Coachella Valley Mosquito and Vector Control District

43420 Trader Place, Indio, CA 92201 | (760) 342-8287 | cvmosquito.org

Board of Trustees Meeting

Tuesday, February 11, 2025

6:00 p.m.

AGENDA

The Board of Trustees will take action on all items on the agenda.

Materials related to an agenda item that are submitted to the Board of Trustees after distribution of the agenda packets are available for public inspection in the Clerk of the Board's office during normal business hours and on the District's website.

This meeting will be conducted by video and/or teleconference as well as in person at the District office located at the address listed above. To view/listen/participate in the meeting live, please join by calling 1-888-475-4499 (toll-free), Webinar ID: 847 1941 0493, or click this link to join: https://us02web.zoom.us/j/84719410493.

TELECONFERENCE NOTICE

Pursuant to Government Code section 54953(b), Vice President Benjamin Guitron will participate from the Hotel Concierge Plaza La Villa, C. Martha Dueñas 39, Centro, 28970 Cdad. De Villa de Alvarez, Col., Mexico. This Notice and Agenda will be posted at the teleconference location. Accessibility to and public comment from this address will be provided as required by Government Code section 54953(b)(3).

Assistance for those with disabilities: If you have a disability and need an accommodation to participate in the meeting, please contact the Clerk of the Board at (760) 342-8287 at least 48 hours prior to the meeting to inform us of your needs and to determine if accommodation is feasible. The District will attempt to accommodate you in every reasonable manner.

1. **Call to Order —** John Peña, President
   A. **Roll Call**

2. **Pledge of Allegiance**

3. **Confirmation of Agenda**

4. **Public Comments**
   Members of the public may provide comments in person or remotely at the time of the meeting as set forth in the agenda. Public comments may also be sent by E-mail to the Clerk of the Board by 2:00 p.m. on February 11, 2025, at mscarborougheckel@cvmosquito.org. E-mails received prior to 2:00 p.m. on the day of the Board meeting will be made part of the record and distributed to the Board. This method is encouraged as it gives the Board of Trustees the opportunity to reflect upon your input. E-mails will not be read at the meeting.

   A. **PUBLIC Comments — NON-AGENDA ITEMS:** This time is for members of the public to address the Board of Trustees on items of general interest (a non-agenda item) within the subject matter jurisdiction of the District. The District values your comments; however, pursuant to the Brown Act, the Board cannot take action on items not listed on the posted Agenda. **Comments are limited to a total of three (3) minutes per speaker for non-agenda items.**

   B. **PUBLIC Comments — AGENDA ITEMS:** This time is for members of the public to address the Board of Trustees on agenda items (Open and Closed Sessions). **Comments are limited to three (3) minutes per speaker per agenda item.**

   All comments are to be directed to the Board of Trustees and shall be devoid of any personal attacks. Members of the public are expected to maintain a professional, courteous decorum during public comments.

5. **Hold Public Hearing Continued from the January 14, 2025, Board of Trustees Meeting Regarding the Energy Service Contract**

   A. Open Public Hearing **— John Peña, Board President**

   B. Public Comments-Energy Service Contract (completed and closed)

   C. Approval of Resolution 2025-01 Adopting Certain Findings Pursuant To Government Code section 4217.10 et seq. and Approving an Energy Service Contract For Energy-Related Improvements. **— ad hoc Building Committee, Jeremy Wittie, MS, CSDM, General Manager, and David I'Anson, Administrative Finance Manager**

D. Close Public Hearing **— John Peña, Board President**

6. Announcements, Presentations, and Written Communications

A. None

7. Items of General Consent

The following items are routine in nature and may be approved by one blanket motion upon unanimous consent. The President or any member of the Board of Trustees may request an item be pulled from Items of General Consent for a separate discussion.

A. Minutes for January 14, 2025, Board Meeting

B. Approval of expenditures for January 11, 2025, to February 10, 2025

C. Annual Statement of Economic Interests/Form 700 Annual Filing for the filing period of 2024/2025 **— Megan Scarborough-Eckel, Executive Assistant/Clerk of the Board**

