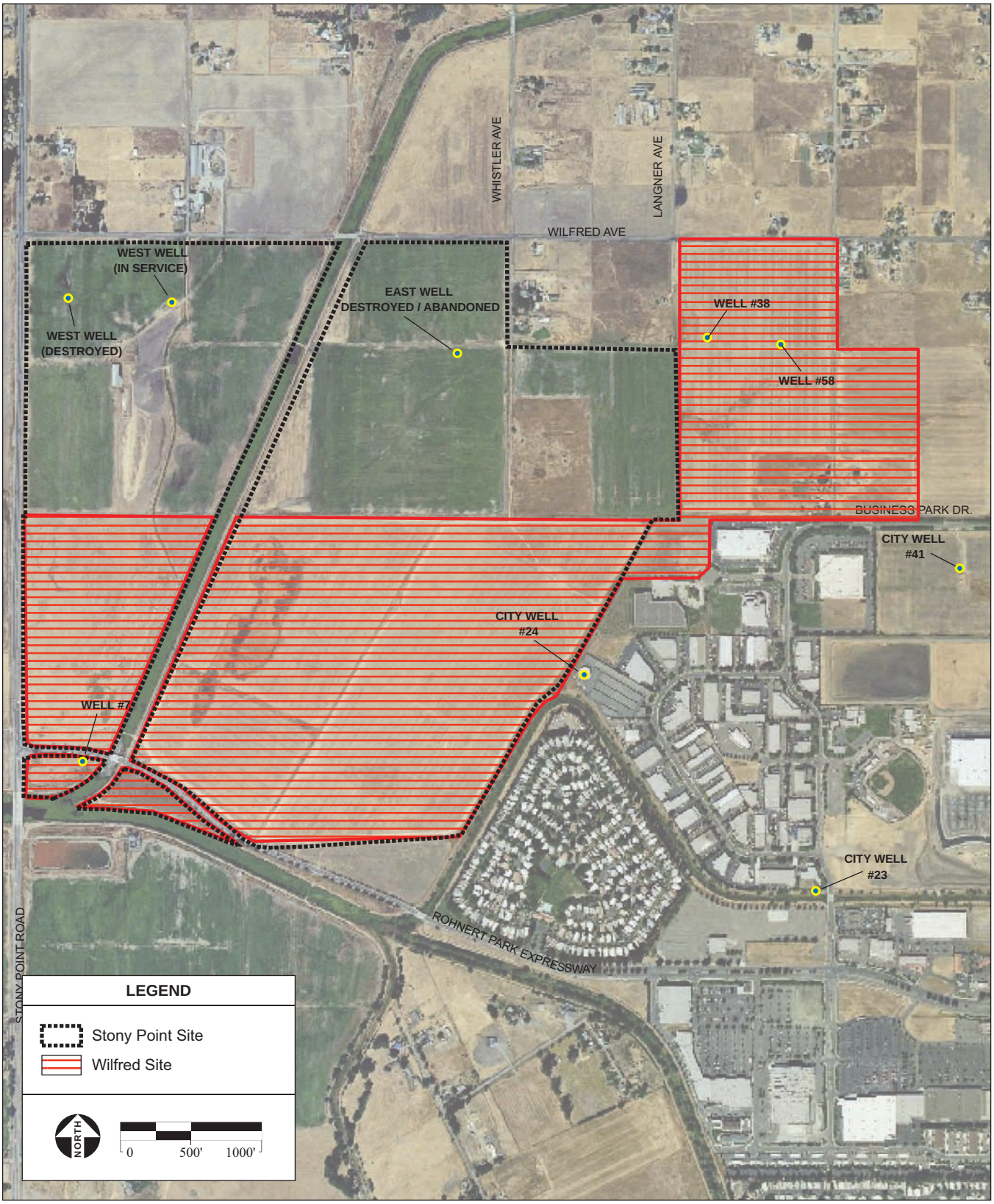
The largest water suppliers in the area are the City and SCWA, both of which are discussed in more detail below. Other water suppliers include Sonoma State University, which operates two private wells and pumped 0.09 million gallons per day (mgd) (approximately 63 gallons per minute (gpm)) in 2003. The City of Cotati operates three groundwater wells and pumps approximately 0.3 mgd (approximately 208 gpm). Penngrove Water Company supplies water to a small area in east Rohnert Park and pumps approximately 0.03 mgd (approximately 21 gpm) (KOMEX, 2007a).

There are three wells located on the Wilfred Site, HydroScience Well #7, KOMEX Well #38 and KOMEX Well #58 (KOMEX, 2007a; HydroScience, 2006). Well #7 is a small diameter well with a pump to fill cattle watering troughs and is located in the southwest corner of the Wilfred Site (**Figure 3.9-2**). Well #38 is a deep irrigation well with a depth of 1,028 feet. Well #58 is a shallow domestic well installed in 1979 with a depth of 120 feet (KOMEX, 2007a). Well #38



SOURCE: Komex, 2007; AES, 2005

Figure 3.9-1
Municipal Well Locations



SOURCE: Hydroscience Engineers; Aerial Photo 8/2002; Komex, 2007; AES, 2005

Figure 3.9-2

Well Locations – Wilfred Site and Stony Point Site and Vicinity

and Well #58 are located on the northeast portion of the Wilfred Site; however, only their approximate location is known.

The nearest water supplier to the Wilfred Site is the City of Rohnert Park (City) (other municipal water providers in the region are described in **Appendix G**). The City of Rohnert Park, located in the Laguna de Santa Rosa watershed within Sonoma County, utilizes 3 sources of water supply: local groundwater, surface water from the Sonoma County Water Agency (SCWA), and recycled water (City of Rohnert Park, 2005).

Rohnert Park derives its water supply from a wellfield consisting of 42 wells, 31 of which are active; and 8 active connections with SCWA's Petaluma Aqueduct (City of Rohnert Park, 2000; KOMEX, 2007a). Rohnert Park's current water supply also includes recycled water (City of Rohnert Park, 2005). **Section 3.3.2** and **Appendix G** contain a detailed accounting of the City of Rohnert Park's past and present water usage.

Sonoma County Water Agency Russian River System

The SCWA provides wholesale water service to Windsor, Santa Rosa, Rohnert Park, Cotati, Petaluma, Sonoma, North Marin Water District, and Valley of the Moon Water District from its Russian River System. The City of Rohnert Park receives water from SCWA through an aqueduct connection. The potable water from SCWA includes a combination of treated surface water and water from Ranney subsurface collectors. The City of Rohnert Park is allocated up to 15 mgd (approximately 10,420 gpm) from the aqueduct with an annual limit of 7,500 acre-feet (approximately 2.44 billion gallons) (HydroScience, 2006). Rohnert Park receives water from SCWA under the terms of an agreement signed in October 1974, which has since been amended 11 times.

The current Eleventh Amended Agreement for Water Supply was approved in January 2001 and increased Rohnert Park's entitlement to 15 mgd. However, water allocated in the Eleventh Amended Agreement exceeded actual production capacity and SCWA announced that an interim impairment condition existed. This was explained as a consequence of SCWA failing to build capacity ahead of need. Additionally, it was anticipated by SCWA that the development of the WSTSP system would increase diversions from the Russian River allowing more water for contractors. In response to the impairment condition SCWA, the City of Rohnert Park and other contractors with SCWA signed the Memorandum of Understanding Regarding Water Transmission System Capacity Allocations During Temporary Impairment. Through the MOU, Rohnert Park was allocated 4.8 mgd from 2000-2002, 5.2 mgd from 2003-2004, and 5.3 mgd in 2005 (KOMEX, 2007a).

In May 2003, the First District Court of Appeals held that the EIR for the WSTSP was inadequate and SCWA announced a new EIR would be prepared (*Friends of the Eel River v. Sonoma County Water Agency, 108 Cal. Ap. 4th 859*). The SCWA informed contractors including the City of Rohnert Park that they should not rely on the anticipated increased diversions from the Russian River and requested expected future water demands. The City of Rohnert Park estimated water demand at 6,926 acre feet per year (6.28 mgd), which would be provided under the 7,500 acre feet per year limit in the Eleventh Amended Agreement (KOMEX, 2007a).

Recycled Water

The City of Rohnert Park uses approximately 10 million gallons of recycled water per month in summer months for irrigation of trees and landscaping throughout the city. The City adopted a Mandatory Use Ordinance for Recycled Water to assure that recycled water is utilized where appropriate. Recycled water offsets over 3 mgd of potable city water. Approximately 510 acres of land are irrigated with recycled water in Rohnert Park which include: two 18-hole golf courses; Roberts Lake Park; Roberts Lake Road and the Park 'n Ride lot landscaped area; City parks; school grounds; and private companies with lawn and landscaped areas (Rohnert Park, City of, 2006). Current recycled water use averages just over 1,000 afy and planned recycled water use is 1,300 afy. The City is currently reviewing the *Incremental Recycled Water Program EIR* prepared by the Subregional Water Recycling System for the expansion of the Rohnert Park recycled water system. The expansion will further reduce demands on water supply and the anticipated completion date is 2010 (City of Rohnert Park, 2005, **Appendix H**).

Local Groundwater Use

The City derives a portion of its drinking water supply from a well field comprising 42 municipal supply wells, 31 of which were active in 1999, and from eight active connections to the SCWA Petaluma Aqueduct. Inactive wells include wells used solely for water level measurement, wells experiencing decreased yields, and wells with maintenance or water quality issues. The average draw on City wells is approximately 100 gpm (HydroScience, 2006). In 1999, groundwater supplied 61% (4.19 mgd) of the City's water supply (KOMEX, 2007a). Generally the aquifer below Rohnert Park varies east and west of Highway 101. Areas east of Highway 101 have shallow, low-yield aquifers, which influence neighboring domestic and agricultural wells. Aquifers on the west side of Rohnert Park generally have deeper, more productive wells (HydroScience, 2006). The rated capacity of the City's well field is 6.3 mgd (HydroScience, 2006). Nearby on-site wells and city wells are shown in **Figure 3.9-2.** The closest city well, #24, is no longer used by the City due to high levels of iron and manganese in the groundwater. Although iron and manganese pose no health risk, they may result in aesthetic impacts such as staining (HydroScience, 2006).

The potential effects of the City's groundwater pumping on wells outside of City limits has resulted in legal action against the City. Due to a 2000 lawsuit, the City agreed to cut back groundwater usage from 4.2 to 2.3 mgd before additional annexation of County lands could occur. However, in order to reduce groundwater withdrawals the City would need to receive additional supplies from SCWA. SCWA anticipated that they could supply additional quantities of water due to the proposed WSTSP. The construction of the WSTSP was delayed by litigation and regulatory constraints and as a result the SCWA was unable to supply the City with water to reduce its groundwater withdrawals. The expected completion of the WSTSP was 2010 at which time the City expected to eliminate groundwater as a potable water supply and receive all water from SCWA (KOMEX, 2007a). Future groundwater used is intended to be less than 2.3 mgd according to the City's 2004 Water Policy Resolution (KOMEX, 2007a).

The City of Rohnert Park published a final Water Supply Assessment (WSA) (**Appendix H**) which describes the relationship between projected demands on the city's water supply and the availability of that supply under normal and dry years. The final WSA illustrates the City's strategy for utilizing the SCWA allocation, current and future recycled water supplies and local groundwater supply to meet the demands associated with new development in the areas proposed for annexation (City of Rohnert Park, 2005, **Appendix H**). According to the WSA, the City intends to follow a conjunctive use strategy with its three water supply sources. During normal and above normal water years, the City would meet demands with its SCWA allocation and recycled water first, in order to minimize its demands on groundwater during these periods. In dry and multiple dry years, the WSA states that the City would continue to use recycled water to the maximum extent possible. During these periods of dry and multiple dry years, the City anticipates that a reduction in the SCWA allocation may occur as presented in the Eleventh Amendment Agreement (City of Rohnert Park, 2005, **Appendix H**).

STONY POINT SITE

The description of municipal water and private water supplies for the Stony Point Site is similar to that for the Wilfred Site due to proximity. Four wells are located on the Stony Point Site including HydroScience Well #7 described above under the Wilfred Site. Of the three wells exclusive to the Stony Point Site, two are no longer in service. The west well (HydroScience Well #1), the remaining well in use, is located in the northwest corner of the Stony Point Site and is used for low volume pumping in connection with cattle activities on that portion of the site. As with the Wilfred Site, the nearest City well is #24. On-site wells and nearby City wells are shown on **Figure 3.9-2**.

LAKEVILLE SITE

There are no existing utility agencies that provide water service to the Lakeville Site. The site is located within the Petaluma Valley Groundwater Basin. There are no municipal supply wells in

the lower Petaluma Valley; the closest municipal wells are located in the City of Petaluma, approximately 9 miles northwest of the Lakeville Site. There are approximately 57 private wells within 1.5 miles of the Lakeville Site. These wells range in depth from 12-736 feet, with an average depth of 243 feet (KOMEX, 2007b). These wells are shown on Figure 5 of the Groundwater Study prepared for the Lakeville Site (**Appendix G**). Well yields average 40 gpm and the maximum reported yield is 650 gpm. Approximately 35 wells are for domestic use, 6 for stock watering/dairy, 2 for irrigation, 2 for monitoring, and 8 for other or unidentified purposes. Two wells are located on the Lakeville Site. North #1 is located on the east side of the Lakeville Site and has a depth of 413 feet. North #2 is located on the west side of the Lakeville Site and has a depth of 650 feet (KOMEX, 2007b).

3.9.2 WASTEWATER SERVICE

WILFRED SITE

There are no municipal wastewater services to the Wilfred Site. The City of Rohnert Park provides wastewater service to areas within the 1999 City limits and Sonoma State University (Rohnert Park, City of, 2000). The Laguna Subregional Wastewater Treatment Plant (WWTP) provides local public wastewater treatment. The Laguna WWTP is located at 4300 Llano Road, approximately four miles west of the Wilfred Site. The WWTP has an average daily dry weather flow of 17.5 mgd (City of Santa Rosa, 2006) and an average daily dry weather capacity of 21.3 mgd (**Appendix D**). The WWTP provides wastewater treatment to the cities of Rohnert Park, Cotati, Santa Rosa, and Sebastopol, as well as the unincorporated South Park County Sanitation District, and wastewater from industrial dischargers. The City of Rohnert Park owns 3.43 mgd of capacity at the Laguna WWTP and has authorization to use a portion of the City of Santa Rosa's unused allotment. Improvements to the effluent disposal system are expected to increase the City of Rohnert Park's allocation to 5.15 mgd (HydroScience, 2006).

The tertiary treatment process consists of grit removal in pre-aeration tanks, sludge and scum removal in primary sedimentation tanks, biological treatment with coagulation, flocculation, sedimentation and clarification followed by filtration. Ultraviolet light is used for disinfection. A belt filter press is used to dewater biosolids. The dewatered biosolids are used for composting, fertilizer and/or disposed of at a landfill. The Laguna WWTP is currently permitted to discharge to 15 locations, including directly to the Laguna de Santa Rosa. The Laguna WWTP is currently constructing a 30-inch diameter sanitary sewer force main on Wilfred Avenue, adjacent to the northern boundary of the Wilfred Site. This force main continues northwest onto Walter Avenue, and eventually reaches the Laguna WWTP headworks west of the Wilfred Site.

Agricultural and urban irrigation is the primary method used to dispose of tertiary treated wastewater, and river discharge is used only as necessary during the rainy season. More than 50 percent of this reclaimed water (nearly four billion gallons annually) is used to irrigate

approximately 5,700 acres of farmlands, including pastures, hay crops, vineyards, and row crops. The reclaimed water is also used to irrigate golf courses, parks, school grounds, and both public and private urban landscaping. All of the water produced during the summer months is used for irrigation, and all of the winter water that can be stored is saved for irrigation for the following summer (Santa Rosa, City of, 2003). Water levels in the ponds are monitored, and when they reach maximum capacity, water is discharged into the Russian River, according to the City of Santa Rosa's National Pollutant Discharge Elimination System (NPDES) permit for the wastewater discharge (Santa Rosa, City of, 2003).

STONY POINT SITE

The description of municipal wastewater services for the Stony Point Site is similar to that for the Wilfred Site due to proximity. There are currently no municipal wastewater services to the Stony Point Site.

LAKEVILLE SITE

There are no existing wastewater facilities at the Lakeville Site. The nearest wastewater treatment facility is the Novato Sanitary District plant (NSD), located approximately 6 miles west of the Lakeville Site. The treatment plant provides primary and secondary treatment. During summer months, wastewater is recycled and used for irrigation and a wildlife pond. During winter months, water is discharged to the San Pablo Bay. NSD serves approximately 60,000 residents; however, the service area for NSD does not extend to the Lakeville Site (NSD, 2006).

The second closest facility is the City of Petaluma's wastewater treatment plant on Lakeville road located approximately 10 miles north of the Lakeville Site. The Petaluma Plant services approximately 55,000 people within the City of Petaluma, the City's urban growth area, and the community of Penngrove. The Petaluma Plant provides secondary treatment of wastewater and has an average dry weather design capacity of 5.2 mgd. During summer months, wastewater is used for irrigation of agricultural land and a golf course. During winter months, wastewater is released to the Petaluma River (Petaluma, City of, 2006). The expansion will provide the build-out capacity necessary for the City of Petaluma. Any project outside of the City of Petaluma's urban growth line, which proposes to dispose of wastewater to the treatment plant, would require approval by the City council and possibly other agencies. The Lakeville Site is located outside the sphere of influence of the City of Petaluma's wastewater service area.

3.9.3 SOLID WASTE SERVICE

WILFRED SITE

The management of non-hazardous solid waste in Sonoma County is mandated by State law and guided by policies at the State and local levels. In 1989, the State of California enacted Assembly

Bill (AB) 939, the California Integrated Waste Management Act. The purpose of AB 939 is to: reduce, recycle, and reuse solid waste generated in the State to the maximum extent feasible; improve regulation of existing solid waste landfills; ensure that new solid waste landfills are environmentally sound; streamline permitting procedures for solid waste management facilities; and specify the responsibilities of local governments to develop and implement integrated waste management programs. As a result of AB 939, all local jurisdictions, cities, and counties are required to divert 50% of the total waste stream from landfill disposal by the year 2000. The Sonoma County Waste Management Authority (SCWMA) met the mandated 25% diversion goal in 1994 and reached a 40% diversion goal in 2000. While Sonoma County has been successful in implementing diversion programs, the 50% mandate has not been reached. With the approval of the SCWMA's time extension application, the County Integrated Waste Management Plan discusses programs aimed at reaching the 50% mandate rate. The 50% diversion goal has been extended by the CIWMB's approval of SCWMA's Time Extension Application on June 18, 2002. A 70% diversion goal for 2015 was identified in the Solid Waste Management Alternatives analysis approved by the Sonoma County Board of Supervisors on February 6, 2001 and by the SCWMA on February 21, 2001 (Sonoma County Waste Management Agency, 2003).

Sonoma County provides waste haul and disposal services to unincorporated areas, such as the Wilfred Site. Eight franchised private collection companies handle refuse collection in Sonoma County and bring solid waste to the nearest transfer station. A series of transfer stations have been built by the County to facilitate economical disposal of refuse generated in the County. The Annapolis, Guerneville, Sonoma, and Healdsburg transfer stations are all located at sites which once served as landfills. Rohnert Park Disposal currently provides weekly residential and commercial trash pick-up service for the City of Rohnert Park, including the incorporated areas near the Wilfred Site.

