SANTA CLARA COUNTY VECTOR CONTROL DISTRICT

MOSQUITO, VECTOR, AND DISEASE CONTROL ASSESSMENT

ENGINEER'S REPORT

FISCAL YEAR 2020 - 2021

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PURSUANT TO THE CALIFORNIA GOVERNMENT CODE, HEALTH AND SAFETY CODE AND ARTICLE XIIID OF THE CALIFORNIA CONSTITUTION

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INTRODUCTION

OVERVIEW

The Santa Clara County Vector Control District ("District") operates within the County of Santa Clara's ("County") Consumer and Environmental Protection Agency ("CEPA") Department of Environmental Health. The District currently provides mosquito, domestic rat, other vector and disease control services, and harmful wildlife control throughout Santa Clara County. The District has been providing its public health protection services in the County for over 30 years. The District's services, which are provided throughout its service area, encompass approximately 1,291 square miles. The District is managed by County staff and is governed by the County Board of Supervisors acting as the Board of Trustees for the District ("Board").

The District is responsible for mosquito and vector-borne disease surveillance and control services throughout Santa Clara County, including the municipalities of Campbell, Cupertino, Gilroy, Los Altos, Los Altos Hills, Los Gatos, Milpitas, Monte Sereno, Morgan Hill, Mountain View, Palo Alto, San Jose, San Martin, Santa Clara, Saratoga, and Sunnyvale, and all unincorporated areas in the County.

The District's core services are summarized as follows:

1. Early detection of public health threats through comprehensive vector surveillance.
2. Reducing vectors or exposure to vectors that transmit diseases.
3. Appropriate, timely response to requests to prevent/control vector-borne diseases on property.

THE 1996 ASSESSMENT

In 1996, the District conducted a protest hearing to establish a benefit assessment (the "1996 Assessment") to fund its mosquito, vector and disease control services throughout the County which provide special benefit to affected properties. The 1996 Assessment was approved by the Board on July 30, 1996 and has been assessed each year since its formation. It generates approximately $2.8 million dollars per year to fund these critical public health services. The 1996 Assessment is fully described and supported by a separate Engineer's Report which is on file with the County and is available for public review.

It should be noted that the 1996 Assessment was formed prior to the passage of Proposition 218 in November of 1996. Proposition 218 placed significant new administrative and engineering requirements on the formation and annual administration of benefit assessments in California while acknowledging that certain "pre-Prop 218" (including this 1996 Assessment) were fully valid. Subsequent legal decisions have confirmed that pre-Prop 218 assessments (e.g. the 1996 Assessment) may be evaluated

in context of the standards at the time versus post-Prop 218 assessments (e.g. the 2005 Assessment.).

THE 2005 ASSESSMENT

In order to maintain current levels of service and to enhance disease surveillance and vector control services to better respond to the threat of West Nile Virus and other public health issues, in 2005, the County proposed a new "overlay" assessment (the "2005 Assessment") on properties within Santa Clara County, (the "2005 Assessment Area"). This Engineer's Report defines this 2005 benefit assessment, which provides funding for mosquito, vector and disease control services throughout Santa Clara County, as well as related costs for equipment, capital improvements and services and facilities necessary to mosquito and vector control programs. In the absence of a new revenue source in 2005, the baseline level of mosquito, vector and disease control services in the County would be a deteriorating level of mosquito, vector and disease control services (i.e. the 1996 Assessment does not include any cost-of-living mechanism, and hence provides diminishing funding each year). The services provided to the County by this 2005 Assessment consist of expanded services, as further described in this report, above the baseline level of services previously provided.

RELATIONSHIP BETWEEN THE 1996 ASSESSMENT AND THE 2005 ASSESSMENT

Both the 1996 Assessment and the 2005 Assessment are reviewed, updated and presented to the County Board of Supervisors each year for consideration, and have been approved and assessed each year since their formations. Both provide critical and additive funding in support of the County's mosquito and vector control programs. It should be noted that, not surprisingly, there are differences in the underlying analysis, method of apportionment, benefit analysis, etc., between the two assessments, they are consistent with one another in mission and purpose, and both are compliant with Proposition 218 requirements.

Most importantly, the sum of the 1996 and 2005 assessments on each property do not exceed the reasonable cost of the proportional special benefit conferred on that parcel. Please refer to the Section on "Parcel Analysis of 1996 Assessment and 2005 Assessement" on page 53 for more discussion. Again this Engineer's Report describes and supports the 2005 Assessment only, while a separate Engineer's Report is on file in support of the 1996 Assessment.

ADDITIONAL INFORMATION ON THE 2005 ASSESSMENT

The 2005 Assessment Area has been drawn to include properties that may request and/or receive direct and more frequent service, that are located within the scope of the vector surveillance area, that are located within flying or traveling distance of potential vector sources monitored by the District, and that will receive a direct special benefit from a reduction in the amount of vectors reaching and impacting the property as a result of the enhanced vector surveillance and control. The Assessment Diagram included in this report shows the boundaries of the 2005 Assessment Area.

The following is an outline of the primary services and improvements that are funded by the mosquito, vector and disease control Assessment:

- Mosquito control in the 2005 Assessment Area
- Surveillance for vector-borne diseases in the 2005 Assessment Area
- Mosquito inspections in the 2005 Assessment Area
- Response to service requests in the 2005 Assessment Area
- Mosquitofish for backyard fish ponds and other appropriate habitats
- Presentations to schools and civic groups
- Identification of mosquitoes, ticks and other arthropods and testing for diseases in the 2005 Assessment Area
- Wildlife surveillance and disease control where there are public health threats in the 2005 Assessment Area
- Domestic Rodent Control in the 2005 Assessment Area
- Mosquito Surveillance and Disease Testing in the 2005 Assessment Area
- Rodent Surveillance and Disease Testing in the 2005 Assessment Area
- Tick Surveillance and Disease Testing in the 2005 Assessment Area
- Upgrading of the Facilities and Equipment Utilized by the District

As used within this Report and the benefit assessment ballot proceeding, the following terms are defined:

> *"Vector" means any animal capable of transmitting the causative agent of human disease or capable of producing human discomfort or injury, including, but not limited to, mosquitoes, flies, mites, ticks, other arthropods, and small mammals and other vertebrates (Health and Safety Code Section 2002(k)).*
>
> *"Vector Control" shall mean any system of public improvements or services that is intended to provide for the surveillance, prevention, abatement, and control of vectors as defined in subdivision (k) of Section 2002 of the Health and Safety Code and a pest as defined in Section 5006 of the Food and Agricultural Code (Government Code Section 53750(m)).*

The District is governed by the Mosquito Abatement and Vector Control District Law of the State of California, California Health and Safety Code §§ 2000 et seq. Following are excerpts from the District Law which summarize the State Legislature's findings and intent with regard to mosquito abatement and other vector control services:

2001. (a) The Legislature finds and declares all of the following:

(1) California's climate and topography support a wide diversity of biological organisms.

(2) Most of these organisms are beneficial, but some are vectors of human disease pathogens or directly cause other human diseases such as hypersensitivity, envenomization, and secondary infections.

(3) Some of these diseases, such as mosquitoborne viral encephalitis, can be fatal, especially in children and older individuals.

(4) California's connections to the wider national and international economies increase the transport of vectors and pathogens.

(5) Invasions of the United States by vectors such as the Asian tiger mosquito and by pathogens such as the West Nile virus underscore the vulnerability of humans to uncontrolled vectors and pathogens.

(b) The Legislature further finds and declares:

(1) Individual protection against the vectorborne diseases is only partially effective.

(2) Adequate protection of human health against vectorborne diseases is best achieved by organized public programs.

(3) The protection of Californians and their communities against the discomforts and economic effects of vectorborne diseases is an essential public service that is vital to public health, safety, and welfare.

(4) Since 1915, mosquito abatement and vector control districts have protected Californians and their communities against the threats of vectorborne diseases.

(c) In enacting this chapter, it is the intent of the Legislature to create and continue a broad statutory authority for a class of special districts with the power to conduct effective programs for the surveillance, prevention, abatement, and control of mosquitoes and other vectors.

(d) It is also the intent of the Legislature that mosquito abatement and vector control districts cooperate with other public agencies to protect the public health, safety, and welfare. Further, the Legislature encourages local communities and local officials to adapt the powers and procedures provided by this chapter to meet the diversity of their own local circumstances and responsibilities.

Health and Safety Code, Section 2082 specifically authorizes the creation of special benefit assessments for vector control, as follows:

(a) A district may levy special benefit assessments consistent with the requirements of Article XIIID of the California Constitution to finance vector control projects and programs.

LEGISLATIVE ANALYSIS

PROPOSITION 218

This Assessment was formed in accordance with Proposition 218, The Right to Vote on Taxes Act, which was approved by the voters of California on November 6, 1996 and is now Article XIIIC and XIIID of the California Constitution. Proposition 218 provides for benefit assessments to be levied to fund the cost of providing services, improvements, as well as maintenance and operation expenses to a public improvement which benefits the assessed property.

Proposition 218 describes a number of important requirements, including a property-owner balloting, for the formation and continuation of assessments, and these requirements are satisfied by the process used to establish this Assessment. When Proposition 218 was initially approved in 1996, it allowed for certain types of assessments to be "grandfathered" in, and these were exempted from the property–owner balloting requirement.

> *Beginning July 1, 1997, all existing, new, or increased assessments shall comply with this article. Notwithstanding the foregoing, the following assessments existing on the effective date of this article shall be exempt from the procedures and approval process set forth in Section 4:*
> *(a) Any assessment imposed exclusively to finance the capital costs or maintenance and operation expenses for sidewalks, streets, sewers, water, flood control, drainage systems or vector control.*

Vector control was specifically "grandfathered in," demonstrating the intent of the Proposition 218 drafters to carve out traditionally appropriate, non-controversial special assessments.

SILICON VALLEY TAXPAYERS ASSOCIATION, INC. V. SANTA CLARA COUNTY OPEN SPACE AUTHORITY

In July of 2008, the California Supreme Court issued its ruling on the Silicon Valley Taxpayers Association, Inc. v. Santa Clara County Open Space Authority ("SVTA vs. SCCOSA"), 44 Cal.4th 431 (2008). The holding is significant because it further explains and clarifies the application of Proposition 218. Several of the most important elements of the ruling included further emphasis that:

- Benefit assessments are for special benefit to property, not general benefits.[1]
- The services and /or improvements funded by assessments must be clearly defined.
- Special benefits are directly received by and provide a direct advantage to property in the 2005 Assessment Area.

[1] Article XIII D, § 2, subdivision (d) of the California Constitution states defines "district" as "an area determined by an agency to contain all parcels which will receive a special benefit from the proposed public improvement or property-related service."

This Engineer's Report, and the process used to establish this assessment are consistent with the SVTA vs. SCCOSA decision because there is a direct special benefit received by benefiting property and the assessment is proportional to the special benefit provided to each property.

ASSESSMENT PROCESS

In 1996 the District conducted a protest hearing in order to establish the 1996 Assessment. The District held a public hearing and did not receive a majority protest against the assessment. The Board adopted the 1996 Assessment on July 30, 1996.

Then, in March 2005, in order to provide additional funding, the Santa Clara County Board of Supervisors, acting as the Board of Trustees for the District (the "Board"), called for an assessment ballot proceeding and Public Hearing on the proposed establishment of the Mosquito, Vector and Disease Control Assessment ("2005 Assessment"). In May and June 2005 the Board conducted an assessment ballot proceeding. A notice of assessment and assessment ballot was mailed to property owners at least 45 days prior to the date of the Public Hearing set by the Board. The notice included a description of the proposed assessments as well as an explanation of the method of voting on the assessments. Each notice included a ballot on which the property owner could mark his or her approval or disapproval of the proposed assessments and a postage-prepaid ballot return envelope.

After the ballots were mailed to property owners, a minimum 45-day time period was provided for the return of the assessment ballots. Following this 45-day time period, a public hearing was held for the purpose of allowing public testimony regarding the proposed assessments and services. At this hearing, the public had the opportunity to provide input on this issue and had a final opportunity to submit ballots. After the conclusion of the public input portion of the hearing, the hearing was continued to August 2nd, 2005 to allow time for the tabulation of ballots. Ballot tabulation began after the close of the public hearing.

It was determined that the assessment ballots submitted in opposition to the proposed assessments did not exceed the assessment ballots submitted in favor of the assessments (weighted by the proportional financial obligation of the property for which ballots are submitted). As a result, the Board gained the authority to approve the levy of the assessments for the fiscal year 2005-06 and to continue to levy them in future years.

The assessments may be continued in future years and may be increased in future years by an annual adjustment tied to the Consumer Price Index, with a maximum annual adjustment not to exceed 3%. The procedures for levy of the assessments in future years commence with the creation of a budget for the upcoming fiscal year's costs and services, an updated assessment roll listing all parcels and their proposed assessments for the upcoming fiscal year and the preparation of an updated Engineer's Report. After these documents are prepared and submitted, they are reviewed and approved by the Board at a noticed public meeting. At the annual public hearing, members of the public can provide

input to the Board prior to the Board's decision on continuing the services funded by the assessments for the next fiscal year.

Since 2005 the assessments have been maintained at the same rate of $8.36 per benefit unit. Although the assessment rate has been maintained since 2005 the assessments have received minimal growth in revenue due to additional construction of houses and commercial properties, which increases the revenues because developed property gets assessed at a higher rate. However, the cost of services and supplies has increased over this period of time causing a structural deficit within the District's operations fund.

Currently, the District has a fund balance of approximately 13 months of operating expenses, but the current structural deficit will reduce that by approximately 1.5 months per year based on current labor costs. Other unanticipated events could also affect the estimated draw down, such as a public health crisis, disaster or emergency, and the introduction of previously unknown vector borne diseases. In order to bridge the gap in the structural deficit the District is proposing an increase in the 2005 Assessment at $8.61 per benefit unit, for Fiscal Year 2020-21.

Beginning in fiscal year 2005-06 District began to enhance its program and services. The fiscal year 2020-21 assessment budget includes outlays for enhanced West Nile Virus surveillance and mosquito control, capital equipment, supplies, disease testing programs, and other vector control programs. This Engineer's Report ("Report") was prepared to establish the estimated costs for the mosquito, vector, disease surveillance and control services and related costs that would be funded by the proposed 2020-21 assessments, to determine the special benefits and general benefits received from the services and to apportion the proposed assessments to lots and parcels within the District based on the estimated special benefit each parcel receives from the services funded by the benefit assessment. If the assessments are so confirmed and approved, the levies would be submitted to the County Auditor/Controller by August 2020 for inclusion on the property tax roll for Fiscal Year 2020-21.

GENERAL DESCRIPTION OF THE PROGRAM AND SERVICES

ABOUT THE VECTOR CONTROL DISTRICT

The Vector Control District of Santa Clara County (District) operates within the County's Consumer and Environmental Protection Agency (CEPA) Department of Environmental Health. The District protects property in Santa Clara County by controlling and monitoring disease-carrying insects such as mosquitoes and ticks, other harmful pests such as rats, and harmful wildlife. The District also protects the usefulness, desirability and livability of property and the inhabitants of property within its jurisdiction through the abatement of vertebrate and invertebrate vectors. In addition, the District regularly tests for diseases carried by insects and small mammals and educates the property owners and the occupants of property in the County about protecting themselves from diseases transmitted by insects and small mammals.

