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DELTA VECTOR CONTROL DISTRICT

BOARD OF TRUSTEES

Greg Gomez	City of Farmersville	Board President
Belen Gomez	City of Woodlake	Board Secretary
Kevin Caskey	County of Tulare	Board Member
Rosemary Hellwig	City of Exeter	Board Member
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DISTRICT MANAGER

Dr. Mustapha Debboun

ENGINEER OF WORK

SCI Consulting Group
Lead Assessment Engineer, John Bliss, M. Eng., P.E.

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INTRODUCTION

OVERVIEW AND HISTORY OF THE DELTA MOSQUITO AND VECTOR CONTROL DISTRICT

The Delta Mosquito and Vector Control District was established in 1922 to address chronic Malaria, as well as elevated pest mosquito populations, in northwest Tulare County. The District's responsibilities were expanded in the 1960's to include control of other disease-carrying insects and rodents (called "vectors"). In 1972, the District's name was changed from the "Delta Mosquito Abatement District" to the "Delta Vector Control District." In April 2021, the District changed its name to include "Mosquito". The official name is "Delta Mosquito and Vector Control District," referred to as the "District" or "Delta MVCD" throughout this report) in order to reflect services provided by the District.

The District serves northwestern Tulare County, covering an area of 712 square miles. The District provides its services to property accommodating approximately 240,000 residents and is the only public agency providing year-round mosquito and vector control and vector-borne disease protection and prevention services in this area of Tulare County.

The Delta Mosquito and Vector Control District is governed by a Board of Trustees (the "Board") with one trustee appointed by each of the incorporated cities located within the District (Dinuba, Exeter, Farmersville, and Woodlake); and two trustees appointed by the County Board of Supervisors. The Board meetings are held at 4:30 pm on the second Wednesday of every month, and the public is invited to attend.

The District provides mosquito control and surveillance of flies, ticks, and other vectors; and disease control services within its boundaries. The District's services are available to all properties within its jurisdiction. The purpose of the Delta Mosquito and Vector Control District is to reduce the risk of vector-borne disease and mosquito nuisance to property and the inhabitants of property within the District. The District's core services are summarized as follows:

- Early detection of public health threats through comprehensive vector surveillance
- Reducing vectors or exposure to vectors that transmit diseases
- Appropriate, timely response to requests to prevent/control vector-borne disease on property
- Public education about mosquitoes and other vectors, the diseases they carry, and how residents can help control them on their property

The Delta Mosquito and Vector Control District employs an integrated mosquito and vector control strategy which particularly emphasizes surveillance and testing to determine thresholds for treatment, and prioritizes narrowly focused response approaches in support of a strategic, comprehensive mosquito and vector control program. The District has had considerable success with this strategy in reducing mosquito and vector populations, especially in its response to the threat of West Nile virus and other public health issues.

CURRENT FUNDING FOR VECTOR CONTROL PROGRAM IS INADEQUATE

The District is currently funded primarily by ad valorem property taxes in the amount of approximately \$3 million per year. From 2010 to 2019 the District received funding from a property-owner approved assessment of approximately \$1 million per year which supported comprehensive mosquito and vector control services as well as the development of the District's laboratory. This assessment expired in 2019 after the development costs of the laboratory had been paid off, leaving a substantial shortfall in funding for the portion dedicated to comprehensive mosquito and vector control services.

Moreover, in recent years there has been a significant increase in local population of the invasive yellow fever mosquito, *Aedes aegypti*, in Tulare County. This mosquito can spread dengue fever, chikungunya, Zika fever, Mayaro, yellow fever viruses, and other disease agents, and is particularly expensive to control. To control *Aedes aegypti* population, focused monitoring, testing, and treatment are required.

Hence, the District is proposing this assessment to replace the funding from the assessment that expired in 2019 and to address increases associated with addressing the invasive *Aedes aegypti*. With an additional funding source, the District would be able to continue providing and improving year-round control of mosquitoes, such as *Aedes aegypti*, and the diseases they carry. As well, be better prepared for the potential introduction of any other invasive mosquito species or emerging disease which may threaten the District residents.

Summary of the Proposed Benefit Assessment Rates and Revenue

As well-described and well-supported in the Engineer's Report, the proposed rates for the proposed new benefit assessment are:

FIGURE 1 – SINGLE FAMILY HOME RATE SUMMARY

Zone	Schedule	Proposed Rate
A	per year	\$12.50
B	per year	\$6.25

Note: These are the rates for single family homes. Other property uses (vacant, commercial, office, multi-family, etc.) are assessed differently as described in the Assessment Apportionment section.

The proposed Benefit Assessment would be \$1,023,546 per year.

THE PROPOSED BENEFIT ASSESSMENT MUST BE COMPLIANT WITH PROPOSITION 218

This proposed assessment is formed consistent 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 XIII C and XIII D of the California Constitution. Proposition 218 provides for benefit assessments to be levied to fund the cost of public services, improvements, as well as

maintenance and operation expenses to a public benefit 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 forty 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” under Proposition 218, underscoring the fact that the drafters of Proposition 218 and the voters who approved it established that funding for vector control is an appropriate use of benefit assessments and therefore confers a special benefit to property.

COMPLIANCE WITH PROPOSITION 218'S SUBSTANTIVE REQUIREMENTS

Proposition 218 authorizes and describes the process for the imposition of benefit assessments for certain governmental services improvements, including vector control, for services over and above baseline services.

The Services proposed to be provided by the District are over and above the (currently diminishing and inconsistent) baseline level of service that would be provided if the measure is not approved. The formula below describes the relationship between the final level of service, the existing baseline level of service, and the enhanced level of service to be funded by the proposed assessment.

Final Level of Service	=	Baseline Level of Service	+	Enhanced Level of Service
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The Baseline Level of Services currently fluctuates significantly each year, depending on available funding, and is expected to decrease each year. The proposed Enhanced Level of Services is based upon \$0,023,564 generated from the proposed Benefit Assessment. The Final Level of Services is the sum of the Baseline and Enhanced Level of Services and would be funded at \$0,851,632 for fiscal year 2021-22.

Further, Proposition 218 imposes four substantive requirements on Benefit Assessments

- Identify all benefitted parcels. All parcels that will have a special benefit conferred upon them and upon which an assessment will be imposed must be identified in the engineer's report and included in the assessment district. Parcels owned by the government cannot be excluded unless clear and convincing evidence demonstrates such a parcel receives no special benefit.
 - The Services will be directly provided to property in the Assessment Area. More specifically, the Services confer special benefits specifically and only to property owners within the District Service Area corresponding effect that is not shared by other parcels outside of the District. This is further described in this report under the "Benefit Factors" section.
 - All properties that are specially benefited assessed. As described in the section "Method of Apportionment," public property that is used for purposes similar to private residential, commercial, industrial, agricultural or institutional uses is benefited and assessed at the same rate as such privately owned property.
- Distinguish general from special benefit. The general benefits must be distinguished from the special benefits conferred on the parcels.
 - This Engineer's Report establishes a separate and quantitative separation and quantification of general benefits. This is described in the section "Calculating General Benefit."
- Proportionality. The proportionate special benefit derived by each parcel must be determined in relationship to the entirety of the capital cost of public improvement, the maintenance and operation expenses of a public improvement, or the cost of the property related service being provided.
 - The method used for apportioning the assessment is based upon the proportional special benefits to be derived from properties in the Assessment Area over and above general benefits assessed on real property in the assessment area or to public at large. The special benefit is further described in the section "Method of Assessment."
- Reasonable cost. The assessment must be apportioned so that the amount assessed to a parcel does not exceed the reasonable cost of the proportional special benefit conferred on that parcel and does not include any costs attributable to general benefits. Thus, the portion of a project cost associated with general benefit must be funded from non-assessment revenues, and an agency which lacks other funds will not be able to use assessment financing, as few cases sustain a conclusion a project has no general benefit.

¹ Cal. Const., art. XIII D, § 4, subpart (4), and League of California Cities Proposition 26 and 218 Implementation Guide

- o This report estimates that the general benefits received by the public at large and land outside the Assessment Area, is estimated to be approximately 5% of the benefits conferred by Mosquito, Vector and Disease Control Assessment. Since these benefits are general in nature they will be funded by sources other than the assessment. As in the “Estimate of Cost and Budget,” the District will contribute \$192,582 from non-assessment revenue, which more than covers any general benefits to the Services. Please refer to the section “Summary of General Benefits” for more detail on the General Benefit factors and calculations.

In summary, this Engineer’s Report is consistent with the requirements of Article XIII C and XIII D of the California Constitution because the Services to be funded are clearly defined; the Services are available to and will only be provided to abated property in the Assessment Area; the Services provide a direct advantage to property in the Assessment Area that would not be received in absence of the Assessment, and are benefits that are over and above general benefits to real property located in the Service Area or to the public at large.

OVERVIEW OF MOSQUITO & VECTOR CONTROL PROGRAMS BENEFIT TO PROPERTY

The District currently provides a “baseline” of mosquito, vector and disease control services in the Service Area that will not be sufficient under the current budget structure if the proposed assessment is not approved. The funding source is diminishing over time and has been significantly reduced since the expiration of the previous assessment in 2019, while the demand to address vector-borne and emerging vectors such as *Aedes aegypti*, is increasing. Absent additional funding from a benefit assessment, a reduced, diminishing level of service would be the new baseline level of service and may include a very low level of surveillance, monitoring and control of mosquitoes, resulting in higher mosquito populations and the potential for outbreak of vector-borne diseases.

The future services to be provided to the proposed Assessment Area would include intensive surveillance, disease prevention, and control of mosquitoes for properties within the Assessment Area such as mosquito, vector and disease prevention services, projects and programs include, but are not limited to, source reduction, biological control, larvicide treatments, adulticide treatments, disease monitoring, public education, reporting, accountability, research and interagency cooperation, as well as capital costs, maintenance, and operation expenses as described later, which are above the baseline level of services, and that otherwise would not be provided if the measure is not approved.

The proposed Assessment Area is narrowly defined to include only properties that, if the Assessment is approved, could request and receive direct and more frequent service, that are located within the scope of the mosquito and vector surveillance areas that are located within flying or traveling distance of potential mosquito-breeding sources monitored by the District, and that would benefit from a reduction in the amount of mosquitoes reaching and impacting the property as a result of the enhanced mosquito surveillance and control. The

Assessment Diagram included at the end of this report shows the boundaries of the Assessment Area.