Solid waste in Sonoma County was formerly hauled from transfer stations to the Central Landfill; however, the Central Landfill is no longer accepting waste. Waste is now outhauled to several different landfills including: Redwood Landfill, Keller Canyon Landfill, West Contra Costa Landfill, Vasco Road Landfill and Potrero Hills Landfill. Most solid waste is transferred to the Redwood Landfill in Novato. It is anticipated that outhaul will occur for the next 5 years (Morelli, pers comm, 2006). It is unknown whether after this time, the Central Landfill will be expanded or outhaul will continue.

STONY POINT SITE

The solid waste services for the Stony Point Site are the same as those described for the Wilfred Site. Solid waste is collected by Sonoma County and most waste is outhauled to the Redwood Landfill.

LAKEVILLE SITE

The solid waste services for the Lakeville Site are the same as those described for the Wilfred Site. Sonoma County provides waste haul and disposal services to the Lakeville Site. As with the Wilfred Site, most waste is transferred to the Redwood Landfill.

3.9.4 ELECTRICITY, NATURAL GAS AND TELECOMMUNICATIONS

WILFRED SITE

Pacific Gas & Electric (PG&E) is the main provider of electricity to Sonoma County and currently provides electricity to the Wilfred Site. PG&E owns and operates a 115 kilovolt (kV) overhead electric transmission line located on the outer edge of Rohnert Park that converts at the Penngrove substation in the south to the Bellevue station in the north. The delivery capacity of the two substations is 50.5 megawatts (MW) while existing City needs are met by 40 MW. The nearest power transmission lines are 12 kilovolt lines adjacent to the Wilfred Site, located along Wilfred Avenue, Labath Avenue, and Stony Point Road.

The major source of energy generation in Sonoma County is the Geysers steam field. The Geysers Recharge Project has the capability to transport (on average) 11 mgd of tertiary-treated recycled water to the Geysers steam field in order to generate electricity. The Geysers Recharge Project involved constructing a 41-mile underground pipeline of 48-inch pipe that begins at the Laguna WWTP, runs along the base of the Mayacamas Mountains, climbs up to the Calpine steam fields, makes two passes under the Russian River and continues up Pine Flat Road. The water is boosted uphill over 3000 vertical feet by a series of three large pump stations to a terminal storage tank on a ridge of the Mayacamas Mountains. From there, the water flows by gravity and is injected into underground wells at depths of 4,000 to 11,000 feet where it is heated to produce a clean "dry" steam that is used in nearby electrical power plants as a reliable, and renewable source of energy (Santa Rosa, City of, 2004a).

PG&E also owns and operates an underground natural gas transmission line (No. 21) within Rohnert Park that is generally aligned with the US 101 corridor on the east. The line is part of a system of lines that transport gas into Sonoma County from out of state. Distribution within the city is provided by mains operating at pressures of 50 pressure per square inch gauge (psig). Dual-run regulator stations facilitate the transition from the underground transmission line, operating at several hundred psig, to the distribution mains. A total of three to four regulator stations are located within City boundaries and dozens more throughout the County. At any point in time, different combinations of stations may be supplying the needs of the City (Rohnert Park, City of, 2000). The nearest 4-inch distribution line is located along Wilfred Avenue, at the northern boundary of the Wilfred Site (Harris, pers. comm., 2005).

AT&T provides local phone service in Sonoma County and maintains most telephone-related infrastructure in the city and County. There are two telephone exchanges which serve Rohnert Park: 1) Rohnert Park Exchange, which is located on Commerce Boulevard north of the Rohnert Park Expressway, and serves areas north of Copeland Creek, and 2) Cotati Exchange, which is located south of Cotati and serves areas south of Copeland Creek. Most telephone wiring is copper-based and capable of providing analog and digital transmission. A fiber optic cable along the US-101 corridor provides high bandwidth service to businesses within the vicinity. Major telephone line corridors in Rohnert Park follow arterial roads. Major north-south corridors include Commerce Boulevard, Roberts Lake Road, Snyder Lane, and Redwood Drive. Major east-west corridors include Golf Course Drive, Rohnert Park Expressway, Southwest Boulevard, and East Cotati Avenue. The nearest telephone lines service existing residential development along Labath Avenue and Wilfred Avenue adjacent to the Wilfred Site (Graves, pers comm., 2005). Cable television service to the City of Rohnert Park and nearby unincorporated areas is provided by TCI/AT&T. Satellite television providers are available including Dish Network and DirecTV.

STONY POINT SITE

Electrical, natural gas, and telecommunications providers for the Stony Point Site are the same as those described for the Wilfred Site. The closest PG&E power transmission lines are 12 kilovolt lines, along Stony Point Road and adjacent to the Stony Point Site (Rivero, pers. comm., 2005). The nearest 6 to 8-inch PG&E natural gas transmission lines are located along Stony Point Road, along the western boundary of the Stony Point Site (Harris, pers. comm., 2005). The nearest 4-inch distribution line is located along Wilfred Avenue, at the northern boundary of the Stony Point Site (Harris, pers. comm., 2005).

AT&T telephone lines are located adjacent to the Stony Point Site. Major lines run underneath East Cotati Avenue, Golf Course Drive, and Redwood Drive. AT&T currently provides telephone service through transmission lines along Stony Point Road adjacent to the Stony Point Site (Graves, pers. comm., 2005).

LAKEVILLE SITE

Pacific Gas & Electric (PG&E) also provides electricity service to the Lakeville Site. PG&E owns and operates a 230 kilovolt (kV) overhead electric transmission line located ¼ mile to the north and another 220 kV overhead electric transmission line ¼ mile to the south of the Lakeville Site. The closest power 12 kV transmission lines parallel Lakeville Highway adjacent to the Lakeville Site and provide service to rural housing on either side of Lakeville Highway. No natural gas facilities currently service the Lakeville Site and vicinity (Hogan, pers. comm., 2005). The nearest natural gas facilities are located in the City of Petaluma, 9 miles north of the Lakeville Site.

AT&T provides local phone service in Sonoma County and maintains most telephone-related infrastructure in the cities and the County. The Lakeville Site is undeveloped and is not currently served by local phone or cable service. Telephone lines are located adjacent to the Lakeville Site, servicing rural residences east of Lakeville Highway ¼ mile north of the Lakeville Site (Graves, pers. comm., 2005).

3.9.5 PUBLIC HEALTH AND SAFETY

POLICE PROTECTION

Wilfred Site

The Sonoma County Sheriff's Department is the fifteenth largest of the fifty-eight sheriff's departments in the State of California and is responsible for providing services to the unincorporated areas of Sonoma County including a majority of the Wilfred Site. The Sheriff's Department is also responsible for providing coroner and correctional services countywide. There are 638 people currently employed by the Sheriff's department in various divisions. The administrative division sets forth the direction of the Department and includes the offices of the sheriff and assistant sheriffs, administrative and patrol captains, internal investigations, personnel services, administrative services, payroll, purchasing and accounting. The detention division is responsible for the operation of the County's jail system, providing security to the municipal and superior courts and the transportation of prisoners within the County and to State prison facilities. The Law Enforcement Division is responsible for suppression of crime in the nearly 1500 square miles of unincorporated area in Sonoma County. The Sheriff maintains a 24-hour patrol force operating from five substations Guerneville, Sonoma Valley, R-COP, Windsor and the Main Office located at 2796 Ventura Avenue in Santa Rosa, CA 95403. The Wilfred Site is located in Sonoma County Sheriff's Department Zone 5. Zone 5 is staffed from the main office and includes the unincorporated areas surrounding Petaluma, Rohnert Park, and Cotati.

The Rohnert Park Public Safety Department provides police services near the Wilfred Site within the Rohnert Park City limits. Additionally, the Department provides services to Creekside Middle School, which is in an unincorporated area within the City's sphere of influence, through an agreement with the County. The Department also provides emergency and mutual aid back-up services to unincorporated areas near the City. A small portion of the Wilfred Site is within the City limits and falls under the jurisdiction of the Rohnert Park Public Safety Department. There are 12 public safety officers in the Rohnert Park Police Services Division of the Public Safety Department. A public safety officer (PSO) is a cross-trained law enforcement and fire fighting professional required to pass the Basic Police Academy, and also receive Fire Fighter One training that is certified by the California State Fire Marshal.

The PSO who is working on patrol is assigned to a geographical area known as a beat. Currently, the City consists of approximately 6.9 square miles divided into three beats with each beat

consisting of approximately 2.3 square miles (**Table 3.9-1**). There are six teams in patrol; three teams cover one beat in a twenty-four hour period (Rohnert Park, City of, 2004c). Each officer works four 10-hour shifts per week. One sergeant and three officers staff each day, swing and graveyard shift, with overlapping shifts. At minimum there are four officers and a sergeant on duty, and with the overlap there can be as many as 10 officers and two sergeants on the street. Normally, dayshift and graveyard patrol teams operate with 3 PSOs, 1 cover PSO, and 1 Sergeant. Swing shift patrol teams operate with 4 PSOs, 1 cover PSO, and 1 Sergeant.

TABLE 3.9-1
ROHNERT PARK POLICE BEAT LOCATIONS

Beat	Location
Beat 1	North of Copeland Creek and East of the Railroad Tracks
Beat 2	West of Railroad Tracks, to West City Boundary. North of Rohnert Park Expressway
Beat 3	Everything South of Copeland Creek

SOURCE: Rohnert Park, 2004; AES, 2004.

Rohnert Park Department of Public Safety provided a comparison of criminal activity in the years 1998 and 2002 (the most recently available certified data) by specific crime categories (**Table 3.9-2**).

As specified in the MOU with the City of Rohnert Park, the Tribe committed to contributing to law enforcement services before the construction of a casino project (**Appendix E**). As of September 2006, the Tribe has contributed $1,325,000 for a Special Enforcement Unit (SEU) with the Rohnert Park Public Safety Department. The SEU helped fund law enforcement efforts against gangs, drugs, and repeat offenders in Rohnert Park. These resources have provided funding for a canine unit. The Department plans on using the remaining funding for an additional canine unit. The SEU conducted 129 felony arrests and 329 misdemeanor arrests for a total of 458 arrests from July 1, 2004 to August 1, 2005. Additionally, SEU authored and served 7 search warrants on known narcotics dealer locations (Donley, 2005).

TABLE 3.9-2
COMPARISON OF CRIMINAL ACTIVITY IN ROHNERT PARK
(1998 AND 2002)

	Number of incidences	
Criminal activity	1998	2002
Homicide	0	2
Rape	11	8
Robbery	37	21
Assault	60	322
Burglary	589	710
Larceny	1,014	820

Criminal activity	Number of incidences	
	1998	2002
Vehicle Theft	100	177

SOURCE: Rohnert Park, City of, 2004; AES, 2004.

Stony Point Site

As with the majority of the Wilfred Site, the Sonoma County Sheriff's Department currently provides law enforcement services to the Stony Point Site. The Stony Point Site is located in Zone 5 of the Sonoma County Sheriff's Department.

Lakeville Site

As with the majority of the Wilfred Site, the Sonoma County Sheriff's Department currently provides law enforcement services to the Lakeville Site. The Lakeville Site is also located within Zone 5 of the Sonoma County Sheriff's Department.

FIRE PROTECTION

Wilfred Site

The majority of the Wilfred Site is located within an unincorporated area of the County where the Sonoma County Fire Services Division currently provides fire service management (Sonoma County Fire, 2004). The Division also advises the Board of Supervisors on fire service issues, assists with disaster program planning and emergency response planning, responds to emergency situations, reviews program and policy matters with the Board of Supervisors, administers contracts with local fire districts, and works with local fire agencies and the California Department of Forestry and Fire Protection (CDF). In addition, CDF responds to State responsibility wildland areas within the County. In 2004 there were 1,031 emergency incident responses including 379 responses for fire, 293 for medical aid, 154 for vehicle accidents, and 205 for other incidents. Other incidents include fallen wires/tress, hazardous materials, rescues, public assistance, smoke checks, fire alarm investigation, station coverage, and mutual aid to other agencies (Sonoma County Fire, 2004). Within the Division, the Rincon Valley Fire Protection District responds to emergency incidents in the unincorporated areas between the cities of Santa Rosa and Rohnert Park, where the majority of the Wilfred Site is located. The District operates out of four stations. Two stations are staffed 24 hours a day by 3 firefighters and the other two stations are operated by volunteer firefighters (Lentz, pers. comm., 2006). The nearest station to the Wilfred Site is approximately two miles to the north and located at 207 Todd Road, in Santa Rosa. A small portion of the Wilfred Site is located within the City of Rohnert Park and is under the jurisdiction of the Rohnert Park Department of Public Safety.

The Rohnert Park Department of Public Safety provides police, fire and medical services to the City of Rohnert Park including the 42,450 residents of the City. Every sworn member of the

department has minimally been trained to the level of medical first responder and several are certified Emergency Medical Technicians. Unlike police officers in other cities, Rohnert Park officers are cross-trained in both police and fire functions, and the system is dependent upon their availability to act as an available firefighter for safe and efficient fire suppression and rescue operations. From 7 AM to 5 PM, Monday through Friday, there are administrative, traffic, training, detectives and other officers available for immediate assistance at either police or fire incidents. There are as many as 15 officers of various ranks available to assist at police and fire incidents including staffing the engine at the main station and any other call during the weekday (Rohnert Park, City of, 2004a).

The Rohnert Park Department of Public Safety Communications Center Dispatch Center is currently staffed with 12 full-time Dispatchers, working four ten-hour days, and one Dispatch Supervisor. The Dispatch Center handles all incoming 9-1-1, emergency, and non-emergency calls for service. Police and fire calls come into the Dispatch center from the Rohnert Park community. Dispatch personnel screen and prioritize the calls for service and dispatch the appropriate police and/or fire resources. Rohnert Park calls that are received by other primary answering points are transferred to the Dispatch Center for handling. The Dispatch Center requests mutual aid when necessary and sends requested resources if available (Rohnert Park, City of, 2004a).

During 2003, the Dispatch Center handled 31,365 police events and 2,768 fire events. Average response times for emergencies were 4 minutes and 36 seconds for police emergencies, and 4 minutes and 33 seconds for fire emergencies. Rohnert Park operates under the County Law Enforcement and Fire Mutual Aid Agreements. In agreements with the City of Cotati and Sonoma State University, police resources of other police departments are also utilized. Rohnert Park also has a contractually formalized "Automatic Aid Agreement" with both Rancho Adobe Fire District and Rincon Valley Fire District. In the event of any reported structural fire in any of the districts, the agreement provides for a response both from and to Rohnert Park (Rohnert Park, City of, 2004a).

The Fire Services Division is a fully integrated operation within the City of Rohnert Park Department of Public Safety with a staff of 12 Public Safety Officers (PSO), 2 Sergeants and 1 Lieutenant assigned primarily to the Fire Services Division. The Commander serves the role of traditional Fire Chief and the Lieutenant serves the equivalent role of Battalion Chief. A civilian inspector performs Fire Code enforcement, plan review, and public education programs. While only 15 trained personnel are assigned to the Fire Division, officers are cross-trained in police and fire services and all 58 PSOs respond to fires. The Public Safety system is dependent upon Patrol PSOs and Sergeants supplementing the engine crews in the event of a fire. **Table 3.9-3** shows the common calls for fire division service from 1998 through 2002 (Rohnert Park, City of, 2004a).

Officers assigned to fire services work the Kelly 24-hour shift schedule. This allows two stations to be staffed twenty-four hours a day. Also each Public Safety Officer has an alert pager at their residence and will respond to all major fire incidents when off duty. The Public Safety Officer also responds to medical-related calls and is trained as a State Certified First Responder.

TABLE 3.9-3
ROHNERT PARK FIRE SERVICES DIVISION – COMMON CALLS (1998 - 2002)

Type of Call	1998	2000	2001	2002
Structure Fires	55	54	30	30
Medical Calls	1386	1315	1538	1357
Arson Fires	5	1	1	1
Dumpster Fires	21	24	15	13
Other Fires	35	8	20	29
Vehicle Fires	35	19	14	21
Wildland Fires	74	28	19	22
Fire Alarms	415	269	270	235
HazMat	30	14	24	30
Traffic Accidents	46	7	7	6
Traffic Problems	3	1	-	-
Public Assist	189	163	208	238
Automatic Aid	24	2	23	51
Mutual Aid	24	7	54	33
Other	44	59	78	74
Police Related	19	2	1	7
Totals	**2405**	**1973**	**2300**	**2147***

NOTES: *In 2002 computerized data was not entered during the last two weeks of September and the first 2 weeks of October due to technical problems. Thus the exact number of calls for the year will be off as result of the lack of 30 days' entries.
SOURCE: Rohnert Park, City of, 2004b.

Four stations (**Figure 3.9-3**) serve the City of Rohnert Park:

- *Station One* (Headquarters) located at 500 City Hall Drive is an "on-call" station that is not staffed in a traditional round-the-clock method. This station is staffed Monday through Friday 8 AM to 5 PM. Equipment at this station includes a Type I engine with a 1500 gallon per minute (GPM) capacity and a 500-gallon tank.

- *Station Two* located at 5200 Country Club Drive is staffed in a traditional fashion, with 2 personnel available 24 hours a day, 7 days a week. Equipment at this station includes a Type I engine with a 1500 GPM capacity, a 500 gallon tank and (2) 20 gallon foam tanks; a Type III engine with a 500 GPM, 400 gallon tank and equipment for wildland/structure

response; and a Truck or Quint with a 1250 GPM capacity, a 500 gallon tank and a 75 foot aerial ladder with nozzle and rescue equipment.

- *Station Three* located at 435 Southwest Boulevard is an "on-call" unstaffed station that responds with off-duty personnel and members of a volunteer contingent. Equipment at this station includes a Type I engine with a 1,000 GPM capacity and a 700 gallon tank, a rescue air unit that can fill bottles up to 5,000 pounds per square inch (PSI), and a Type I hazardous materials response trailer.

- *Station Four* located at 1312 Maurice Avenue is staffed in a traditional fashion, with 2 personnel on duty 24 hours a day, 7 days a week. Equipment at this station includes a Type I engine with a 1,250 GPM capacity and a 500 gallon tank.

Additionally, the fire division also has a fully equipped mobile office (command vehicle) and a Ford Explorer, Expedition and Crown Victoria driven by the sergeants and lieutenants in a fire event. Also, each officer working on patrol is also issued a personal patrol vehicle that many take home to expedite response in the event of an emergency.