The District staff currently consists of approximately 42 regular employees. About 30% of the staff perform management, science and outreach duties. The remaining 70% of District staff are year-round or seasonal Vector Control Technicians. In addition to their scheduled duties, District Technicians respond to approximately 1,100 service requests from the public each year for mosquitoes, 1,300 requests for rodent control, and 1,800 requests for harmful wildlife and many other miscellaneous vector control requests. Considerable information systems, media relations, and administrative support are also provided by CEPA staff, including the Agency's executive leadership team.

The agency is governed by the Board of Supervisors for Santa Clara County acting as the District's Board of Trustees. The Board meetings are held at 9:00 a.m. two Tuesday per month, and these meetings are open to the public and also available to view on-line.

DESCRIPTION OF VECTOR CONTROL PROGRAM

As mentioned earlier, the baseline level of services in the County included a declining level of mosquito, vector and disease surveillance and control services as permitted with the limited funding available for the District. The 2005 Assessment provides the additional funding to operate the program and expand the services provided in the 2005 Assessment Area to the level necessary to protect the usefulness, utility, desirability and livability of property within the District's jurisdiction.

The assessment will provide funding for the continuation and enhancement of the projects, services and programs for surveillance, disease prevention, abatement, and control of vectors within the County. Such mosquito abatement, vector control and disease prevention projects and programs include, but are not limited to, source reduction, larvicide applications, disease monitoring, public education, reporting, accountability, research and interagency cooperative activities (collectively "Services"). The cost of these Services includes capital costs (equipment, capital improvements and facilities), regulatory compliance costs, maintenance, and operation expenses necessary and incidental to the vector control program.

INTRODUCTION

Following are the Services and resulting level of service for the 2005 Assessment Area. As previously noted, the baseline level of service included a declining level of mosquito, vector and disease surveillance and control services in the County. The Services funded by the 2005 Assessments are over and above the baseline level of service. The formula below describes the relationship between the final level of service, the baseline level of service, and the enhanced level of service funded by the proposed assessment.

Final Level of Service	=	Baseline Level of Service	+	Enhanced Level of Service

The Services are further defined as follows:

- Mosquito control in the 2005 Assessment Area
- Surveillance for vector-borne diseases in the 2005 Assessment Area
- Mosquito inspections in the 2005 Assessment Area
- Response to service requests in the 2005 Assessment Area District
- Mosquito fish for backyard fish ponds and other appropriate habitats
- Presentations to schools and civic groups
- Identification of mosquitoes, ticks and other arthropods and testing for diseases in the 2005 Assessment Area
- Wildlife education, surveillance and control where there are public health threats in the 2005 Assessment Area
- Domestic Rat education and control in the 2005 Assessment Area
- Mosquito Surveillance and Disease Testing in the 2005 Assessment Area
- Rodent Surveillance and Disease Testing in the 2005 Assessment Area
- Tick Surveillance and Disease Testing in the 2005 Assessment Area
- Upgrading of the Facilities and Equipment Utilized by the District
- Yellowjacket control in public areas of the 2005 Assessment Area

VECTORS AND VECTOR-BORNE DISEASES IN SANTA CLARA COUNTY

MOSQUITOES

Mosquitoes generally occur where there is adequate vegetation for harborage and where water is standing and/or stagnant. Although these mosquitoes have seasonal cycles, they tend to reproduce continuously when conditions are suitable.

The following species are currently important in the County:

Species	Habitat	Abundance	Season	Disease Associations
Culex tarsalis	Many	Great	Sprg, Sum, Fall	West Nile virus, St. Louis encephalitis, Western equine encephalitis
Culex pipiens	Many	Great	Year around	West Nile virus, St. Louis encephalitis
Culista incidens	Many	Great	Sprg, Fall	None known
Culiseta inornata	Salt marsh	Moderate	Winter	None known
An. freeborni	Creeks, lakes	Moderate	Sum, Fall	Malaria
An. franciscanus	Creeks, lakes	Moderate	Sum, Fall	None known
An. puntipennis	Creeks, lakes	Moderate	Sum, Fall	Malaria
Aedes sierrensis	Trehole mosquitoes	Moderate	Spring	Dog Heartworm

Culex erythrothorax could become an important mosquito in the County. It is associated with large emergent vegetation in fresh water (e.g., tules), but is abundant in only very small areas of Santa Clara County. It is a strong vector of West Nile virus and an avid human biter.

Floodwater habitats are occupied by mosquitoes that lay their eggs in damp soil that might be flooded up to two years later. Once the area floods, most of the eggs hatch, producing a large number of mosquitoes for a short period of time. The District only has three species of concern, though *Aedes squamiger* can be so abundant in the Spring that it was the first cause of organized mosquito abatement along the southern coast of San Francisco Bay. Floodwater mosquitoes prefer to bite in the evening, but they also bite during the day. Two species (*Ae squamiger and Ae washinoi*) have only one generation annually, spending most of the year as eggs. *Aedes dorsalis* has multiple generations, but its numbers are restricted by the lack of rainfall during the warm season and water management in marsh areas.

Species	Habitat	Abundance	Season	Disease Associations
Aedes squamiger	Impounded salt marsh	Great	Winter, Spring	none
Aedes washinoi	Fresh floodwater sites	Moderate	Winter, Spring	none
Aedes dorsalis	Impounded salt marsh	Moderate	Summer	none

There are three additional floodwater species that could become major pests in Santa Clara County. *Aedes taeniorhynchus* is a salt marsh species that has only been found

once in the County, but can become very abundant in the summer in other locations. If climate change predictions prove to be accurate, this species may progress northward to the bay area as temperatures warm. *Aedes melanimon* occurs in the fall in salt marshes, but its major pest status in the Central Valley suggests that it could potentially take advantage of changing conditions in Santa Clara County. *Aedes nigromaculis* used to be abundant in parts of the County, associated with irrigated pastures. It can have many generations per year and can travel long distances.

Containers are the third primary mosquito habitat in Santa Clara County. Containers can range from naturally occurring holes in trees to water accumulated in crumpled plastic. Both *Culex pipiens* and *Culiseta incidens* commonly occur in containers other than tree holes. The other container-breeders are characterized by day-biting activity, bright markings, small size and deposition of eggs above the water line in the container. Our native tree-hole mosquito, *Aedes sierrensis*, hatches only one generation per year. It can reach great abundance locally but it does not fly far. *Aedes sierrensis* is commonly considered our most important vector of dog heartworm. *Aedes albopictus, Aedes aegypti and Aedes notoscriptus* are three potentially important container breeders that could get introduced into Santa Clara County. Since 2013 these species have expanded in central and south San Joaquin Valley, and throughout most of southern California. Since these mosquitoes are known to "hitchhike" in vehicles, the likelihood that they will arrive here has increased significantly. Those species are important because they reach great abundance, bite during the day, and reproduce continuously in containers often associated with human habitations. While they do not appear to be an efficient vector of WNV, they are very effective vectors of Zika, Dengue Fever and Chikungunya viruses, which spread in a human-mosquito cycle. *Aedes japonicus* is a vector of Japanese encephalitis and experimental vector of West Nile virus, and is currently established in Oregon, Washington and the eastern United States.

Mosquito-associated diseases in our area are caused either by viruses or the protozoans which cause malaria (*Plasmodium falciparum* or *Plasmodium vivax*). The County has been spared from common California viruses like Western equine encephalomyelitis (WEE) and St. Louis encephalitis (SLE), but West Nile virus (WNV) became established here in 2004. Dengue, Zika and Chikungunya viruses do not circulate in California, but infected individuals traveling from endemic areas have the potential to start a local cycle if the right *Aedes* mosquito species are present. Santa Clara County has high counts of imported *Aedes*-borne viruses in the State. Malaria used to be a major health problem in California, and there have been occasional local transmission cases over the years caused by *Anopheles* mosquitoes.

The diseases of most concern are: WEE, SLE, WNV, and Malaria, which are all transmitted by mosquitoes; Plague, transmitted by fleas; Hantavirus Pulmonary Syndrome, transmitted by field mice and rodents; tick-borne Lyme disease, Pacific Coast Tick Fever, Relapsing fever caused by *Borrelia miyamotoi* and Tularemia. Among the principal threats to which the District responds are:

- Human and animal diseases associated with mosquitoes
- Annoyance and economic disruption caused by mosquitoes and other biting flies
- Injury to humans from ectoparasitic arthropods
- Injury to humans from venomous arthropods
- Human diseases or potential injury associated with wildlife

OTHER BITING FLIES

Although a variety of biting flies occur in the County (stable flies, snipe flies, black flies, no-see-ums, deer/horse flies), black gnats are the only non-mosquito species that commonly affect large areas. Black gnats (*Leptoconops torrens*), sometimes called the valley gnat, develop in the cracks of soil with high clay content. Black flies *(Simulium vittatus)* have become an issue in limited areas recently.

ECTOPARASITES

Santa Clara County has the full range of ectoparasites that commonly affect humans. The most common are ticks, fleas, bed bugs, lice, scabies mites, and rat mites. *Dermacentor occidentalis* and *Ixodes pacificus* are the two most abundant species of ticks in the County. *Dermacentor* adults are reported a little later in the year, but both are most commonly found on humans in the cooler part of the year. The Lyme disease bacteria (*Borrelia burgdorferi,* associated with *Ixodes pacificus*) is the most important tick-transmitted pathogen, though only about six cases of Lyme disease occur in the County each year. Potentially, *Ixodes pacificus* could transmit one of the ehrlichial pathogens (causing human granulocytic ehrlichiosis or human monocytic ehrlichiosis) and *Dermacentor occidentalis* could transmit the agent causing Rocky Mountain spotted fever (*Rickettsia rickettsii*) or Pacific Coast Tick Fever *(Rickettsia philippi)*. *Borrellia miyamotoi*, also transmitted by *I. pacificus,* has recently been detected in the County and may cause relapsing fever. The common cat flea (*Ctenocephalides felis*) is our most abundant flea problem. Modern insecticidal treatments for pets have greatly reduced the disease potential of this pest.

A large variety of animal-associated fleas occasionally infest places where people live, including *Pulex* species associated with wood rats. Bed bugs are a growing problem world-wide, and since 2006 the number of complaints received by the District had been doubling each year until finally leveling off in 2010. Residents of shelter facilities, home owners who have visited an infested site, hotel users and college dormitories are the most common problem sites. Bed bugs are not known to transmit any pathogen but they can cause annoyance, loss of sleep, and sometimes secondary skin infection. Head lice (*Pediculus humanus capitis*) are abundant among children, as they are in most parts of the country. Scabies mites (*Sarcoptes scabei*) appear to be increasing in abundance, and may explain at least some of the cases of residents who complain of an unknown source of skin irritation. Rat mites (*Ornithonyssus bacoti*) are a very common problem in Santa Clara County due to the abundance of commensal rodents (rodents harboring parasites in a symbiotic relationship). These mites require rats to complete their life cycle, but some mites wander from their usual hosts to bite people. Generally, the mites disappear when rats are controlled effectively.

FILTH FLIES

Most of the filth flies in Santa Clara County are either blow flies (*Phormia*), lesser house flies (*Fannia*), or house flies (*Musca domestica*). Although flies are produced in compost heaps, dog feces, and other domestic sites, the vast majority of problems result from agricultural operations in the southern part of the County.

VENOMOUS ARTHROPODS

Venomous arthropods are a common cause for concern among residents. Yellow jackets (*Vespula*) and paper wasps (*Polistes*) are the most common problem, especially in late summer and fall. The only dangerous spiders in the County are the black widow (*Latrodectus mactans*) and the yellow-sac spider (*Cheiracanthium*). The brown widow spider (*Latrodectus geometricus)* is established in Southern California and is rapidly colonizing other areas in California. Its venom is more potent than that of the black widow, but it is less likely to bite. The brown recluse spider (*Loxosceles lata*) does not occur in the County. The Africanized honey bee may also occur in Santa Clara County.

RODENTS

The roof rat (*Rattus rattus*) is by far the most abundant rodent pest in the County. Few homes escape infestation at one time or another. The Norway rat (*Rattus norvegicus*) can be an important pest where urban development is most intense. Domestic mice are a widespread, but minor problem. Four kinds of native rodents can cause problems in domestic situations. The wood rat, *Neotoma fuscipes*, appears to be domesticating itself so that it sometimes infests homes in much the same manner as a roof rat. The California vole (*Microtus californicus*) and various species of deer mice (*Peromyscus* spp.) can infest peridomestic habitats. The California ground squirrel (*Otospermophilus beecheyi*) infests embankments near homes and damages earthen levees.

Rodents can be very destructive to property through their normal activities, destroying wiring, walls, and other property. They also spoil or consume huge quantities of food. The close association of commensal rodents (rats and mice) with humans is sometimes the source of a variety of bacterial diseases, including salmonellosis and leptospirosis. The dangerous urban cycle of plague (*Yersinia pestis*) can be supported by commensal rats and the sylvatic cycle of the disease by all of the native rodents mentioned above. The last urban plague outbreak in California was recorded in 1924, but sylvatic plague continues to this day in our County. *Neotoma spp* have a worrying association with leishmaniasis and American trypanosomiasis, but neither pathogen has been observed in the County. Sin Nombre (Hanta) virus, secreted in rodent urine, droppings, and saliva and acquired by humans from breathing in virus particles, is present in the County and associated with *Peromyscus,* and *Microtus.*

WILDLIFE

Wildlife associated with human activities can cause a number of problems. Certain wildlife may constitute a direct threat to public health of humans, especially unsupervised children. The greatest problems occur when people feed wildlife and help them grow comfortable in

the presence of humans. Coyotes can sometimes take small pets as food when they become accustomed to humans in urban areas, and there have been rare instances of attacks on humans in other areas. The District primary focus is to educates the public about how to protect their pets and to use exclusion techniques at their properties. Mountain lions may enter urban areas, apparently in pursuit of deer and other prey. They are 'specially protected species' that requires close coordination between the District and the California Department of Fish and Wildlife. Certain wildlife are reservoirs of pathogens such as West Nile virus, Saint Louis Encephalitis, rabies, plague and other pathogens which may be introduced to humans. The District mainly focuses on the reservoir roles of smaller urban wildlife such as raccoons, opossums, and skunks, when they pose a public health risk to humans.

INTEGRATED PEST MANAGEMENT

While the District's services address a variety of vectors, they all share general principles and policies. These include the identification of vector problems; responsive actions to controlling existing populations of vectors, prevention of new sources of vectors from developing, and the management of habitat in order to minimize vector production; education of land-owners and others on measures to minimize vector production or interaction with vectors; and provision and administration of funding and institutional support necessary to accomplish these goals.

In order to accomplish effective and environmentally sound vector management, the manipulation and control of vectors must be based on careful surveillance of their abundance, habitat (potential abundance), pathogen load, and/or potential contact with people; the establishment of treatment criteria (thresholds); and appropriate selection from a wide range of control methods. This dynamic combination of surveillance, treatment criteria, and use of multiple control activities in a coordinated program is generally known as Integrated Pest Management (IPM) (Glass 1975, Davis et al 1979, Borror et al 1981, Durso 1996, Robinson 1996). In recent years there has been increasing use of the term Integrated Vector Management (IVM) to highlight the specialized needs for addressing vectors.