This Engineer's Report ("Report") defines proposed Benefit Assessment, which would enhance the existing services provided in the Area, and provides for these improved mosquito, vector and disease services for property throughout the Service Area, as well as related costs for equipment, capital improvements and services, and facilities necessary and incidental to mosquito and disease control programs.

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 rodents and other vertebrates (Health and Safety Code Section 2002(k)).

"Vector Control" means 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 operates under the authority of the Mosquito Abatement and Vector Control District Law of the State of California. Following are excerpts from the Mosquito Abatement and Vector Control District Law of 2002, codified in the Health and Safety Code, Section 2000, et seq. which serve to 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.

Further the Health and Safety Code, ~~2002~~ specifically authorizes the creation of benefit assessments for vector control, as follows:

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

This Engineer's Report was prepared by SCIT Consulting Group ("SCI") to describe the mosquito, vector and disease control services provided by the proposed assessment, to establish the estimated costs for those services, to determine the special benefits received by property from the services, and to apportion the special assessments to lots and

parcels within the District's Service Area based on the estimated special benefit each parcel receives from the services funded by the benefit assessment.

ASSESSMENT PROCESS

In order to allow property owners to ultimately decide whether funding should be provided for the Services summarized earlier, on 10/21/12 the Delta Mosquito Vector Control District Board of Trustees ("Board") directed the Assessment Engineer to initiate the proceedings for a benefit assessment. An Assessment Engineer's Report was prepared to establish the estimated costs for the mosquito, disease surveillance and control services and related costs that would be funded by the assessment, to determine the special benefits and general benefits received from the Services, and to apportion the 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.

Following submittal of the Report to the Board for preliminary approval, the Board may, by Resolution, call for an assessment proceeding and Public Hearing on the establishment of the Mosquito, Vector Disease Control Assessment ("Assessment").

If the Board approves such Resolution and for the mailing of notices and ballots, a notice of assessment and assessment ballots will be mailed to property owners at least 45 days prior to the date of the Public Hearing by the Board. Such notice would include a description of the assessments as well as an explanation of the method of voting on the assessment. Each notice would include a ballot which the property owner could mark his or her approval or disapproval of the assessment, and a postage-prepaid ballot return envelope.

After the ballots are mailed to property owners, a minimum 45-day time period must be provided for the return of the assessment ballots. Following this 45-day time period, a public hearing must be held for the purpose of public testimony regarding the proposed assessment and services. At this hearing, the public would have the opportunity to provide input on this issue and would have a final opportunity to submit ballots. After the conclusion of the public input portion of the hearing, the hearing may be continued to a future date to allow time for the tabulation of ballots.

With the passage of Proposition 218 on November 1996, The Right to Vote on Taxes Act, now Article XIII C and XIII D of the California Constitution, the proposed assessments can be levied for fiscal year 2021-22, and future years if the ballots submitted in favor of the assessment are greater than the ballots submitted in opposition to the assessments. (Each ballot is weighted by the amount of proposed assessment for the property that it represents).

If it is determined, when the tabulation results are announced, that the assessment ballots submitted in opposition to the proposed assessment do not exceed the assessment ballots submitted in favor of the assessment (weighted proportional financial obligation of the property for which ballots are cast) the Board may take any resolution, to approve the levy of the assessment for fiscal year 2021-22 and future fiscal years. If the assessment

is so confirmed and approved, the levies be submitted to the Tulare County Auditor for inclusion on the property tax rolls for fiscal year 2021-22.

It should be noted that the Tulare County Auditor's assessments to the property tax bills each year for any single parcel, only if the assessment total is greater than \$10.00. Given that the rate varies per property, the District will only have to submit assessments to the County Auditor each year for those parcels that have an assessment greater than \$10.00 for the current year, or a combined assessment (or more years) greater than \$10.00. As a result, some parcels will receive an assessment on their property tax bills only once for every two, three, or more years, such that the total accumulated assessment is greater than \$10.00.

If the assessment is so confirmed and approved, the District will commence in fiscal year 2021-22 to establish and provide the services described in this report. The fiscal year 2022 assessment budget includes outlays for Invasive *Aedes* *Aegypti*, West Nile virus surveillance and mosquito control, vector control, capital equipment, supplies and disease testing programs.

If the assessment is so confirmed and approved, it may be continued in future years and may be increased in future years by an annual adjustment tied to the Western Region's Pacific Division Consumer Price Index for Urban Consumers (CPI-U), with a maximum annual adjustment not to exceed 3%. Any change in the CPI in excess of 3% shall be cumulatively reserved as the "Unused CPI" and shall be used to increase the maximum authorized assessment rate in years in which the CPI is less than 3%. The maximum authorized assessment rate is equal to the maximum assessment rate in the first fiscal year the assessment was levied adjusted annually by a maximum of 1) 0% (2) the change in the CPI plus any Unused CPI as described above.

The procedures for the levy of the assessment in future years commence with the creation of a budget for the upcoming fiscal year 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 could be reviewed and preliminarily approved by the Board at a public meeting. At this meeting, the Board could call for the publication in a local newspaper of the intent to continue the assessment and set the date for a public hearing. At the annual public hearing, members of the public could provide input to the Board prior to the Board's decision on continuing the services and assessments for the next fiscal year.

GENERAL DESCRIPTION OF THE MOSQUITO & VECTOR CONTROL PROGRAM AND SERVICES

ABOUT THE VECTOR CONTROL PROGRAM

The Delta Mosquito and Vector Control District is an independent district (not part of any county or city) that controls and manages mosquitoes and other vectors. The District protects the usefulness, desirability and livability of property, as well as the inhabitants within its jurisdiction, through the abatement of such nuisances. In addition, the District regularly tests for diseases carried by mosquitoes and educates property owners and the occupants of property in the District about how to protect themselves from vector-borne diseases.

Over the course of time, a simple common-sense approach to mosquito control has evolved into a science-based program charged with protecting the public health from vector-borne disease via a comprehensive, integrated, and highly technical program that gives consideration to the principles of ecology without damaging the environment. The use of methods, which minimally impact wildlife, non-targeted beneficial plant and animal species are involved to provide a program that is effective and lasting.

OVERVIEW OF VECTOR CONTROL

A vector is defined by the State of California as "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, other insects, mites, and rats, but not including any domesticated animal." [California Health and Safety Code Section 2002(k)].

DESCRIPTION OF VECTOR CONTROL PROGRAM

- Response to mosquito problems as well as other pestiferous or disease-carrying organisms on property in the District.
- Control of mosquito larvae on residential, agricultural sources, ditches, dairy pits, drain lines, vaults, seasonal ponds, horse troughs, wastewater treatment plants, under buildings, fresh water creeks, catch basins, and other sources on property in the District.
- Survey and data analysis of mosquito larvae populations to assess public health risks and allocate control efforts on property in the District.
- Monitoring of mosquito and other non-phagous dipteran populations using carbon dioxide-baited traps, sticky boxes, New Jersey traps, gravid traps, Biogents Sentinel (BG) traps, and other surveillance methods on property in the District.
- Monitoring for diseases carried and transmitted by mosquitoes on property in the District, such as Encephalitis, Malaria, Heartworm, and West Nile virus.
- Testing of dead birds and mosquitoes for viruses and other diseases, and other disease surveillance methods to detect vector-borne diseases on property in the District.

- Testing of new adulticide and insecticide brands and investigation of their efficacy.
- Cooperation with the local health department, the State Department of Public Health, State Universities, and other agencies to survey and identify arthropod-borne diseases such as Lyme disease in National and State Parks, trails and other recreational areas frequented by the public.
- Monitoring and/or advice for control of other nuisance and potentially hazardous organisms and vectors such as ticks and fleas on property in the District.
- Educate residents about the risks of diseases carried by mosquitoes, ticks, and other disease vectors, and how to better protect themselves and their pets.
- Education programs on vectors and abatement at school, community, and civic group meetings in the District.
- Distribution of printed material and brochures that describe what residents, employees and property owners can do to keep their homes and property free of mosquitoes and other vectors.

The District protects the public from vector-borne disease and mosquito nuisance while protecting the environment, through a coordinated activities collectively known as the Integrated Vector Management Program (IVMP). For all vector species, public education is a primary control strategy. In addition, the District determines the abundance of vectors and the risk of vector-borne disease on a regular basis through evaluation of public service requests and field and laboratory surveillance activities. If the populations exceed or are anticipated to exceed predetermined criteria, District staff employs the most efficient, effective, and environmentally sensitive means of control for the situation. Where feasible, water management or other physical controls are instituted to reduce vector production. In some circumstances, the District uses biological control such as the placing of mosquitofish. When these approaches are ineffective or are otherwise inappropriate, pesticides are used to treat pest-producing or pest-harboring areas.

VECTORS AND VECTOR-BORNE DISEASES IN THE DISTRICT SERVICE AREA

The District undertakes activities through the Integrated Vector Management Program to control the following vectors of disease or discomfort within the District:

MOSQUITOES

Certain species of mosquitoes found in the District can transmit West Nile virus, Western Equine Encephalomyelitis, St. Louis Encephalitis, and potentially other emerging diseases. A few species of mosquitoes are capable of transmitting Dog Heartworm. Although some species of mosquitoes have not been shown to transmit disease, all mosquito species can cause human discomfort from the female mosquito bites to obtain blood. Reactions range from irritation to the area of the bite to severe allergic reactions or secondary infections resulting from scratching the irritated area. Additionally, an abundance of mosquitoes can cause economic losses, and reduce the use or enjoyment of recreational, agricultural, or industrial areas.

Of the world's 3,000 mosquito species, more than 50 are found in California, and 24 have been identified in Tulare County. Continuous surveillance and special control efforts are aimed at the most troublesome species: *Aedes sierrensis*, *Aedes nigromaculis*, *Aedes vexans*, *Aedes aegypti*, *Anopheles freeborni*, *Anopheles punctipennis*, *Culex quinquefasciatus*, *Culex tarsalis*, and *Culex stigmatosoma*.