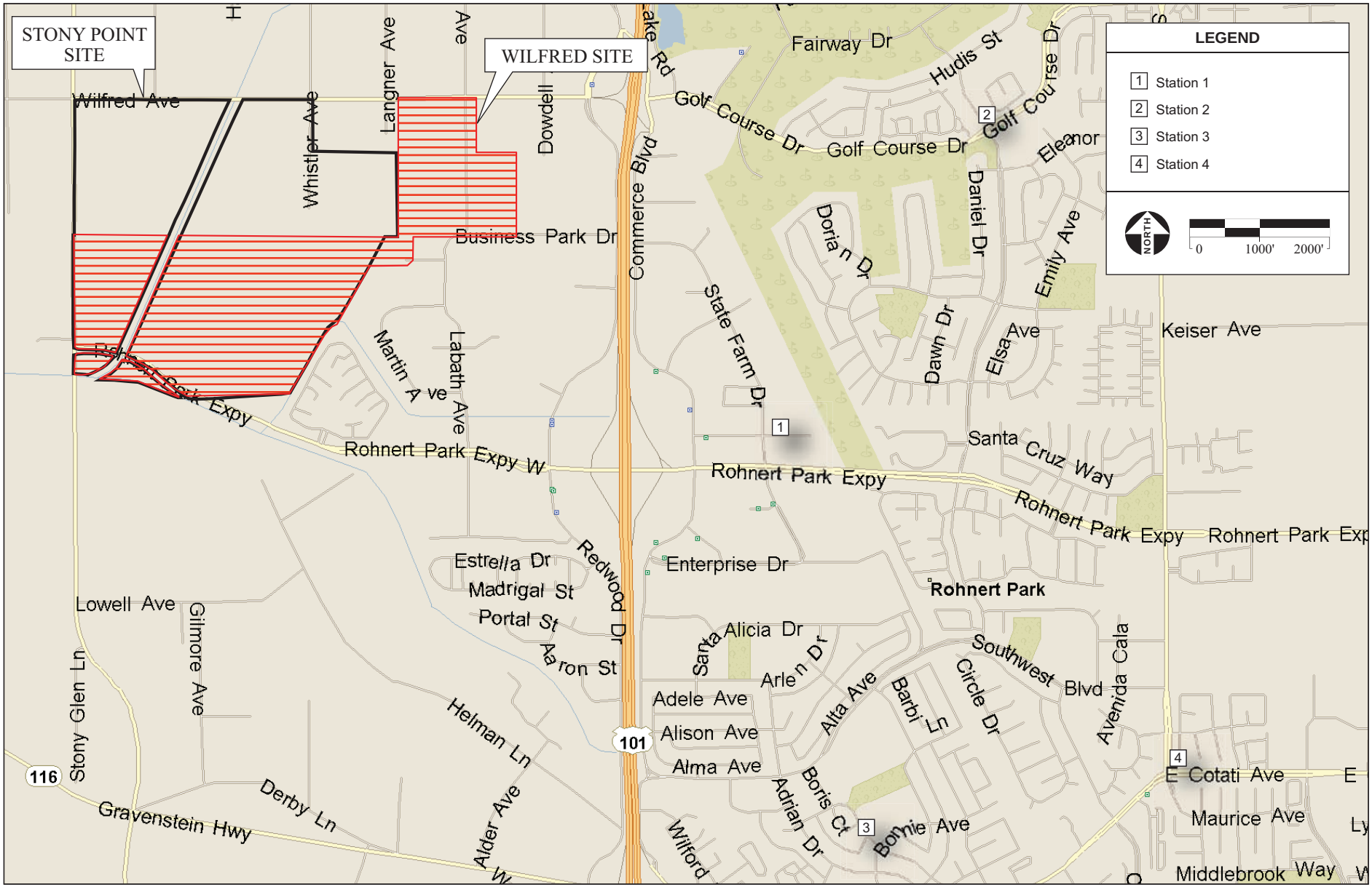
Stony Point Site

As with the majority of the Wilfred Site, fire protection management and services are provided by the Sonoma County Fire Services Division and the Rincon Valley Fire Protection District.

Lakeville Site

The Lakeville Site is also located in an unincorporated area of the County where the Sonoma County Fire Services Division provides services through the Lakeville Volunteer Fire Department (VFD) in County Service Area #40. The Lakeville VFD has approximately 15 volunteer firefighters who respond out of the main station at 5565 Lakeville Highway in Sonoma County.

There is one fire engine located at the main station and another located along Highway 37 in a storage facility. The nearest ladder truck is located in the City of Petaluma and operated by the City of Petaluma Fire Department. CDF responds to wildfire incidents in this area out of the Petaluma Station in west Petaluma. Additionally, the County has an Automatic Aid Agreement with the City of Novato to provide emergency back-up services. The response time to the Lakeville Site is approximately 9 minutes (Gaab, pers comm., 2006).



SOURCE: AES, 2005

Figure 3.9-3
Fire Station Locations

EMERGENCY MEDICAL RESPONSE

Wilfred Site

Through contractual agreements with Sonoma County, American Medical Response maintains a paramedic-staffed advanced life support ambulance at a facility in the center of Rohnert Park. This ambulance is staffed 24 hours every day of the year. Back-up ambulances are deployed on a dynamic basis from adjacent jurisdictions. AMR also provides ambulance service in the unincorporated areas of the County surrounding Rohnert Park.

Emergency facilities that serve the vicinity of Rohnert Park are: Petaluma Valley Hospital located five miles south of the Wilfred Site at 1301 Redwood Way in Petaluma, , Santa Rosa Memorial Hospital located seven miles north of the Wilfred Site at 1165 Montgomery Drive in Santa Rosa and Sutter Warrack Hospital located seven miles north of the Wilfred Site at 2449 Summerfield Road in Santa Rosa. The hospital used by emergency incidents at the Wilfred Site would depend on the extent of injuries and preference of the individual. Santa Rosa Memorial Hospital would be used for trauma and cardiac emergencies.

Stony Point Site

The emergency medical services for the Stony Point Site are the same as those described for the Wilfred Site.

Lakeville Site

City of Petaluma provides primary ambulance services to this area. Novato Ambulance provides back-up services and normally operates along Highway 37 from Novato to Sears Point (Gaab, pers. comm., 2006). The nearest hospital is Sonoma Valley Hospital located at 347 Andrieux Street in Sonoma, California. The hospital is approximately 10 miles north of the Lakeville Site.

3.9.6 SCHOOLS

Wilfred Site

Sonoma County has 40 school districts; there are 171 schools and almost 73,000 students. The Wilfred Site is located within three of these school districts (**Figure 3.9-4**): Cotati-Rohnert Park Unified School District, Bellevue Union Elementary School District, and Santa Rosa High School District (Sonoma County Office of Education, 2004). The Cotati-Rohnert Park Unified School District consists of 15 schools that serve the communities of Cotati and Rohnert Park. There were 7,700 students enrolled in the 2002-2003 school year (California Department of Education, 2004). The Bellevue Union Elementary School District consists of 3 schools that serve the elementary school population of Santa Rosa and had 1,699 students enrolled in the 2002-2003

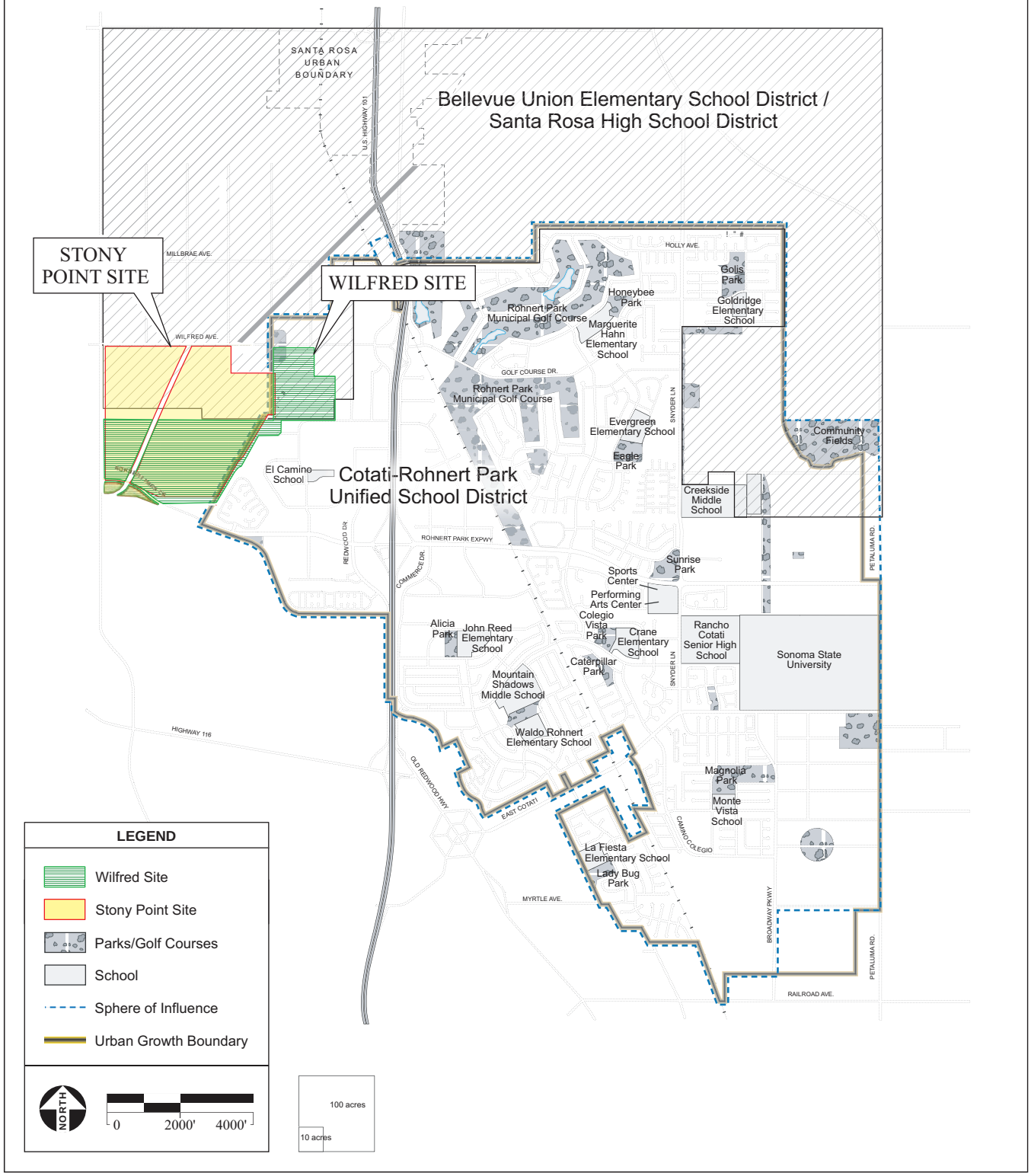
school year (California Department of Education, 2004). The Santa Rosa High School District consists of 16 schools that serve the high school population of Santa Rosa and had 13,029 students enrolled in the 2002-2003 school year (California Department of Education, 2004).

Stony Point Site

As with the Wilfred Site the Stony Point Site is located within three school districts. The southern four project parcels are located in the Cotati-Rohnert Park Unified School District. The northern parcels are located within the Bellevue Union Elementary School District. The northern parcels are also located in the Santa Rosa High School District.

Lakeville Site

The Lakeville Site is located in the Old Adobe Union School District, consisting of five elementary schools and approximately 2,000 students (Old Adobe Union School District, 2006). The Old Adobe School District has a pupil to teacher ratio of 21.1:1 and an average class size of 22.6. There are 90.3 full-time equivalent (FTE) teachers of which 99% are fully certified, 6.8 FTE administrators, 4.6 FTE pupil services employees and 113 classified staff (definitions located below **Table 3.9-4**; California Department of Education, 2006). The Lakeville Site is also located in the Petaluma Joint Union High School District which includes 10 junior high and high schools and approximately 5,360 students (Petaluma City Schools, 2006). The Petaluma Joint Union High School District has a pupil to teacher ratio of 22.6:1 and an average class size of 28.3. There are 263.5 full-time equivalent (FTE) teachers of which 97.6% are fully certified, 22.4 FTE administrators, 27.9 FTE pupil services employees and 248 classified staff (California Department of Education, 2006).



SOURCE: City of Santa Rosa; AES, 2005

Figure 3.9-4
School Districts

TABLE 3.9-4
SCHOOL INFORMATION BY DISTRICT (2002–2003)

School (Grade span)	Enrollment	Special Ed. Enrollment (Ages 5-21)	% Fully Credentialed Teachers	FTE Admin	FTE Pupil Services	FTE Teachers	# Classified Staff	Pupil/ Teacher Ratio	Avg. Class Size	# of Computers	# of Students Per Computer
Cotati-Rohnert Park Unified School District											
Community Day (7-9)	38	0	100.0	0	0	2.6	1	14.6	17.5	0	0
Creekside Middle (6-8)	892	95	100.0	2	5.6	37.4	26	23.9	29.8	100	8.9
El Camino High (9-12 Cont.)	182	10	100.0	1	0.8	6.2	5	29.4	19.4	26	7
Evergreen Elementary (K-6)	389	47	100.0	1	1	1.6	18	20.9	21.9	64	6.1
Gold Ridge Elementary (K-6)	396	27	100.0	1	2	18.8	13	21.1	22.0	81	4.9
Hahn (Marguerite) Elementary (K-6)	476	26	100.0	1	1.6	22	18	21.6	22.1	80	6
La Fiesta Elementary (K-6)	309	54	100.0	1	2.3	16.6	17	18.6	22.3	35	/8.8
Monte Vista Elementary (K-6)	619	69	97.1	1	2	32.2	23	19.2	21.6	85	7.3
Mountain Shadows Middle (6-8)	981	133	100.0	2	7	39.4	25	24.9	30.7	164	6
Page (Thomas) Elementary (K-5)	380	40	100.00	1	1.6	18	15	21.1	23.3	60	6.5
Phoenix High (9-12 Cont)	34	0	100.0	0	0	2	1	17.0	18.8	11	3.1
Rancho Cotate High (9-12)	2032	263	95.0	4.8	15.6	77.6	46	26.2	27.7	459	4.4
Reed (John) Elementary (K-6)	470	1	100.0	1	2.4	26.2	23	17.9	20.7	64	7.3
Richard Crane Elementary (K-6)	0	0	2	0	0	0	0	0	0	0	0
Rohnert (Waldo) Elementary (K-6)	422	48	100.0	1.6	1.2	21.4	19	19.7	24.0	65	6.5
Technology High School (9-12 Alternative)	58	0	83.3	0.3	0	5.4	1	10.7	25.1	50	1.2
Bellevue Union Elementary District											
Bellevue Elementary (K-6)	553	70	100.0	2	1	32	23	17.3	21.2	97	5.7
Kawana Elementary (K-6)	619	73	100.0	2	0	3.8	18	18.3	20.9	67	9.2
Meadow View Elementary (K-6)	527	39	100.0	2	0	27	07	19.5	22.2	55	9.6
Santa Rosa High District											
Allen (Elsie) High (9-12)	1597	206	98.7	4	6	74.8	33	21.4	19.8	500	3.2
Carrillo (Maria) High (9-12)	1545	140	100.0	4.4	5	62.8	31	24.6	23.3	386	4
Cook (Lawrence) Middle (7-8)	844	126	100.0	3	4	45.4	24	18.6	25.2	149	5.7
Grace High (9-12 Cont)	38	0	100.0	0	1	2	0	19.0	11.9	7	5.4
Hilliard Comstock Middle (7-8)	709	104	100.0	2	4	32.8	20	21.6	26.3	52	13.6
Mesa High (9-12 Cont)	42	0	6.7	0	0.6	2.4	0	17.5	NA	22	1.9
Midrose High (9-12 Cont)	41	0	100.0	0	0.4	2.3	1	15.8	15.1	16	2.6
Montgomery High (9-12)	1820	163	100.0	4.2	5.4	77.1	33	23.6	22.5	250	7.3
Nueva Vista High (7-12 Cont)	42	9	100.0	0.2	0.4	2.4	1	17.5	7.8	26	1.6
Piner High (9-12)	1402	165	97.2	4.4	4.6	66.2	31	21.2	22.6	401	3.5
Ridgway High (9-12 Cont)	245	36	100.0	1	1	17.1	12	14.3	14.4	96	2.6
Rincon Valley Middle (7-8)	843	115	100.0	2	3	34.8	18	24.2	29.9	85	9.9
Roseland Accelerated Middle (7-8)	142	0	83.3	0	0	6	4	23.7	23.7	50	2.8
Santa Rosa High (9-12)	1965	204	98.9	3.2	5	84.8	30	23.2	22.3	406	4.8
Santa Rosa Middle (7-8)	792	96	100.0	2	3	35	19	22.6	28.5	131	6
Slater (Herbert) Middle (7-8)	962	134	97.7	2	3.2	40.4	21	23.8	29.8	150	6.4

TERMINOLOGY:
% Fully Credentialed Teachers is the percent of teachers who hold a full credential.
Full-Time Equivalent (FTE) is the percentage of time a staff member works represented as a decimal. A full-time person is 1.00, a half-time person is .50 and a quarter-time person is .25.
FTE Administrators include principals, assistant principals, program directors or coordinators, and other certificated staff not providing direct services to students.
FTE Pupil Services employees include counselors, nurses, psychologists, social workers, research specialists, speech specialists and other medical personnel.
FTE Teachers is defined as an employee of the school district who holds a position requiring certification and whose duties require direct instruction to the pupils in the school(s) of that district.
Classified Staff is an employee of a school district, in a position not requiring certification. The data are not collected in a manner that will allow full-time equivalent (FTE) reporting.
NA means not applicable. Indicates an alternative school.
SOURCE: California Department of Education, 2004; AES, 2004.

3.10 OTHER VALUES

3.10.1 NOISE

This section describes the noise environment of the Wilfred Site, Stony Point Site and the Lakeville Site. The issues that are addressed include: acoustical terminology, typical noise levels, construction noise levels, Federal noise abatement criteria, and existing noise levels.

ACOUSTICAL BACKGROUND AND TERMINOLOGY

Noise is often described as unwanted sound. Sound is defined as any pressure variation in air that the human ear can detect. If the pressure variations occur frequently enough (at least 20 times per second), it can be heard and hence is called sound. The number of pressure variations per second is called the frequency of sound, and is expressed as cycles per second, or Hertz (Hz).

Measuring sound directly in terms of pressure would require a very large and awkward range of numbers. To avoid this, the decibel scale was devised. The decibel scale uses the hearing threshold (20 micropascals of pressure), as a point of reference, defined as 0 dB. Other sound pressures are then compared to the reference pressure, and a logarithm is taken to keep the numbers in a practical range. The decibel scale allows a million-fold increase in pressure to be expressed as 120 dB. Another useful aspect of the decibel scale is that changes in levels (dB) correspond closely to human perception of relative loudness.

The perceived loudness of sounds is dependent upon many factors, including sound pressure level and frequency content. However, within the usual range of environmental noise levels, perception of loudness is relatively predictable, and can be approximated by weighing the frequency response of a sound level meter by means of the standardized A-weighing network. There is a strong correlation between A-weighted sound levels (expressed as dBA) and community response to noise. For this reason, the A-weighted sound level has become the standard tool of environmental noise assessment. All noise levels reported in this section are in terms of A-weighted levels in decibels.

Community noise is commonly described in terms of the "ambient" noise level, which is defined as the all-encompassing noise level associated with a given noise environment. A common statistical tool to measure the ambient noise level is the average, or equivalent, sound level (L_{eq}) over a given time period (usually one hour). The Leq is the foundation of the Day-Night Average Level noise descriptor, Ldn, and shows very good correlation with community response to noise. **Table 3.10-1** contains definitions of acoustical terminology used in this section. **Table 3.10-2** shows examples of noise sources, which correspond to various sound levels.

TABLE 3.10-1
ACOUSTICAL TERMINOLOGY

Term	Definition
Acoustics	The science of sound.
Ambient Noise	The distinctive acoustical characteristics of a given space consisting of all noise sources audible at that location. In many cases, the term ambient is used to describe an existing or pre-project condition such as the setting in an environmental noise study.
Attenuation	The reduction of noise.
A-Weighting	A frequency-response adjustment of a sound level meter that conditions the output signal to approximate human response.
Decibel or dB	Fundamental unit of sound. A Bell is defined as the logarithm of the ratio of the sound pressure squared over the reference pressure squared. A Decibel is one-tenth of a Bell.
CNEL	Community Noise Equivalent Level. Defined as the 24-hour average noise level with noise occurring during evening hours (7 - 10 PM) weighted by a factor of three and nighttime hours (10pm – 7am) weighted by a factor of 10 prior to averaging.
Frequency	The measure of the rapidity of alterations of a periodic signal, expressed in cycles per second or hertz.
Ldn	Day/Night Average Sound Level. Similar to CNEL but with no evening weighting.
Leq	Equivalent or energy-averaged sound level.
Lmax	The highest root-mean-square (RMS) sound level measured over a given period of time.
Loudness	A subjective term for the sensation of the magnitude of sound.
Noise	Unwanted sound.
Threshold of Hearing	The lowest sound that can be perceived by the human auditory system, generally considered to be 0 dB for persons with perfect hearing.
Threshold of Pain	Approximately 120 dB above the threshold of hearing.