In support of its IPM program, the District has expanded current GIS / GPS capability by putting live digital mapping and data access into the hands of field staff.

The District's Vector Management Program, like any other IPM program, by definition involves procedures for minimizing potential environmental impacts. The District employs IPM principles by first determining the species and abundance of vectors through evaluation of public service requests and field surveys of vector populations; and then, if the populations exceed predetermined criteria, using the most efficient, cost-effective, and environmentally sensitive means of control. For all vector species, public education is an important control strategy, and for some vectors (rodents, wildlife, ticks) it is the District's primary control method. In some situations, water management or other physical control activities (historically known as "source reduction" or "permanent control") can be instituted to reduce vector-breeding sites. The District also uses biological control such as the

planting of mosquito fish (in ornamental ponds, unused swimming pools and other standing water bodies). When these approaches are not effective or are otherwise inappropriate, natural materials that have been found to be environmentally safe are used to treat specific pest-producing or pest-harboring areas.

The District is organized into three principle sections to accomplish IPM. First, the headquarters element provides leadership, expertise, public relations/education, and interface with other governmental authorities.

The operational section includes field staff who perform IPM in the field. They have considerable training in performing duties and therefore benefits from information on risk assessment through continuing education and direct communication from the District's professional staff. Although each technician is assigned to an area of operation, the technicians often collaborate with each other to perform more complex control activities in other areas. Technicians also perform surveillance functions by responding to complaints from individual residents and by extensive examination of aquatic sites for mosquito larvae. Technicians also monitor their areas to be sure that their control efforts have been successful by monitoring all life stages of mosquitoes. Technicians perform inspections of premises for mosquito breeding sources, rodent problems, wildlife issues, and other vector problems based on their training and certifications issued by California Department of Public Health.

Finally, the disease surveillance and science section provides authoritative risk assessment, supplements surveillance, interacts with local government agencies for long-term reduction of vector sources, and performs operational research in support of IPM.

Using a technology known as ultra-low-volume (ULV) application, the District has the capability for using aerosolized insecticide for area treatment of adult mosquitoes. This capability has only been used in targeted areas where adult mosquitoes are found positive for a human disease agent.

The following is a summary of the District's application of IPM to the vectors and issues outlined above.

MOSQUITOES

PERMANENT WATER MOSQUITOES.

Risk assessment: Historically, *Culex tarsalis* and *Culex pipiens* have been very abundant in the Santa Clara Valley. The great vector potential of these species has been documented locally each year since the arrival of WNV in 2004. *Anopheles* species decreased in abundance when intense agricultural activity polluted streams and ponds, but these mosquitoes are increasing in abundance now that creeks are less polluted and have more shade. The threat of *Anopheles* as vectors is reduced by the absence of resident malaria pathogens in the area. *Culiseta*, particularly *Culiseta incidens*, are very widespread in the County, occurring in many kinds of habitats during most of the year. However, tests of their ability to transmit viral pathogens show them to be of little significance as vectors.

Surveillance: Surveillance of these mosquitoes is accomplished by a combination of methods. First, individual residents and property owners call the District with complaints about bites or potential larval sites. Second, field staff actively examine potential sites by sampling water, collecting larvae, and identifying the larvae to species. Surveillance and control of mosquito larvae in urban areas has substantially improved due to the aerial backyard surveillance program, which addresses the significant increase in neglected swimming pools over the last several years. Staff utilized high altitude aerial photographs to identify green or neglected swimming pools. Since 2007, aerial surveillance has detected over 4,000 neglected swimming pools; over 1,000 additional properties were detected in 2010 alone. Finally, various traps (light traps, carbon dioxide baited traps, foul water traps to attract ovipositing females) are used to collect adult mosquitoes. When the method is used, the adults are collected and are subsequently classified and identified to species.

During the warm months, the District utilizes seasonal staff to help inspect and treat mosquito-breeding sources. Every year, tens of thousands of catch basins are inspected and treated throughout the County, with a focus on urbanized areas. Catch basins can produce *Culex pipiens,* a potential WNV vector, in great numbers at locations close to residences and businesses.

Viruses transmitted by permanent water mosquitoes are surveyed by testing the mosquito vectors, the avian reservoirs, and humans. West Nile virus, Saint Louis Encephalitis virus, and Western Equine Encephalitis virus can be detected in the District's laboratory by using polymerase chain reaction (PCR), rapid amplification or commercial strip immunoassay. Other viral tests of mosquitoes, birds, or mammals are performed by the California Department of Health Services. The District participates in the state-wide dead bird surveillance program for West Nile virus, responding to reports of dead birds from the public. These results are mapped using a Geographic Information System. The District actively seeks data on human cases from the County Department of Public Health to monitor potential infected mosquitoes in the area.

Cases of imported malaria, zika, dengue and chikungunya are reported from the Department of Public Health directly to the District by checking for *Anopheles* and invasive Aedes adult mosquitoes, and looking for larvae sources within a one-mile radius of the address of the cases.

Control: The District currently uses four main materials to kill permanent water larvae and mosquitoes. The toxin of the natural bacteria *Bacillus thuringiensis* var. *israelensis* (Bti) can be applied as either a liquid or a granule. This toxin must be eaten by larvae, restricting its use to the first through third instars. Bti has the tremendous advantage of specificity, only affecting mosquitoes and closely related groups of flies. The spores of *Bacillus sphaericus,* also known as Lysinibacillus sphaericus (Lsph), are also available for liquid spray or granular application. This product has the advantage over Bti of sometimes reproducing in the water, extending the life of its effectiveness. Lsph is only effective

against *Culex* and works well in highly polluted water. In recent years, new formulations combine the toxins of both Bti and Lsph; the presence of multiple protein toxins should reduce the chance of resistance developing in mosquito populations. Methoprene is an analogue of a natural insect hormone that prevents successful development of larvae. It is available as a short-lived liquid and longer-acting granules and briquets. Finally, the District uses surface films in the form of either a short life-cycle oil combined with surfactants (BVA, kontrol) in situations where the materials above will not work. These are the only materials available that are effective against pupae. A fifth class of control agent, called spinosad, which is derived from naturally occurring soil bacterium, has recently been used in the IPM program.

The District uses the mosquito fish, *Gambusia affinis*, for biological control. These work particularly well during warm months in decorative ponds and swimming pools, but they are also used in surface water that does not connect with the watershed or have endangered species concerns. The District is prohibited from introducing these fish into watersheds, though many of the creeks are already populated by mosquito fish. If necessary, mosquito fish can be used in combination with chemical control in a process sometimes referred to as Integrated Biological Control. The District recently upgraded it's fish-rearing facility to allow in-house breeding and production of mosquitofish.

Although the District seldom uses physical control, its application can permanently alter habitats so that they do not produce mosquitoes. One example was the reconstruction of a major sewage line that had been leaking, producing a very large *Culex* site. The sewage treatment plant funded replacement of the line, but the effect was permanent elimination of a very problematic mosquito source. Other efforts to design civil infrastructure in ways to exclude mosquitoes include interactions with the South Bay Salt Pond Restoration Project, the Santa Clara Valley Urban Runoff Pollution Prevention Program, the planning departments of individual cities, the Santa Clara County Parks and Recreation Department, and the Santa Clara Valley Water District.

Monitoring: For the most part, monitoring is the continuation of surveillance activities. The District specifically check treatment sites and monitor adult mosquito populations to be sure that applications were successful. Different types of traps such as light traps, carbon-dioxide baited traps and foul-water traps are used to evaluate the success of the program.

FLOODWATER MOSQUITOES

Risk assessment: The first mosquito abatement district in California was initiated in order to control *Aedes squamiger* in coastal marshes along the shore of south San Francisco Bay. This species remains the main nuisance threat in the area. Untreated, it emerges in huge numbers in the spring (up to three billion mosquitoes per acre), moves up to 20 miles inland, and bites day and night. During the summer, *Aedes dorsalis* behaves similarly. With the implementation of the South Bay Salt Pond Restoration Project, the District has begun to see an expansion of the habitat favorable to these mosquitoes.

Aedes washinoi can be problematic when it's narrow flight range intersects with human populations. Like the other *Aedes* species, it is a day-biter and can cause significant nuisance. It tends to inhabit shallow, intermittent water sources in wooded areas, and emergence usually lasts from late March through the end of July.

Other freshwater floodwater species have not been a major problem in the County since changes in agricultural practice reduced the numbers of *Aedes nigromaculis*. Should average temperatures increase significantly in the long term, there are several other species (*Aedes taeniorhynchus, Aedes vexans, Psorophora columbiae*) that could be a significant problem in our area. The vector potential of all of these species is low in the County.

Surveillance: The location and intensity of surveillance is guided by past observation of breeding sites. The District has an annual program of quantitative surveillance of *Aedes squamiger;* counts of larvae determine population density and assess treatment success; categorization of larvae by instar (the lifecycle stage between molts) provides a measurement of larval age and helps to time treatments of large breeding areas. Temperature at representative sites is recorded both to predict developmental times and to avoid application of Bti when temperatures are too low. Surveillance for this species is one of the principal activities of the District working along the coast mainly from November through February. *Aedes dorsalis* requires alert attention to tide patterns in the summer followed by rapid inspection of sites. At summer temperatures, this species can complete development in a week. There is a risk of allowing emergence of this species between inspection visits to remote salt marsh sites. However, with the cooperation of city agencies, water management usually is successfully employed to prevent emergence.

Control: Salt marshes are treated with either Bti, methoprene, or a combination of the two ("Duplex"). Surface agents are not used often in the salt marsh because of environmental sensitivity. Mosquito fish do not survive in most parts of the marsh because of elevated salinity. Also, fish are not likely to be effective when temperatures are cold.

Physical control of salt marsh species has not been attempted for many years in Santa Clara County. Working closely with the South Bay Salt Pond Restoration Project and the US Army Corps of Engineers, there is now the potential for guiding modifications to the coastline. By maximizing acreage of fully tidal marsh (which does not produce many mosquitoes), avoiding seasonally flooded wetlands along the coast, and constructing deep water reservoirs for mosquito predators, it may be possible to reduce the coastal acreage that requires treatment. The District was successful in making mosquito control one of the objectives of the salt marsh restoration, which could lead to implementation of effective physical control. The District also collaborates with City of Palo Alto staff during the warm season to avoid *Aedes dorsalis* fly-offs from the Palo Alto Flood Basin using water level management.

Monitoring: *Aedes squamiger* and *Aedes dorsalis* are aggressive day and night-time biters. As a result, public complaints are an accurate assessment of the success or failure of

treatments. Carbon-dioxide baited traps are also an effective means of monitoring the adults of these species.

CONTAINER-BREEDING MOSQUITOES

Risk assessment: *Aedes sierrensis* can be a significant nuisance. Although most emerge in the spring, many adults survive well into summer. This species generally only travels short distances, but within their flight range residents are likely to have an intense nuisance problem. The species is an important vector of dog heartworm. *Aedes albopictus* has been introduced into the county twice, each time having been eradicated. It is now established in southern California. *Aedes aegypti* has recently invaded San Mateo County and the Central Valley. These two invasive species would be a significant problem in the County because they would probably spread to many neighborhoods, reproduce throughout the warm season, and create a nuisance day-biting problem that currently does not exist. Both species could also support transmission of Dengue, Zika and Chikungunya viruses, were those pathogens introduced locally.

Surveillance: Complaints from residents are the principle means of surveillance. The invasive *Aedes* species are attracted to carbon-dioxide baited traps. The most common ways to monitor are the use of black cups or buckets, (which are attractive to ovipositing females) and inspection of container larval sites. Informing the public to look for day-biting, black and white mosquitoes is also effective.

Control: Bti, methoprene, spinosad, and surface agents can be used to control larvae of these species. During the last *Aedes albopictus* infestation, it was very helpful to treat the interior of the originally infested building with pyrethrins, a plant-derived material, and to apply a residual, microencapsulated deltamethrin product (Suspend) to exterior surfaces in the vicinity. Larval sites were eliminated by chemical treatment or physical removal. The combination of controlling oviposition sites to females and reduction of the adult mosquito population by adulticiding was effective in eradicating the species from the local infestation. Districts in Central California where *Aedes aegypti* is established have had some success with ULV applications of larvicides in urban residential settings.

Monitoring: Given the possible establishment of this species in southern California, the District established a permanent invasive species surveillance program during 2012, which consists of the use of oviposition traps and increased public awareness efforts.

ECTOPARASITES

Threat assessment: The complex of ectoparasites creates a significant volume of requests from the public. Head lice are common in the County, but infestations are usually handled without advice from the District. As mentioned earlier, bedbugs are a rapidly increasing problem across the country. Bed bugs are sometimes the source of a frustrating, unknown biting problem. The District does not perform bedbug inspection and control but provides bed-bug identification and information, and collaborates with Municipal Code Enforcement agencies throughout the County to assist affected public and property managers. Fleas associated with rodents and carnivores that prey on rodents raise the possibility of plague,

requiring some concern from the District. Scabies is usually considered a medical problem, but some residents find that they are unable to get a diagnosis from physicians. Another common problem with scabies infestation is that the patient has tried the lotion for treatment, but failed to eradicate the mite. As a result, the patient still has scabies, but the physician has ruled out the possibility. Rat mites are abundant in the County, often creating an intolerable problem with bites in a home. Ticks are most noticeable in the winter and create a risk of Lyme disease and Rocky Mountain spotted fever. Residents usually encounter ticks when hiking in county or state parks, though some residences in the Santa Cruz Mountains have tick infestations in their back yards.

Surveillance: Among the ectoparasites, the District performs regular surveillance on ticks. The disease surveillance team collects ticks by brushing vegetation with a large flag of cloth, to which the ticks stick. The ticks are processed in the District laboratory for detection of the Lyme disease bacteria (*Borrelia burgdorferi*) and Tickborne Relapsing Fever bacteria (*Borrelia miyamotoi)*. Other ectoparasites are surveyed only in response to complaints. A number of techniques are available, including direct visual search, watching for fleas on white socks, placing a container with dry ice on a tray of soapy water, and placing sticky traps.

Control: The District does not perform any control activities for ectoparasites except advice and education.

FILTH FLIES

Threat assessment: Significant infestations of filth flies are invariably the result of agricultural activity in Santa Clara County. As a result, the source of flies can be very persistent. Flies transmit a number of pathogens by simply acting as a host and carrying them from place to place. The damage to human health is often in the form of increased rates of diarrhea where flies are abundant. Since diarrhea rates are not reported, complaints about flies are more commonly based on aesthetics.

Surveillance: The District does not actively survey areas for flies, but long-term surveillance programs have been undertaken in response to complaints. In addition to direct visual search, the District uses strips of sticky paper to count flies and white index cards to count fly feces.

Control: The District does not perform any control activities for flies. Advice is given on sanitation, exclusion, and insecticidal treatment. In some cases, the District has worked with Solid Waste Management or Code Enforcement to force owners to clean up a fly problem.

Monitoring: In some cases, surveillance at a problematic site has continued to assure compliance with sanitation requirements.

VENOMOUS ARTHROPODS

Threat assessment: Yellow jacket wasps can be very abundant at locations with waste food (e.g., parks). To our knowledge, the Africanized honey bee (AHB) has not entered the County. However, new reports show their spread as far north as Sacramento. In established areas, it has caused significant stinging incidents after it arrives in the county. The actual threat from other venomous arthropods in the county is very small.