OTHER ANIMALS OF IMPORTANCE

Although certain animal species such as ground squirrels, chipmunks, ticks, opossums, wood rats, roof rats, house mice, and associated vectors will not be regularly controlled, these animals play important roles in the transmission of Plague, Rickettsiosis, Anaplasmosis, Ehrlichiosis, Murine Typhus, Hantavirus, and Lyme Disease, and may be surveyed for other diseases. The District provides education and consulting services to the public about diseases associated with these host species and vectors, along with appropriate measures to protect health. In extreme cases where the transmission of disease is likely, as with Disther activities, control efforts may be employed. Control of these animals will be done in consultation with the California Department of Health Services, Tulare Department of Environmental Health, local animal control, Tulare County Agricultural Commissioner's Office, other State and local agencies.

Most of the animals mentioned above are extremely mobile and cause the greatest hazard or discomfort away from their sources of origin. Each potential vector, primarily fleas and ticks have a unique life cycle and most occupy a variety of habitats. In order to effectively control these vectors, an integrated vector management program must be employed. District policy is to identify those species that are current vectors, to recommend techniques for their prevention and control, to anticipate and minimize any new interactions between vectors and humans.

INTEGRATED VECTOR MANAGEMENT

The Integrated Vector Management Program of the Delta Mosquito and Vector Control District is a long-standing, ongoing program of surveillance and control of mosquitoes and other vectors of human disease and discomfort. The program consists of six types of activities:

1. SURVEILLANCE For vector populations, vector habitats, disease pathogens, and public distress associated with vectors, this includes trapping and laboratory analysis of vectors to evaluate population and disease threats, direct visual inspection of known or suspected habitats, the use of all-terrain vehicles, maintenance of paths, and public surveys;
2. PUBLIC EDUCATION to encourage and assist reduction of prevention of vector habitats on private and public property;
3. PHYSICAL CONTROL Management of vector habitats, especially through elimination of water-breeding sources, water control and maintenance, improvement of channels, tide gates, levees, and other water control facilities, etc;
4. VEGETATION MANAGEMENT to improve surveillance, reduce vector populations, usually through education and cooperation of property owners;

5. BIOLOGICAL CONTROL Rearing, stocking, and provision to the public of the “mosquitofish” *Gambusia affinis*; application of the bacterium *Bacillus thuringiensis*, *Bacillus sphaericus*, and possibly use of other predators or pathogens of vectors;
6. CHEMICAL CONTROL Application of non-persistent insecticides to reduce populations of larval or adult mosquitoes and other invertebrate threats to public health.

The District’s activities address mosquitoes and other arthropods but both share general principles and policies including identification of vector problems; responsive actions to control existing populations of vectors, prevent sources of vectors from developing, and manage habitat to minimize vector production; education of land-owners and others on measures to minimize vector production; interaction with vectors; and provision and administration of funding and other 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), potential and/or potential contact with people; the establishment of treatment criteria (thresholds), appropriate selection from a wide range of control methods. This dynamic combination of surveillance, treatment criteria, and use of multiple control activities coordinated program is generally known as Integrated Pest Management (IPM) (Glass 1975, Da 1979, Borror et al 1981, Durso 1996, Robinson 1996).

The District’s Vector Management Program, like many other IPM programs, by definition involves procedures for minimizing potential impacts. The District’s Program employs IPM principles by determining the species and abundance of vectors through evaluation of public service requests and field surveys of immature and adult mosquito populations; and then, if the populations exceed predetermined criteria, using the most efficient, effective, and environmentally sensitive method of control. For all vector species, and their host, public education is an important strategy, and for some vectors (flies, rodents, ticks) it is the District’s primary control method. In some situations, water management or other physical control activities (known as “source reduction” or “permanent control”) can be instituted to reduce vector sources. The District also uses biological control such as the placing of mosquitofish in some settings. When these approaches are not effective or are otherwise inappropriate, pesticides are used to treat specific pest-producing or pest-harboring areas.

In order to maximize efficiency with the operational staff, specific vector sources in the Assessment Area, the District is divided into zones (currently six). Each zone is assigned a trained Vector Control Technician, whose responsibilities include inspection and treatment of known vector sources, finding and controlling unknown sources, minor physical control, and responding to service requests from the public. Each zone is further divided in the suburban or urban areas to help with service requests and control.

Vector control activities are conducted at a variety of sites throughout the District’s Assessment Area. These sites can be roughly divided into those where activities may have an effect on the natural environment either directly (through drainage), and sites

where the potential environmental impacts are negligible “Non-Environmental Sites.” Examples of “Environmental Sites” in the Project area include Lakes and Ponds, Rivers and Streams, Vernal Pools and other Seasonal Pools, Storm Water Detention Basins, Flood Control Channels, Street Drains and Gutter Wash Drains, Irrigated Pastures, or Agricultural Ditches. Examples of “Non-Environmental Sites” include Animal Troughs, Artificial Containers, Tire Piles, Foundations, Ornamental Fish Ponds, Swimming Pools, Animal Waste Detention Ponds, and Non-Natural Harborage (such as wood piles, residential and commercial landscape, trash receptacles, etc.).

SURVEILLANCE AND SITE ACCESS

In addition to nuisance, disruption of activities, and rendering our environment uninhabitable, certain insects and animals transmit a number of diseases. The mosquito-borne diseases of most concern in Terrell County are West Nile virus (WNV), Western Equine Encephalomyelitis (WEE) virus, and St. Louis Encephalitis (SLE) virus, Dengue, Chikungunya, and Zika viruses.

The District has identified mosquito and other potential vector sources scattered throughout the District. All properties within the District are within mosquito-borne range of one or more mosquito sources, and/or the normal range of one or more other vectors. Furthermore, the District’s geographic area has long suffered from mosquitoes and other vectors and includes a large number of sources.

Mosquito populations are surveyed using a variety of field methods and traps. Surveillance is conducted in a manner based upon an equal effort throughout the District boundaries, focusing on areas of likely source. Treatment strategies are based upon the results of the surveillance program, and are specifically designed for an individual area. Small volume mosquito “dippers” and observation are used to evaluate larval populations, and service requests from the public, BG traps, resting boxes, gravid trap ovitraps, and carbon dioxide-baited traps are used to evaluate adult populations. The surveillance traps are located and spread throughout the District in a balanced approach such that the traps measure mosquito levels throughout the District.

Mosquito-borne diseases are surveyed by using mosquitoes, and dead birds. Coops with sentinel chickens are maintained on the property of willing landowners.

Adult mosquitoes are collected and tested for infection of WNV, SLE, WEE, Dengue, Chikungunya, and Zika viruses. Specimens are collected utilizing a variety of surveillance traps or mechanisms, with small battery-powered traps baited with carbon dioxide in the form of dry ice, or a sugary water which specifically attracts host seeking females or an organically infused liquid designed to replicate the preferred breeding habitat of certain species. Intermittently, mosquitoes are also captured directly from resting boxes and natural resting sites. Although most traps are placed in vegetated areas with little light competition, care is taken to ensure placement of traps does not significantly damage any vegetation.

Surveillance is also conducted to determine habitat (e.g., standing water) and the effectiveness of control operations. Traps will be conducted using techniques with insignificant impacts on the environment. Staff routinely uses pre-existing accesses such as roadways, open areas, walkways, and vegetation management (i.e., pruning trees, clearing brush, and herbicide application) is conducted where regrowth impedes safe access. All of these actions only result in temporary/localized physical change to the environment with regeneration/regrowth occurring within a span of six to nine months.

In order to access various sites throughout the District for surveillance and control, District staff utilizes specialized equipment such as light trucks, all-terrain vehicles, and boats. District policies on use of this equipment are designed to avoid environmental impact.

In addition, the District's jurisdiction allows for testing for the presence of Plague and Murine Typhus by collecting ground squirrels, wild rodents, opossums, and fleas. (Currently the District does not anticipate to provide this service due to a lack of manpower and certified specialists to perform.) Testing for the presence of Hantavirus Pulmonary Syndrome could be conducted by collecting wild rodents. Small animals could be trapped using live traps baited with food. The traps would be set in the afternoon and would be collected within 24 hours. The animals would be anesthetized and blood, tissue, and flea samples would be obtained. Threatened and endangered species and other legally protected animals that become trapped would be released immediately and would not be used in these tests.

Disposable supplies contaminated with blood and tissue would be stored in appropriate biohazard containers in the District laboratory and disposed of in accordance with all applicable laws. Reusable items would be cleaned and sterilized before being used again. The disposal of animal carcasses would be in compliance with all Federal, State, and local laws and regulations.

EDUCATION

The primary goal of the District activities is to prevent vectors from reaching public nuisance or disease thresholds by managing habitat while protecting habitat values for their predators and other beneficial organisms. Vector prevention is accomplished through public education, including site-specific recommendations on water and land use, and by physical control (discussed in a later section).

The District's education program teaches people within the District how to recognize, prevent, and suppress vector breeding and harborage on property. This part of the District's Services is accomplished through the distribution of brochures, fact sheets, and newsletters, participation in local fairs and events, presentations to community organizations, contact with Technicians, response to service requests, and public service announcements and news releases. Education also includes a school program to teach future adults in the District to prevent vector sources, and to educate their parents or guardians about vectors and how they can reduce vector-human interaction on property within the District.

CONTROL OF MOSQUITOES

When a mosquito source produces mosquito populations above District treatment thresholds, the Technician will generally work with the landowner or responsible agency to reduce the habitat value of the site for mosquitoes ("physical"). If this is ineffective, the Technician will determine the best method of treatment, including biological control and/or chemical control. The District's vector control program provides each property a District-wide level of consistent mosquito and vector control that all properties will benefit from equivalent reduced levels of mosquito and vector populations. Surveillance and monitoring are provided on a District-wide basis. Although the District cannot predict or anticipate where and when control measures will be applied, the type and location of control is dependent on the surveillance and monitoring, consistent thresholds and objectives are comparable throughout the District.

PHYSICAL CONTROL

The District physically manipulates and manages mosquito habitat areas ("sources") within the District to reduce mosquito production. This may include removal of containers and debris, removing standing water from unenclosed swimming pools and spas, removal of vegetation or sediment, interrupting water flow from stored water, pumping and/or filling sources, improving drainage and water control systems, breaching or repairing levees, and installing, improving, or removing pumps and other water control structures in wetlands.