SOURCE: Bollard and Brennan, 2002.

The Day-night Average Level (L_{dn}) is based upon the average noise level over a 24-hour day, with a +10 decibel weighing applied to noise occurring during nighttime (10:00 PM to 7:00 AM) hours. The nighttime penalty is based upon the assumption that people react to nighttime noise exposures as though they were twice as loud as daytime exposures. Because Ldn represents a 24-hour average, it tends to disguise short-term variations in the noise environment. Ldn-based noise standards are commonly used to assess noise effects associated with traffic, railroad and aircraft noise sources.

TABLE 3.10-2
TYPICAL A-WEIGHTED SOUND LEVELS OF COMMON NOISE SOURCES

Loudness Ratio	Decibels (dBA)	Description
128	130	Threshold of pain
64	120	Jet aircraft take-off at 100 feet
32	110	Riveting machine at operators position
16	100	Shot-gun at 200 feet
8	90	Bulldozer at 50 feet
4	80	Diesel locomotive at 300 feet
2	70	Commercial jet aircraft interior during flight
1	60	Normal conversation speech at 5-10 feet
1/2	50	Open office background level
1/4	40	Background level within a residence
1/8	30	soft whisper at 2 feet
1/16	20	Interior of recording studio

SOURCE: Bollard and Brennan, 2002.

REGULATORY ENVIRONMENT

Construction Noise Levels

Noise due to construction activities may be considered to be significant if:

- the construction activity is long-term;
- use of heavy equipment and noisy activities occurs at night;
- pile driving or surface blasting is planned; and
- industry-standard noise abatement measures are not implemented for noise-producing equipment.

Operation Noise Levels

Some guidance as to the significance of changes in ambient noise levels is provided by the 1992 findings of the Federal Interagency Committee on Noise (FICON), which assessed the annoyance effects of changes in ambient noise levels resulting from aircraft operations. The FICON recommendations are based upon studies that relate aircraft and traffic noise levels to the percentage of persons highly annoyed by the noise. Annoyance is a summary measure of the general adverse reaction of people to noise that generates speech interference, sleep disturbance, or interference with the desire for a tranquil environment.

The rationale for the FICON recommendations is that it is possible to consistently describe the annoyance of people exposed to transportation noise in terms of L_{dn}. The changes in noise exposure that are shown in **Table 3.10-3** are expected to result in equal changes in annoyance at sensitive land uses. Although the FICON recommendations were specifically developed to

address aircraft noise impacts, they are used in this analysis for traffic noise described in terms of L_{dn}. For non-transportation noise sources affecting noise-sensitive land uses, an increase in ambient noise levels of 5 dBA is considered to be potentially significant (BBA, 2004).

TABLE 3.10-3
MEASURES OF SUBSTANTIAL INCREASE FOR TRANSPORTATION NOISE EXPOSURE

Ambient Noise Level Without Project (Ldn)	Significant Impact Assumed to Occur if the Project Increases Ambient Noise Levels By:
<60 dB	+ 5 dB or more
60-65 dB	+3 dB or more
>65 dB	+1.5 dB or more

SOURCE: BBA, 2004.

Even if an increase in background noise is not significant, a potentially significant impact may result if the resulting ambient background noise levels associated with a project nonetheless exceed normally acceptable limits. The basic test of significance is whether the resulting noise levels would be expected to annoy a reasonable person of normal sensitiveness (BBA, 2004).

Federal recommendations for acceptable noise levels at residential receivers are generally in the range of 55 dB L_{dn} to 65 dB L_{dn}, based upon the recommendations by the U.S. Environmental Protection Agency, the U.S. Department of Housing and Urban Development, and other Federal agencies. These criteria are typically applied to noise from transportation noise sources, but may be used to assess the compatibility of other noise sources relative to residential land uses, provided that consideration is given to potential disturbances due to impulsive sound, tonal content (whistles, music, etc.), and the prevalence of nighttime activities (BBA, 2004).

For other noise sources, especially those that may occur over short periods of the day or night, it is common to apply noise criteria based upon hourly noise levels, making a distinction between noise levels produced during daytime and nighttime hours. Acceptable hourly noise levels in residential areas are usually considered to be in the range of 50 to 55 dB (average) during daytime hours and 45 to 50 dB (average) during nighttime hours. The lower noise level limits would be appropriate in areas that currently have low ambient noise levels. Hourly noise standards are usually expressed in terms of average (L_{eq}) or median (L_{50}) noise levels, and they often are corrected for the presence of impulsive sounds and tonal content (BBA, 2004).

DESCRIPTION OF THE AFFECTED ENVIRONMENT

The Wilfred site, Stony Point site, and the Lakeville site are all located in rural settings. Urban land uses are encroaching upon both the Wilfred site and the Stony Point site, however. A mobile home park and a business park are located adjacent to the southern boundary of both sites. Scattered rural residential development is also present to the north and northeast of both sites (see **Figure 3.8-9**). Development near the Lakeville site is limited to rural residential to the east and

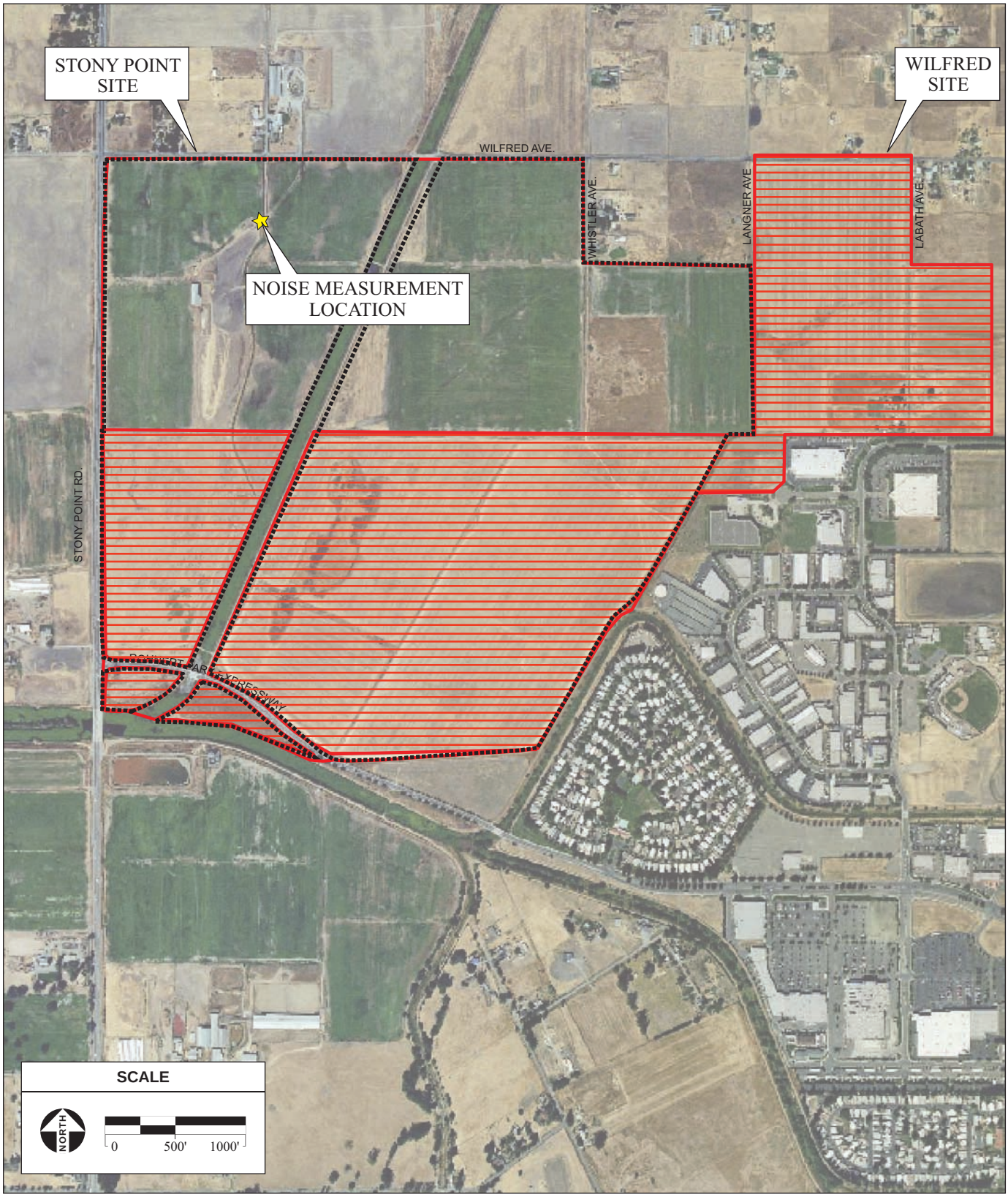
north. The Infineon Raceway (formerly Sears Point Raceway) is located over the hills to the east of the Lakeville site.

The noise environment on all three sites is defined primarily by traffic on nearby roadways. Other noise sources present in the vicinities of the sites include occasional aircraft over-flights, use of farm equipment, and electric water pumps. To describe the ambient noise environment, continuous noise level measurements were taken for all three sites. One continuous noise level measurement was taken for the Wilfred site and the Stony Point site because of their close proximity to each other and the relatively uniform traffic volumes along the length of Wilfred Avenue. At the Wilfred site and Stony Point site, ambient noise was measured about 425 feet south of Wilfred Avenue and about 1,000 feet east of Stony Point Road (**Figure 3.10-1**). At the Lakeville site, the ambient noise was measured about 50 feet from the centerline of Lakeville Highway (**Figure 3.10-2**).

Table 3.10-4 lists the measured Day-Night Levels (L_{dn}) measured at each site over the period from October 14 through October 20, 2004. At the Lakeville site only three full days worth of data were obtained due to a meter malfunction caused by high winds and heavy rains that began on Sunday, October 17. Noise measurement equipment consisted of Larson Davis Laboratories (LDL) Model 820 precision integrating sound level meters, which were equipped with B&K Type 4176 ½" microphones. The measurement equipment was calibrated immediately before use, and meets the specifications of the American National Standards Institute (ANSI) for Type 1 sound measurement systems. More detailed information regarding the noise measurements can be found in the Environmental Noise Analysis report prepared by BBA (**Appendix R**).

The **Table 3.10-4** data indicate that average ambient noise levels ranged from 50 to 60 dB L_{dn} on the Wilfred site and the Stone Point site, and from 70 to 73 dB L_{dn} on the Lakeville site. These levels are consistent with levels expected for semi-rural areas affected by local traffic noise, with the noise levels measured on the Lakeville site being the most elevated, showing the influence of the Lakeville Highway.

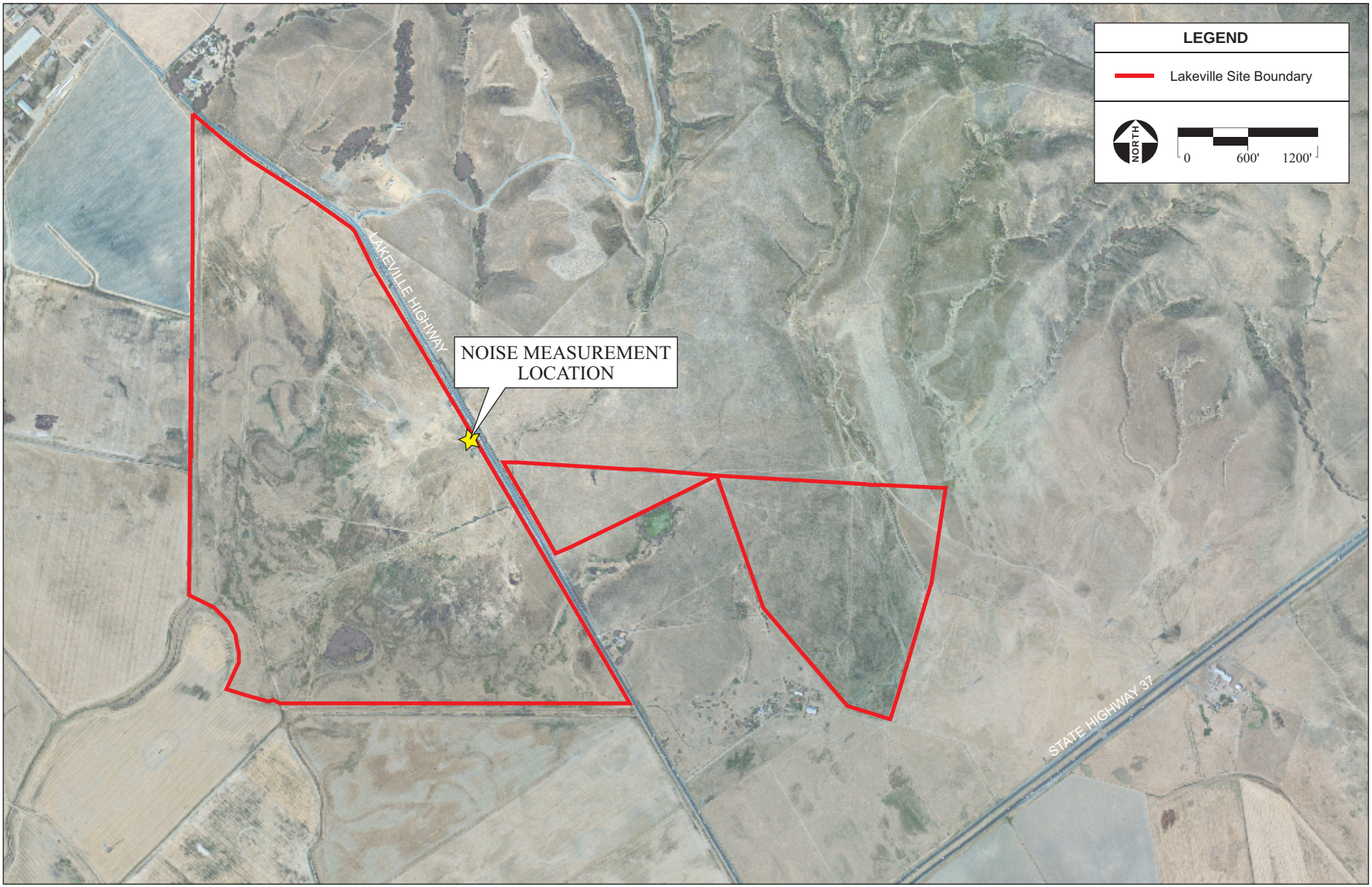
The traffic noise measurements were used to calibrate the Federal Highway Administration (FHWA) Highway Traffic Noise Prediction Model (FHWA-RD-77-108) for traffic on the nearest roadways. In addition, the ambient noise measurement data were used to derive the average day-night traffic noise distribution factor for traffic noise modeling in terms of L_{dn}. The FHWA model is the analytical method currently favored for traffic noise prediction by most governmental agencies. It is applied to Federal and State roadway projects by the California Department of Transportation (Caltrans). The model is based upon the CALVENO noise emission factors for automobiles, medium trucks and heavy trucks, with consideration given to



SOURCE: BBA, 2004; Aerial Photography, 8/2002; AES, 2005

Figure 3.10-1

Ambient Noise Measurement Location – Wilfred and Stony Point Sites



SOURCE: BA, 2004; Aerial Photograph, 10/2002; AES, 2005

Figure 3.10-2
Ambient Noise Measurement Location – Lakeville Site

TABLE 3.10-4
MEASURED AMBIENT NOISE LEVELS

Date	Day of Week	L_{dn}, dB	
		Wilfred and Stony Point Sites	Lakeville Site
October 14, 2004	Thursday	54.9	72.8
October 15, 2004	Friday	54.4	72.8
October 16, 2004	Saturday	51.6	70.4
October 17, 2004	Sunday	51.5	--
October 18, 2004	Monday	52.5	--
October 19, 2004	Tuesday	60.3	--
October 20, 2004	Wednesday	49.9	--
Average:		*55.0*	*72.1*

SOURCE: BBA, 2004.

vehicle volume, speed, roadway configuration, distance to the receiver, and the acoustical characteristics of the site.

The FHWA model was developed to predict hourly L_{eq} values for traffic conditions, and is considered to be accurate within 1.5 dB. To predict L_{dn} values, it is necessary to determine the day/night distribution of traffic and to adjust the traffic volume input data to yield an equivalent hourly traffic volume. Short-term traffic noise level measurements were conducted on October 13, 2004. The purpose of the noise measurements was to determine the accuracy of the FHWA model in predicting traffic noise.

The noise measurements were conducted in terms of the L_{eq}, and the measured values were later compared to the values predicted by the FHWA model using the observed traffic volumes, speed, and distance to the microphones. **Table 3.10-5** compares the measured and modeled noise levels for the observed traffic conditions.

As shown in **Table 3.10-5**, the FHWA model under-predicted the measured average noise levels for traffic on Rohnert Park Expressway, Stony Point Road, and Lakeville Highway by approximately 2 to 4 dB. This was likely due to accelerating vehicles and vehicles traveling over the speed limit. The FHWA model over-predicted traffic noise levels for Wilfred Avenue, probably due to actual vehicle speeds being lower than 40 mph on the existing narrow roadway.

3.10.2 HAZARDOUS MATERIALS

STONY POINT AND WILFRED SITES

Existing Conditions

Phase I Environmental Site Assessments (ESA's) were conducted for the Wilfred and Stony Point Sites (**Appendix S**). The purpose of the assessments is to identify environmental conditions and hazardous materials involvement that may pose a material risk to human health or to the

TABLE 3.10-5
NOISE MEASUREMENT SUMMARY AND FHWA MODEL CALIBRATION

Roadway	Alts	Vehicles per Hour			Posted Speed (mph)	Distance (feet)[a]	Measured L_{eq}, dB	Modeled L_{eq}, dB[b]
		Autos	Medium Trucks	Heavy Trucks				
Rohnert Park Expressway	A-E	624	12	16	35	35	70.2	66.3
Stony Point Road	A-E	496	40	16	50	45	70.8	68.1
Wilfred Avenue	A-E	100	0	0	40	30	58.4	60.2
Lakeville Highway	F	1044	28	68	55	35	76.1	74.2

NOTE: [a] Distance is measured from the roadway centerline.
[b] Acoustically "soft" site assumed.
SOURCE: BBA, 2004.

environment, or in any way affect the use of the Stony Point and Wilfred sites. The Phase I ESAs were performed in conformance with the scope and limitations of ASTM Standard Practice E1527-00, which specifies the appropriate inquiry requirements for the innocent landowner defense under the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA).

While conducting the Phase I ESAs, visual inspections for underground storage tanks, vent pipes, hazardous materials dumps, soil stockpiles, and other obvious signs of hazardous materials involvement were performed. In addition, historical aerial photographs were examined and interpreted in order to provide indications of the presence of aboveground storage tanks, industrial buildings, gas station canopies or pump islands, and other indications of bulk hazardous materials storage within the study areas. The Phase I ESAs also contain regulatory agency database reports that identify sites and listings where hazardous materials are generated, used, stored, or sites where remedial activities are ongoing that could affect the planned uses of the site. The following paragraphs describe the findings of each Phase I ESA. An updated database report (EDR, 2005) was reviewed by AES in October 2005. Sites and listing that were identified in the database report are incorporated in the following described Phase I ESAs.