Surveillance: Yellow jacket and bee problems occurring on public lands are evaluated by District personnel. Honey bees are collected for morphometric evaluation to determine whether or not they are AHB. Responses concerning other venomous arthropods are based on complaints from the public.

Control: The district treats yellow jackets on public land with Wasp Freeze (allethrin + phenothrin) or Drione (silica aerogel and pyrethrins). In response to inquiries, the public is advised on safe use of a commercial product. The District does not treat spiders or honey bees.

RODENTS

Threat assessment: The mild climate in the Santa Clara Valley creates ideal conditions for commensal rodents. Roof rats are especially abundant, sometimes adopting a lifestyle similar to tree squirrels. Native rodents are commonly peridomestic or, in the case of wood rats, domestic. Rodents cause extensive damage to structures and harbor important human pathogens.

Surveillance: Rodents are generally detected through the presence of droppings or signs of damage. The type of rodent can be approximated from the size and shape of feces and the kind of damage. In response to complaints, the District commonly evaluate problems based on these signs and indications.

Control: The District does not routinely apply rodenticides, but it does perform rodent inspections on request for the public. These inspections produce a comprehensive, written recommendation to the resident on how to eliminate rodents from the house or business. The strategy proposed by the District is exclusion of rodents through rodent proofing the house, elimination of outdoor sources of rodents (e.g., ivy, fruits, nuts), and decimation of the rodents through trapping.

WILDLIFE

Threat assessment: While very rare, other communities in the State have reported injury to children, adults, and pets as wildlife become accustomed to humans. In the vast majority of cases, these incidents have been preceded by people feeding wildlife. Although skunks, opossums, and raccoons are reported as potential vectors of rabies the virus has mainly been detected in bats during the past few years in the State. Under certain conditions, these animals can also damage property. Conditions in the Santa Clara Valley are conducive for these animals, so that they are common even in the most urbanized portions

of the community. The District has adopted the State of California Fish and Wildlife Threat Assessment Guidelines as modified for Santa Clara County.

Surveillance: The District collaborates with the County Department of Public Health in monitoring rabies virus in bats that are found dead or have been in close contact with human. Complaints from the public are the principle means of surveillance. The District responds to complaints from residents by looking for the animals themselves, monitoring reports of sighting or tracks, droppings, dens, scraps of prey, around the properties.

Control: The District assists the public in solving wildlife problems by providing advice on prevention measures, exclusion, and sanitation. Increasingly, the District has turned to targeted advertising to educate the public about the dangers of feeding or sheltering wild animals. In situations that require exclusion from property, the District use a variety of exclusion and repulsion techniques to get the animals to move.

Monitoring: The District update maps and lists on occurrence of wildlife problems. Trapping is used in collaboration with other agencies to monitor the roles of smaller urban wildlife as disease reservoir when they pose direct public health concerns.

OTHER VERTEBRATES

Threat assessment: The District occasionally receives calls about other vertebrates such as rattlesnakes, squirrels, and pigeons. Rattlesnakes are a serious envenomation risk to humans, and can cause serious injury on rare occasions. The California Poison Control Center notes that rattlesnakes account for more than 800 bites each year with one to two deaths. Pigeons, especially when aggregating in large numbers, can pose a risk of transmission of psittacosis to humans. Squirrels occasionally enter houses or take up residence in attics.

Surveillance: The District responds to complaints and when necessary inspects for signs of the animals.

Control: For snake issues, the District first attempts to determine if a venomous snake is involved. If a rattlesnake is suspected, an inspection will be performed. Field inspections and advice are routine for pigeon calls. Most squirrel issues are handled by providing information over the phone or website.

Monitoring: The District updates maps and lists on occurrence of miscellaneous vertebrate problems.

PUBLIC RELATIONS, OUTREACH, AND EDUCATION

The District maintains two full time positions for public relations, outreach, and education and also works extensively with CEPA media relations staff. This team develops and disseminates press releases, publish brochures, maintain the District's website and social media, respond to requests for interviews from all media, inform other government agencies, and give presentations. The emergence of West Nile Virus created a need for a

dedicated advertising budget, and regular and extensive media contacts, outreach and education. The advertising budget was increased during FY13 to expand educational efforts about invasive *Aedes,* wildlife coexistence and Lyme disease. The District has also developed (through County Information Services Department) its first mobile application to promote public awareness about District services. The District is currently expanding its educational efforts to include early season information meetings and outreach about WNV and mosquito control to neighborhood groups.

The District also interacts professionally at many levels. The Vector Biology Discussion Group meets monthly to discuss biological issues with eight other vector control districts in the Bay area. Personnel attend meetings of the Mosquito and Vector Control Association of California, the American Mosquito Control Association, the Vertebrate Pest Group, Society for Vector Ecology, and the Entomological Society of America.

INTERAGENCY PROGRAMS

The District actively seeks cooperative exchanges with a wide range of other agencies at county, state, and national levels. Among the relationships are or have been:

- Santa Clara County Department of Public Health – Data sharing for threat assessment and coordination of public outreach.
- Santa Clara County Department of Environmental Health – Representation of the VCD's interests, waste tire disposal (a significant mosquito breeding source)
- Santa Clara County Division of Agriculture – Insect identification, non-medical pests
- Code Enforcement divisions of individual cities Countywide – Enforcement of sanitation and structural changes
- City of Palo Alto Parks and Recreation Department – Salt marsh treatment
- City of Palo Alto Public Works Department – Storm drain treatment and wastewater treatment facilities access
- San Jose-Santa Clara Regional Wastewater Facility – Contracts with the District for mosquito control
- Sunnyvale Department of Services – Salt marsh treatment
- Valley Water (formerly Santa Clara Valley Water District) – Access to streams, design of wetlands and other structures
- California Department of Fish and Wildlife – Wildlife problems, endangered species issues
- California Department of Public Health – Laboratory support, interaction with other districts, collation of data, licensing staff, Arbovirus predictive risk analyses and planning for invasive *Aedes*
- US Fish and Wildlife Service – Salt marsh treatment
- US Army Corps of Engineers – Project development
- Valley Homeless Healthcare Program – Notification and information to the housing insecure community about targeted pesticide application events
- Elementary schools throughout the County for Environmental Education program related to District activities

- Wildlife Center of Silicon Valley – coordinate with for providing wildlife services to the public

RESEARCH AND TESTING

The District performs special research projects as opportunity allows and needs dictate. These projects relate directly to operational problems so that the results enhance protection of health and property. Examples include distribution of Pesticide resistant genes in *Culex* populations in a West Nile virus focus, testing of control techniques, study of the overwintering characteristics of *Culex pipiens*, and assess distribution of Murine Typhus disease in rodent populations.

ASSESSMENT

The District has evaluated and estimated the costs of extending and providing the Services to the 2005 Assessment Area. The estimated costs are summarized in the Summary Cost Estimate below and detailed in Estimate of Cost, located on page 27.

The amount to be paid for the Services and the expenses incidental thereto, to be paid by the Santa Clara County Vector Control District for the fiscal year 2020-21 is generally as follows:

SUMMARY COST ESTIMATE - *F.Y. 2020-21 BUDGET*

Vector & Disease Control Services	$9,589,981
Fixed Asset & Capital Equipment	$342,500
Contributions to / (from) Reserve / Contingency	($2,346,365)
Incidentals	$94,101
TOTAL BUDGET	$7,680,217
Less:	
District Contribution & Current Rev.[1]	($3,191,333)
Net Amount To Assessments	$4,488,884

Notes:

1. As determined in the following section, at least 4% of the cost of the Services must be funded from sources other than the 2005 Assessment to cover any general benefits from the Services. Therefore, out of the total cost of Services of $9,932,481 the District must contribute at least $397,299 from sources other than the 2005 Assessment. The District will contribute $3,191,333 which is over the estimated general benefits and equates to 32.13% of the total budget.

An Assessment Diagram is hereto attached and made a part hereof showing the exterior boundaries of the 2005 Assessment Area. The distinctive number of each parcel or lot of land in the 2005 Assessment Area is its Assessor Parcel Number appearing on the Assessment Roll.

I do hereby determine and apportion said net amount of the cost and expenses of the Services, including the costs and expenses incidental thereto, upon the parcels and lots of land within the Mosquito, Vector and Disease Control Assessment, in accordance with the special benefits to be received by each parcel or lot, from the Services, and more particularly set forth in the Cost Estimate hereto attached and by reference made a part hereof.

The assessment determination is made upon the parcels or lots of land within the 2005 Assessment Area proportion to the special benefits to be received by the parcels or lots of land, from the Services.

The assessment is subject to an annual adjustment tied to the change in the Consumer Price Index-U for the San Francisco Bay Area (the "CPI"), with a maximum annual adjustment not to exceed 3%.

The 2005 Assessment may be levied annually and may be adjusted by up to the maximum CPI change, not to exceed 3% annually, without any additional assessment ballot proceeding. The additional change in the CPI, over and above the base fiscal year 2005-06 CPI, and excluding previous year's annual adjustments to the maximum authorized assessment rate is 3.31%. Therefore, the maximum authorized assessment rate for fiscal year 2020-21 is increased by 3.00% which equates to $8.61 per single family equivalent benefit unit. The estimate of cost and budget in this Engineer's Report proposes assessments for fiscal year 2020-21 at the rate of $8.61 per single family equivalent benefit unit.

Table 1, below provides a summary of the proposed rates for various property use types for the 2005 assessment. (The rates for the 1996 Assessment are also shown for convenience.)

TABLE 1 – 2005 RATES BY PROPERTY USE TYPE (AND 1996 ASSESSMENT RATES SHOWN)

Property Type	2005 Assessment	2005 Assessment Unit	1996 Assessment	1996 Assessment Unit
Single Family Residential	**$8.61**	each	**$5.08**	each
Condominium	**$5.17**	each	**$5.08**	each
Duplex	**$3.70**	per unit	**$10.16**	each
Triplex, Fourplex	**$3.70**	per unit	**$15.24**	each
Multi-Family Residential, 5+ Units	**$2.41**	per unit	**$25.40**	each
Mobile Home on Separate Lot	**$2.50**	each	**$5.08**	each
Commercial / General Manufacturing	**$4.31**	per fifth acre	**$17.62**	each
Office	**$12.23**	per fifth acre	**$14.83**	each
Regional Shopping Center	**$4.31**	per fifth acre	**$27.02**	each
Community Shopping Center	**$4.31**	per fifth acre	**$22.52**	each
Neighborhood Shopping Center	**$4.31**	per fifth acre	**$18.01**	each
Industrial	**$4.31**	per fifth acre	**$14.83**	each
Parking Lot	**$0.18**	per fifth acre	**$25.40**	each
Agriculture	**$0.02**	per fifth acre	**$10.75**	each
Rangelands/Timber	**$0.00**	per fifth acre	**$10.75**	each

Each parcel or lot of land is described in the Assessment Roll by reference to its parcel number as shown on the Assessor's Maps of the County of Santa Clara for the fiscal year 2020-21. For a more particular description of the property, reference is hereby made to

the deeds and maps on file and of record in the office of the County Assessor of the County of Santa Clara.

Dated: April 15, 2020

Engineer of Work

By_____.
John W. Bliss, License No. C52091
Vice President, SCI Consulting Group (SCI)

ESTIMATE OF COST

SANTA CLARA COUNTY VECTOR CONTROL DISTRICT
Mosquito, Vector and Disease Control Assessment
Estimate of Cost
Fiscal Year 2020-21

	Total Budget
Vector Control Services and Related Expenditures	
Vector Control and Disease Prevention Operations	$5,702,260
Materials, Supplies, Equipment and Administration	$3,887,721
Other/Emergency Services/Contingency Funds	$0
Fixed Assets	$342,500
Facility Debt Service Payments	$0
Total Services and Operation	$9,932,481
Less:	
Contribution from other Sources[1]	($320,503)
Contribution from 1996 Assessment	($2,870,830)
Net Cost of Vector Control, Fixed Asset Equipment, Operation	$6,741,148
Contributions to / (from) Reserve / Contingency Fund	($2,346,365)
Incidental Costs	
County Collection, Levy Administration, and Other Incidentals [2]	94,100.84
Total Mosquito, Vector & Disease Control Services and Incidentals (Net Amount to be Assessed)	$4,488,884

Budget Allocation to Property

Zone of Benefit	Total SFE Units[3]	Assessment per SFE[4]	Total Assessment[5]
Zone A	520,381.18	$8.61	$4,480,482
Zone B	1,951.65	$4.31	$8,402
			$4,488,884

Notes:

1. As determined in the following section, at least 4% of the cost of the Services must be funded from sources other than the 2005 Assessment to cover any general benefits from the Services. Therefore, out of the total cost of Services of $9,932,481 the District must contribute at least $397,299 from sources other than the 2005 Assessment. The District will contribute $3,191,333 which is over the estimated general benefits and equates to 32.13% of the total budget.

2. Incidental Costs includes allowance for uncollectible assessments from assessments on public agency parcels, County collection charges, and assessment administration costs.

3. SFE Units means Single Family Equivalent benefit units. See method of assessment in the following Section for further definition.

4. The assessment rate per SFE is the total amount of assessment per Single Family Equivalent benefit unit.

5. The proceeds from the assessments will be deposited into a special fund for the 2005 Assessment. Funds raised by the assessment shall be used only for the purposes stated within this Report. Any balance remaining at the end of the fiscal year, June 30, must be carried over to the next fiscal year. The assessment amounts are rounded down to the even penny for purposes of complying with the collection requirements from the County Auditor. Therefore, the total assessment amount for all parcels subject to the assessments may vary slightly from the net amount to be assessed.

METHOD OF ASSESSMENT

This section of the Report explains the benefits to be derived from the Services provided for property in the District, and the methodology used to apportion the total assessment to properties within the Mosquito, Vector and Disease Control Assessment area. The benefit discussion section applies to both the 1996 Assessment and the 2005 Assessment as described below.

The Mosquito, Vector and Disease Control Assessment Area consists of all Assessor Parcels as defined by the approved boundary description (boundary will be coterminous with the County of Santa Clara).

The method used for apportioning the assessment is based upon the proportional special benefits to be derived by the properties in the assessment area over and above general benefits conferred on real property in the Assessment Area. Special benefit is calculated for each parcel in the Assessment Area using the following process:

1. Identification of total benefit to the properties derived from the Services
2. Calculation of the proportion of these benefits that are special vs. general
3. Determination of the relative special benefit within different areas of the Assessment Area
4. Determination of the relative special benefit per property type and property characteristic
5. Calculation of the specific assessment for each individual parcel based upon special vs. general benefit; location, property type and property characteristics

DISCUSSION OF BENEFIT

In summary, the assessments can only be levied based on the proportional special benefit provided to the real property from the additional Services. This benefit is received by property over and above any general benefits received. With reference to the engineering requirements for property related assessments, under Proposition 218 an engineer must determine and prepare a report evaluating the amount of special and general benefit received by property within the Assessment Area as a result of the improvements or services provided by a local agency. That special benefit is to be determined in relation to the total cost to that local entity of providing the service and/or improvements.