BIOLOGICAL CONTROL

The mosquitofish *Gambusia affinis*, is the District's primary control agent used against mosquitoes. Mosquitofish are not native to California, but have been widely established in the state since the early 1920's, and now inhabit natural and constructed water bodies. The District rears mosquitofish on its fishery facility. District technicians place mosquitofish in natural and made settings within the District where either previous surveillance has demonstrated a consistent production of mosquitoes, or where current surveillance indicates that mosquito populations will likely exceed chemical control thresholds without prompt action. Mosquitofish are also used to control mosquito production in artificial containers such as ornamental ponds, aquatic plant barrels, horse troughs, and abandoned swimming pools within the District. District residents living within the District can request mosquitofish for this purpose.

CHEMICAL CONTROL

Since many mosquito sources cannot be adequately controlled with physical control measures or mosquitofish, the District uses biological materials and/or chemical insecticides approved by the U.S. Environmental Protection Agency, the California Department of Pesticide Regulation, and other environmental agencies to control mosquito production where observed mosquito populations exceed District thresholds. When field inspections indicate the presence of populations which meet District criteria for chemical control (including abundance, species composition, proximity to human settlements, water temperature, presence of predators, levels of disease activity, and others), the District's California Certified Vector Control Teams apply these materials to the site in strict accordance with the label instructions. When possible the District uses

selective larvicides; if large numbers of adult mosquitoes are present and public health threatened, the District may apply selective persistence aerosol adulticides to reduce the number of adult mosquitoes.

Mosquito Larvicides: Depending on time of year, water temperature, organic content, mosquito species present, larval density, and other variables, pesticide applications may be repeated at any site at recurrence intervals ranging from annually to weekly. Larvicides routinely used by the District include BVA-2 Oil, Methoprene (Altosid) (*Bacillus thuringiensis israelensis*), Bs (*Bacillus sphaericus*) and Agnique (used sparingly).

- a. BVA-2 Oil is a petroleum distillate with low phytotoxicity and fast environmental breakdown that forms a thin film on water and kills larvae and pupae through suffocation. It is typically applied by hand, ATV, or truck at application rates of 1-5 gallons per acre.
- b. Methoprene, or Altosid, is a synthetic juvenile hormone designed to disrupt the transformation of a juvenile mosquito into an adult. It is applied either in response to observed high populations of mosquito larvae at a site, or as a sustained-release product that can persist up to four months or less depending on formulation. Application is by hand, ATV, or aircraft.
- c. Bti (*Bacillus thuringiensis israelensis*) is a bacterium that is ingested by larval mosquitoes and disrupts their gut leading to death before pupation. Bti is applied by the District as a liquid bonded to inert substrate (typically corn cob granules) to assist penetration into vegetation. Persistence is low in the environment, and efficacy depends on careful timing of application relative to the larval instar. Therefore, use requires frequent inspections of larval sources during periods of larval production, and may require frequent applications of material. Application can be by hand, ATV, or aircraft.
- d. Agnique is the trade name for a surface film larvicide comprised of ethoxylated alcohol. It is used as an alternative to the Golden Bear 1111 product. Application is made by hand.
- e. Finally, *Bacillus sphaericus* is a biological larvicide that the District uses. The mode of action is similar to that of Bti, but *Bs* may be used more than Bti in some sites because of its greater effectiveness in water with high organic content. Application can be by hand, ATV, or aircraft.

Mosquito Adulticides: In addition to chemical control of mosquito larvae, the District also makes aerosol applications of pesticides for adult mosquitoes within the District if specific criteria are met, including species composition, population density (as measured by landing count or other quantitative methods), proximity to human populations, and/or human disease risk. As with larvicides, adulticides are applied in strict compliance with label requirements.

SERVICE REQUESTS

The District responds to all service requests from persons residing or employed within its boundaries. Any property owner, business or resident may contact the District to request a vector control related service, and a District technician will

respond promptly to evaluate the property, the situation, and perform appropriate surveillance and/or control services. The District responds to service requests in a timely manner, regardless of location, within its boundaries.

SUMMARY OF EXPANDED SERVICES FUNDED BY PROPOSED ASSESSMENT

If this assessment is approved, the District will provide enhanced, expanded and improved Services and Improvements, to be funded by the Assessment, which is or will be above the current baseline level of service.

These enhanced Services and Improvements above the baseline services include a significant increase from the baseline services described above, as well as:

- Increased monitoring of mosquito and hematophagous arthropod populations using carbon dioxide-baited traps, ~~testing~~ New Jersey light traps, gravid traps, ovitraps, and other surveillance methods, by increasing the number and locations of these traps and methods on property throughout the District.
- Continue providing free mosquito-saturation for backyard ponds and other water features.
- Controlling mosquito-breeding sources with environmentally sound products wherever mosquito larvae or pupae are found, with special focus on invasive mosquito vectors such as *Aedes aegypti*.
- Testing for diseases that can be carried by *Aedes aegypti* mosquito.
- Responding rapidly to service requests concerning mosquitoes, insects, and other vectors.
- Conducting environmentally safe adult mosquito control when necessary to protect public health.
- Providing community education and outreach on how to prevent and protect residents from mosquito bites, mosquito diseases, and other vector-borne diseases.

ESTIMATE OF COSTS AND BUDGET

FIGURE 2 – COST ESTIMATE FY2021-22

Delta MVCD Mosquito, Vector and Disease Control Assessment Estimate of Cost - Fiscal Year 2021-22			
<i>Preliminary Budget</i>			
Mosquito & Vector Control Services and Related Expenditures			
Mosquito, Vector Control and Disease Prevention Operations			\$2,900,000
Materials, Utilities and Supplies			\$880,000
Capital Equipment and Fixed Assets			\$71,632
Total Mosquito Control Services and Related Expenditures			\$3,851,632
Incidental Costs ¹			
Allowance for Uncollectable Assessments			\$32,000
Levy Administration, County Collection Fee, and Other			\$113,819
Total Incidental Costs			\$145,819
Less Contributions from other Sources (i.e. current budget) ²			
Existing Revenue			_____
Total Contributions from other Sources			_____
Total Mosquito, Vector and Disease Control Services and Incidental Costs			\$4,023,546
(Net Amount to be Assessed)			
Budget Allocation to Property			
Zones of Benefit	Total SFE Units ³	Assessment per SFE ⁴	Total Assessment ⁵
Zone A	81821.767	\$12.50	\$1,022,772
Zone B	123.809	\$6.25	\$774
			\$1,023,546

Notes:

- Incidental Costs include allowance for uncollectable assessments from assessments on public agency parcels, and county collection charges.
- As determined in the following section, at least 5% of the cost of the Services must be funded from other sources, other than the Assessments, to cover any general benefits from the proposed Services. Therefore, out of the total cost of the Services of \$3,851,632, the District must contribute at least \$192,580 from other than the Assessments. The District will contribute \$2,973,605 from assessed revenue, which more than covers any general benefits from the Services. The District contribution also offsets the minimal amount of baseline services that are provided in the proposed Assessment Area. The total costs of the new services and benefits is the sum of the total assessment amount plus the general benefit contribution.

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. Funds raised by the assessment shall only be used 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.

Note: For the sake of brevity within this report, the budget above represents only a top-line summary of the District's forecasted budget for fiscal year 2021-22. The detailed and comprehensive District budget is available upon request, and provides actual costs for prior years, and both forecasted and actual costs for the current fiscal year.

METHOD OF ASSESSMENT

This section of the Report explains the benefit derived from the Services to be provided for property in the Assessment Area and the methodology used to apportion the total assessment to properties within the Delta Mosquito, Vector and Disease Testing and Control Assessment Area.

The proposed Mosquito, Vector and Disease Control Service Area consists of the assessed parcels in the Delta Mosquito and Vector District, as defined within the area of the boundary diagram included within the Engineer's Report and consistent with the Service Area. (See the Assessment Roll for all the parcels included in the proposed Improved Mosquito, Vector and Disease Testing and Control Assessment.)

The method used for apportioning the assessment is based upon the proportional special benefits to be derived by the properties in the Assessment Area and above general benefits conferred on real property assessment area or public at large. Special benefit is calculated for each parcel in the Assessment Area.

1. Identification of total benefit to 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 within the Assessment Area
4. Determination of the relative special benefit per property type and property characteristic
5. Calculation of the specific assessment for individual parcel based upon special vs. general benefit; location, property type and property characteristics

DISCUSSION OF BENEFIT

In summary, the assessments can only be based on the special benefit to property. This special benefit is received by property and above any general benefits from the Services. 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. The special benefit is to be determined in relation to the total actual cost of providing the service and/or improvements.

Proposition 218 as described in Article XIII D of the California Constitution has confirmed that assessments must be based on the 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, which apply to property in the Assessment Area, confer special benefits to property and ultimately improve safety, utility, functionality and usability of

property in the Assessment Area. These special benefits to property in the Assessment Area in much the same way that storm drainage, sewerage service, water service, sidewalks and paved streets enhance the utility and functionality of each parcel of property served by these improvements, providing with more utility of use and making them safer and more usable for occupants.

It should also be noted that Proposition 218 includes a requirement that existing assessments in effect upon its effective date 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 question requirements. However, certain assessments were excluded from voter approval requirements.

The Legislature also made a specific determination after Proposition 218 was enacted that vector control services constitute a subject for special assessment. Health and Safety Code section 2082, which was signed in 2002, provides that a district may levy special assessments consistent with the requirements of Article IX of the California Constitution to finance vector control projects and programs.

MOSQUITO AND VECTOR CONTROLS AS SPECIAL BENEFIT TO PROPERTIES

As described below, this Engineer's Report shows that mosquito and vector control is a special benefit that provides direct advantage to property in the Assessment Area. For example, if approved, the assessment would provide for surveillance throughout the Assessment Area to measure and track the resources of mosquitoes impacting property in the area and the people who live and work on the property; 2) mosquito and mosquito source control, treatment and control throughout the Assessment Area such that all property in the area benefits from a comparable reduction of mosquito levels; 3) monitoring throughout the Assessment Area to evaluate the effectiveness of no worries treatment and control and to ensure all properties are receiving the equivalent level of mosquito reduction benefits; and 4) services which result in District staff directly visiting, inspecting and treating property.