360 Acre Stony Point Site

A Phase I ESA was conducted for the 360-acre Stony Point Site (**Appendix S**) in November 2003. The Phase I ESA concluded that the possibility exists that chemical fertilizers or other agricultural chemicals may be present in the soil, however such conditions are considered *de*

minimus, which, according to the ASTM standard "generally would not pose a significant risk to public health or the environment."
The Phase I ESA (**Appendix S**) revealed no evidence of recognized environmental conditions (REC's) with the exception of Assessor's Parcel Number (APN) 045-072-006. This parcel is located in the northeastern portion of the site. Historical aerial photographs revealed numerous items scattered throughout this 11-acre parcel. A title report revealed that APN 045-072-006 was the previous location of a junkyard. The Phase I ESA recommended further investigations on the 11-acre parcel and, as a result, a Phase II ESA (Geocon, 2004; **Appendix S**) was performed to determine if the junkyard impacted surface and/or subsurface conditions.

Soil samples were collected and analyzed as part of the Phase II. The samples were analyzed for the following:

- Title 22 Metals using Environmental Protection Agency (EPA) Test Method 6010B/7471.

- Total petroleum hydrocarbons such as gasoline (TPHg), diesel (TPHd), and motor oil (TPHmo), by EPA Test Method 8015B Modified.

- Benzene, toluene, ethylbenzene, and total xylenes (BTEX) and methyl tertiary-butyl ether (MTBE) by EPA Test Method 8020A.

- Soluble lead by EPA Test Method 6010B.

TPHg, BTEX, and MTBE were not present above the laboratory detection limits. TPHd was detected in each soil sample at levels below regulatory action levels. The environmental screening level (ESL) for TPHd is 100 milligrams per kilogram (mg/kg). ESL's are baseline action levels for determining whether or not a site requires further investigations and or cleanup. The San Francisco Bay Area Regional Water Quality Control Board (RWQCB) sets the regulatory ESLs. The analytical results for diesel show concentrations ranging from 1.1 to 4.0 mg/kg. TPHmo was also detected at concentrations ranging from 1.6 to 9.7 mg/kg. The analytical results for TPHd are below the ESLs. There are no established ESLs for TPHmo. Based on the results of the soil sampling, the Phase II ESA recommended no further assessments (**Appendix S**).

An Addendum to the Huffman Broadway Group's original Phase I ESA was concluded in December 2003 (Huffman-Broadway, 2003c; **Appendix S**). The addendum studied eight additional parcels on and adjacent to the Stony Point Site, including APN 045-072-001, which is a three-acre parcel located on the northeastern corner of the site. Other parcels adjacent to the northeast and southeast boundaries of the site were studied as well (**Appendix S**). The Phase I

ESA Addendum revealed no RECs in connection with the parcels and recommended no further assessments or investigations with respect to hazardous materials (Huffman-Broadway, 2003c, **Appendix S**).

3.86 Acre Center Section – Wilfred Site

For the purposes of the hazardous materials assessment, the Wilfred Site is divided into 3 areas, the 66-acre northeast corner, the 181-acre southwest corner (southern portion of the 360-acre Stony Point Site) and a 3.86-acre connecting parcel. AES conducted a Phase I ESA for the 3.86-acre corner section of the site in August 2005. The 3.86-acre site is comprised of one undeveloped parcel located off Park Court in a light commercial and industrial area. Some improvements on the site exist for drainage. The site appeared to have been graded recently and had a slight downhill slope from west to east towards a stormwater culvert located on the eastern border. AES did not find any obvious signs of gross contamination on the 3.86-acre site. Additionally, the database report did not identify the 3.86-acre site as having any hazardous materials involvement. Adjacent sites within 0.50 miles are discussed below.

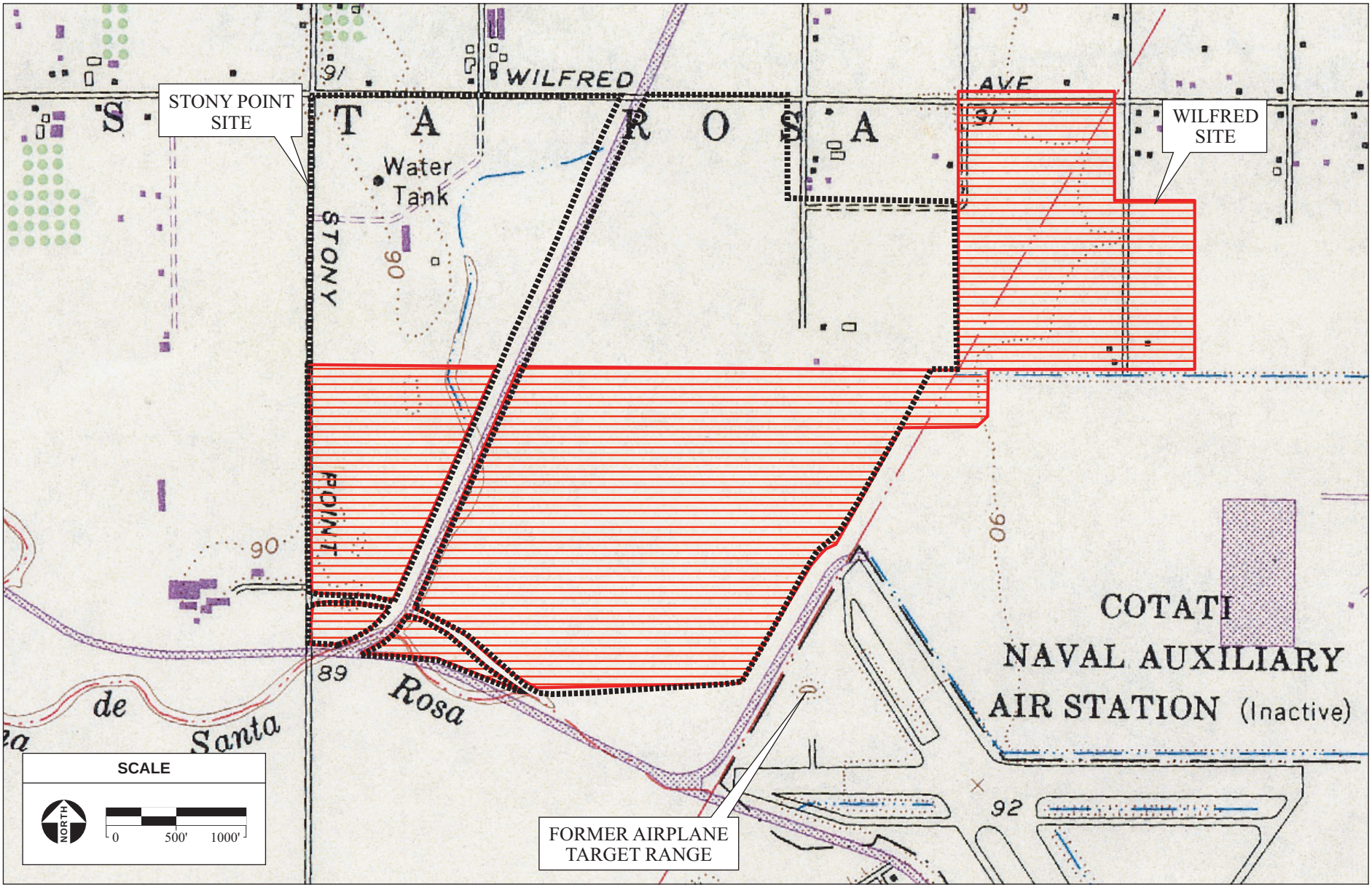
66 Acre Northeast Section Wilfred Site

AES conducted a Phase I ESA for an area containing the 66-acre northeast section of the site in September 2005. The 66-acre potion of the site consists of 6 parcels of rural residential, vacant, and undeveloped properties. The 66-acre section has 2 rural residential dwelling units. The remaining area is open pasture. One of the residential dwellings appeared vacant during the site visit. There were no indications of hazardous material use, release or storage on the 66 acre Northeast Section of the Wilfred Site. The database report identified two sites within 0.50 miles of the Wilfred site that have ongoing remedial investigations and are open environmental cases. Both sites have leaking underground storage tanks (LUST) and are under the regulatory oversight of the Regional Water Quality Control Board (RWQCB). The adjacent LUST sites are discussed further below.

Former Naval Auxiliary Air Station Outlying Field Cotati California

*The Naval Auxiliary Air Station Outlying Field Cotati California (NAAS) was located adjacent to the southeastern border of the Wilfred and Stony Point Sites (**Figure 3.10-3**). The NAAS was operational from 1943 to 1945 when the Navy ceased operation due to several runway failures. The NAAS had two runways, one running east and west, and one running northwest and southeast. The NAAS occupied a total of 216.95 acres and was used primarily for touch and go exercises for Alameda and Santa Rosa Air Stations. The presence of several facilities buildings including a fire and crash truck building for emergency vehicles, an oil storage shed and pump house, and a control tower have been confirmed on historical aerial photographs. An aircraft machine gun firing range, also known as an Airplane Target Range was located at the western end of the east-west runway (**Figure 3.10-3**). There is no documentation that the firing range was ever used*

during the 2 ½ years that the U.S. Navy occupied the property. In addition to the



SOURCE: USGS 7.5 min Quadrangle "Cotati, CA" (1954, ph.rev. 1965); AES, 2005

Figure 3.10-3
Former Naval Auxiliary Air Station Location

facilities buildings and firing range, two 25,000-gallon gasoline underground storage tanks (USTs) and fueling station were present on the NAAS (**Appendix T**).

Federal Evaluation of the NAAS

In 1986, Congress established the Defense Environmental Restoration Program (DERP) at 10 United States Code (USC) 2701 *et seq*. This program directed the Secretary of Defense to carry out a program of environmental restoration at facilities under the jurisdiction of the Secretary. The Department of Defense (DoD) role in the DERP is to ensure that policy and management of the overall program are consistent with the provisions of the DERP statute, and where appropriate, CERCLA, Superfund Amendments and Reauthorization Act (SARA) and the National Oil and Hazardous Substance Pollution Contingency Plan (NCP). Execution of the program has been delegated by DoD to the U.S. Army Corps of Engineers (USACE) for all Formerly Used Defense Sites (FUDS).

In an Inventory Project Report (INPR) the NAAS site (designated No. J09CA7470) was determined to be formerly used by the DoD and eligible for the DERP as a FUDS. A Records Research Report was prepared on the NAAS on behalf of the USACE in support of the DERP for FUDS (**Appendix T**).

The following outlines the method of evaluating a FUDS property: 1) INPR (property eligibility document), 2) preliminary assessment (PA), 3) site inspection (SI), 4) remedial investigation/feasibility study (RI/FS), 5) decision document, 6) remedial design/remedial action (RD/RA), and 7) long-term operation/long-term monitoring (LTO/LTM). At any point within this process, a time-critical removal action can be initiated, if warranted, or a determination that no DoD action is indicated (NDAI) can be made. If a site is determined to be NDAI, a project closeout document is generated.

In 1999, an INPR was developed (**Appendix T**). The USACE, Sacramento District, determined that the INPR was insufficient to establish and initiate formal projects at the former NAAS. Thus, a draft Records Research Report (preliminary assessment) was prepared to provide the information needed to determine if any projects should be originated and proceed to the SI phase. To date, no other prior actions have taken place at the site.

The Records Research Report (**Appendix T**) determined that no further assessments were necessary for the NAAS. There is no record that the fueling of airplanes or that maintenance of airplanes took place at the NAAS. There is no evidence that DoD activity resulted in releases of hazardous materials that would pose a threat to human health or the environment.

On-Site Investigations

Public concerns raised during the EIS scoping period, prior to the publication of the Records Research Report, were focused on residual contamination from the airplane target range. The

target range was located on the western edge of the east-west runway on the NAAS. The concern raised is that the possibility exists that lead or other contaminants from the target range could have affected soil conditions on the Wilfred or Stony Point sites. As a result, soil samples were collected from the Wilfred/Stony Point Sites in an area in close proximity to the airplane target range. Surface and subsurface soil samples were collected and analyzed by a California State certified lab. Analytical Environmental Services (AES) collected a total of eight samples on June 7th, 2004 at depths of approximately 6 inches and 18 inches. These were chilled at 4 degrees Celsius and transported under chain-of-custody protocols to Kiff Analytical in Davis, California. A total of four sampling locations were chosen (**Figure 3.10-4**) and analyzed for the following:

- Volatile Organic Compounds (VOC's) including gasoline constituents benzene, toluene, ethylbenzene, and total xylenes by (BTEX) EPA Test Method 8260B.
- Oils and grease by EPA Method 418.1.
- CAM-17 Metals and Total Lead by EPA Methods 6010B/7471A.

Analytical data from soil samples collected show no contamination (**Appendix T**). Lead was detected in concentrations ranging from 4.25 milligrams per kilogram (mg/kg) to 7.08 mg/kg. These results represent normal background levels for lead. The ESL for lead is 200 mg/kg. Oil and grease were detected at concentrations ranging from 19 mg/kg to 54 mg/kg, again well within normal background levels from naturally occurring organics.

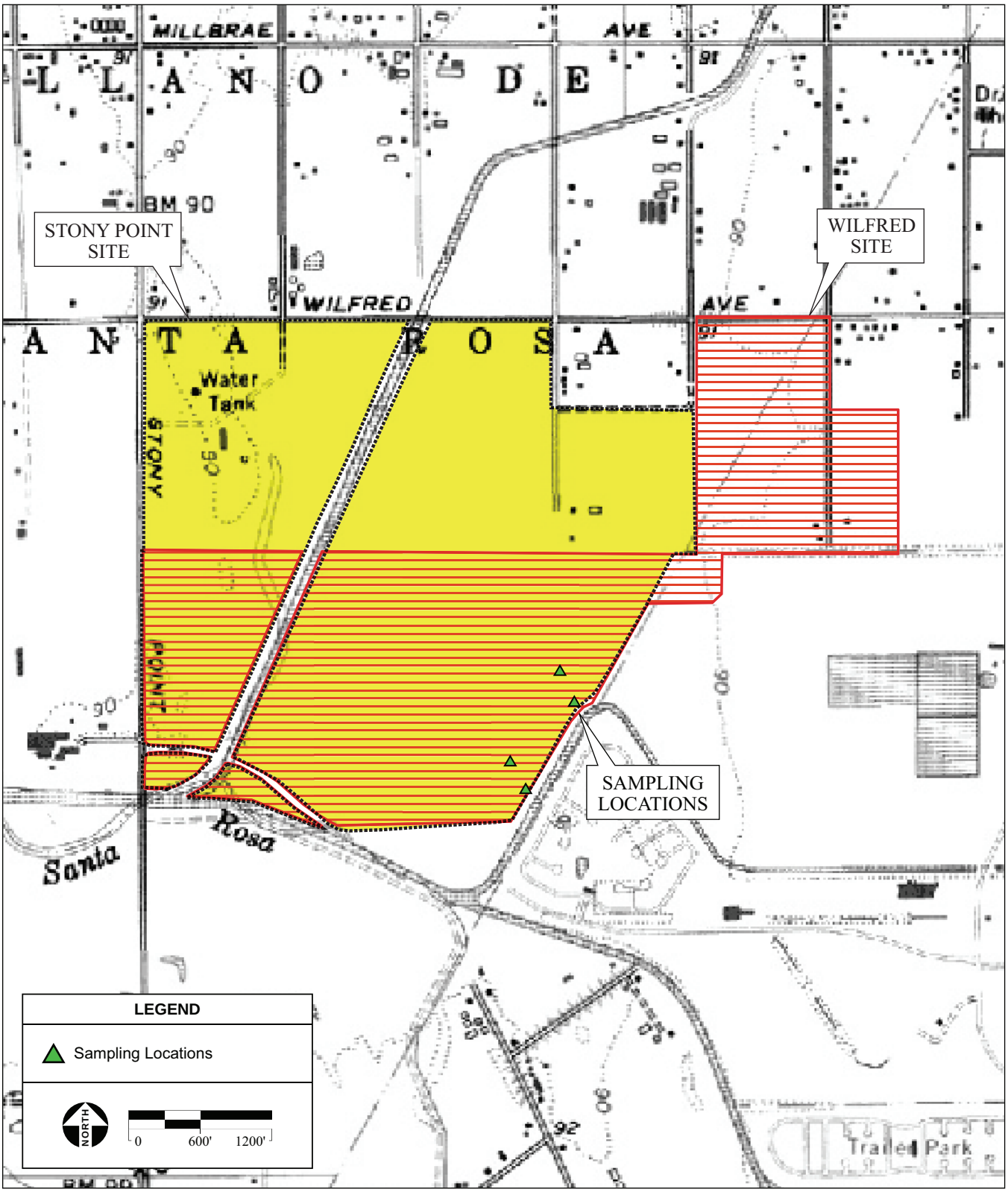
Hazardous Materials Investigations in the Vicinity of the NAAS

The former site of the NAAS is currently developed with commercial, residential, and industrial land uses. Numerous hazardous materials investigations have taken place in the area dating to 1973. No contamination from the NAAS was discovered in any of these investigations. The following is a chronological summary of each hazardous materials investigation conducted in the vicinity of the NAAS.

The area of the airplane target range was redeveloped into the Rancho Verde Mobile Home Park in 1973. The Mobile Home Park project involved removal of approximately 27-acres of runway asphalt that was covering approximately 60% of the mobile home park site.

An Environmental Impact Questionnaire from 1972 that was prepared by the mobile home project Civil Engineer stated "*The proposed mobile home park will not have a significant adverse affect (sic) on the environment"*. The following paragraphs describe the development and reuse of the remainder of the former NAAS site.

In 1977, Santa Rosa Enterprises built a Pacific Gas and Electric Company (PG&E) facility as a Materials Distribution Center at 600 Rohnert Park Expressway, southeast of the Wilfred/Stony Point sites. By 2001, PG&E had relocated this facility to a new site. As part of the termination



SOURCE: "Cotati, CA" USGS Topographic Quadrangle; AES, 2005

Figure 3.10-4
Sampling Locations

of lease activities, PG&E contracted with Kleinfelder, Inc. to complete a Phase I and Phase II Environmental Site Assessment of the site in 2002. An underground storage (UST) used by PG&E leaked petroleum hydrocarbons into the soil and groundwater at the site. The tanks were removed and contaminated soils were excavated and removed for off-site disposal. The resulting contamination was remediated by placing oxygen releasing compounds into one of five ground water monitoring wells. The remediation efforts were reviewed by the Sonoma County Environmental Health Division, which closed the case in February 2002 (**Appendix T**). Hydrocarbons were detected in near surface soil samples collected in an area used for storage of emergency oil-filled equipment. The vertical and lateral extent was not delineated and further sampling was recommended. As a result soil and groundwater samples were collected at depths up to 10 feet below ground surface (bgs). The samples were analyzed for benzene, toluene, ethyl benzene, xylene (BTEX), MTBE, semi-volatile organic compounds (SVOCs), volatile organic compounds (VOCs), polychlorinated biphenyls (PCBs), and petroleum hydrocarbons such as diesel, gasoline, and motor oil. Petroleum hydrocarbons such as diesel, gasoline, and motor oil were detected in the upper 6-inches and concentrations dropped significantly in underlying soils with non-detected concentrations below 12 inches. It was determined that the hydrocarbons were the likely result of pretreatment of the sub-base with road oil and not likely the result of an accidental release. Groundwater samples collected at the site show that groundwater has not been impacted by significant levels of contaminants (**Appendix T**).

In 1986, Codding Enterprises began redevelopment of the NAAS for retail shopping centers. In December 1990, a Phase I Environmental Site Assessment was conducted on Codding Properties Lots 2 and 3, Rohnert Park, California, by BACE Geotechnical, Inc., for Target Stores. The report stated there were no obvious adverse environmental problems on the site, or adjacent properties (**Appendix T**).