Proposition 218 as described in Article XIIID of the California Constitution has confirmed that assessments must be based on the proportional special benefit to property:

> *"No assessment shall be imposed on any parcel which exceeds the reasonable cost of the proportional special benefit conferred on that parcel."*

The below benefit factors, when applied to property in the Assessment Area, confer proportional special benefits to property and ultimately improve the safety, utility, functionality and usability of property in the Assessment Area. These are special benefits to property in the Assessment Area in much the same way that storm drainage, sewer service, water service, lighting, sidewalks and paved streets enhance the safety, utility and functionality of each parcel of property served by these improvements, providing them with more utility of use and making them safer and more usable for occupants and property owners.

Proposition 218 included a requirement that existing assessments in effect upon Proposition 218's effective date were required to be confirmed by either a majority vote of registered voters in the Assessment Area, or by weighted majority property owner approval using the new ballot proceeding requirements. However, certain assessments were excluded from these voter approval requirements. Of note is that in California Constitution Article XIIID Section 5(a) this special exemption was granted to assessments for sidewalks, streets, sewers, water, flood control, drainage systems and vector control. The Howard Jarvis Taxpayers Association explained this exemption in their Statement of Drafter's Intent:

> *"This is the "traditional purposes" exception. These existing assessments do not need property owner approval to continue. However, future assessments for these traditional purposes are covered."*[2]

The drafters of Proposition 218 acknowledged that vector control assessments were a traditionally appropriate and accepted assessment. Therefore, the District's 1996 Assessment ("Assessment 1") did not require voter confirmation.

Because all assessments, existing before or after Proposition 218 must be based on special benefit to property, the drafters of Proposition 218 inherently found that vector control services confer a special benefit on property. Moreover, the statement of drafter's intent also acknowledges that any new or increased vector control assessments after the effective date of Proposition 218 would need to comply with the voter approval requirements Proposition 218 established. This requirement is a recognition that additional assessments for such "traditional" purposes would be established after Proposition 218 was in effect. The drafters of Proposition 218 clearly recognized vector assessments as a "traditional" appropriate use of assessments, acknowledged that new vector assessments may be formed after Proposition 218 and inherently were satisfied that vector control services confer special benefit to properties.

The Legislature also made a specific determination after Proposition 218 was enacted that vector control services constitute a proper subject for a special assessment. California Health and Safety Code section 2082, adopted in 2002, provides that a district may levy special assessments consistent with the requirements of Article XIIID of the California

[2] Howard Jarvis Taxpayers Association, "Statement of Drafter's Intent", January 1997.

Constitution to finance vector control projects and programs. The intent of the Legislature to allow and authorize benefit assessments for vector control services after Proposition 218 is shown in the Assembly and Senate analysis the Mosquito Abatement and Vector Control District Law where it states that the law:

> *Allows special benefit assessments to finance vector control projects and programs, consistent with Proposition 218.* [3]

Therefore the State Legislature unanimously found that vector control services are a valuable and important public service that can be funded by special benefit assessments. To be funded by assessments, vector control services must confer a proportional special benefit to property.

MOSQUITO AND VECTOR CONTROL IS A SPECIAL BENEFIT TO PROPERTIES

As described below, this Engineer's Report concludes that mosquito and vector control is a special benefit that provides direct advantages to property in the Assessment Area. For example, the assessment provides reduced levels of mosquitoes and other vectors on property throughout the Assessment Area. Moreover, the assessment reduces the risk of the presence of diseases on property throughout the Assessment Area, which is another direct advantage received by property in the Assessment Area. Moreover, the assessment will fund Services that improve the use of property and reduce the nuisances and harm created by vectors on property throughout the Assessment Area. These are tangible and direct special benefits that will be received by property throughout the specific area covered by the Assessments.

The following section, Benefit Factors, describes how and why vector control services specially benefit properties in the Assessment Area. These benefits are particular, distinct, and direct from its effect on property in general or the public at large.

BENEFIT FACTORS

In order to allocate the proposed assessments, the Engineer identified the types of special benefit arising from the aforementioned Services that would be provided to property within the Assessment Area. These benefit factors are comprehensive and are in support of both the 1996 Assessment and the 2005 Assessment as described below. These types of special benefit are as follows:

REDUCED MOSQUITO AND VECTOR POPULATIONS ON PROPERTY AND AS A RESULT, ENHANCED DESIRABILITY, UTILITY, USABILITY AND FUNCTIONALITY OF PROPERTY IN THE ASSESSMENT AREA.

The assessments provide enhanced services for the surveillance and control and abatement of nuisances and disease-carrying mosquitoes. These Services materially reduce the number of vectors on properties throughout the Assessment Area. The lower mosquito and vector populations on property in the Assessment Area is a direct advantage

[3] Senate Bill 1588, Mosquito Abatement and Vector Control District Law, Legislative bill analysis

to property that serves to increase the desirability and "usability" of property. Clearly, properties are more desirable and usable in areas with lower mosquito populations and with a reduced risk of vector-borne disease. This is a special benefit to residential, commercial, agricultural, industrial and other types of properties because all such properties will directly benefit from reduced mosquito and vector populations and properties with lower vector populations are more usable, functional and desirable.

Excessive mosquitoes and other vectors in the area can materially diminish the utility and usability of property. For example, prior to the commencement of mosquito control and abatement services, properties in many areas in the State were considered to be nearly uninhabitable during the times of year when the mosquito populations were high.[4] The prevention or reduction of such diminished utility and usability of property caused by mosquitoes is a clear and direct advantage and special benefit to property in the Assessment Area .

The State Legislature made the following finding on this issue:

> *"Excess numbers of mosquitoes and other vectors spread diseases of humans, livestock, and wildlife, reduce enjoyment of outdoor living spaces, both public and private, reduce property values, hinder outdoor work, reduce livestock productivity; and mosquitoes and other vectors can disperse or be transported long distances from their sources and are, therefore, a health risk and a public nuisance; and professional mosquito and vector control based on scientific research has made great advances in reducing mosquito and vector populations and the diseases they transmit."* [5]

Mosquitoes and other vectors emerge from sources throughout the Assessment Area, and with an average flight range of two miles, mosquitoes from known sources can reach all properties in the Assessment Area. These sources include standing water in rural areas, such as marshes, pools, wetlands, ponds, drainage ditches, drainage systems, tree holes and other removable sources such as old tires and containers. The sources of mosquitoes also include numerous locations throughout the urban areas in the Assessment Area. These sources include underground drainage systems, containers, unattended swimming pools, leaks in water pipes, tree holes, flower cups in cemeteries, over-watered landscaping and lawns and many other sources. By controlling mosquitoes at known and new sources, the Services will materially reduce mosquito populations on property throughout the Assessment Area.

A recently increasing source of mosquitoes is unattended swimming pools:

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[4] Prior to the commencement of modern mosquito control services, areas in the State of California such as the San Mateo Peninsula, Napa County, Lake County and areas in Marin and Sonoma Counties had such high mosquito populations or other vector populations that they were considered to be nearly unlivable during certain times of the year and were largely used for part-time vacation cottages that were occupied primarily during the months when the natural vector populations were lower.

[5] Assembly Concurrent Resolution 52, chaptered April 1, 2003

> *"Anthropogenic landscape change historically has facilitated outbreaks of pathogens amplified by peridomestic vectors such as Cx. pipiens complex mosquitoes and associated commensals such as house sparrows. The recent widespread downturn in the housing market and increase in adjustable rate mortgages have combined to force a dramatic increase in home foreclosures and abandoned homes and produced urban landscapes dotted with an expanded number of new mosquito habitats. These new larval habitats may have contributed to the unexpected early season increase in WNV cases in Bakersfield during 2007 and subsequently have enabled invasion of urban areas by the highly competent rural vector Cx. tarsalis. These factors can increase the spectrum of competent avian hosts, the efficiency of enzootic amplification, and the risk for urban epidemics."* [6]

INCREASED SAFETY OF PROPERTY IN THE ASSESSMENT AREA.

The Assessments results in improved year-round proactive Services to control and abate mosquitoes and other vectors that otherwise would occupy properties throughout the Assessment Area. Mosquitoes and other vectors are transmitters of human disease pathogens, so the reduction of mosquito and vector populations makes property safer for use and enjoyment and reduces the likelihood of human disease. In absence of the assessments, these Services would not be provided, so the Services funded by the assessments make properties in the Assessment Area safer, which is a distinct special benefit to property in the Assessment Area.[7] This is not a general benefit to property in the Assessment Area or the public at large because the Services are tangible mosquito, vector and disease surveillance and control services that are provided directly to the properties in the Assessment Area and the Services are over and above what otherwise would be provided by the District or any other agency.

This finding was confirmed in 2003 by the State Legislature:

> *"Mosquitoes and other vectors, including but not limited to, ticks, Africanized honey bees, rats, fleas, and flies, continue to be a source of human suffering, illness, death, and a public nuisance in California and around the world. Adequately funded mosquito and vector control, monitoring and public awareness programs are the best way to prevent outbreaks of West Nile Virus and other diseases borne by mosquitoes and other vectors."* [8]

Also, the Legislature, in Health and Safety Code Section 2001, finds that:

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[6] Riesen William K. (2008). Delinquent Mortgages, Neglected Swimming Pools, and West Nile Virus, California. Emerging Infectious Diseases. Vol. 14(11).

[7] By reducing the risk of disease and increasing the safety of property, the proposed Services will materially increase the usefulness and desirability of certain properties in the Assessment Area.

[8] Assembly Concurrent Resolution 52, chaptered April 1, 2003

> *"The protection of Californians and their communities against the discomforts and economic effects of vectorborne diseases is an essential public service that is vital to public health, safety, and welfare."*

REDUCTIONS IN THE RISK OF NEW DISEASES AND INFECTIONS ON PROPERTY IN THE ASSESSMENT AREA.

Mosquitoes have proven to be a major contributor to the spread of new diseases such as West Nile Virus, among others. A highly mobile population combined with migratory bird patterns can introduce new mosquito-borne diseases into previously unexposed areas.

> *"Vector-borne diseases (including a number that are mosquito-borne) are a major public health problem internationally. In the United States, dengue and malaria are frequently brought back from tropical and subtropical countries by travelers or migrant laborers, and autochthonous transmission of malaria and dengue occasionally occurs. In 1998, 90 confirmed cases of dengue and 1,611 cases of malaria were reported in the USA and dengue transmission has occurred in Texas."*[9]

> *"During 2004, 40 states and the District of Columbia (DC) have reported 2,313 cases of human WNV illness to CDC through ArboNET. Of these, 737 (32%) cases were reported in California, 390 (17%) in Arizona, and 276 (12%) in Colorado. A total of 1,339 (59%) of the 2,282 cases for which such data were available occurred in males; the median age of patients was 52 years (range: 1 month--99 years). Date of illness onset ranged from April 23 to November 4; a total of 79 cases were fatal."* [10] *(According to the Centers for Disease Control and Prevention on January 19, 2004, a total of 2,470 human cases and 88 human fatalities from WNV have been confirmed).*

A study of the effect of aerial spraying conducted by the Sacramento-Yolo Mosquito and Vector Control District (SYMVCD) to control a West Nile Virus disease outbreak found that the SYMVCD's mosquito control efforts materially decreased the risk of new diseases in the treated areas:

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[9] Rose, Robert. (2001). Pesticides and Public Health: Integrated Methods of Mosquito Management. Emerging Infectious Diseases. Vol. 7(1); 17-23.

[10] Center for Disease Control. (2004). West Nile Virus Activity --- United States, November 9--16, 2004. Morbidity and Mortality Weekly Report. 53(45); 1071-1072.

> *After spraying, infection rates decreased from 8.2 (95% CI 3.1–18.0) to 4.3 (95% CI 0.3–20.3) per 1,000 females in the spray area and increased from 2.0 (95% CI 0.1–9.7) to 8.7 (95% CI 3.3–18.9) per 1,000 females in the untreated area. Furthermore, no additional positive pools were detected in the northern treatment area during the remainder of the year, whereas positive pools were detected in the untreated area until the end of September (D.-E.A Elnaiem, unpub. data). These independent lines of evidence corroborate our conclusion that actions taken by SYMVCD were effective in disrupting the WNV transmission cycle and reducing human illness and potential deaths associated with WNV.* [11]

The Services described elsewhere in this report, funded by the assessments help prevent on a year-round basis the presence of vector-borne diseases on property in the Assessment Area. This is another tangible and direct special benefit to property in the Assessment Area that would not be received in absence of the assessments.

PROTECTION OF ECONOMIC ACTIVITY ON PROPERTY IN THE ASSESSMENT AREA.

As recently demonstrated by the SARS outbreak in China and outbreaks of Avian Flu, outbreaks of pathogens can materially and negatively impact economic activity in the affected area. Such outbreaks and other public health threats can have a drastic negative effect on tourism, business and residential activities in the affected area. The assessments help to prevent the likelihood of such outbreaks in the District.

Mosquitoes hinder, annoy and harm residents, guests, visitors, farm workers, and employees. A vector-borne disease outbreak and other related public health threats would have a drastic negative effect on agricultural, business and residential activities in the Assessment Area.

The economic impact of diseases is well documented. According to a study prepared for the Centers for Disease Control and Prevention, economic losses due to the transmission of West Nile Virus in Louisiana was estimated to cost over $20 million over approximately one year:

> *The estimated cost of the Louisiana epidemic was $20.1 million from June 2002 to February 2003, including a $10.9 million cost of illness ($4.4 million medical and $6.5 million nonmedical costs) and a $9.2 million cost of public health response. These data indicate a substantial short-term cost of the WNV disease epidemic in Louisiana.* [12]

Moreover, a study conducted in 1996-97 of La Crosse Encephalitis (LACE), a human illness caused by a mosquito-transmitted virus, found a lifetime cost per human case at

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[11] Carney, Ryan. (2008), Efficiency of Aerial Spraying of Mosquito Adulticide in Reducing the Incidence of West Nile Virus, California, 2005. Emerging Infectious Diseases, Vol 14(5)

[12] Zohrabian A, Meltzer MI, Ratard R, Billah K, Molinari NA, Roy K, et al. West Nile Virus economic impact, Louisiana, 2002. Emerging Infectious Disease, 2004 Oct. Available from http://www.cdc.gov/ncidod/EID/vol10no10/03-0925.htm

$48,000 to $3,000,000 and found that the disease significantly impacted lifespans of those who were infected. Following is a quote from the study which references the importance and value of active vector control services of the type that would be funded by the proposed assessments:

> *The socioeconomic burden resulting from LACE is substantial, which highlights the importance of the illness in western North Carolina, as well as the need for active surveillance, reporting, and prevention programs for the infection.* [13]

Agriculture, tourism and business properties also benefit from reduced levels of harmful or nuisance mosquitoes and other vectors. For example, reduced vector populations on agricultural properties improve economic activity on the property because employees are more productive. Conversely, any outbreaks of emerging vector-borne pathogens such as West Nile Virus could also materially negatively affect these industries. Diseases transmitted by mosquitoes and other vectors can adversely impact business and recreational functions.