The proposed services to be provided by the District would be provided throughout the Assessment Area, that is, the benefit received in the Assessment Area would be in the entire District Service Area. All property would benefit from the proposed comprehensive mosquito, vector and disease monitoring and prevention services.

Moreover, the Services funded by the Assessment would reduce the level of mosquitoes and vectors arriving at and negatively impacting properties within the proposed Assessment Area.

The following section, Benefit Factors, shows how the Services would specially benefit properties in the Assessment Area. These are particular and distinct from their effect on property in general or the public at large.

BENEFIT FACTORS

In order to allocate the assessments, the EIR identified types of special benefit arising from the Services and that would be provided to property within the Assessment Area. These types of special benefit are as follows:

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

The assessment will provide new and enhanced services for the control and abatement of nuisance and disease-carrying mosquitoes, including the invasive yellow fever mosquito, *Aedes aegypti*, and other vectors. 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 are an advantage to property that will serve 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 properties 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 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 of the State were considered to be nearly uninhabitable during the times of year when the mosquito populations were high. The prevention or reduction of such diminished utility and usability of property caused by mosquitoes is a clear and direct advantage to property in the Assessment Area.

The State Legislature made the following finding on this issue:

³ Prior to the commencement of modern mosquito services, areas in the State of California such as the San Mateo Peninsula, Napa County and areas in Marin and Sonoma Counties had such high mosquito 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 mosquito populations were lower.

“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.”⁴

Mosquitoes and other vectors emerge from sources throughout 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, ditches, drainage systems, tree holes, dairy pits, irrigation ditches, and other reservoirs such as old tires and containers. The sources of mosquitoes also include locations throughout the urban areas in the Assessment Area. These sources include ground drainage systems, containers, unattended swimming pools, plant trays, birdbaths, leaks in water pipes, tree holes, flower cups in cemeteries, watered landscaping lawns and many other sources. By controlling mosquitoes at known sources, the Services will materially reduce mosquito populations throughout the Assessment Area.

A known increasing source of mosquitoes is unattended swimming pools.

INCREASED SAFETY OF PROPERTY ASSESSMENT AREA

The Assessment will result in new year-round proactive Services to control and abate mosquitoes and other vectors that should occupy properties throughout the Assessment Area. Mosquitoes and other vectors are transmitters of diseases, so the reduction of mosquito and other vector populations makes the Assessment Area safer for use and enjoyment. In absence of the proposed assessment, these Services would not be provided, or provided on a very limited basis, so the Services funded by the assessment make properties in the Assessment Area safer, which is a distinct special benefit to property in the Assessment Area.⁵ This is not a general benefit to property in the Assessment Area or the public because the Services are tangible mosquito, vector and disease control services that will be provided to the properties in the Assessment Area, and the Services are over and above the services that could be provided by the Delta Mosquito and Vector Control District without the assessment.

This finding was confirmed in 2003 by the State Legislature:

⁴ Assembly Concurrent Resolution 52, chaptered April 1, 2003.

⁵ By reducing the risk of disease and improving the safety of property, the proposed Services will materially increase the usefulness and desirability of the properties in the Assessment Area.

“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.”⁶

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

“The protection of Californians and their communities against the discomforts and economic effects of vector borne 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 PROPOSED DEVELOPMENT AREA

Mosquitoes have proven to be the major contributors to the spread of new diseases such as West Nile virus, among others. A highly populated area combined with migratory bird patterns can introduce new mosquito-borne diseases to previously unexposed areas. With the presence of *Aedes aegypti* in the District, the spread of Dengue, Chikungunya, Zika, or Yellow fever is a major concern.

“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.”⁷

“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.”⁸ (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).

⁶ Assembly Concurrent Resolution 52, chaptered April 1, 2003.

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

⁸ Center for Disease Control (2004). West Nile Activity --- United States, November 9--16, 2004. Morbidity and Mortality Report. 53(45); 1071-1072.

More recently, Florida and Texas experienced an outbreak of the mosquito-borne Zika virus (ZIKV) in 2016 that was attributed to increased passenger traffic from regions with ZIKV transmission:

*The high volume of traffic entering Florida from ZIKV-affected regions, especially the Caribbean, is likely to have provided a substantial supply of ZIKV-infected individuals. Because Florida is unlikely to sustain long-term ZIKV transmission, the potential for future ZIKV outbreaks in this region is dependent upon activity elsewhere. Therefore, we expect that outbreaks in Florida will cycle with ZIKV transmission dynamics in the Americas.*⁹

Some vector populations are highly mobile and may introduce new vector-borne diseases into previously unexposed areas:

*“Distribution of vector-borne diseases is determined by complex demographic, environmental and social factors. Global travel and trade, unplanned urbanization and environmental challenges such as climate change can impact on pathogen transmission, making transmission season longer or more intense or causing diseases to emerge in countries where they were previously unknown.”*¹⁰

Vectors, including ticks, have proven to be a major contributor to the spread of new diseases such as Lyme disease, among others.

“In 2017, state and local health departments reported a record number of cases of tickborne disease to CDC. Cases of Lyme disease, anaplasmosis/ehrlichiosis, spotted fever rickettsiosis (including Rocky Mountain spotted fever), babesiosis, tularemia, and Powassan virus disease all increased—from 48,610 cases in 2016 to 59,349 cases in 2017. These 2017 data capture only a fraction of the number of people with tickborne illnesses. Under-reporting of all tickborne diseases is common, so the number of people actually infected is much higher.

*This increase follows an accelerating trend of tickborne diseases reported in the United States. Between 2004 and 2016, the number of reported cases of tickborne disease doubled, and researchers discovered seven new tickborne pathogens that infect people.*¹¹

⁹Grubaugh, Nathan D. et al. (2017), Genomic epidemiology reveals multiple introductions of Zika virus into the United States. *Nature*. Vol 546(7658); 401-405.

¹⁰Vector-borne Diseases. World Health Organization. October 2017.
<https://www.who.int/news-room/facts-detail/vector-borne-diseases>

¹¹Record Number Of Tickborne Diseases Reported in 2017 | Cdc Online Newsroom | Cdc
<https://www.cdc.gov/media/releases/2018/s1114-record-number-tickborne-diseases.html>

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

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.¹²

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

PROTECTION OF ECONOMIC ACTIVITY AND PROPERTY IN ASSESSMENT AREA

As demonstrated by the SARS outbreak and outbreaks of Avian Flu, outbreaks of pathogens can materially and negatively impact activity in the affected area. Such outbreaks and other public health threats can have a drastic negative effect on tourism, business and residential activity in the affected area. The proposed assessments will help prevent the likelihood of outbreaks in the Assessment Area.

Mosquitoes hinder, annoy and harm residents, visitors, farm workers, and employees. A vector-borne disease outbreak and related public health threats would have a drastic negative effect on agriculture, tourism, 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 be over \$20 million over approximately one year:

¹² 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).

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. ¹³

The economic impact of diseases is ~~well documented~~. There are several published studies which have looked at the economic impact of West Nile Virus in the United States as well as California. From 1999 to 2012 the West Nile Virus has cost the United States an estimated \$800 million in hospitalizations and lost productivity, according to a study prepared for the Centers for Disease Control and Prevention. Economic losses due to the outbreak of West Nile Virus in Sacramento County, California was estimated to cost \$2.98 million in 2005:

In 2005, an outbreak of West Nile virus (WNV) disease occurred in Sacramento County, California; 163 human cases were reported. In response to WNV surveillance indicating increased WNV activity, the Sacramento-Yolo Mosquito and Vector Control District conducted an emergency aerial spray. We determined the economic impact of the outbreak, including the vector control event and the medical cost to treat WNV disease. WNV disease in Sacramento County cost ≈\$2.28 million for medical treatment and patients' productivity loss for both West Nile fever and West Nile neuroinvasive disease. Vector control cost ≈\$701,790, including spray procedures and overtime hours. The total economic impact of WNV was \$2.98 million. A cost-benefit analysis indicated that only 15 cases of West Nile neuroinvasive disease would need to be prevented to make the emergency spray cost-effective. ¹⁵

A study prepared for the Centers for Disease Control and Prevention notes that economic losses due to the transmission of West Nile Virus in the US was estimated to cost over \$778 million from 1999 to 2012:

¹³ Zohrabian A, Meltzer MI, Ratard R, Billah K, Molinari NA, Roy K, et al. West Nile Virus economic impact, Louisiana, 2002. *Emerging Infectious Diseases*, 2004 Oct. Available from <http://www.cdc.gov/ncidod/EID/vol10no10/03-0925.htm>.

¹⁴ Frellick, Marcia. West Nile Cost United States \$800 Million in 14 years. Medscape. 2014.

¹⁵ Barber LM, Schleier JJ III, Peterson RK. A cost-benefit analysis of West Nile Virus outbreak, Sacramento County, California, USA, 2005. *Emerg Infect Dis* 2010 16(3).

*There are no published data on the economic burden for specific West Nile virus (WNV) clinical syndromes (i.e., fever, meningitis, encephalitis, and acute flaccid paralysis [AFP]). We estimated initial hospital and lost-productivity costs from 80 patients hospitalized with WNV disease in Colorado during 2003; 38 of these patients were followed for 5 years to determine long-term medical and lost-productivity costs. Initial costs were highest for patients with AFP (median \$25,117; range \$5,385–\$283,381) and encephalitis (median \$20,105; range \$3,965–\$324,167). Long-term costs were highest for patients with AFP (median \$22,628; range \$624–\$439,945) and meningitis (median \$10,556; range \$0–\$260,748). Extrapolating from this small cohort to national surveillance data, we estimated the total cumulative costs of reported WNV hospitalized cases from 1999 to 2012 to be \$778 million (95% confidence interval \$673 million–\$1.01 billion). These estimates can be used in assessing the cost-effectiveness of interventions to prevent WNV disease.*¹⁶

Moreover, a study conducted in 1996-97 on La Crosse Encephalitis (LACE), a human illness caused by a mosquito-transmitted virus, found a lifetime cost per human case at \$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 reflects 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.*¹⁷

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

PROTECTION OF THE ASSESSMENT AREAS TOURISM AND BUSINESS INDUSTRIES

The tourism and business industries in the Assessment Area will benefit from reduced levels of harmful or nuisance mosquitoes and other. Conversely, any outbreaks of endemic

¹⁶ Initial and Long-Term Costs of Patients Hospitalized with West Nile Virus Disease. Arboviral Diseases Branch, Centers for Disease Control and Prevention, Fort Collins, Colorado; Prion and Health Office, Centers for Disease Control and Prevention, Atlanta, Georgia; Division of Preparedness and Emerging Infections, Centers for Disease Control and Prevention, Atlanta, Georgia. J. Erin Staples, Manjunath Shankar, James J. Sejvar, Martin I. Meltzer, and Mark E. J. Erwin. Arboviral Diseases Branch, Centers for Disease Control and Prevention, 3150 Road, Fort Collins, CO 80521. E-mail: AUV1@cdc.gov.