In February 1991, a Phase II Environmental Site Assessment was conducted on Codding Properties, Lots 2 and 3 south of W. Rohnert Park Expressway at Labath Avenue, Rohnert Park, California by Certified Environmental Consulting, Inc. A Phase II sampling and testing program was performed to demonstrate that the site has not suffered any identifiable or significant contamination. The sample results indicated that there was no significant contamination found on the property (**Appendix T**).

The Final Focused Environmental Impact Report for Expressway Mall (**Appendix T)** was completed in March of 1991. In a cultural resources survey performed for this environmental impact report, Archaeological Services, Inc. reported that, “some areas are covered with fill and large pile of asphalt, possibly from a now defunct airport that was located nearby.” However, the draft and final Environmental Impact Reports did not identify hazardous materials as a significant environmental issue.

In 1992, Target Stores had Kleinfelder, Inc. review the assessments listed above. The summary stated that the conclusion of the Phase II report (that there was no significant contamination found on the property, and therefore, no further work appears warranted) could not be substantiated. Kleinfelder recommended that a soil and groundwater sampling program be implemented at the site and focused on the proposed Target Stores parcel. As a result of this recommendation, Kleinfelder conducted the assessment, "Preliminary Groundwater Quality Assessment, Proposed Target Store Site, Labath Avenue and Rohnert Park Expressway" per the request of Target Stores. The summary of the assessment is that there was no petroleum product contamination noted in any of the soil samples collected (**Appendix T**).

In February 1992, a Phase I Environmental Assessment and Review of Property and Existing Building, Food 4 Less, 605 Rohnert Park, California was conducted by BACE Geotechnical. This report stated there was not a significant risk of soil and/or groundwater contamination by hazardous materials at the site either due to current or past uses of the property, or to off-site sources of contamination (**Appendix T**).

In September 1992, a Phase I Environmental Assessment was conducted by BACE Geotechnical for the House of Fabrics/The Craft Store, Lot 3, Rohnert Park Parcel Map, 145 Rohnert Park, California. This report stated there were no obvious adverse environmental problems on the study site, or adjacent properties (**Appendix T**).

In February 1993, "Phase I Environmental Site Assessment, Sears Homelife/Petsmart 565 & 575 Rohnert Park, California," was prepared by BACE Geotechnical, Inc. Their report concluded that, "there were no obvious adverse environmental conditions on the study site, or on adjacent properties" (**Appendix T**).

The Draft Environmental Impact Report for the city of Rohnert Park General Plan Amendment and Update was completed in August of 1995. This environmental impact report did not identify any hazardous materials and concluded that hazardous materials were not a significant environmental issue (**Appendix T**).

In October 1997, a report was filed on a leaking UST at Chevron #9-1912 located at 300 Rohnert Park Expressway. According to the California State Water Resources Board's Underground Storage Tank GeoTracker Program, there was a release of product containing Methyl-Tertiary-Butyl Ether (MTBE) at this address. Remedial action occurred in April 2000 by the excavation and removal of contaminated soil. Five groundwater monitoring wells were installed and the site is still being monitored (**Appendix T**).

In June 2002, "Phase I Environmental Site Assessment, 600 Rohnert Park Expressway, Rohnert Park, California," was prepared by Kleinfelder, Inc. for the lot currently occupied by the

California Highway Patrol. This report states that a release of petroleum hydrocarbons from an underground storage tank used by PG&E contaminated soil and groundwater at the site. The site has been remediated to the satisfaction of the County of Sonoma Environmental Health Division, and the North Coast Regional Water Quality Control Board, and no further action was required (**Appendix T**).

Research to date has indicated that the extensive redevelopment of the NAAS property has removed or obscured all signs of the structures, runways, underground storage tanks, and the machine gun firing range that comprised the former facility. No visible evidence of the former airfield remains **(Appendix T)**.

Database Report

A regulatory agency database report was performed to identify locations of past and/or current hazardous materials involvement. Regulatory agency databases were searched for records of known storage tank sites and known sites of hazardous materials generation, storage, or contamination, or where violations pertaining to storage and/or use of hazardous materials have occurred. Databases were searched for sites and listings up to two miles from a point roughly equivalent to the center of the site. The environmental database review was accomplished by using the services of a computerized search firm, Environmental Data Resources, Inc. (EDR). EDR uses a geographical information system to plot locations of past and/or current hazardous materials involvement.

The EDR report for the 3.86-acre section of the Wilfred site was completed in August 2005 and is included the Phase I ESA (**Appendix S)**. A summary of the databases accessed by EDR is listed in **Table 3.10-6**. The 3.86-acre site was not listed on any database searched by EDR. Several adjacent sites were listed in the EDR report.
The EDR report including the 66-acre northeastern portion of the Wilfred site was conducted in August 2005 and is part of the Phase I ESAs in **Appendix S.** A summary of the databases accessed by EDR is listed in **Table 3.10-6**. The government regulatory agency database search shows no known contaminant sites located on the Wilfred Site. The database report identified sites that are located on the west side of Stony Point Road, approximately 50 feet from the western edge of the Wilfred/Stony Point sites. Additionally, two leaking underground storage tank (LUST) sites with ongoing remedial activities are located within 0.50 miles of the eastern property boundary of the Wilfred site. The findings of the database reports and subsequent file review at the RWQCB are described below.

The Pimentel Estate site, also known as the Morrison Brothers Dairy is located at 5151 Stony Point Road. The site is listed on the HAZNET database as producing wastes and mixed oils. The

oils are transported off-site for recycling. The site is also listed on the Cortese database for discharges of water contaminated with animal waste. In 1994 the RWQCB staff inspected discharge locations that were observed during an aerial survey and confirmed that discharges of water contaminated with animal wastes to the Laguna de Santa Rosa was occurring. The discharges were the result of uncontrolled rainfall-induced runoff from animal confinement areas. As a result the RWQCB issued a Cleanup and Abatement Order (Order No. 94-45) that required the dairy to clean up and properly dispose of accumulated manure in animal confinement areas. The cleanup occurred and the order was archived at the RWQCB.

TABLE 3.10-6
DATABASES SEARCHED

Database	Type of Record	Agency
NPL	National Priority List	USEPA
CORRACTS[1]	RCRA[2] Corrective Actions	USEPA
SPL	State equivalent priority	STATE
SCL	State equivalent CERCLIS[3] List	STATE
CERCLIS/ NFRAP[4]	Sites currently or formerly under review by USEPA	USEPA
TSD	RCRA permitted treatment, storage, disposal facilities	USEPA
LUST	Leaking Underground Storage Tanks	State Regulatory Commission
SWF/LF	Permitted as solid waste landfills, incinerators or transfer stations	State/Regional Regulatory Commission
DEED RSTR	Sites with deed restrictions	STATE
CORTESE[5]	State index of properties with hazardous waste	STATE
TOXIC PITS	Toxic pits cleanup facilities	STATE
WATER WELLS	Federal and State Drinking Water Sources	USGS/STATE
RCRA Viol	RCRA violations/ enforcement actions	USEPA
TRIS	Toxic Release Inventory Database	USEPA
UST/AST	Registered underground or aboveground storage tanks	STATE
RCRIS SQG[6]	Sites that generate hazardous materials	USEPA
HAZNET	Hazardous Waste Information System	STATE
CHMIRS	California Hazardous Materials Incident Reporting System	STATE

NOTES: [1]CORRACTS: Corrective Action Report System, a USEPA database of corrective actions taken at a RCRA Regulated site (also known as CARS).
[2]RCRA: Resource Conservation and Recovery Act.
[3]CERCLIS: Comprehensive Environmental Response, Compensation & Liability Information System.
[4]NFRAP: No Further Remedial Action Planned (archived CERCLIS sites).
[5]CORTESE: Based on input from 14 state databases.
[6]RCRIS SQG. Resource Conservation and Recovery Information System Small Quantity Generator. According to federal guidelines, a SQG produces less than 1,000 kg/month of non-acutely hazardous wastes.
SOURCE: EDR, 2004.

The Betty Bowles property is located at 5307 Stony Point Road and is currently listed n the State Leaking Underground Storage Tank (LUST) database. A leak was discovered during tank closure activities in January 2000. Soil samples were collected and ground water monitoring wells installed in the area adjacent to the tank. The analytical results revealed low levels of benzene, 1,1-dichloroethane and 1,2-dichloroethane. The case is still active, however analytical results for March 2003 (**Appendix S**), show concentrations have decreased to below the laboratory detection limits.

The Poncia Storage Site is located at Stony Point Road and Laguna de Santa Rosa. The site is a municipal wastewater facility with two USTs installed in 1978 to contain waste. The EDR report lists the tanks as leaking, and no other information is given in the EDR report. The UST and LUST databases on the State Water Resources Control Board's online Geo Tracker were searched with no results given for the Ponica Storage Site. The EDR contact for this site had no knowledge of any UST's located onsite, presently or in the past. There are no listings for USTs in that vicinity on the current lists of LUST. If a LUST site were present at that location, any groundwater contamination would be south of the Wilfred and Stony Point sites. Due to the fact that all the information listed in the EDR report for this site could not be confirmed, it appears that this information is not reliable and should not be considered as a threat to surface and/or subsurface conditions on the Wilfred/Stony Point Site.

The RPM Machine and Supply site is located approximately 0.25 miles southeast of the Wilfred/Stony Point Site at 560 Martin Avenue. The RPM Machine and Supply site is listed on the EDR report as a small quantity generator (SQG). There were no violations pertaining to the storage and/or disposal of hazardous materials listed in the EDR report for this site.

The DY3 productions site is located approximately 0.30 miles southeast of the Wilfred/Stony Point Site at 539 Martin Avenue. The DY3 productions site is listed on the HAZNET database as producing .85 tons of organic wastes per year. Additionally, the site is listed on the Cortese database as the location of a LUST. However a telephone conversation with the property owner (Jones, pers. comm., 2004) confirmed that there are no USTs on that property.

The Aled Auto Truck Repair & Fleet Maintenance site is located approximately 0.30 miles southeast of the Wilfred/Stony Point Site at 538A Martin Avenue. The site is listed as a small quantity generator on the RCRIS database. There were no violations pertaining to the storage and/or disposal of hazardous materials listed in the EDR report for this site.

The Arcturus Marine Systems site is located approximately 0.35 miles southeast of the Wilfred/Stony Point Site at 517A Martin Avenue. The site is listed as a SQG on the RCRIS database. There were no violations listed in the EDR report for this site. Additionally, the site is

listed on the HAZNET database as producing .1251 tons of liquid wastes per year. The wastes are transported offsite for disposal.

The Alvarado Bakery site is located approximately 0.35 miles southeast of the Wilfred/Stony Point Site at 500 Martin Avenue. The site is listed as a LUST site that received a closure status in 1996. The Alvarado Bakery site is also listed on the Facilities Index Database (FID) as having an active UST on-site. There was no additional information in the EDR report as to whether the tanks are for gasoline, diesel fuel, or waste oils.

The DiSalvo Trucking Company is located approximately 0.50 miles southeast of the Wilfred/Stony Point Site at 650 Carlson Court. The site is listed on the State Hazardous Substance Storage Container database as having two 10,000 gallon diesel, one 10,000 gallon unleaded gasoline, and one 6,000 gallon UST. Information was lacking on what the 6,000 gallon tank is used for. Additionally, the site is reported by EDR as having a LUST on-site that received a closure status in 1995.

LUST sites located less than 0.50 miles from the Wilfred/Stony Point Site have received regulatory agency closure status with the exception of the two sites. The RWQCB was contacted to determine the regulatory status of the sites and to review the case files. The first site is the Tesoro fuel station located approximately 0.30 miles east of the Wilfred Site at 5085 Redwood Drive, Rohnert Park. The Tesoro fuel station site is currently an open environmental case with the RWQCB. Contamination at the Tesoro fuel station was reported in 2003. Analytical data from groundwater samples collected at the gas station site have detected methyl tertiary-butyl ether (MTBE) and its breakdown product tertiary-butyl ether (TBA). The site has been evaluated by installing 6 groundwater monitoring wells throughout the site. There are currently no signs of off-site migration of contaminants. Domestic wells located west of the gas station were sampled, and to date, no contaminants have been detected. The Tesoro fuel station site has been given the highest priority MTBE Threat Classification and is designated as a Class I MTBE cleanup site. Mr. Cliff Ives, the County of Sonoma Department of Health Services (CSDHS) case worker for the site, indicated that after site characterization is complete, a Corrective Action Plan will be required for the site.

The second site is the Wilfred Shell (aka Redwood Shell) located approximately 0.35 miles east of the Wilfred Site. Contamination at the Redwood Shell site was discovered in 1998. There are currently 16 groundwater monitoring wells on the Redwood Shell site that have detected MTBE and its breakdown product TBA. Groundwater extraction and treatment systems were installed in 2003 to remediate the groundwater contamination. A groundwater contour map provided in the third quarter 2006 groundwater monitoring event indicates that shallow groundwater at the Redwood Shell site is hydraulically contained; however, it is not clear how far the capture zone for the wells extends laterally off-site or vertically. Influent MTBE concentrations have ranged

from 7,200 to 130 µg/L, and a total of about 119 pounds of MTBE and 12 pounds of TBA are estimated to have been removed since 2003. Since November 2005, system influent concentrations have been below 1,000 µg/L. Mr. Cliff Ives, the CSDHS case worker for the site, indicated that after site characterization is complete, a Corrective Action Plan will be required for the site.

Sites with hazardous materials involvement that are located beyond 0.50 miles from the project site have significantly less potential to affect the surface and/or subsurface conditions at the project site. The Rohnert Park Materials Center is located approximately 0.55 miles southeast of the Wilfred/Stony Point sites at 600 Rohnert Park Expressway. The site is listed on the EDR report as having a 1,000 gallon unleaded fuel UST. There are no reported leaks or spills listed in the EDR report. The Interior Finishing site is located approximately 0.60 miles southeast of the Wilfred/Stony Point sites at 619 Martin Avenue, # 4. The site is listed in the EDR report as a SQG with no reported violations. The site is also listed on the HAZNET database as producing oxygenated solvents that are transported offsite for disposal. The former PG&E equipment yard is located approximately 0.60 miles southeast of the Wilfred/Stony Point sites at 600 Rohnert Park Expressway. The former PG&E yard is listed as having closure status since 2002.

During cooperating agency review, an additional site was identified as being located approximately 0.45 miles southeast of the Wilfred/Stony Point sites. The site is the Groom Properties HVOC Plume (aka 101 International site). AES reviewed case files for the Groom Properties HVOC site (aka 101 International site) at the RWQCB. The results of the file review are summarized in an AES memo included in **Appendix Z**.

Investigation of soil and groundwater quality at the 101 International Site (6100 Redwood Drive) began in 1989 following the removal of three underground storage tanks (USTs). Soil sampling at that time indicated a release of hydrocarbons into the soil and groundwater. During the preliminary investigations, groundwater samples from two of the three monitoring wells showed detectable levels of petroleum and halogenated hydrocarbons. Subsequently, additional upgradient wells and downgradient wells were installed to define the extent of groundwater contamination. Analytical results from the monitoring wells indicated the downgradient extent of contamination had been defined. The sampling results indicated that the concentration of trichloroethene (TCE) increased upgradient from the area of the removed gasoline tanks. This upgradient trend suggested a possible off-site source rather than the previously suspected source, the area of the removed USTs. A potential historic upgradient source of chlorinated hydrocarbon waste was identified. A sheet metal degreasing unit (using TCE as a solvent) was operated at a business formerly located at 5925 Redwood Drive. This property is located adjacent to and north (upgradient) of the 5980 Redwood Drive property (Groom Property), which is also upgradient of from the 101 International site. There are currently no additional remedial activities required by the RWQCB at the 101 International site with the exception of the property owner maintaining

the on-site monitoring wells. The RWQCB has requested a work plan from the property owner of the Groom property at 5980 Redwood Drive. To date, the RWQCB has not received a work plan from the property owner to define the extent of groundwater impacts. There are no suspected sources of TCE on the upgradient properties. Ms. Colleen Hunt, the RWQCB case worker for the site has indicated that the source of TCE has been identified and the RWQCB will continue its attempt in getting the property owner to comply. According to the current information, the downgradient extent of the TCE contamination is delineated and no additional sampling is required at the 101 International site. The groundwater flow in the area of the HVOC plume is generally to the south-southwest, away from the Wilfred/Stony Point sites. This persistent south-southwest gradient limits the potential for upgradient migration of contaminants in groundwater.

LAKEVILLE SITE

The EDR report was conducted in November 2004 and is included in **Appendix U.** A summary of the databases accessed by EDR is listed above in **Table 3.10-6**. The Lakeville site was not listed in the EDR report as having current/previous hazardous materials involvement. There are three sites located more than 0.50 miles from the Lakeville site. The first site is identified as the Ahlgrim Trust Waste Tire site located approximately 0.50 miles north of the Lakeville site at 7777 Lakeville Road in Petaluma. The Ahlgrim Trust Waste Tire site is listed on the SWF/LF as a tire disposal site. The landfill is listed as closed in the EDR report; therefore it is not likely to affect the planned uses of the proposed Lakeville site. The second site is identified as the Sleepy Hollow Dairy located approximately 0.60-miles north of the Lakeville site at 7689 Lakeville Highway in Petaluma. The Sleepy Hollow Dairy is listed on the HIST UST database as the location of one regular gasoline storage tank. The EDR report does not give information on the size of the tank. The third site is a traffic incident listed on the CHMIRS database that occurred at 7685 Lakeville Highway, Petaluma. According to the EDR report, a K-Mart truck carrying a mixed load of paints and fertilizers was involved in a fatal accident in 1997. None of the sites listed in the EDR report has affected or will affect the Lakeville site.

3.10.3 VISUAL RESOURCES

CRITERIA FOR ANALYSIS

A viewshed is comprised of one or more viewing corridors, or *vistas*. Each of these vistas provides a line-of-sight that can be characterized uniquely from among other vistas within the viewshed. The visual experience within each vista is comprised of the following constituent elements:

1. Clarity in Line of Sight—the overall visibility of the object within the viewshed, influenced by such factors as trees, buildings, topography or any other potential visual obstruction within the viewshed.

2. Duration of Visibility—the amount of time the object is exposed to viewers within the viewshed. For example, a passing commuter will experience a shorter period of viewing time than a resident within the viewshed.

3. Proximity of the Viewer—the effects of foreshortening due to the distance of the viewer from the object will influence the dominance of the object in the perspective of the viewer within the viewshed.

4. Number of Viewers—the number of viewers anticipated to experience the visual character of the object in forward-oriented view (i.e., not through a rear-view mirror). A densely populated residential district, or a busy highway within the viewshed of the object would present more viewers than unpopulated areas.

WILFRED SITE

Regulatory Setting

Guidance for regional aesthetic values within the Wilfred site's viewshed is afforded by the regional and local regulatory setting. As discussed in **Section 3.8**, the Sonoma County General Plan, Sonoma County Zoning Regulations, City of Rohnert Park General Plan and Northwest Specific Plan comprise the regulatory framework for analysis of the visual impacts.

Regional Context

The Wilfred site is located adjacent to the western boundary of the City of Rohnert Park in southern Sonoma County, just west of U.S. Highway 101 (US-101) (designated by Sonoma County as a scenic corridor). To the north, the City of Santa Rosa is approximately five miles away along US-101, while the City of Petaluma lies approximately seven miles away, along southbound US-101. The northbound course of US-101 exits the region at the Sonoma County line just beyond Cloverdale, approximately 40 miles away. The highway continues southward and crosses through Marin County where it exits the region at the Golden Gate Bridge toward San Francisco, approximately 42 miles distant. The community of Cotati abuts the southern boundary of Rohnert Park, with Sebastopol nearly eight miles to the northwest. The Wilfred Site is situated within the Santa Rosa Plain, also known as the Cotati Valley, which is bounded by the Sonoma Mountains and Mayacama Mountains to the east, and the Mendocino Range to the west.