> *A study prepared for the United States Department of Agriculture in 2003 found that over 1,400 horses died from West Nile Virus in Colorado and Nebraska and that these fatal disease cases created over $1.2 million in costs and lost revenues. In addition, horse owners in these two states spent over $2.75 million to vaccinate their horses for this disease. The study states that "Clearly, WNV has had a marked impact on the Colorado and Nebraska equine industry."* [14]

> *Pesticides for mosquito control impart economic benefits to agriculture in general. Anecdotal reports from farmers and ranchers indicate that cattle, if left unprotected, can be exsanguinated by mosquitoes, especially in Florida and other southeast coastal areas. Dairy cattle produce less milk when bitten frequently by mosquitoes* [15]

The Services funded by the assessments help prevent the likelihood of such outbreaks on property in the Assessment Area and reduce the harm to economic activity on property caused by existing mosquito populations. This is another direct advantage received by property in the Assessment Area that would not be received in absence of the assessments.

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[13] Utz, J. Todd, Apperson, Charles S., Maccormack, J. Newton, Salyers, Martha, Dietz, E. Jacquelin, Mcpherson, J. Todd, Economic And Social Impacts Of La Crosse Encephalitis In Western North Carolina, Am J Trop Med Hyg 2003 69: 509-518

[14] S. Geiser, A. Seitzinger, P. Salazar, J. Traub-Dargatz, P. Morley, M. Salman, D. Wilmot, D. Steffen, W. Cunningham, Economic Impact of West Nile Virus on the Colorado and Nebraska Equine Industries: 2002, April 2003, Available from

http://www.aphis.usda.gov/vs/ceah/cnahs/nahms/equine/wnv2002_CO_NB.pdf

[15] Jennings, Allen. (2001). USDA Letter to EPA on Fenthion IRED. United States Department of Agriculture, Office of Pest Management Policy. March 8, 2001.

REDUCED RISK OF NUISANCE AND LIABILITY ON PROPERTY IN THE ASSESSMENT AREA

In addition to health related factors, uncontrolled mosquito and vector populations create nuisances for the occupants of property in the Assessment Area. Properties in the Assessment Area, therefore, benefit from the reduced nuisance factor that will be created by the Services. Agricultural and rangeland properties also benefit from the reduced nuisance factor and harm to livestock and employees from lower mosquito and vector populations.

Agricultural, range, golf course, cemetery, open space and other such lands in the Assessment Area contain large areas of mosquito and vector habitat and are therefore a significant source of mosquito and vector populations. In addition, residential and business properties in the Assessment Area can also contain significant sources.[16] It is possible that property owners where are sources of mosquitoes are located may be held liable for the transmission of diseases or other harm. For example, in August 2004, the City of Los Angeles approved new fines of up to $1,000 per day for property owners who don't remove standing water sources of mosquitoes on their property.

The Services protect the business and industry property in the Assessment Area. This is a direct advantage and a special benefit to property in the Assessment Area.

IMPROVED MARKETABILITY OF PROPERTY.

As described previously, the Services specially benefit properties in the Assessment Area by making them more useable, livable and functional. The Services also make properties in the Assessment Area more desirable, and more desirable properties also benefit from improved marketability. This is another tangible and direct special benefit to property which will not be enjoyed in absence of the Services.[17]

BENEFIT FINDING

In summary, the special benefits described in this Report and the Services in the Assessment Area directly benefit and protect the real properties in the Assessment Area in excess of the assessments for these properties. Therefore, the assessment engineer finds that the cumulative special benefits to property from the Services are reasonably equal to or greater than the annual assessment amount per benefit unit. The special benefits as described above are conferred on property in the Assessment Area and support both the 1996 Assessment and the 2006 Assessment.

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[16] Sources of mosquitoes on residential, business, agricultural, range and other types of properties include removable sources such as containers that hold standing water.

[17] If one were to compare two hypothetical properties with similar characteristics, the property with lower mosquito infestation and reduced risk of vector-borne disease will clearly be more desirable, marketable and usable.

GENERAL VS. SPECIAL BENEFIT

Article XIIIC of the California Constitution requires any local agency proposing to increase or impose a benefit assessment to "separate the general benefits from the special benefits conferred on a parcel." The rationale for separating special and general benefits is to ensure that property owners subject to the special benefit assessment are not paying for general benefits. The assessment can fund the special benefits to property in the 2005 Assessment Area but cannot fund any general benefits. Accordingly, a separate estimate of the special and general benefit is given in this section.

In other words:

Total Benefit	**=**	**General Benefit**	**+**	**Special Benefit**

There is no widely-accepted or statutory formula to determine general benefit from vector control services. General benefits are benefits from improvements or services that are not special in nature, are not "particular and distinct" and are not "over and above" benefits received by other properties. General benefits are conferred to properties located "in the district,18" but outside the 2005 Assessment Area and to "the public at large." SVTA vs. SCCOSA provides some clarification by indicating that general benefits provide "an indirect, derivative advantage" and are not necessarily proximate to the improvements and services funded by the assessments.

A formula to estimate the general benefit is listed below:

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[18] SVTA vs. SCCOSA explains as follows:

"OSA observes that Proposition 218's definition of "special benefit" presents a paradox when considered with its definition of "district." Section 2, subdivision (i) defines a "special benefit" as "a particular and distinct benefit over and above general benefits conferred on real property located in the district or to the public at large." (Art. XIII D, § 2, subd. (i), italics added.) Section 2, subdivision (d) defines "district" as "an area determined by an agency to contains all parcels which will receive a special benefit from a proposed public improvement or property-related service." (Art. XIII D, § 2, subd. (d), italics added.) In a well-drawn district — limited to only parcels receiving special benefits from the improvement — every parcel within that district receives a shared special benefit. Under section 2, subdivision (i), these benefits can be construed as being general benefits since they are not "particular and distinct" and are not "over and above" the benefits received by other properties "located in the district."

We do not believe that the voters intended to invalidate an assessment district that is narrowly drawn to include only properties directly benefiting from an improvement. Indeed, the ballot materials reflect otherwise. Thus, if an assessment district is narrowly drawn, the fact that a benefit is conferred throughout the district does not make it general rather than special."

General Benefit	=	Benefit to Real Property Outside the 2005 Assessment Area	+	Benefit to Real Property Inside the 2005 Assessment Area that is Indirect and Derivative	+	Benefit to the Public at Large

Special benefit, on the other hand, is defined in the state constitution as "a particular and distinct benefit over and above general benefits conferred on real property located in the district or to the public at large." The SVTA v. SCCOSA decision indicates that a special benefit is conferred to a property if it "receives a direct advantage from the improvement (e.g., proximity to a park)." In this proposed special benefit assessment, the overwhelming proportion of the benefits conferred to property is special, since the advantages from the mosquito and disease protection funded by the 2005 Assessments are directly received by the properties in the 2005 Assessment Area and are only minimally received by property outside the 2005 Assessment Area or the public at large.

Proposition 218 uses the phrase "over and above" general benefits in describing special benefit. (Art. XIIID, sections 2(i) & 4(f).) There currently are some mosquito and vector related services being provided to the 2005 Assessment Area. Consequently, there currently are some mosquito control related benefits being provided to the 2005 Assessment Area and any new and enhanced service provided by the District would be over and above this baseline. Arguably, all of the Services proposed to be funded by the assessment therefore would be a special benefit because the additional Services would particularly and distinctly benefit and protect the property in the 2005 Assessment Area over and above the previous baseline benefits and service.

Nevertheless, some of the Services would benefit the public at large and properties outside the 2005 Assessment Area.

DAHMS V. DOWNTOWN POMONA PROPERTY

On June 8, 2009, the 4th Court of Appeals amended its original opinion upholding a benefit assessment for property in the downtown area of the City of Pomona. On July 22, 2009, the California Supreme Court denied review. On this date, Dahms became good law and binding precedent for assessments. In Dahms the court upheld an assessment that was 100% special benefit on the rationale that the services funded by the assessments were directly provided to property in the assessment district. Similar to Downtown Pomona, the 2005 Assessments fund mosquito, vector and disease control services directly provided to property in the 2005 Assessment Area. Moreover, as noted, the Services directly reduce mosquito and vector populations on all property in the 2005 Assessment Area. Therefore, Dahms establishes a basis for minimal or zero general benefits from the 2005 Assessments. However, in this report, the general benefit is more conservatively estimated and described, and then budgeted so that it is funded by sources other than the 2005 Assessments.

BONANDER V. TOWN OF TIBURON

On December 31, 2009, the 1st District Court of Appeals overturned a benefit assessment approved by property owners to pay for placing overhead utility lines underground in an area of the Town of Tiburon. The Court invalidated the assessments on the grounds that the assessments had been apportioned to assessed property based in part on relative costs within sub-areas of the assessment district instead of proportional special benefits. The Engineer's Report is consistent with Bonander because the assessments have been apportioned based on the overall cost of the Services and proportional special benefit to each property.

BEUTZ V. COUNTY OF RIVERSIDE

On May 26, 2010, the 4th District Court of Appeals issued a decision on the Steven Beutz v. County of Riverside ("Beutz") appeal. This decision overturned an assessment for park maintenance in Wildomar, California, primarily because the general benefits associated with improvements and services were not explicitly calculated, quantified and separated from the special benefits. These assessments are consistent with Beutz because the general benefits have been explicitly calculated and quantified and excluded from the assessments.

GOLDEN HILL NEIGHBORHOOD ASSOCIATION V. CITY OF SAN DIEGO

On September 22, 2011, the San Diego Court of Appeals issued a decision on the Golden Hill Neighborhood Association v. City of San Diego appeal. This decision overturned an assessment for street and landscaping maintenance in the Greater Golden Hill neighborhood of San Diego, California. The court described two primary reasons for its decision. First, like in Beutz, the court found the general benefits associated with services were not explicitly calculated, quantified and separated from the special benefits. Second, the court found that the City had failed to record the basis for the assessment on its own parcels. These assessments are consistent with Greater Golden Hill because the general benefits have been explicitly calculated and quantified and excluded from the assessments.

CALCULATING GENERAL BENEFIT

Without this assessment the District would lack the funds to continue to provide the baseline level of service and additional Services to the 2005 Assessment Area. The only additional service that is being provided is the vector control program assessment-funded Services. Consistent with footnote 8 of SVTA v. SCCOSA, and for the reasons described above, the District has determined that all parcels in the 2005 Assessment Area receive a shared direct advantage and special benefit from the Services. The Services directly and particularly serve and benefit each parcel, and are not a mere indirect, derivative advantage. As explained above, Proposition 218 relies on the concept of "over and above" in distinguishing special benefits from general benefits. As applied to an assessment proceeding this concept means that all vector control services, which provide direct

advantage to property in the 2005 Assessment Area, are over and above the baseline and therefore are special.

Nevertheless, the proposed Services may provide a degree of general benefit, in addition to the predominant special benefit. This section provides a conservative measure of the general benefits from the 2005 Assessments.

BENEFIT TO PROPERTY OUTSIDE THE DISTRICT

Properties within the 2005 Assessment Area receive almost all of the special benefits from the Services because the Services funded by the 2005 Assessments will be provided directly to protect property within the 2005 Assessment Area from mosquitoes and vector-borne diseases. However, properties adjacent to, but just outside of, the proposed boundaries may receive some benefit from the proposed Services in the form of reduced mosquito populations on property outside the 2005 Assessment Area. Since this benefit, is conferred to properties outside the district boundaries, it contributes to the overall general benefit calculation and will not be funded by the 2005 Assessment.

A measure of this general benefit is the proportion of Services that would affect properties outside of the 2005 Assessment Area. Each year, the District will provide some of its Services in areas near the boundaries of the 2005 Assessment Area. By abating mosquito populations near the borders of the 2005 Assessment Area, the Services could provide benefits in the form of reduced mosquito populations and reduced risk of disease transmission to properties outside the Assessment 2005 Assessment Area. If mosquitoes were not controlled inside the 2005 Assessment Area, more of them would fly from the 2005 Assessment Area. Therefore control of mosquitoes within the Unprotected Areas provides some benefit to properties outside the 2005 Assessment Area but within the normal flight range of mosquitoes, in the form of reduced mosquito populations and reduced vector-borne disease transmission. This is a measure of the general benefits to property outside the 2005 Assessment Area because this is a benefit from the Services that is not specially conferred upon property in the 2005 Assessment Area.

The mosquito potential outside the 2005 Assessment Area is based on studies of mosquito dispersion concentrations. Mosquitoes can travel up to two miles, on average, so this destination range is used. Based on studies of mosquito destinations, relative to parcels in the 2005 Assessment Area average concentration of mosquitoes from the Unprotected Areas on properties within two miles of the 2005 Assessment Area is calculated to be 6%.[19] This relative vector population reduction factor within the destination range is combined with the number of parcels outside the 2005 Assessment Area and within the destination range to measure this general benefit and is calculated as follows:

[19] Tietze, Noor S., Stephenson, Mike F., Sidhom, Nader T. and Binding, Paul L., "Mark-Recapture of *Culex Erythrothorax* in Santa Cruz County, California", Journal of the American Mosquito Control Association, 19(2):134-138, 2003.

Criteria:

Mosquitoes may fly up to 2 miles from their breeding source.

31,218 parcels within 2 miles of, but outside of the District, may receive some mosquito and disease protection benefit

6% portion of relative benefit that is received

479,864 Parcels in the District.

Calculations:

Total Benefit = 31,218 * 6% = 1,874 parcels equivalents

Percentage of overall parcel equivalents = 1,874 / (479,864+1,874) = 0.38%

Therefore, for the overall benefits provided by the Services to the 2005 Assessment Area =, it is determined that 0.38% of the benefits would be received by the parcels within two miles of the 2005 Assessment Area boundaries. Recognizing that this calculation is an approximation, this benefit will be rounded up to 1.0%.

BENEFIT TO PROPERTY *INSIDE* THE DISTRICT THAT IS *INDIRECT AND DERIVATIVE*

The "indirect and derivative" benefit to property within the 2005 Assessment Area is particularly difficult to calculate. As explained above, all benefit within the 2005 Assessment Area is special because the mosquito and disease control services in the 2005 Assessment Area would provide direct service and protection that is clearly "over and above" and "particular and distinct" when compared with the level of such protection under current conditions. Further the properties are within the proposed 2005 Assessment Area boundaries and this Engineer's Report demonstrates the direct benefits received by individual properties from mosquito and disease control services.

In determining the 2005 Assessment Area, the District has been careful to limit it to an area of parcels that will directly receive the Services. All parcels will directly benefit from the surveillance, monitoring and treatment that will be provided on an equivalent basis throughout the 2005 Assessment Area in order to maintain the same improved level of protection against mosquitoes and other vectors and reduced mosquito and vector populations throughout the area. The surveillance and monitoring sites would be spread on a balanced basis throughout the area. Mosquito and vector control and treatment would be provided as needed throughout the area based on the surveillance and monitoring results. The shared special benefit - reduced mosquito levels and reduced presence of vector-borne diseases - would be received on an equivalent basis by all parcels in the 2005 Assessment Area. Furthermore, all parcels in the 2005 Assessment Area would directly benefit from the ability to request service from the District and to have a District field technician promptly respond directly to the parcel and address the owner's

or resident's service need. The SVTA vs. SCCOSA decision indicates that the fact that a benefit is conferred throughout the 2005 Assessment Area does not make the benefit general rather than special, so long as the 2005 Assessment Area is narrowly drawn and limited to the parcels directly receiving proportional shared special benefits from the service. This concept is particularly applicable in situations involving a landowner-approved assessment-funded extension of a local government service to benefit lands previously not receiving that particular service. The District therefore concludes that, other than the small general benefit to properties outside the 2005 Assessment Area (discussed above) and to the public at large (discussed below), all of the benefits of the Services to the parcels within the 2005 Assessment Area are special benefits and it is not possible or appropriate to separate any general benefits from the benefits conferred on parcels in the 2005 Assessment Area.