¹⁷ Utz, J. Todd, Apperson, Charles S., Malcolm Newton, Salyers, Martha, Dietz, E. Jacquelin, Mcpherson, J. Economic And Social Impacts Of La Crosse Encephalitis In Western North Carolina, Am J Trop Med Hyg 2003 69: 509-518.

vector-borne pathogens such as West Nile, Dengue, Chikungunya, and Zika viruses could also materially negatively affect businesses. 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."¹⁸

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 mosquitoes¹⁹

The proposed assessments will serve the businesses and industries in the Assessment Area. This is a direct advantage and special benefit to property in the Assessment Area.

REDUCED RISK OF NUISANCE AND LIABILITY ON PROPERTY IN ASSESSMENT AREA

In addition to health related factors, uncontrolled mosquito and vector populations create a nuisance for residents, employees, customers, tourists, farm workers and guests in the Assessment Area. Properties in the Assessment Area benefit from the reduced nuisance factor that will be created by the Sewer Agricultural and range properties also benefit from the reduced nuisance and harm to livestock and employees from lower mosquito and vector populations.

Agricultural, range, golf course, cemetery space and other such lands in the Assessment Area contain large areas of standing water 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 of standing water that sources of mosquitoes could be a source 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 do not remove standing water sources of mosquitoes on their property.

¹⁸ 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, April 2003, Available from

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

¹⁹ Jennings, Allen. (2001). USDA Letter to EPA on Fenthion IRED. United States Department of Agriculture, Office of Pest Management Policy. March 8, 2001.

²⁰ Sources of mosquitoes on residential, agricultural, range and other types of properties include removable sources such as containers that hold standing water.

The proposed Services to be provided by the District will reduce the mosquito and vector related nuisance and health liability to properties in the Assessment Area. The reduction of that risk of liability constitutes a special benefit to property in the Assessment Area and this special benefit would not be received, received minimally, in absence of the proposed Services funded by the proposed assessments.

IMPROVED MARKETABILITY OF PROPERTY

As described previously, the proposed Services will specially benefit properties in the Assessment Area by making them more usable and functional. The Services also make properties in the Assessment Area desirable, and more desirable properties also benefit from improved marketability. This is another tangible special benefit to certain property in the Assessment Area which will be enjoyed in absence of the proposed Services!

BENEFIT FINDING

In summary, the special benefits described in this Report and provision of Services to the Assessment Area ("enhanced level of service") 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 assessment of \$12.50 per benefit unit or Single Family Equivalent (SFE) for Zone A, and \$6.25 per SFE for Zone B. (Figure 3 – Cost Estimate). These rates per SFE generate revenues of \$1,023,569 which is the amount needed to fund the District's budget of \$3,719,403 less the District contribution of \$2,973,905. Further, the Engineer has determined that the special benefit to each parcel reasonably exceeds the sum of the taxes and assessments imposed on each parcel.

GENERAL V.S. SPECIAL BENEFIT

Article XIII C of the California Constitution requires any local agency proposing to increase or impose a benefit assessment to "separate the general benefit 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 assessment are not paying for general benefits. The assessment can fund the special benefits to property in the assessment area but cannot fund any general benefits. Accordingly, the separate estimate of the special and general benefit is given in this section.

In other words:

²¹ If one were to compare two hypothetical properties with similar characteristics, the property with lower mosquito infestation and risk of vector-borne disease will clearly be more desirable, marketable and usable.

$$\text{Total Benefit} = \text{General Benefit} + \text{Special Benefit}$$

There is no widely accepted or statutory definition for general benefit from vector control services. General benefits are those improvements or services that are not special in nature, are not “particular and distinct” are not “over and above” benefits received by other properties. General benefits conferred to properties located “in the district,” but outside the narrowly-drawn Assessment Area “to the public at large.” General benefits provide “an indirect, derivative advantage” are not necessarily proximate to the improvements and services funded by the assessments.

A formula to estimate the general benefit is listed below:

$$\text{General Benefit} = \text{Benefit to Real Property Outside the Assessment Area} + \text{Benefit to Real Property Inside the Assessment Area that is Indirect and Derivative} + \text{Benefit to the Public at Large}$$

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

Proposition 218 twice uses the phrase “over and above” general benefits in describing special benefit. (Art. XIID, sections 2(i).) Significantly, without this proposed assessment, only the existing, minimal, shifting and inconsistent baseline services would be provided. The majority of the Services to be funded by the proposed assessment therefore would be a special benefit because the Services would particularly and distinctly benefit and protect the Assessment Area above the minimal baseline benefits and service. However, some of the Services benefit the public at large and properties outside the Assessment Area. In this report, the general benefit is conservatively estimated and described, and then budgeted so that it is funded by sources other than the assessment.

The Assessments described in this Engineer’s Report fund mosquito, vector and disease control services directly provided to property in the Assessment Area. Moreover, as noted in this Report, the Services directly reduce mosquito and vector populations on all property in the Assessment Area. Therefore, in this report, the general benefit is conservatively estimated and described, and budgeted so that it is funded by sources other than the assessment.

CALCULATING GENERAL BENEFIT

Without the proposed new assessment the District would be unable to continue to provide same level of Services. The District has stated that all parcels in the Assessment Area would receive a shared direct advantage and benefit from the Services. The Services would directly and particularly serve and benefit each parcel, and would not be a mere indirect, derivative advantage. As explained, Proposition 218 relies on the concept of "over and above" in distinguishing special benefits from general benefits. As applied to an assessment proceeding the baseline general benefit is minimal and that the majority of the vector control services, which provide advantage to property in the Assessment Area, are over and above the baseline and therefore are special.

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

BENEFIT TO PROPERTY OUTSIDE THE DISTRICT SERVICE AREA

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

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

The mosquito potential outside the Assessment Area is based on studies of mosquito dispersion concentrations. Based upon a 2003 study in Santa Cruz County average concentration of mosquitoes in the Assessment Area, properties within two miles of the

Assessment Area is calculated to be 6%. The relative vector population reduction factor within the destination range is combined with the number of parcels outside the Assessment Area and within the destination range to measure this general benefit. This is calculated as follows:

Z/d ZW

THERE ARE 18,695 PARCELS WITHIN TWO MILES OF OUTSIDE OF THE ASSESSMENT AREA THAT MAY RECEIVE SOME MOSQUITO AND DISEASE PROTECTION BENEFIT

6% PORTION OF RELATIVE BENEFIT THAT IS RECEIVED FROM STUDY

THERE ARE 80,943 PARCELS IN THE ASSESSMENT AREA

$> h > d / W^{\wedge}$

TOTAL BENEFIT = 18,695 PARCELS 6% = 1,122 PARCEL EQUIVALENTS

PERCENTAGE OF OVERALL PARCEL EQUIVALENTS = 1,122 / 80,943 = 1.39%

Therefore, for the overall benefit provided by Services and Improvements to the Assessment District, it is determined that 39% of the benefits would be recognized by the parcels within two miles of Assessment District boundary. Recognizing that this calculation is an approximation, the benefit will be rounded up to 1.5%.

BENEFIT TO PROPERTY INSIDE THE ASSESSMENT AREA THAT IS INDIRECT AND DERIVATIVE

The “indirect and derivative” benefit to property within the Assessment Area is particularly difficult to calculate. As explained above, the benefit within the Assessment Area is special because the mosquito, vector and disease control services in the Assessment Area would provide direct service and protection that is “over and above” and “particular and distinct” when compared with the minimal services under current conditions. Further, the properties are within the Assessment Area boundaries and this Engineer’s Report demonstrates the direct benefits received by all properties from mosquito, vector and disease testing and control services.

The Engineer has drawn the Assessment Area to include parcels that will directly receive the Services. (There are a small number of parcels within the District Boundary that do not receive special benefit such as certain wrap parcels, etc.) All parcels within the District boundaries will directly benefit from the surveillance, monitoring and treatment that will be provided on an equivalent basis throughout the Assessment Area in order to maintain the same improved level of protection against mosquitoes and reduced mosquito 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

²² Tietze, Noor S., Stephenson, Mike F., Sinden 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.

special benefit - reduced mosquito and vector and reduced presence of vector-borne diseases - would be received on an equivalent basis by all parcels in the Assessment Area.

Furthermore, all parcels in the Assessment Area directly benefit from the ability to request service from the District and to District field technicians promptly respond directly to the parcel and address the owner's service need. The fact that a benefit is conferred throughout the Assessment Area does not make the benefit general rather than special, so long as the Assessment Area is narrowly drawn and limited to the parcels directly receiving 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 lands previously not receiving that particular service or receiving only minimal services.

Hence, other than the small benefit to properties outside the Assessment Area (discussed above) and to the public at large (discussed below), all of the benefits of the Services to the parcels within the Assessment Area are special benefits. It is not possible or appropriate to separate any individual general benefits from the total benefits conferred on parcels in the Assessment Area.

BENEFIT TO THE PUBLIC AT LARGE

With the type and scope of Services to be provided in the Assessment Area, it is very difficult to calculate and quantify the scope of the benefit conferred to the public at large. Because the Services directly serve and benefit the property in the 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, and sidewalks, and when traveling in and through the Assessment Area they will benefit from the Services. A fair and appropriate measure of the general benefit to the public at large is the amount of highway, street and sidewalk area within the Assessment Area relative to the overall land area. An analysis of maps of the Assessment Area shows that approximately 5% of the land area in the Assessment Area is covered by highways and sidewalks. This 5% therefore is a fair and appropriate measure of the benefit to the public at large within the Assessment Area.