Wilfred Site Viewshed

The Wilfred site is located in a largely rural, agricultural area on the outskirts of the City of Rohnert Park in unincorporated Sonoma County, with the Sonoma Mountains and the Mayacama Mountains visible on the eastern horizon, and the Mayacama Mountains visible on the western horizon. The topography of the Wilfred site is level, with the Wilfred-Bellevue Channel bisecting the southwestern portion of the site from north to south. The Laguna de Santa Rosa transects the southwestern tip of the southwestern portion of the Wilfred site, running east-west.

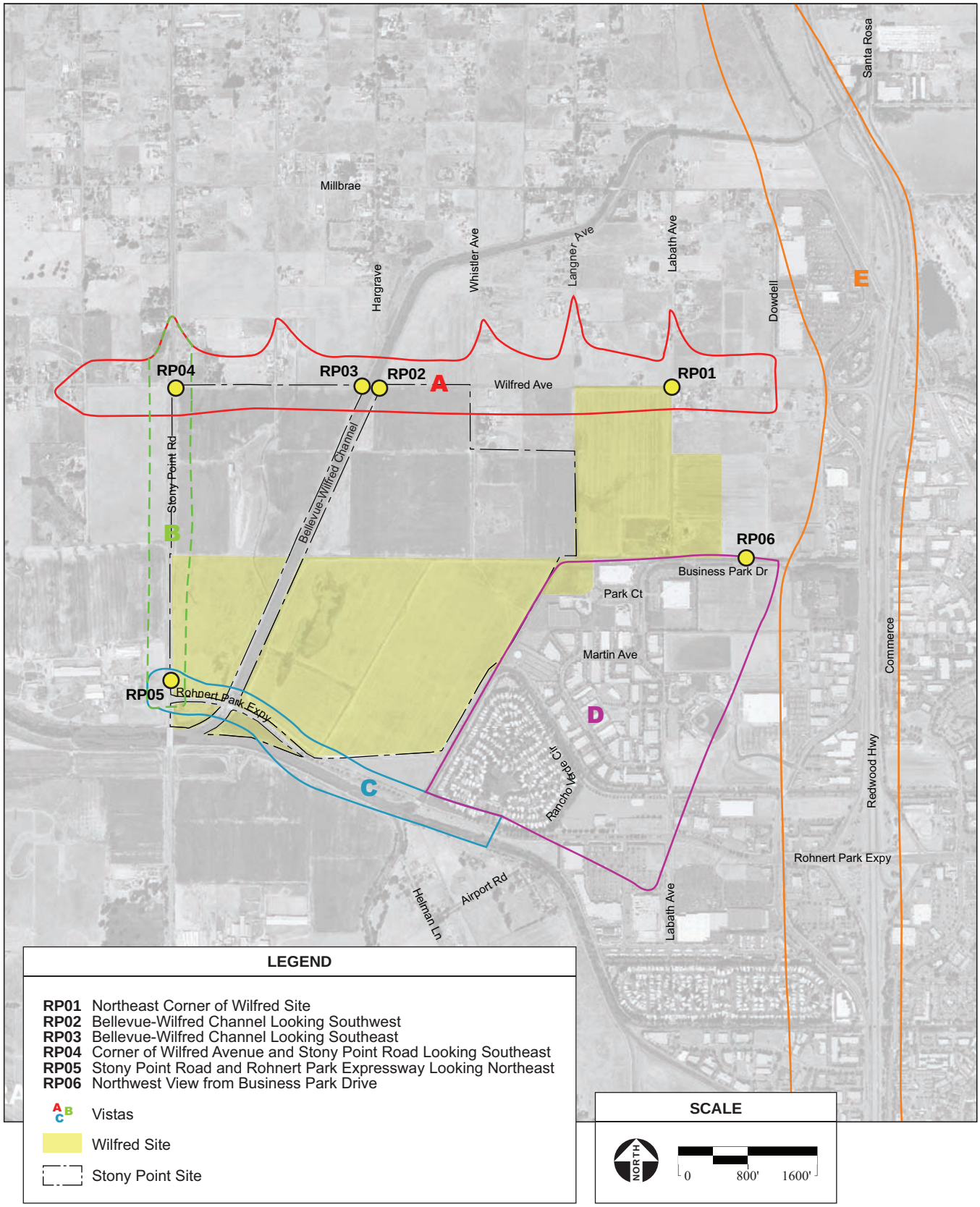
The Wilfred site is undeveloped except for two residences and associated structures on the south side of the northeastern portion of the site. The site is generally used for agriculture, cattle grazing, and rural residential purposes. Rural residential development surrounds the site to the north and east, with a mobile home park to the southeast and a business park and apartment complex further east and southeast, while further east multiple service, entertainment and regional commercial businesses line the north-south running Redwood Drive along US-101. Agricultural land uses are present to the west of the site, including a dairy and a vineyard.

Local and regional roadway geometry is detailed in the Transportation and Circulation discussion in **Section 3.8**. The main transportation route through Sonoma County and passing the vicinity of the Wilfred site is the northbound and southbound US-101. The streets abutting the Wilfred site include Wilfred Avenue, Stony Point Road, Business Park Drive, Park Court, Langner Avenue, Labath Avenue and the Rohnert Park Expressway (See **Figure 1-3**). Other streets in the viewshed include Primrose Avenue at its intersection with Wilfred Avenue to the northwest of the southwestern portion of the Wilfred site, Whistler Avenue, transecting Wilfred Avenue and continuing south approximately 530 yards, Dowdell Avenue crossing Wilfred Avenue to the northeast and continuing south approximately 280 yards, and Redwood Drive intersecting Wilfred Avenue approximately 580 yards east of Labath Avenue.

The viewshed resulting from the above characteristics is shown on **Figure 3.10-5**. The Wilfred site shares mutual views with local residences, streets and businesses. Views occur to and from Wilfred Avenue, Stony Point Road, and Rohnert Park Expressway adjacent to the Wilfred site, as well as the adjoining streets in the vicinity of the Wilfred site, named above, as well as residences and businesses located along these thoroughfares.

Identification of Vistas within the Viewshed

The viewshed is comprised of a set of vistas, which are identified by considering existing and planned land uses as well as the transportation network in the vicinity of the Wilfred site offering a potential view. Vistas within the viewshed are described by expressing the strength of the viewing experience, framed within the analytical criteria listed above. While the viewing experience is personal and subjective in nature, the application of the above criteria allows for an objective, baseline assessment of the visual environment and subsequent visual impacts of the Wilfred site alternative.



SOURCE: Aerial Photograph, 8/2002; AES, 2006

Figure 3.10-5
Viewshed – Rohnert Park Sites

Vista A – Wilfred Avenue: Residential and Commuter Vista

Wilfred Avenue runs east-west along the approximately 1,100-foot northern boundary of the northeastern portion of the Wilfred site. The length of Wilfred Avenue in this vista is a 1.5-mile stretch that spans from Dowdell Avenue on the east to Taylor Avenue on the west. Approximately 30 residences line Wilfred Avenue and its tributary streets in visible proximity to the Wilfred site. The northeast portion of the Wilfred site is proposed for construction under Alternatives A and G. The nearest residences to this portion are on the portions of Langner Avenue, Labath Avenue, Whistler Avenue and Dowdell Avenue, near their intersections with Wilfred Avenue, and on Wilfred Avenue near its intersection with these tributaries. This component of Vista A is located east of the Bellevue-Wilfred Channel. **Figure 3.10-6** shows the view to the Wilfred site from the northeast corner of Wilfred Avenue and Dowdell Avenue, northeast of the proposed construction area. **Figure 3.10-7** provides a view from the Bellevue-Wilfred Channel, northwest of the proposed construction area.

The commuter component of Vista A is provided from Wilfred Avenue and its tributaries named above, in addition to Primrose Avenue and Stony Point Drive at their intersections with Wilfred Avenue, west of the Bellevue-Wilfred Channel, as well as Taylor Avenue at its intersection with Wilfred Avenue, west of Stony Point Road. The length of Wilfred Avenue offering a view is approximately 1.5 miles in length, however the duration of view is based on a forward-oriented perspective and thus depends upon traffic conditions and whether the approach is westbound or eastbound. Eastbound commuters experience a forward oriented view of the proposed construction portion of the Wilfred site on the right quarter, for approximately 1.2 miles if starting from Taylor Avenue. While the duration of view is dependent upon deceleration, stopping and acceleration time, an average speed of 45 mph grants commuters a forward-oriented view of the construction component of the Wilfred site for approximately one minute before this area falls from view at the commuter's right flank. Westbound commuters entering the vista at Dowdell Avenue experience a forward oriented view of the proposed construction area for approximately 0.45 miles on the left quarter. At an average speed of 45 mph, westbound commuters on Wilfred Avenue experience a view for approximately half a minute.

Northeast Corner of Wilfred Site (RP01)

SOURCE: AES, 2006

Figure 3.10-6
Viewshed Site Photograph

Bellevue-Wilfred Channel Looking Southeast (RP03)

SOURCE: AES, 2006

Figure 3.10-7
Viewshed Site Photograph

Vista B – Stony Point Road: Commuter Vista

The Stony Point Road commuter vista is approximately 0.65 miles in overall length, although duration of visibility is dependent upon traffic conditions and whether the commuter is on a northbound or southbound trajectory. **Figure 3.10-8** shows the Wilfred site as seen from the corner of Stony Point Road and Wilfred Avenue. The southbound vista begins approximately 50 yards north of Wilfred Avenue, and continues for another 0.31 miles south with the proposed construction area beginning nearly directly to the left. In all, the southbound vista is approximately 0.34 miles. While the duration of visibility is dependent upon traffic conditions, deceleration and acceleration time where stoppage is required, an average speed of 50 mph offers approximately half a minute of view to southbound commuters on Stony Point Road, until the proposed construction site falls back from view to the commuter's left flank. Northbound commuters on Stony Point road enter the vista at Rohnert Park Expressway, with the proposed construction site coming into view at the commuter's right quarter. **Figure 3.10-9** shows the Wilfred site as seen from Stony Point Road near the Rohnert Park Expressway. The distance of visibility on the northbound passing is approximately 0.7 miles. While the duration of visibility is dependent upon traffic conditions, deceleration and acceleration where stoppage is required, an average speed of 50 mph would offer approximately a one minute view to the proposed construction area before the commuter passes Wilfred Avenue, and the proposed construction area passes from forward-oriented view at the commuter's right flank.

Vista C – Rohnert Park Expressway: Commuter Vista

The Rohnert Park expressway, running east-west just south of the southwest portion of the Wilfred site as well as the Southeast Quadrant comprising Vista D below, is a commuter vista that connects Redwood Drive on the east side of the viewshed with Stony Point Drive on the west. Due to the existing built environment, landscaping and trees, no forward-oriented view to the portion of the Wilfred site to be built under Alternative A is offered to westbound commuters. Eastbound commuters receive an intermittent line of sight with breaks in near-ground vegetation and landscaping, however no view is offered once abreast of the trailer park at Rancho Verde circle in either westbound or eastbound trajectory.

Vista D – Southeast Quadrant: Residential and Business Park Vista

Vista D provides a limited view northward for the trailer park at Rancho Verde Circle off Rohnert Park Expressway and the business park on Business Park Drive, southeast of the Wilfred site. Landscaping, buildings and trees offer a limited view to the Wilfred site for residents abutting northern boundary of the trailer park. Similarly, landscaping and trees provide a limited view to the business park under existing conditions. Within this vista, a view of the proposed construction portion of the Wilfred site is afforded to westbound commuters on Business Park Drive, although it is largely occluded by landscaping and trees along the northern side of the street. The view is intermittent. **Figure 3.10-10** shows this perspective to the construction portion of the Wilfred

Corner of Wilfred Avenue and Stony Point Road Looking Southeast (RP04)

SOURCE: AES, 2006

Figure 3.10-8
Viewshed Site Photograph

Stony Point Road and Rohnert Park Expressway Looking Northeast (RP05)

SOURCE: AES, 2006

Figure 3.10-9
Viewshed Site Photograph

Northwest View from Business Park Drive (RP06)

SOURCE: AES, 2006

Figure 3.10-10
Viewshed Site Photograph

site, but was taken at the apex of the berm and parallel to the tree line that normally occlude views from the street.

Vista E – U.S. 101 and Interchange Businesses: Regional Commercial and Commuter Vista

A southbound approach on U.S. 101 offers a momentary view to the proposed construction portion of the Wilfred site at the commuter's right quarter. The view is mostly occluded by the regional commercial facilities along Redwood Drive between the highway and the Wilfred site. The moment of view comes at the apex of the Commerce Boulevard overpass. Descending from the overpass, complete occlusion of view occurs with the Wilfred site still at the right quarter. Northbound commuters are afforded no view; regional commercial establishments dominate the view to the west, between commuters and the Wilfred site.

Lighting and Glare

A site visit was conducted to measure nighttime lighting and glare on the night of February 22, 2006 between 7:00 PM and 8:00 PM. Using an Extech Instruments® Model 407026 heavy-duty light meter, existing lighting conditions were measured within each of the vistas identified above. The points of measurement are identified on the data points called out on **Figure 3.10-5**, and appear alongside measured lighting values on **Table 3.10-7**.

TABLE 3.10-7
DATA POINT LIGHT READINGS

Data Point	Existing Lighting
RP01	0.0 Foot-candles
RP02	0.0 Foot-candles
RP03	0.0 Foot-candles
RP04	5.3 Foot-candles
RP05	0.6 Foot-candles
RP06	1.9 Foot-candles

SOURCE: AES, 2006.

The existing lighting conditions within **Vista A** were measured at the data points RP1, RP2, RP3 and RP4 as called out on **Figure 3.10-5**. Instrumentation registered 0.0 foot-candles at RP1; existing lighting was most prominent along the regional commercial area along Redwood Drive, adjacent to the U.S. 101, and was below measurable thresholds on the instrumentation. Minor illumination occurred at the residences in the vicinity of RP1, and was generally confined to the residences at which it occurred.

Instrumentation registered 0.0 foot-candles at RP2 and RP3; as with RP1, existing lighting was most prominent along the regional commercial area along Redwood Drive, adjacent to the U.S.

101, and was below measurable thresholds on the instrumentation. Minor illumination also occurred at the residences in the vicinity of RP2 and RP3, and was confined to the residences at which it occurred.

RP4 is the data point occurring at the intersection of **Vista A** along Wilfred Avenue and **Vista B** along Stony Point Road. Here, instrumentation registered 5.3 foot-candles. Existing lighting was most prominent as a result of downcast lamppost lighting at this intersection. Minor illumination also occurred at the residences in the vicinity of RP4, and was generally confined to the residences at which it occurred.

RP5 is mapped at Stony Point Road near its intersection with Rohnert Park Expressway, and at the intersection of **Vista B** and **Vista C**. Lampposts and traffic signals place ambient lighting at this data point that, compounded with the flow of traffic, ranged from 0.3 foot-candles to 0.6 foot-candles. Minor illumination also occurred at the dairy in the vicinity of RP5, and was confined to the dairy itself.

The lighting along Business Park Drive near RP6, where a partial view is offered, is more variable. A 100-foot transect along Business Park Drive was walked under and between the downcast lampposts along the Drive. Instrumentation registered existing lighting conditions between 0.01 foot-candles and 1.9 foot-candles.

STONY POINT SITE

Regulatory Setting

Guidance for regional aesthetic values within the Stony Point Site's viewshed is afforded by the regional regulatory setting. As discussed in **Section 3.8**, the Sonoma County General Plan and Sonoma County Zoning Regulations comprise the regulatory framework for analysis of the visual impacts from the project alternatives proposed for the Stony Point Site.

Regional Context

The Stony Point site is located adjacent to the western boundary of the City of Rohnert Park in southern Sonoma County, just west of US-101 (designated by Sonoma County as a scenic corridor). To the north, the City of Santa Rosa is approximately five miles away along US-101, while the City of Petaluma lies approximately seven miles away, along southbound US-101. The northbound course of US-101 exits the region at the Sonoma County line just beyond Cloverdale, approximately 40 miles away. The highway continues southward and crosses through Marin County where it exits the region at the Golden Gate Bridge toward San Francisco, approximately 42 miles distant. The community of Cotati abuts the southern boundary of Rohnert Park, with Sebastopol nearly eight miles to the northwest. The Stony Point site is situated within the Santa

Rosa Plain, also known as the Cotati Valley, which is bounded by the Sonoma Mountains and Mayacama Mountains to the east, and the Mendocino Range to the west.

Stony Point Site Viewshed

The Stony Point site is located in a largely rural, agricultural area on the outskirts of the City of Rohnert Park in unincorporated Sonoma County, with the Sonoma Mountains and the Mayacama Mountains visible on the eastern horizon, and the Mayacama Mountains visible on the western horizon. The topography of the Stony Point site is level, with the Wilfred-Bellevue Channel bisecting the site from north to south. The Laguna de Santa Rosa transects the southwestern tip of the Stony Point site, running east-west.

The Stony Point site is undeveloped except for a large barn located on the site's northwestern corner. The site is generally used for agriculture, cattle grazing, and wastewater disposal. Rural residential development surrounds the site to the north and east, with a mobile home park to the southeast and a business park and apartment complex further east and southeast, while further east multiple service, entertainment and regional commercial businesses line the north-south running Redwood Drive along US-101. Agricultural land uses are present to the west of the site, including a dairy and a vineyard.

Local and regional roadway geometry is detailed in the Transportation and Circulation discussion in **Section 3.8**. The main transportation route through Sonoma County and passing the vicinity of the Stony Point site is the northbound and southbound US-101. The streets abutting the Stony Point site include Wilfred Avenue, Stony Point Road, Business Park Drive, Park Court, Langner Avenue, Labath Avenue and the Rohnert Park Expressway (See **Figure 1-3**). Other streets in the viewshed include Primrose Avenue at its intersection with Wilfred Avenue to the northwest of the southwestern portion of the Stony Point site, Whistler Avenue, transecting Wilfred Avenue and continuing south approximately 530 yards, Dowdell Avenue crossing Wilfred Avenue to the northeast and continuing south approximately 280 yards, and Redwood Drive intersecting Wilfred Avenue approximately 580 yards east of Labath Avenue.

The viewshed resulting from the above characteristics is identical to that of the Wilfred site, above, and is shown on **Figure 3.10-5**, above. The Stony Point site shares mutual views with local residences, streets and businesses. Views occur to and from Wilfred Avenue, Stony Point Road, and Rohnert Park Expressway adjacent to the Stony Point site, as well as the adjoining streets in the vicinity of the Stony Point site, named above, as well as residences and businesses located along these thoroughfares.

Identification of Vistas within the Viewshed

The viewshed is comprised of a set of vistas, which are identified by considering existing and planned land uses as well as the transportation network in the vicinity of the Stony Point site

offering a potential view. Vistas within the viewshed are described by expressing the strength of the viewing experience, framed within the analytical criteria listed at the beginning of this section. While the viewing experience is personal and subjective in nature, the application of the above criteria allows for an objective, baseline assessment of the visual environment and subsequent visual impacts of the Stony Point site alternatives.

Vista A – Wilfred Avenue: Residential and Commuter Vista

Wilfred Avenue runs east-west along the northern boundary of the Stony Point site. The length of Wilfred Avenue in this vista is a 1.5-mile stretch that spans from Dowdell Avenue on the east to Taylor Avenue on the west. Approximately 30 residences line Wilfred Avenue and its tributary streets in visible proximity to the Stony Point site. The portion of the Stony Point site located east of the Bellevue-Wilfred Channel in Vista A is shown on **Figure 3.10-7**, above. The portion of the Stony Point site located west of the Bellevue-Wilfred Channel in this vista is shown on **Figure 3.10-11**.