D. Informational Items:

- Financials **— David l'Anson, Administrative Finance Manager**
- Important Budget Meeting Dates
- Government Finance Officers Association Budget Academy, January 6 to 9, 2025, Garden Grove, CA **— David l'Anson, Administrative Finance Manager**
- Semi-annual research reports from the University of California, Davis, University of California, Riverside, Mount Sinai School of Medicine, and the USDA for 2024 **— Jennifer A. Henke, MS, BCE, Laboratory Manager**
- Mosquito and Vector Control Association of California (MVCAC) Annual Conference, January 27-29, 2025, Oakland, CA
- Approval for Biologist to attend the Pacific Branch of the Entomological Society of America Annual Conference, March 30-April 2, 2025, in an amount not to exceed $2000.00 from fund #7600.01.400.027, Professional Development **— Jennifer A. Henke, M.S., BCE, Laboratory Manager**
- Approval to purchase two Guardian 190-G4 VF Ultra Low-Volume (ULV) Sprayer, in an amount not to exceed $50,000 from Capital Replacement Budget Fund #8415.14.300.000 – **Edward Prendez, Information Technology Manager**

8. Business Session

A. Old Business- **None**

B. New Business

i. Discussion and/or approval of Resolution 2025-03 to participate in the Southern Region Mutual Aid Agreement. **— Jeremy Wittie, MS, CSDM, General Manager**

ii. Discussion and/or approval of Resolution 2025-04 regarding the updating of bank account signatories. **— David I'Anson, Administrative Finance Manager**

****Continue New Business until after closed session if necessary****

9. Committee and Trustee Reports

A. Executive Committee **— John Peña, Board President**

Executive Committee oral report and Executive Committee minutes from January 31, 2025

B. Finance Committee **— Frank Figueroa, Board Treasurer**

Finance Committee oral report.

C. Trustee Comments, Requests for Future Agendas Items, Travel, and/ or Staff Actions

The Board may not legally take action on any item presented at this time other than to direct staff to investigate a complaint or place an item on a future agenda unless (1) by a majority vote, the Board determines that an emergency exists, as defined by Government Code Section 54956.5, or (2) by a two-thirds vote, the board determines that the need for action arose subsequent to the agenda being posted as required by Government Code Section 54954.2(a). Each presentation is limited to no more than three minutes.

10. Reports

A. General Manager and Staff

i. General Manager's Report **— Jeremy Wittie, MS, CSDM, General Manager**

Questions and/or comments from Trustees regarding the report

B. General Counsel

11. Closed Session

Closed Session (s):

A. **Public Employee Performance Evaluation pursuant to Government Code Section 54957 (b)(1)**

Title: General Manager

B. **Conference with Labor Negotiators pursuant to Government Code Section 54957.6**

Agency designated representatives: President John Peña, Vice President Benjamin Guitron, and Trustee Felipe Ortiz
Unrepresented employee: General Manager

C. **Liability Claim pursuant to Government Code §54961**
Claimant: Mecca Land Development

D. **Conference with Real Property Negotiators pursuant to Government Code section 54956.8.**

Property: 83733 Avenue 55, Thermal, California
Agency Negotiator: Jeremy Wittie, General Manager
Negotiating Party: Coachella Valley Unified School District
Under Negotiation: Price and terms of payment

**** 8. Continued New Business:**

iii. Discussion and/or approval of changes to General Manager's compensation and/or benefits. **— John Pena, President**

ii. **Adjournment**

At the discretion of the Board, all items appearing on this agenda, whether or not expressly listed for action, may be deliberated, and may be subject to action by the Board.

Certification of Posting

I certify that on February 7, 2025, I posted a copy of the foregoing agenda near the regular meeting place of the Board of Trustees of the Coachella Valley Mosquito & Vector Control District and on the District's website, said time being at least 72 hours in advance of the meeting of the Board of Trustees (Government Code Section 54954.2)

Executed at Indio, California, on February 7, 2025

Megan Scarborough-Eckel

Megan Scarborough-Eckel, Clerk of the Board

PUBLIC HEARING

NOTICE OF PUBLIC HEARING

RESOLUTION ADOPTING CERTAIN FINDINGS AND APPROVING AN ENERGY SERVICE CONTRACT FOR ENERGY-RELATED IMPROVEMENTS TO THE COACHELLA VALLEY MOSQUITO AND VECTOR CONTROL DISTRICT FACILITY WITH CENTRICA BUSINESS SOLUTIONS

The Coachella Valley Mosquito and Vector Control District will hold a Public Hearing on **January 14, 2025, at 6:00 PM** at the District office located at **43-420 Trader Place, Indio, CA 92201,** for the purpose of presenting findings, receiving public comment, and considering the adoption of a Resolution approving an Energy Service Contract with Centrica Business Solutions. The contract is for the implementation of certain energy-related improvements to District facilities, in accordance with California Government Code Sections 4217.10 to 4217.18.