SUMMARY OF GENERAL BENEFITS

Using a sum of the measures of general benefit to the public at large and land outside the Assessment Area, we find that approximately 5.00% of the benefits conferred by the Improved Mosquito, Vector and Disease Testing and Control Assessment may be general in nature and should be funded by other than the assessment.

General Benefit Calculation	
	1.50% (Outside the Assessment Area)
+	0.00% (Inside the Assessment Area – Indirect and Derivative)
+	<u>3.50%</u> (Public at Large)
=	5.00% (Total General Benefit)

The estimated cost of the Services is \$51,532. Of this total budget amount, the District must contribute at least \$192,582 (5% of the total) from sources other than the Mosquito, Vector and Disease Control Assessment. The District will contribute \$2,973,905 from sources other than the Improved Mosquito and Disease Testing and Control Assessment, which totals over 77% of the total budget. This contribution amount offsets any gains/benefits from the Improved Mosquito, Vector and Disease Testing and Control Assessment Services.

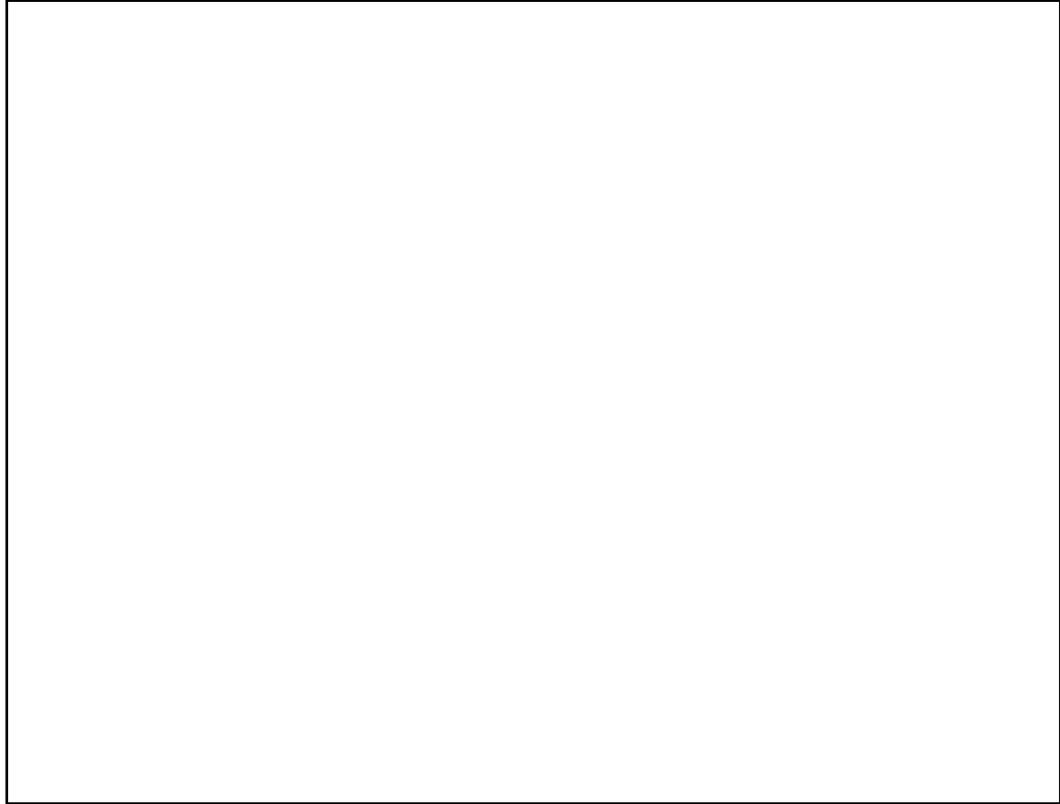
ZONES OF BENEFIT

The District's mosquito, vector, and disease control programs, projects, services and improvements that will be funded by the Improved Mosquito and Disease Testing and Control Assessment will be provided primarily within the District boundaries.

Since the Services and Improvements will be provided throughout the District and will result in reduced vector populations and other special benefits (benefits) in the District, the boundaries of the Assessment Area have been drawn to match the boundaries of the District. Moreover, within the Assessment Area, certain areas will receive different levels of special benefits. These areas, which are named "Zones of Benefit," are described as follows.

The majority of the properties in the Assessment Area will receive equal levels of Services and Improvements and therefore equal levels of benefits. Those areas that will receive the full level of Services and Improvements were carefully drawn to be within Zone A. Relative to Zone A, there are some areas in the eastern part of the District that are remotely located and sparsely populated, and have been identified to receive reduced level of Services and Improvements and corresponding benefits to other parcels in the District. These areas are hereinafter referred to as Zone B or Zone B and are depicted on the Assessment Diagram included with this Report. Other parcels within the District boundaries are within Zone of Benefit A or Zone A.

The Zones of Benefit are shown in the following graphic:



The boundaries of the two Zones of Benefit have been carefully drawn. Zone of Benefit A includes the properties in the District that would receive the full level of Services and Improvements and the full level of benefits. Such areas are in areas with a material population of people, pets, livestock on the property.

Zone of Benefit B contains the properties in certain portions of the District that receive a reduced level of Services and Improvements and corresponding benefits relative to other parcels in the District because these properties are generally in more remote, mountainous or inaccessible areas, and they support less population. In other words, the boundaries of the two Zones of Benefit within the Assessment Area have been drawn and specifically drawn to include properties that will be specially treated from the mosquito and vector control services at two different levels.

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

In summary, parcels in each zone would be the following assessment rates:

- Zone A – 100% of the assessment rate (\$12.50)
- Zone B – 50% of the assessment rate (\$6.25)

Zone B will be subject to reduced assessments, commensurate with the different benefit level.

METHOD OF ASSESSMENT

As previously discussed, the assessment is a comprehensive, year-round mosquito and vector control and disease surveillance and control service that will clearly confer special benefits to properties in the Assessment Area. These benefits can partially be measured by the property owners, guests, employees, tenants and animals who will enjoy a more habitable, safer and more desirable place to work or visit. As noted, these benefits ultimately flow to the underlying property.

Therefore, the apportionment of benefit is partially based on people who potentially live on, work at, or otherwise use the property. The methodology of determining benefit to property through the extent of use by people is a commonly used method of apportionment of benefits from assessments.

Moreover, assessments have a long history in California and are a large part based on the principle that any benefits from a service provided and funded by assessments that is enjoyed by tenants and other non-property owners ultimately is conferred to the underlying property.

With regard to benefits and source locations, the Assessment Engineer determined that since mosquitoes readily fly from their breeding locations to all properties within 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 mosquito and vectors, rather than just those that are sources of mosquitoes.

Although some primary mosquito sources are located outside of residential areas, residential properties can and do generate, with their often significant, populations of mosquitoes and vector organisms. For example, water catch basins in residential areas in the Assessment Area are a common source of mosquitoes. Moreover, there are many other common residential sources for mosquitoes such as plants, bird baths, pet dishes and other miscellaneous backyard areas, neglected swimming pools, leaking water pipes and tree holes. Clearly, the potential for mosquito sources on virtually all property. More importantly, properties in the Assessment Area are within the destination range of mosquitoes and most properties are within the destination range of multiple mosquito source locations.

Because the Services will be provided throughout the Assessment Area with the same level of control objective, mosquitoes can rapidly fly from their breeding locations to

other properties over a large area, and the current or potential breeding sources throughout the Assessment Area, the Assessment Engineer determined that all similar properties in the Assessment Area have a generally equivalent mosquito "destination" potential and, therefore, receive equivalent levels of benefit (except as noted above for Zone B).

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

A fixed or flat assessment was deemed inappropriate because larger residential, commercial and industrial properties receive a degree of benefit other similarly used properties that are significantly smaller. (For 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 0.20 acre site. The larger property generally has a larger coverage area and is visited 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.) Large 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 usage potential and destination potential for mosquitoes. This method is further described below.

ASSESSMENT APPORTIONMENT

The special benefits derived from Improved Mosquito, Vector and Disease Testing and Control Assessment are conferred on property not based on a specific property owner's occupancy of property, the property owner's demographic status, such as age or number of dependents. However, 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 Assessment Area without excessive nuisance, diminished "livability" or the potential health hazards brought by mosquitoes and the diseases they carry is a special benefit to properties in the Assessment Area. This benefit can be in part measured by the number of people who 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 not purchasing property in the²³ area.

²³ Benefits conferred upon property are related to the average number of people who could potentially live on, work at or otherwise use a property, not how the property is currently used by the present owner.

In order to apportion the cost of the Services to property, each property in the 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 Equivalent (SFE). This SFE methodology is commonly used to distribute assessments in proportionate special benefit. For the purposes of this Engineer's Report, all properties designated an SFE value, which is each property's relative benefit in relation to a "benchmark" parcel in the Assessment Area. The "benchmark" property is the single-family dwelling on a parcel of less than one acre. This benchmark parcel is assigned a Single Family Equivalent benefit unit or one SFE.

The special benefit conferred upon a specific parcel is derived as a sum function of the applicable special benefit type, such as increased safety on a parcel (i.e., disease risk reduction) and a parcel-specific attribute (such as the number of residents living on the parcel) which supports that special benefit. Calculated special benefit increases accordingly with an increase in the product of special benefit type and supportive parcel-specific attribute.

The calculation of the special benefit for parcels in the Assessment Area from the Services is summarized in the following equation:

$$\text{Special Benefit (per parcel)} = \sum f (\text{Special Benefits, Property Specific Attributes (per parcel)})$$

¹. Such as use, property type, and size.

RESIDENTIAL PROPERTIES

Certain residential properties in the Assessment Area that contain a single residential dwelling unit and are on a lot less than or equal to one acre are assigned one Single Family Equivalent or 1.0 SFE. Traditional houses, zero-lot line houses, town homes, and secured mobile homes on a separate parcel (mobile home park) are included in this category of single-family residential property.

Single family residential properties in excess of one acre receive additional benefit relative to a single-family home on up to one acre. 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 and an additional rate equal to the agricultural rate described below 0.021 SFE per quarter 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 as agricultural properties, are assigned the residential SFE rates for the dwelling on the property and are assigned additional SFE benefit units for the agricultural 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 in proportion to the number of dwelling units they occupy each year, 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 the Assessment Area. This Report adjusts the District's population density factors from the USCs updated through 2019 (which is the most recent data available at the present time) as well as the average dwelling unit size for each property type. After determining the Population Density and Square Footage Factor for each property type, an SFE rate is generated for residential property structure, as indicated in Figure 4 below.