The commuter component of Vista A is provided from Wilfred Avenue and its tributaries named above, in addition to Primrose Avenue and Stony Point Road at their intersections with Wilfred Avenue, west of the Bellevue-Wilfred Channel, as well as Taylor Avenue at its intersection with Wilfred Avenue, west of Stony Point Road. As noted above, the length of Wilfred Avenue offering a view is approximately 1.5 miles in length, however the duration of view is based on a forward-oriented perspective and thus depends upon traffic conditions and whether the approach is westbound or eastbound.

Eastbound commuters experience a forward-oriented view of the Stony Point site on the right quarter, for approximately 0.85 miles if starting from Taylor Avenue. While the duration of view is dependent upon deceleration, stopping and acceleration time, an average speed of 45 mph grants commuters a forward-oriented view of the Stony Point site for approximately half a minute before the site falls from view at the commuter's right flank. Westbound commuters entering the vista at Dowdell Avenue experience a forward oriented view of the Stony Point site for approximately 1.3 miles on the left quarter. At an average speed of 45 mph, westbound commuters on Wilfred Avenue experience a view for nearly two minutes until the Stony Point Site falls out of forward oriented view at the commuter's left flank upon reaching Stony Point Road.

Bellevue-Wilfred Channel Looking Southwest (RP02)

SOURCE: AES, 2006

Figure 3.10-11
Viewshed Site Photograph

Vista B – Stony Point Road: Commuter Vista

The Stony Point Road commuter vista is approximately 0.73 miles in overall length, although duration of visibility is dependent upon traffic conditions and whether the commuter is on a northbound or southbound trajectory. The southbound vista begins approximately 50 yards north of Wilfred Avenue, and continues for another 0.7 miles south with the Stony Point site coming into view on the left quarter and falling back directly to the commuter's left upon crossing Wilfred Avenue. **Figure 3.10-8**, above, shows the Stony Point site as seen from the corner of Stony Point Road and Wilfred Avenue. While the duration of visibility is dependent upon traffic conditions, deceleration and acceleration time where stoppage is required, an average speed of 50 mph offers nearly one minute of view to southbound commuters on Stony Point Road, until the Stony Point site falls back from view to the commuter's left flank upon reaching the Rohnert Park Expressway. Northbound commuters on Stony Point road enter the vista at Rohnert Park Expressway, with the proposed construction site coming into view at the commuter's right quarter. **Figure 3.10-9**, above, shows the Stony Point site as seen from Stony Point Road near the Rohnert Park Expressway. The distance of visibility on the northbound passing is approximately 0.7 miles. While the duration of visibility is dependent upon traffic conditions, deceleration and acceleration where stoppage is required, an average speed of 50 mph would offer nearly one minute view to the proposed construction area before the commuter passes Wilfred Avenue, and the Stony Point site passes from forward-oriented view at the commuter's right flank.

Vista C – Rohnert Park Expressway: Commuter Vista

The Rohnert Park expressway, running east-west just south of the Stony Point site, is a commuter vista that connects Redwood Drive on the east side of the viewshed with Stony Point Drive on the west. Due to the existing built environment, landscaping and trees, no forward-oriented view to the Stony Point site is offered to westbound commuters. Eastbound commuters receive an intermittent line of sight with breaks in near-ground vegetation and landscaping, however no view is offered once abreast of the trailer park at Rancho Verde circle in either westbound or eastbound trajectory.

Vista D – Southeast Quadrant: Residential and Business Park Vista

Vista D provides a limited view northward for the trailer park at Rancho Verde Circle off Rohnert Park Expressway and the business park on Business Park Drive, southeast of the Stony Point site. Landscaping, buildings and trees offer a limited view to the Stony Point site for residents within and abutting the northern boundary of the trailer park. Similarly, landscaping and trees provide a limited view to the business park under existing conditions. Within this vista, a view of the Stony Point site is afforded to westbound commuters on Business Park Drive at their right quarter, although it is largely occluded by landscaping and trees along the northern side of the street. The view is intermittent. **Figure 3.10-10**, above, shows this perspective to the Stony Point site, but was taken at the apex of the berm and parallel to the tree line that normally occlude views from the street.

Vista E – U.S. 101 and Interchange Businesses: Regional Commercial and Commuter Vista

A southbound approach on U.S. 101 offers a momentary and mostly occluded view to the Stony Point site at the commuter's right quarter. The occlusion in this view is caused by the regional commercial facilities along Redwood Drive, residences and trees between the highway and the Stony Point site. The moment of view comes at the apex of the Commerce Boulevard overpass. Descending from the overpass, complete occlusion of view occurs with the Stony Point site still at the right quarter. Northbound commuters are afforded no view; regional commercial establishments dominate the view to the west, between commuters and the Stony Point site.

Lighting and Glare

The data points from which measurements were taken, as well as the resultant readings on the instrumentation, are identical to the conditions noted above for the Wilfred site.

LAKEVILLE SITE

Regulatory Setting

Guidance for regional aesthetic values within the Lakeville site's viewshed is afforded by the regional regulatory setting. As discussed in **Section 3.8**, the Sonoma County General Plan and Sonoma County Zoning Regulations comprise the regulatory framework for analysis of the visual impacts from the project alternative proposed for the Lakeville site.

The Lakeville site is located within a Sonoma County General Plan designated "Scenic Landscape Unit." Both Lakeville Highway and SR-37 are designated by the County as scenic corridors. In addition, SR-37 in the vicinity of the Lakeville site is listed by the California Department of Transportation as eligible for designation as a California scenic highway. The Lakeville site's parcels are within an Open Space-Agriculture and Resource Management areas.

Regional Context

The Lakeville site is in an unincorporated area of Sonoma County in its southern end, southeast of the City of Petaluma and east of the City of Novato in Marin County. The site is at the lower end of the Petaluma Valley at the base of the Sonoma Mountains in a structural depression in the Coast Ranges. The Lakeville site is located in a rural, agricultural area in unincorporated Sonoma County near the intersection of Lakeville Highway (a Sonoma County Scenic Corridor) and State Route 37 (SR-37), a California Scenic Highway and a County Scenic Corridor. The Lakeville Highway is the main thoroughfare characterizing the region, and begins on its south at SR-37, running northward until it turns west and joins the US-101 at the City of Petaluma. The western boundary is at the Petaluma River, nearly two miles west of the Lakeville Highway along SR-37, and the eastern boundary is at the Sonoma Mountains, less than two miles east of the Lakeville site. The San Pablo Bay is just south of the Lakeville site, approximately 2.2 miles distant.

LAKEVILLE SITE VIEWSHED

Figure 3.10-12 shows the viewshed of the Lakeville site and its constituent vistas. The Lakeville site is located in a rural, agricultural area in unincorporated Sonoma County near the intersection of Lakeville Highway and SR-37. The Lakeville site is currently undeveloped and is used for cattle grazing. Vegetation on the site primarily consists of uninterrupted grasslands. The only public viewpoints of the Lakeville site are from surrounding roadways. The views from Lakeville Highway and SR-37 are relatively unobstructed, although the view from SR-37 is relatively distant. The topography of the Lakeville site is largely level, with an upslope located in the northeastern corner of the site. Agricultural and grazing land uses surround the Lakeville site, with residences in visual proximity.

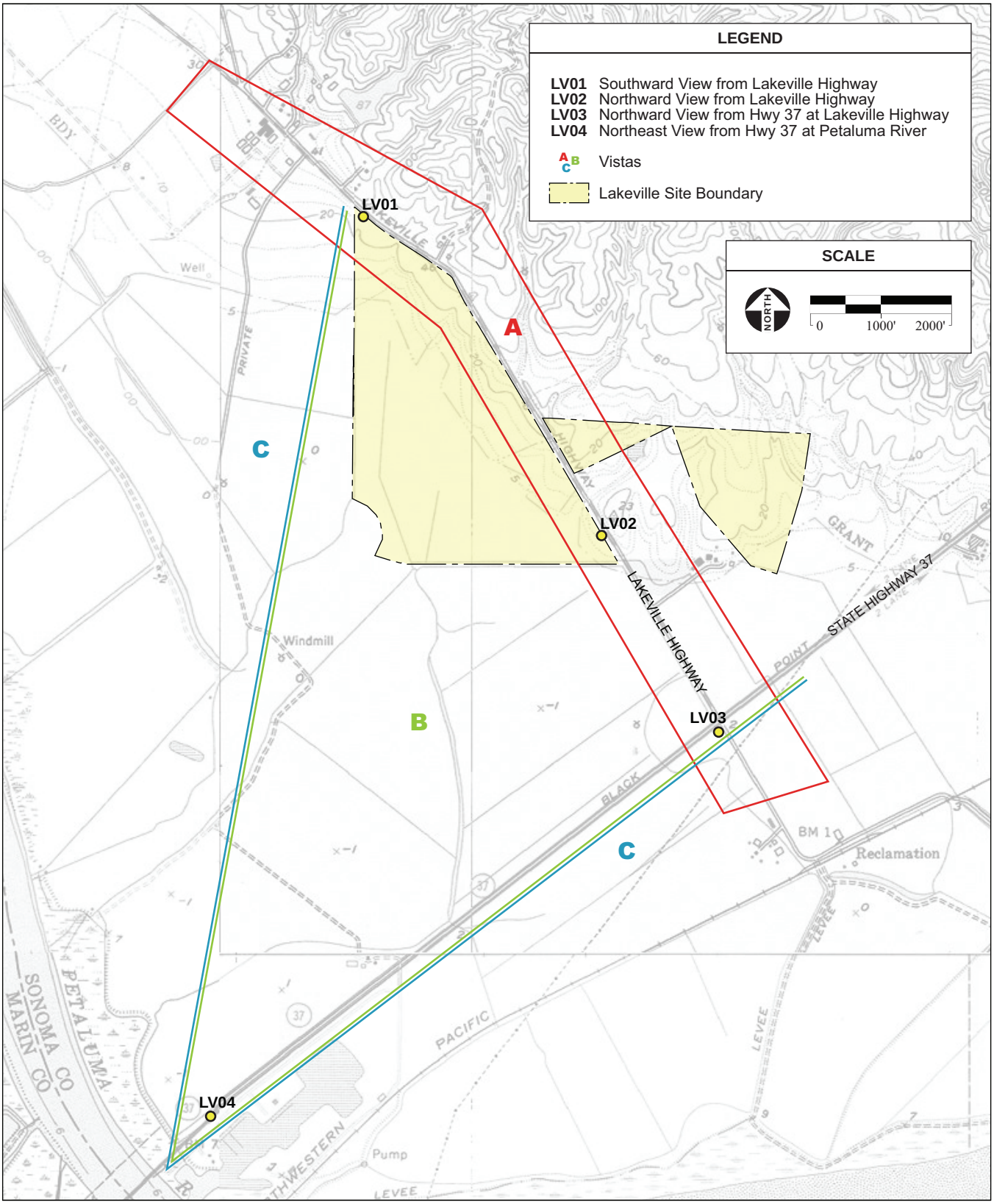
Identification of Vistas within the Viewshed

Vistas within the viewshed are described by expressing the strength of the viewing experience, framed within the analytical criteria listed above. While the viewing experience is personal and subjective in nature, the application of the analytical criteria at the beginning of this section allows for an objective, baseline assessment of the visual environment.

Vista A – Lakeville Highway Residential, Commercial and Commuter Vista

The Lakeville Highway residential, commercial and commuter vista is approximately 1.7 miles in overall length, although duration of visibility is dependent upon traffic conditions and whether the commuter is on a northbound or southbound trajectory. The southbound vista begins approximately half a mile south of Twin House Ranch Road along the Lakeville Highway, at the Sleepy Hollow Vineyard and approximately a quarter mile north of the Lakeville site, and continues for another 0.8 miles. **Figure 3.10-13** shows the Lakeville site as seen from the southbound approach along the Lakeville Highway. While the duration of visibility is dependent upon traffic conditions, deceleration and acceleration time where stoppage is required, an average speed of 50 mph offers nearly 1.3 minutes of view to southbound commuters on the Lakeville Highway, until the proposed construction area falls back from view to the commuter's left flank on the near approach to the Lakeville site's southern boundary.

Northbound commuters on the Lakeville Highway enter the vista at SR-37, with the Lakeville site coming into view at the commuter's left quarter. **Figure 3.10-14** shows the Lakeville site as seen from a northbound approach along the Lakeville Highway. The viewing distance on the northbound passing is approximately 1.7 miles. While the duration of visibility is dependent upon traffic conditions, deceleration and acceleration where stoppage is required, an average speed of 50 mph would offer approximately two minutes of view to the proposed construction area before the commuter passes from the vista, and the Lakeville site falls back from forward-oriented view at the commuter's left flank.



SOURCE: "Sears Point, CA" USGS 7.5 Minute Topographic Quadrangle,
Unsectioned areas of "San Pablo Mountains", T4N, R5W; Mt. Diablo Baseline & Meridian; AES, 2006

Figure 3.10-12
Viewshed – Lakeville Site

Vista B – SR-37 Scenic and Commuter Vista

The portion of State Route 37 that includes Vista B in the Lakeville site viewshed is designated a scenic corridor by the State of California, and provides a wide field of view for commuters, including a view of open space and agricultural lands to the north, and the northern shore of San Pablo Bay to the south, beyond a field of salt flats and bay marshlands. Approximately 2.4 miles of view to the Lakeville site occur in this vista, in a stretch that spans the viewshed from its western boundary at the Petaluma River, to its eastern boundary just beyond the intersection with the Lakeville Highway. The westbound view begins approximately 0.4 miles east of the Lakeville Highway, and continues approximately 0.6 miles west of the Lakeville Highway. The Lakeville site as seen from the SR-37 and Lakeville Highway intersection is shown on **Figure 3.10-15**. The Lakeville site comes into view nearly directly to the right, and upgrade of SR-37.

While the duration of visibility is dependent upon traffic conditions, deceleration and acceleration where stoppage is required, an average speed of 50 mph would offer approximately 1.2 minutes of view until the Lakeville Site falls out of forward oriented view at the commuter's right flank.

The eastbound SR-37 view begins at the Petaluma River, and spans the viewshed to provide approximately 2.4 miles of view. The Lakeville site enters view at the commuter's left quarter, against a backdrop comprised of agricultural land and the Sonoma Mountains, northeast of the Lakeville site. **Figure 3.10-16** shows the view to the Lakeville site from the SR-37 bridge over the Petaluma River. While the duration of visibility is dependent upon traffic conditions, deceleration and acceleration where stoppage is required, an average speed of 50 mph would offer nearly three minutes of view to eastbound commuters on SR-37, until the Lakeville Site falls out of forward oriented view at the commuter's left flank, approximately 0.4 miles east of Lakeville Highway.

Vista C – Regional Residential and Commercial Vista

Figure 3.10-12 shows the vistas within the Lakeville site's viewshed. A number of residences and commercial activities west, northwest and southwest of the Lakeville site, and not in Vista A or Vista B, are afforded a view of the Lakeville site. In this frame of view, the Lakeville site appears in the distance, against a backdrop of agricultural land and haloed by the Sonoma Mountains. The Lakeville site appears upgrade of most viewers in Vista C.

Lighting and Glare

A site visit was conducted to measure nighttime lighting and glare, on the night of February 22, 2006 between 8:30 PM and 9:30 PM. Using an Extech Instruments® Model 407026 heavy-duty light meter, existing lighting conditions were measured within each of the viewsheds identified

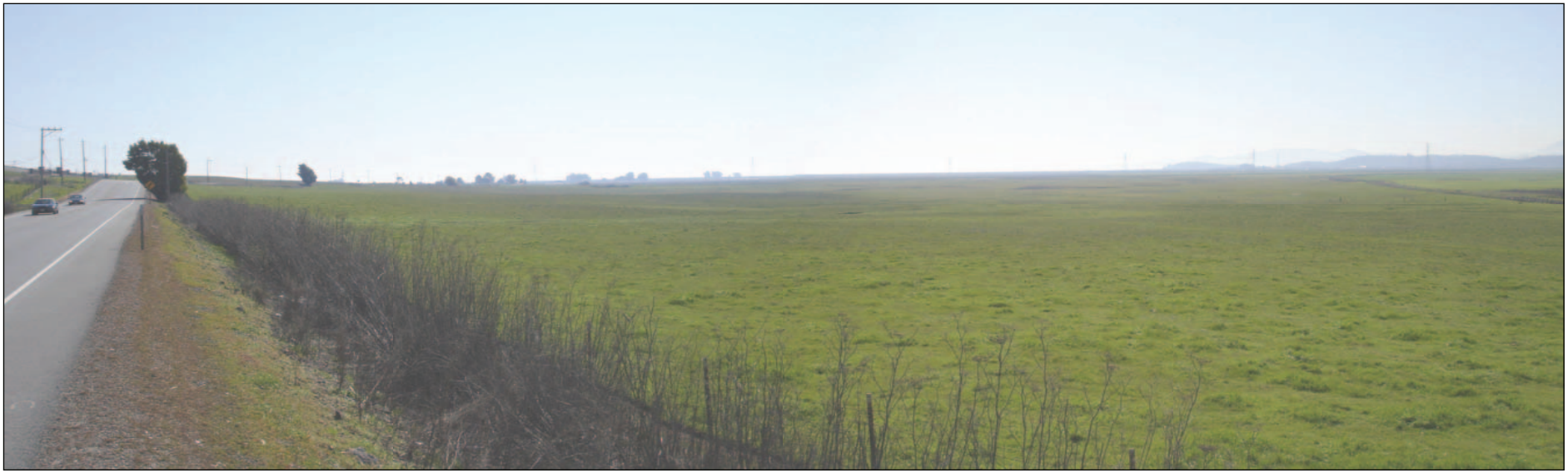
above. The points of measurement are identified on the data points called out on **Figure 3.10-12**, and appear alongside measured lighting values on **Table 3.10-8**.

TABLE 3.10-8
DATA POINT LIGHT READINGS

Data Point	Existing Lighting
LV01	0.0 Foot-candles
LV02	0.0 Foot-candles
LV03	0.6 Foot-candles
LV04	0.3 Foot-candles

SOURCE: AES, 2006.

The existing lighting conditions within **Vista A** were measured at the data points LV01 and LV02 as called out on **Figure 3.10-12**. Instrumentation registered 0.0 foot-candles at LV01; existing lighting was most prominent further south, at the intersection of the Lakeville Highway and SR-37, and was below thresholds on the instrumentation. Minor illumination occurred at various points along the Lakeville highway and sparsely distributes around parts of Vista C, and was generally confined to the locations at which it occurred.



Southward View from Lakeville Highway (LV01)

SOURCE: AES, 2006

Figure 3.10-13
Viewshed Site Photograph

Northward View from Lakeville Highway (LV02)

SOURCE: AES, 2006

Figure 3.10-14
Viewshed Site Photograph

Northward View from Hwy 37 at Lakeville Highway (LV03)

SOURCE: AES, 2006

Figure 3.10-15
Viewshed Site Photograph

Northeast View from Hwy 37 at Petaluma River (LV04)

SOURCE: AES, 2006

Figure 3.10-16
Viewshed Site Photograph

LV03 is mapped at the Lakeville Highway at its intersection with SR-37, and at the intersection of **Vista A** and **Vista B**. Lampposts and traffic signals place ambient lighting at this data point that, compounded with the flow of traffic, ranged from 0.2 foot-candles to 0.6 foot-candles. Additional illumination occurs as a result of passing nighttime traffic.

The lighting at LV04 within **Vista B** registered existing lighting conditions between 0.00 foot-candles and 0.3 foot-candles. The major source of illumination here is from passing traffic.