Benefit To The Public At Large

With the type and scope of Services provided to the 2005 Assessment Area, it is very difficult to calculate and quantify the scope of the general benefit conferred on the public at large. Because the Services directly serve and benefit all of the property in the 2005 Assessment Area, any general benefit conferred on the public at large would be small. Nevertheless, there would be some indirect general benefit to the public at large.

The public at large uses the public highways, streets and sidewalks, and when traveling in and through the 2005 Assessment Area they will benefit from the Services. A fair and appropriate measure of the general benefit to the public at large therefore is the amount of highway, street and sidewalk area within the 2005 Assessment Area relative to the overall land area. An analysis of maps of the 2005 Assessment Area shows that approximately 1.11% of the land area in the 2005 Assessment Area is covered by highways, streets and sidewalks. This 1.11% therefore is a fair and appropriate measure of the general benefit to the public at large within the 2005 Assessment Area.

Summary of General Benefits

Using a sum of the measures of general benefit for the public at large and land outside the 2005 Assessment Area, we find that approximately 2.11% of the benefits conferred by the proposed 2005 Assessment may be general in nature and should be funded by sources other than the 2005 Assessment.

General Benefit Calculation

1.0%	**(Outside the 2005 Assessment Area)**
+ 0.0%	**(Property within the 2005 Assessment Area)**
+ 1.11%	**(Public at Large)**
= 2.11%	**(Total General Benefit)**

Although this analysis supports the findings that 2.11% of the 2005 Assessment may provide general benefit only, this number is increased by the Assessment Engineer to 4% to conservatively ensure that no assessment revenue is used to support general benefit. This additional amount allocated to general benefit also covers general benefit to parcels in the 2005 Assessment Area if it is later determined that there is some general benefit conferred on those parcels.

The proposed 2005 Assessment total budget for mosquito and vector abatement, disease control, and capital improvement $9,932,481. Of this total budget amount, the District will contribute $3,191,333 or 32.13% of the total budget from sources other than the 2005 Assessment. This contribution offsets any general benefits from the Mosquito, Vector and Disease Control Assessment Services. For fiscal year 2020-21 it is anticipated that the 1996 Assessment will generate approximately $2,870,830 and the 2005 Assessment will generate approximately $4,488,884 in assessment revenue (Please note that the above discussion of special and general benefit applies only to the 2005 Assessment.)

PROPORTIONALITY - ZONES OF BENEFIT

The District's mosquito, vector, and disease control programs, projects and services that will be funded by the proposed 2005 Assessment will be provided in all areas within the County boundaries. However, areas east of the westernmost ridgeline of the Diablo Range are more remotely located and receive a reduced level of Services and corresponding benefits relative to other parcels in the District. These areas are hereinafter referred to as Zone of Benefit B or Zone B and are depicted on the Assessment Diagram included with this Report. All other parcels within the County boundaries are within Zone A.

Using District estimates for the amount of Services provided to parcels east of the ridgeline (Zone B), we find that parcels in Zone B receive approximately one-half of the average level of Services and benefits provided to other parcels in the District (Zone A). Therefore, parcels in Zone B receive 50% of the assessment rate per benefit unit.

The SVTA vs. SCCOSA decision indicates:

> *"In a well-drawn district — limited to only parcels receiving special benefits from the improvement — every parcel within that district receives a shared special benefit. Under section 2, subdivision (i), these benefits can be construed as being general benefits since they are not "particular and distinct" and are not "over and above" the benefits received by other properties "located in the district."*
>
> *We do not believe that the voters intended to invalidate an assessment district that is narrowly drawn to include only properties directly benefitting from an improvement. Indeed, the ballot materials reflect otherwise. Thus, if an assessment district is narrowly drawn, the fact that a benefit is conferred throughout the district does not make it general rather than special. In that circumstance, the characterization of a benefit may depend on whether the parcel receives a direct advantage from the improvement (e.g., proximity to park) or receives an indirect, derivative advantage resulting from the overall public benefits of the improvement (e.g., general enhancement of the district's property values)."*

In the assessment, the advantage that each parcel receives from the proposed Services is direct, and the boundaries for each Zone of Benefit are narrowly drawn so each Zone includes parcels that receive the similar levels of benefit from the Services. Therefore, the even spread of assessment for similar properties in each of the narrowly drawn Zones of Benefit within the District is indeed consistent with the OSA decision and establishes proportionality of the assessments to property. (Please note that the above discussion of zones of benefit applies only to the 2005 Assessment.)

METHOD OF ASSESSMENT

BACKGROUND ON 1996 ASSESSMENT

The following Method of Assessment and apportionment sections apply to the 2005 Assessment only. Refer to the Engineer's Report for the 1996 Assessment for a description of the 1996 Assessments proportionality and method of assessment. For quick reference, the 1996 Assessment Methodology table is included below:

TABLE 2 – 1996 ASSESSMENT METHOD TABLE (FOR REFERENCE ONLY)

Table "F" FY 1996/97 Assessments for Vector Control Services		
Land Use	West of Ridge Line	East of Ridge Line
Single Family Residential (SFR)	$5.08	$1.02
Condominiums, Townhouses & Mobile Homes	$5.08	$1.02
General Industrial Non Manufacturing	$14.83	$2.97
General Manufacturing	$17.62	$3.52
Vacant Manufacturing Buildings	$6.81	$1.36
Regional Shopping Centers	$27.02	$5.40
Community Shopping Centers	$22.52	$4.50
Neighborhood Shopping Centers	$18.01	$3.60
Offices, Banks & Clinics	$14.83	$2.97
Service Stations	$10.39	$2.08
Agricultural	$10.75	$2.15

2005 ASSESSMENT METHOD OF ASSESSMENT

As previously discussed, the 2005 Assessments fund enhanced, comprehensive, year-round mosquito and vector control, disease surveillance and control Services that will reduce mosquito and vector populations on property and will clearly confer special benefits to properties in the 2005 Assessment Area. These benefits can also partially be measured by the occupants on property in the Improvement District because such parcel population density is a measure of the relative benefit a parcel receives from the Improvements. Therefore, the apportionment of benefit is partially based the population density of parcels.

It should be noted that many other types of "traditional" assessments also use parcel population densities to apportion the assessments. For example, the assessments for sewer systems, roads and water systems are typically allocated based on the population density of the parcels assessed. Moreover, assessments have a long history of use in California and are in large part based on the principle that any benefits from a service or improvement funded by assessments that is enjoyed by tenants and other non-property owners ultimately is conferred directly to the underlying property.[20]

[20] For example, in *Federal Construction Co. v. Ensign (1922) 59 Cal.App. 200 at 211*, the appellate court determined that a sewer system specially benefited property even though the direct benefit was to the people who used the sewers: "Practically every inhabitant of a city either is the owner of the land on which he resides or on which he pursues his vocation, or he is the tenant of the owner, or is the agent or servant of such owner or of such tenant. And since it is the inhabitants who make by far the greater use of a city's sewer system, it is to them, as lot owners or as tenants, or as the servants or agents of such lot owners or tenants, that the advantages of actual use will redound. But this advantage of use means

With regard to benefits and source locations, the assessment engineer determined that since mosquitoes and other vectors readily fly from their breeding locations to all properties in their flight range and since mosquitoes are actually attracted to properties occupied by people or animals, the benefits from mosquito and vector control extend beyond the source locations to all properties that would be a "destination" for mosquitoes and other vectors. In other words, the control and abatement of mosquito and vector populations ultimately confers benefits to all properties that are a destination of mosquitoes and vectors, rather than just those that are sources of mosquitoes.

Although some primary mosquito and vector sources may be located outside of residential areas, residential properties can and do generate their own, often significant, populations of mosquitoes and vector organisms. For example, storm water catch basins in residential areas are a common source of mosquitoes. Since the typical flight range for a female mosquito, on average is 2 miles, most homes in the Assessment Area are within the flight zone of many mosquito sources. Moreover, there are many other common residential sources of mosquitoes, such as miscellaneous backyard containers, neglected swimming pools, leaking water pipes and tree holes. Clearly, there is a potential for mosquito sources on virtually all types of property. More importantly, all properties in the Assessment Area are within the destination range of mosquitoes and most properties are actually within the destination range of multiple mosquito source locations.

Because the Services are provided throughout the 2005 Assessment Area with the same level of control objective in each zone, mosquitoes can rapidly and readily fly from their breeding locations to other properties over a large area, and because there are current or potential breeding sources literally everywhere in the 2005 Assessment Area, the Assessment Engineer determined that all similar properties in the 2005 Assessment Area have generally equivalent mosquito "destination" potential and, therefore, receive equivalent levels of benefit within areas in a same Zone of Benefit.

In the process of determining the appropriate method of assessment, the Engineer considered various alternatives. For example, a fixed assessment amount per parcel for all residential improved property was considered but was determined to be inappropriate because agricultural lands, commercial property and other property also receive benefits from the assessments. Likewise, an assessment exclusively for agricultural land was considered but deemed inappropriate because other types of property, such as residential and commercial, also receive the special benefit factors described previously.

A fixed or flat assessment was deemed to be inappropriate because larger residential, commercial and industrial properties receive a higher degree of benefit than other similarly used properties that are significantly smaller. (For two properties used for commercial purposes, there is clearly a higher benefit provided to a property that covers several acres in comparison to a smaller commercial property that is on a 0.25 acre site. The larger

---

that, in the final analysis, it is the lot owners themselves who will be especially benefited in a financial sense."

property generally has a larger coverage area and higher usage by employees, customers, tourists and guests that would benefit from reduced mosquito and vector populations, as well as the reduced threat from diseases carried by mosquitoes and other vectors. This benefit ultimately flows to the property.) Larger commercial, industrial and apartment parcels, therefore, receive an increased benefit from the assessments.

In conclusion, the assessment engineer determined that the appropriate method of assessment apportionment should be based on the type and use of property, the relative size of the property its relative population and usage potential, and its destination potential for mosquitoes. This method is further described below.

ASSESSMENT APPORTIONMENT

The following Assessment Apportionment sections applies to the 2005 Assessment only. Refer to the Engineer's Report for the 1996 Assessment for a description of the 1996 Assessments assessment apportionment.

The special benefits derived from the 2005 Assessment are conferred on property and are not based on a specific property owner's occupancy of property or the property owner's demographic status, such as age or number of dependents. However, it is ultimately people who do or could use the property and who enjoy the special benefits described above. The opportunity to use and enjoy property within the 2005 Assessment Area without the excessive nuisance, diminished "livability" or the potential health hazards brought by mosquitoes, vectors and the diseases they carry is a special benefit to properties in the 2005 Assessment Area. This benefit can be in part measured by the number of people who potentially live on, work at, visit or otherwise use the property, because people ultimately determine the value of the benefits by choosing to live, work and/or recreate in the area, and by choosing to purchase property in the area.[21]

In order to apportion the cost of the Services to property, each property in the 2005 Assessment Area is assigned a relative special benefit factor. This process involves determining the relative benefit received by each property in relation to a single family home, or, in other words, on the basis of Single Family Equivalents (SFE). This SFE methodology is commonly used to distribute assessments in proportion to estimated special benefit. For the purposes of this Engineer's Report, all properties are designated an SFE value, which is each property's relative benefit in relation to a "benchmark" parcel in the 2005 Assessment Area. The "benchmark" property is the single family detached dwelling on a parcel of less than one acre. This benchmark parcel is assigned one Single Family Equivalent benefit unit or one SFE.

The calculation of the special benefit apportionment and relative benefit to properties in the Assessment Area from the Services is summarized in the following equation:

[21] It should be noted that the benefits conferred upon property are related to the average number of people who could potentially live on, work at or otherwise could use a property, not how the property is currently used by the present owner.

Special Benefit (per property)	=	$\sum f$ **(Special Benefits)**	*	$\sum f$ **(Property Specific Attributes[1])**

1. Such as use, property type, size, as well as vector-specific attributes such as destination potential and population potential.

RESIDENTIAL PROPERTIES

Certain residential properties in the 2005 Assessment Area that contain a single residential dwelling unit and are on a lot of less than one acre are assigned one Single Family Equivalent or 1.0 SFE. Traditional houses, zero-lot line houses, and townhomes are included in this category.

Single family residential properties in excess of one acre receive additional benefit relative to a single family home up to one acre, because the larger parcels provide more area for mosquito sources and the mosquito, vector and disease control Services. Therefore, such larger parcels receive additional benefits relative to a single family home on less than one acre and are assigned 1.0 SFE for the residential unit and an additional rate equal to the agricultural rate described below of 0.002 SFE per one-fifth acre of land area in excess of one acre. Mobile home parcels on a separate parcel and in excess of one acre also receive this additional acreage rate.

Other types of properties with residential units, such as agricultural properties, are assigned the residential SFE rates for the dwelling units on the property and are assigned additional SFE benefit units for the agricultural-use land area on the property.

Properties with more than one residential unit are designated as multi-family residential properties. These properties, along with condominiums, benefit from the services and improvements in proportion to the number of dwelling units that occupy each property, the average number of people who reside in each property, and the average size of each property in relation to a single family home in Santa Clara County. This Report analyzed Santa Clara County population density factors from the 2000 US Census as well as average dwelling unit size for each property type. After determining the Population Density Factor and Square Footage Factor for each property type, an SFE rate is generated for each residential property structure, as indicated in Table 3 below.

The SFE factor of 0.43 per dwelling unit for multifamily residential properties applies to such properties with two to four units (duplex, triplex, fourplex). Properties in excess of 5 units typically offer on-site management, monitoring and other control services that tend to offset some of the benefits provided by the 2005 Assessment. Therefore the benefit for properties in excess of 5 units is determined to be 0.28 SFE per unit for the first 20 units and 0.10 SFE per each additional unit in excess of 20 dwelling units.

TABLE 3 - SANTA CLARA COUNTY RESIDENTIAL ASSESSMENT FACTORS

	Total Population	*Occupied Households*	*Persons per Household*	*Pop. Density Equivalent*	*SqFt Factor*	*Proposed Rate*
Single Family Residential	1,036,439	319,230	3.25	1.00		**1.00**
Condominium	145,582	51,822	2.81	0.87	0.70	**0.60**
Duplex, Triplex, Fourplex	132,770	45,423	2.92	0.90	0.48	**0.43**
Multi-Family Residential, 5+ Units	290,499	130,362	2.23	0.69	0.40	**0.28**
Mobile Home on Separate Lot	46,256	18,503	2.50	0.77	0.38	**0.29**

Source: 2000 Census (the most recent data available when the 2005 Assessment was established), Santa Clara County and property dwelling size information from the Santa Clara County Assessor data and other sources.

COMMERCIAL/INDUSTRIAL PROPERTIES

Commercial and industrial properties are generally open and operated for more limited times, relative to residential properties. Therefore, the relative hours of operation can be used as a measure of benefits, since residents and employees also provide a measure of the relative benefit to property. Since commercial and industrial properties are typically open and occupied by employees approximately one-half the time of residential properties, it is reasonable to assume that commercial land uses receive one-half of the special benefit on a land area basis relative to single family residential property.