An SFE factor of 0.82 is applied to condominium parcels. The per dwelling unit for multi-family residential properties applies to such properties with two to four units (duplex, triplex, fourplex). Properties in excess of five (5) units typically offer on-site management, monitoring and other control services that offset some of the benefits provided by the District's Improved Mosquito, Vector and Disease and Control Assessment. Therefore, the benefit for properties in excess of five (5) units is determined to be 0.38 SFE per unit for the first 20 units and 0.10 SFE per each additional unit in excess of 20 dwelling units.

FIGURE 3 – RESIDENTIAL ASSESSMENT FACTORS

Type of Residential Property	Pop. Density Equivalent	SqFt Factor	SFE Factor
Single Family Residential	1.00	1.00	1.00
Condominium	1.07	0.76	0.82
Duplex, Triplex, Fourplex	0.84	0.52	0.44
Multi-Family Residential (5+ Units)	0.77	0.49	0.38
Mobile Home on Separate Lot	0.86	0.75	0.65

Source: 2019 Census, Tulare County, and dwelling size information from the Tulare County Assessor's Office.

COMMERCIAL AND 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 benefit. Employee density also provides a measure of the relative benefit to property. Since commercial and industrial properties are typically open and occupied by employees approximately one-half the times of residential properties, it is reasonable to assume that commercial and industrial properties receive one-half the special benefit on a land area basis relative to single family residential property.

The average size of a single-family home in the Assessment Area is 1.0 acre. Therefore, a commercial property of 0.5 acres receives one-half the relative benefit, or a 0.50 SFE factor.

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

To determine employee density factors, this utilizes the findings from the San Diego County Association of Governments Generators Study (the "SANDAG Study") because these findings were approved by 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 the following Figure, the SFEs 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 generally involve uses that are more land intensive relative to buildings 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 for the first 5 acres and the relevant SFE rate per each additional acre for Institutional properties that are used for residential, commercial or industrial purposes also assessed at the appropriate residential, commercial or industrial rates with commercial/office and residential mixed uses (i.e., commercial uses on the floor and apartments on the upper floors) may be assessed for both uses for the parcel.

Self-storage and golf course properties are similarly based on average usage densities. The following Figure lists the benefit assessment factors for such business properties.

AGRICULTURAL, WINEYARD, DRY RANGELAND, CEMETERY AND GOLF COURSE PROPERTIES

Utilizing research and agricultural employment data from UC and the California Employment Development Department and other sources, Report calculated an average usage density of 0.05 people per acre for agriculture property, 0.01 for rangelands and timber, 1.2 for cemeteries, and 3.0 for golf courses. Since these properties typically are a source of mosquitoes and vectors and typically closest to other sources of mosquitoes and other vectors, it is not possible to determine that the benefit to these properties is twice the usage density relative to commercial and industrial properties. The SFE factors per 0.25 acres of land area, after adjusting for the usage density, are shown in the following Figure 5.

FIGURE 4 – COMMERCIAL/INDUSTRIAL BENEFIT ASSESSMENT FACTORS

Type of Commercial/Industrial Land Use	Average Employees 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	
Winerie ³	12	0.250	
Golf Course	3	0.033	
Cemeteries	1.20	0.050	
Agriculture / Vineyards	0.05	0.00210	
Timberland / Dry Rangeland	0.01	0.00042	

1. Source: San Diego Association of Government 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 quarter acre of land area or portion thereof. Additional acres over five for commercial, office, shopping center and industrial parcels are calculated as one or portion thereof. (Therefore, the minimum assessment for any parcel in these categories is the SFE Units listed herein.)

VACANT PROPERTIES

The benefit to vacant properties is intended to be proportional to the corresponding benefits for similar type developed properties. Vacant properties are assessed at a lower rate due to the lack of active benefits measured by use by residents, employees, customers, and guests. A measure of this benefit 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 found that 34% of the assessed value of improved property is classified as land value. 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 0.34 to account for the current low use density and potential for harm or nuisance to the property owner and residents, employees, customers and guests. The combination of these measures results in a 0.20 factor. It is reasonable to assume, therefore, that approximately 20% of the benefits are related to the underlying land and 80% are related to the day-to-day use of the property. Using this ratio, the SFE factor for vacant parcels is 0.20 per parcel.

It must be noted that in future years, the SFE factors for properties in the proposed Service Area will be reviewed and updated to reflect land use changes – i.e., vacant land that has been developed, residential land that has been converted to commercial – for assessment calculation purposes.

OTHER PROPERTIES

Article XIID stipulates that public properties must be assessed unless those properties are reasonably determined to receive special benefits for the assessment.

All properties that are specially benefited are assessed. Public property that is used for purposes similar to private residential, commercial, industrial, agricultural or institutional uses is benefited and assessed at the same rate as such privately owned property.

Miscellaneous, small and other parcels such as roads, right-of-way parcels, and common areas typically do not generate significant benefits to 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.

DURATION OF ASSESSMENT

The assessment ballot proceeding authorizes the Assessment to be levied for fiscal year 2021-22 and every year thereafter, so long as mosquitoes and other vectors remain in existence and the Delta Mosquito Vector Control District requires funding from the Assessment for its Services in the Assessment Area. As noted previously, if the Assessment and the duration of the Assessment are approved by property owners in an assessment ballot proceeding, the Assessment can be levied annually after the Delta Mosquito Vector Control District 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, Board of Trustees holds an annual public hearing to continue the Assessment.

APPEALS AND INTERPRETATION

Any property owner who feels the Assessment levied on subject property is in error as a result of incorrect information used to apply the foregoing method of assessment, may file a written appeal with the Manager of the Delta Mosquito and Vector Control District or his or her designee. Any such appeal is to be filed for correction of an assessment during the then current fiscal year before July 1, the upcoming year. Upon the filing of any such appeal, the District Manager 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, appropriate changes shall be made to the Assessment Roll. If any such changes are made after the Assessment Roll has been filed with Tulare County for collection, the District Manager or his or her designee is authorized to refund to the property owner the amount of any over assessed reduction. Any dispute over the decision of the District Manager or her designee, shall be referred to the District Board of Trustees. The decision of the District Board of Trustees shall be final.

ASSESSMENT

The Delta Mosquito and Vector Control District Board of Trustees contracted with the undersigned Engineer of Works to prepare and file a report presenting an estimate of costs of Services, a diagram for the benefit of the Assessment Area, an assessment of the estimated costs of Services, and the benefits and general benefits conferred thereby upon all assessable parcels within the Assessment Area,

The undersigned, by virtue of power vested in me under Article XIIIID of the California Constitution, the Government Code, the Health and Safety Code, and the order of Delta Mosquito, Vector, and Disease Control Board of Trustees, I hereby make the following determination of an assessment for the proportion of the estimated cost of the Services, and the costs and expenses incidental thereto to be paid by the Mosquito, Vector and Disease Control Assessment.

The District's Mosquito, Vector, and Disease Program has selected and estimated the costs of extending and improving the Services to the Assessment Area. The estimated costs are summarized in Figure 3 and detailed in Figure 6 below.

The amount to be paid for the Services and expenses incidental thereto, to be paid by the Delta Mosquito, Vector, and Disease Control Program for fiscal year 2021-22 is generally as follows:

FIGURE 5 – SUMMARY COST ESTIMATE FY 2021-22 BUDGET

Total Mosquito Control Services and Related Expenditures	\$3,851,632
Total Incidental Costs	\$145,819
Total Contributions from other Sources	
Total Mosquito, Vector and Disease Control Services and Incidentals	\$1,023,546
<hr/>	
Budget Allocation to Property	\$1,023,546

An Assessment Diagram is hereto attached as a part hereof showing the exterior boundaries of the Assessment Area. The district of each parcel of land in the Assessment Area is its Assessor's Parcel Number appearing on the Assessment Roll.

I do hereby determine and apportion the net of the cost and expenses of the Services, including the costs and expenses incidental thereto, upon the parcels and lots of land within the Improved Mosquito, Vector, and Disease Testing and 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 this Engineer's Report.

The assessment determination is made upon the parcels or lots of land within the Assessment Area in 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 to the Western Region's Pacific Division Consumer Price Index for All Urban Consumers (CPI-U), as of December of each succeeding year ("CPI"), with a maximum adjustment not to exceed 3%. Any change in the CPI in excess of 3% shall be cumulative as the "Unused CPI" and shall be used to increase the maximum authorized assessment rate in years in which the CPI is less than 3%. The maximum authorized assessment rate shall be equal to the maximum assessment rate in the first fiscal year the assessment is levied adjusted annually by the minimum of 1) 3% or 2) the change in the CPI plus any Unused CPI as described above.

If property owners in the Assessment Area, at an assessment ballot proceeding, approve the initial fiscal year assessment for special benefits to their property including the CPI adjustment schedule, the assessment may be levied annually and may be adjusted by up to the maximum annual CPI adjustment without any additional assessment ballot proceeding. In the event that in future years assessments are levied at a rate less than the maximum authorized assessment rate, the assessment rate in a subsequent year may be increased up to the maximum authorized assessment rate without any additional assessment ballot proceeding.

Each parcel or lot of land is described in the Assessment Roll by reference to its parcel number as shown on the Assessor's Map of Tulare County for the fiscal year 2021-22. 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 Tulare County.

I hereby place opposite the Assessor Parcel Number for each parcel or lot within the Assessment Roll, the proposed amount of the assessment for fiscal year 2021-22 for each parcel or lot of land within the Mosquito and Disease Control Assessment Area.

Dated: July 28, 2021

Engineer of Work

By: _____
John W. Bliss, License No. C052091

²⁴ Each parcel has a uniquely calculated assessment based on the estimated level of special benefit to the property as determined in accordance with this Engineer's Report.

ASSESSMENT ROLL

Reference is hereby made to the Assessment Roll for the assessment proceedings on file in the office of Delta Mosquito and Control District, as the Assessment Roll is too voluminous to be bound with this Report.

ASSESSMENT DIAGRAM

The boundaries of the proposed Mosquito and Disease Control Assessment are displayed on the following Assessment Diagram.