The average size of a single family home with 1.0 SFE factor in Santa Clara County is 0.20 acres. Therefore, a commercial property with 0.20 acres receives one-half the relative benefit, or a 0.50 SFE factor.

The SFE values for various commercial and industrial land uses are further defined by using average employee densities because the special benefit factors described previously are also related to the average number of people who work at commercial/industrial properties.

To determine employee density factors, this Report utilizes the findings from the San Diego County Association of Governments Traffic Generators Study (the "SANDAG Study") because these findings were approved by the State Legislature which determined the SANDAG Study to be a good representation of the average number of employees per acre of land area for commercial and industrial properties. As determined by the SANDAG Study, the average number of employees per acre for commercial and industrial property is 24. As presented in Table 2, the SFE factors for other types of businesses are determined relative to their typical employee density in relation to the average of 24 employees per acre of commercial property.

Commercial and industrial properties in excess of 5 acres generally involve uses that are more land intensive relative to building areas and number of employees (lower coverage ratios). As a result, the benefit factors for commercial and industrial property land area in excess of 5 acres is determined to be the SFE rate per fifth acre for the first 5 acres and the relevant SFE rate per each additional acre over 5 acres. Institutional properties that

are used for residential, commercial or industrial purposes are also assessed at the appropriate residential, commercial or industrial rate.

Table 2 below lists the benefit assessment factors for business properties.

AGRICULTURAL, RANGELAND, GOLF AND CEMETERY PROPERTIES

Utilizing research and agricultural employment reports from UC Davis and the California Employment Development Department and other sources, this Report calculated an average usage density of 0.05 people per acre for agriculture property, 3.0 for golf courses, 0.01 for rangelands and timber and 1.2 for cemeteries. Since these properties typically are a source of mosquitoes and/or are typically closest to other sources of mosquitoes and other vectors, it is reasonable to determine that the benefit to these properties is twice the usage density ratio of commercial properties. The SFE factors per 0.20 acres of land area are shown in the following Table 4.

TABLE 4 - COMMERCIAL/INDUSTRIAL BENEFIT ASSESSMENT FACTORS

Type of Commercial/Industrial Land Use	*Average Usage Per Acre* [1]	*SFE Units per Fraction Acre* [2]	*SFE Units per Acre After 5*
Commercial	24	0.500	0.500
Office	68	1.420	1.420
Shopping Center	24	0.500	0.500
Industrial	24	0.500	0.500
Self Storage or Parking Lot	1	0.021	
Golf Course	3.00	0.13	
Cemetery	1.20	0.05	
Agriculture	0.05	0.0021	
Rangelands/Timber	0.010	0.00042	

1. Source: San Diego Association of Governments Traffic Generators Study, University of California, Davis and other studies and sources.

2. The SFE factors for commercial and industrial parcels indicated above are applied to each fifth acre of land area or portion thereof. (Therefore, the minimum assessment for any assessable parcel in these categories is the SFE Units listed herein.)

VACANT PROPERTIES

The benefit to vacant (unimproved) properties is determined to be proportional to the corresponding benefits for similar type developed properties. However, vacant properties are assessed at a lower rate due to the lack of active benefits, as measured by use by residents, employees, customers and guests. A measure of the benefits accruing to the underlying land is the average value of land in relation to improvements for developed property. An analysis of the assessed valuation data from the County of Santa Clara found that 50% of the assessed value of improved properties is classified as land value. Since vacant properties have very low to zero population/use densities until they are developed, a 50% benefit discount is applied to the valuation factor of 0.50 to account for

the current low use density and potential for harm or nuisance to the property owner or his residents, employees, customers and guests. The combination of these measures results in a 0.25 factor. It is reasonable to assume, therefore, that approximately 25% of the benefits are related to the underlying land and 75% are related to the day-to-day use of the property. Using this ratio, the SFE factor for vacant parcels is 0.25 per parcel.

OTHER PROPERTIES

Article XIIID stipulates that publicly owned properties must be assessed unless those properties are reasonably determined to receive no special benefit from the 2005 Assessment.

All properties that are specially benefited are assessed. Publicly owned property that is used for purposes similar to private residential, commercial, industrial or institutional uses is benefited and assessed at the same rate as such privately owned property. Other public properties such as watershed parcels, parks, open space parcels are determined to, on average, receive similar benefits as a single family home. Therefore such parcels are assessed an SFE benefit factor of 1. Miscellaneous, small and other parcels such as roads, right-of-way parcels, and common areas typically do not generate significant numbers of employees, residents, customers or guests and have limited economic value. These miscellaneous parcels receive minimal benefit from the Services and are assessed an SFE benefit factor of 0.

Church parcels, institutional properties, and property used for educational purposes typically generate employees on a less consistent basis than other non-residential parcels. Therefore, these parcels are determined to, on average, receive similar benefits as a single family home. Therefore such parcels are assessed an SFE benefit factor of 1.

PARCEL ANALYSIS OF 1996 ASSESSMENT AND 2005 ASSESSMENT

Regarding benefit assessments, Proposition 218 requires that "no assessment shall be imposed on any parcel which exceeds the reasonable cost of the proportional special benefit conferred on that parcel." Since parcels within the District are subject to the sum of the 1996 assessment and 2005 Assessment, additional discussion and analysis is warranted to ensure that this critical requirement of Proposition 218 is satisfied.

Both assessment were individually designed, developed and formed subject to the standard that individual costs do not exceed individual special benefit and individual assessed amount for the individual assessment – therefore the sum of the two assessments also does not exceed the sum of the special benefit and assessments.

Further, Table 5, below shows the sum of the two assessments for several key property use types

TABLE 5 – SUM OF 1996 ASSESSMENT AND 2005 ASSESSMENTS

Property Type	Sum of 1996 Assessment and 2005 Assessment
Single Family Residential	**$13.69**
Condominium	**$10.25**
Duplex	**$17.56**
Multi-Family Residential, 5 Units	**$37.45**
Mobile Home on Separate Lot	**$7.58**
Commercial / General Manufacturing on 1/2 acre	**$28.38**
Office on 1/2 acre	**$45.40**
Industrial on 1/2 acre	**$25.59**

A reasonable review of the tabulated total assessment costs for various property uses in Table 5 confirms that these totals do not exceed the cost-benefits of the actual services provided and described in this report. Finally, although admittedly an imperfect reference comparison, these costs are far below even one service call from a private pest control service which typically exceeds $100.

DURATION OF ASSESSMENT

It is proposed that the 1996 Assessment and the 2005 Assessment be levied for fiscal year 2020-21 and continued every year thereafter, so long as mosquitoes and vectors remain in existence and the Santa Clara County Vector Control District requires funding from the Assessments for its Services. As noted previously, the 2005 Assessment can continue to be levied annually after the Santa Clara County Vector Control District Board of Supervisors/Board of Trustees approves an annually updated Engineer's Report, budget for the Assessment, Services to be provided, and other specifics of the Assessment. In addition, the District Board of Supervisors/Board of Trustees must hold an annual public hearing to continue the 2005 Assessment.

APPEALS AND INTERPRETATION

Any property owner who feels that the assessment levied on the subject property is in error as a result of incorrect information being used to apply the foregoing method of assessment, may file a written appeal with the District Manager of the Santa Clara County Vector Control District or his or her designee. Any such appeal is limited to correction of an assessment during the then current Fiscal Year or, if before July 1, the upcoming fiscal year. Upon the filing of any such appeal, the District Manager or his or her designee will promptly review the appeal and any information provided by the property owner. If the District Manager or his or her designee finds that the assessment should be modified, the appropriate changes shall be made to the assessment roll. If any such changes are approved after the assessment roll has been filed with the Santa Clara County for collection, the District Manager or his or her designee is authorized to refund to the property owner the amount of any approved reduction. Any dispute over the decision of

the District Manager, or his or her designee, shall be referred to the Board. The decision of the Board shall be final.

ASSESSMENT DIAGRAM

The 2005 Assessment Area includes all properties within the boundaries of the Santa Clara County.

The boundaries of the 2005 Assessment Area are displayed on the following Assessment Diagram.

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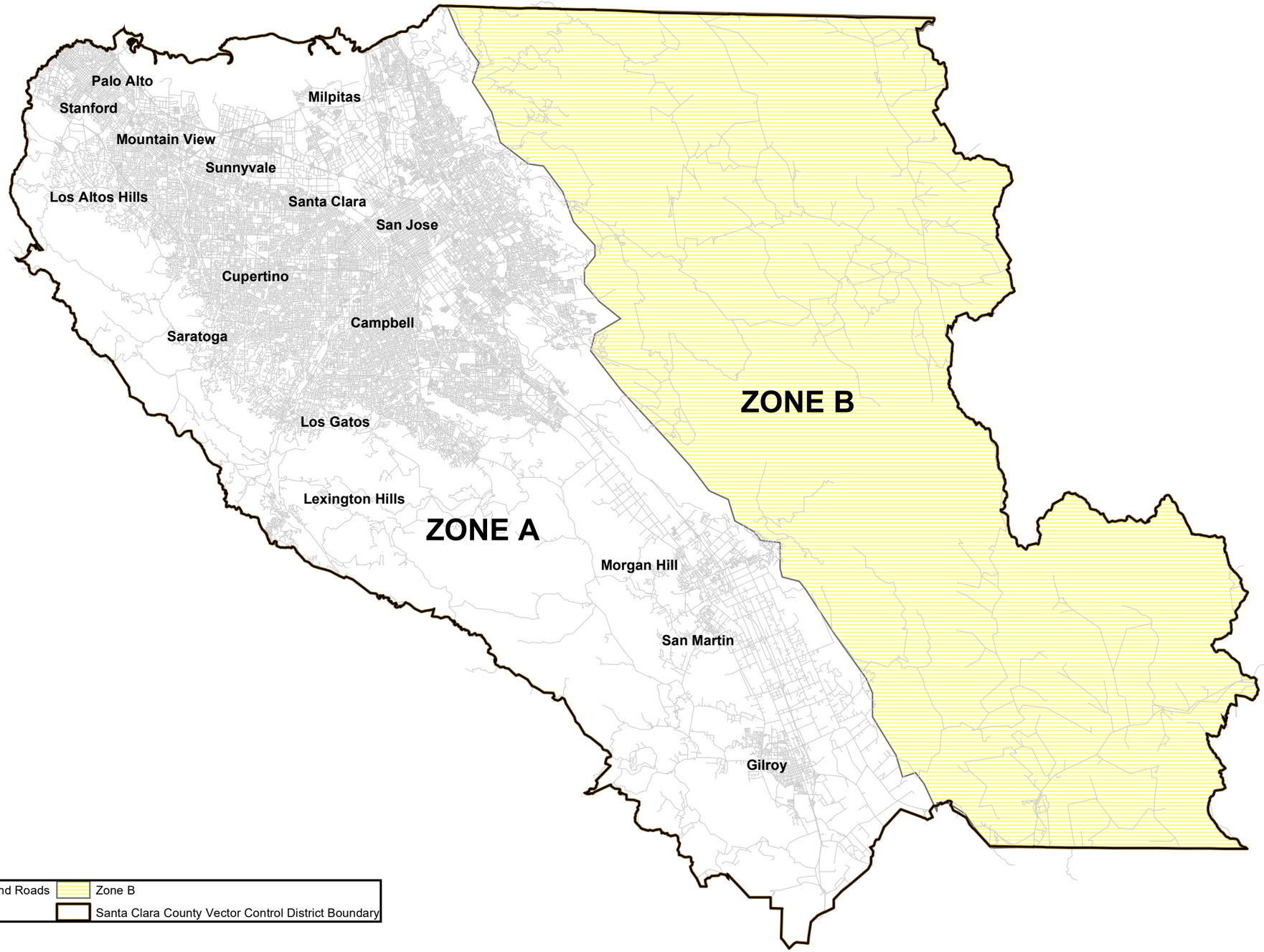
SANTA CLARA COUNTY VECTOR CONTROL DISTRICT



Streets and Roads
Zone B
Santa Clara County Vector Control District Boundary

FILED IN THE OFFICE OF THE DISTRICT MANAGER OF THE SANTA CLARA COUNTY VECTOR CONTROL DISTRICT, COUNTY OF SANTA CLARA, CALIFORNIA, THIS _____ DAY OF _____, 2020.

_____
DISTRICT MANAGER

RECORDED IN THE OFFICE OF THE DISTRICT MANAGER OF THE SANTA CLARA COUNTY VECTOR CONTROL DISTRICT, COUNTY OF SANTA CLARA, CALIFORNIA THIS _____ DAY OF _____, 2020.

_____
DISTRICT MANAGER

AN ASSESSMENT WAS CONFIRMED AND LEVIED BY THE BOARD OF THE SANTA CLARA COUNTY VECTOR CONTROL DISTRICT, COUNTY OF SANTA CLARA, ON THE LOTS, PIECES AND PARCELS OF LAND ON THIS ASSESSMENT DIAGRAM ON THE _____DAY OF _____, 2020 FOR THE FISCAL YEAR 2020-21 AND SAID ASSESSMENT DIAGRAM AND THE ASSESSMENT ROLL FOR SAID FISCAL YEAR WERE FILED IN THE OFFICE OF THE COUNTY AUDITOR OF THE COUNTY OF SANTA CLARA ON THE _____ DAY OF _____, 2020.
REFERENCE IS HEREBY MADE TO SAID RECORDED ASSESSMENT ROLL FOR THE EXACT AMOUNT OF EACH ASSESSMENT LEVIED AGAINST EACH PARCEL OF LAND.

_____
DISTRICT MANAGER

FILED THIS _____ DAY OF _____, 2020 AT THE HOUR OF _____ O'CLOCK __.M. IN THE OFFICE OF THE COUNTY TAX COLLECTOR OF THE COUNTY OF SANTA CLARA, STATE OF CALIFORNIA, AT THE REQUEST OF THE BOARD OF THE SANTA CLARA COUNTY VECTOR CONTROL DISTRICT.

_____
COUNTY TAX COLLECTOR, COUNTY OF SANTA CLARA

Note:
REFERENCE IS HEREBY MADE TO THE MAPS AND DEEDS OF RECORD IN THE OFFICE OF THE ASSESSOR OF THE COUNTY OF SANTA CLARA FOR A DETAILED DESCRIPTION OF THE LINES AND DIMENSIONS OF ANY PARCEL SHOWN HEREIN. THOSE MAPS SHALL GOVERN FOR ALL DETAILS CONCERNING THE LINES AND DIMENSIONS OF SUCH PARCELS. EACH PARCEL IS IDENTIFIED IN SAID MAPS BY ITS DISTINCTIVE ASSESSOR'S PARCEL NUMBER

PREPARED BY SCI CONSULTING GROUP
4745 MANGELS BLVD
FAIRFIELD, CA 94534
707-430-4300

SANTA CLARA COUNTY VECTOR CONTROL DISTRICT
MOSQUITO, VECTOR, AND DISEASE CONTROL
ASSESSMENT DIAGRAM

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ASSESSMENT ROLL

Reference is hereby made to the Assessment Roll in and for said assessment proceedings on file in the office of the District Manager of the District and the Clerk of the Board of Supervisors/Board of Trustees, as said Assessment Roll is too voluminous to be bound with this Engineer's Report.