The findings will demonstrate, and the Energy Service Contract will require, that the cost to the District for implementing these energy improvements will be less than the anticipated marginal cost of thermal, electrical, or other energy that would have been consumed by the District without these improvements.

The District's jurisdiction includes the cities of **Cathedral City, Coachella, Desert Hot Springs, Indian Wells, Indio, La Quinta, Palm Desert, Palm Springs, Rancho Mirage and unincorporated sections of Riverside County**.

For further information, please contact District General Manager, Jeremy Wittie, at (760) 342-8287.

Megan Scarborough-Eckel

Megan Scarborough-Eckel, Clerk of the Board

	Coachella Valley Mosquito and Vector Control District **Staff Report**	**February 11, 2025**

Agenda Item: Public Hearing
Discussion and/or Approval of Resolution 2025-01 Adopting Certain Findings Pursuant To Government Code section 4217.10 et seq. and Approving an Energy Service Contract For Energy-Related Improvements. **— ad hoc Building Committee, Jeremy Wittie, MS, CSDM, General Manager, and David I'Anson, Administrative Finance Manager**

Background
Public Hearing regarding the Centrica Engergy Services contract was conintued from the January 14, 2025 Board of Trustees meeting.

Staff Recommendation:
Finalize Energery Services Agreement with Centrica Business Solutions.

Exhibits:

- Staff Report from January 14, 2025 Public Hearing
- Resolution 2025.01.14
- Centrica Design-Build Energy Services Agreement
- IGA Report

	Coachella Valley Mosquito and Vector Control District **Staff Report**	**January 14, 2025**

Agenda Item: Public Hearing

Discussion and/or approval for staff to finalize Energy Services Contract and scope of work with Centrica Business Solutions **— ad hoc Building Committee, Jeremy Wittie, MS, CSDM, General Manager, and David I'Anson, Administrative Finance Manager**

Background:

The ad hoc Building Committee was tasked with exploring energy-related improvements to reduce electricity costs and environmental impact. Centrica Business Solutions ("Centrica") conducted an investment-grade audit and provided a comprehensive scope of work for the proposed project.

The scope was revised down due to uncertainty with electrical vehicle regulations and availability.

The recommended scope of work consists of:

Project	**Cost**
LED Lighting Upgrade	$264,518
Building Management System Replacement and Expansion	$222,613
Replacement of current Solar Photovoltaics	$818,125
New Solar Photovoltaics	$957,507
Total	$2,262,765

Annual service options for measurement and verification (MV) and Operations and Maintenance (OM) will be determined through contract negotiaions which will be budgeted annually in the operating budget.

Staff Recommendation:

Authorize staff to move forward with negotiating a contract with Centrica Business Solutions. Schedule a public hearing for January as required by Government Code section 4217.13

Exhibits:

- IGA Report
- Centrica Design-Build Energy Services Agreement

RESOLUTION NO. 2025-01
A RESOLUTION OF THE BOARD OF TRUSTEES OF THE COACHELLA VALLEY MOSQUITO AND VECTOR CONTROL DISTRICT ADOPTING CERTAIN FINDINGS PURSUANT TO GOVERNEMENT CODE SECTION 4217.10 ET SEQ. AND APPROVING AN ENERGY SERVICE CONTRACT FOR ENERGY-RELATED IMPROVEMENTS

WHEREAS, Chapter 3.2 (sections 4217.10 et seq.) of the California Government Code authorizes public agencies, such as the Coachella Valley Mosquito and Vector Control District ("District"), to enter into an Energy Services Contract for the implementation of energy-related improvements following a regularly scheduled public hearing, public notice of which is given at least two (2) weeks in advance, at which the legislative body of the agency (1) determines that the terms of the Energy Services Contract are in the best interest of the District, and (2) makes findings consistent with Chapter 3.2 of the California Government Code; and

WHEREAS, Government Code sections 4217.10 through 4217.18 authorize the Board of Trustees of the District, without advertising for bids, to enter into one or more energy service agreements with any person or entity, pursuant to which that person or entity will provide electrical or conservation services to the District, which may comprise or include an energy conservation facility, if the anticipated cost to the District for electrical energy or conservation services provided under the agreements is less than the anticipated marginal cost to the District for the procurement of electrical, or other energy that would have been consumed by the District in the absence of the energy service agreement; and

WHEREAS, as set forth in California Public Resources Code Section 25008, the policy of the State of California is to promote all feasible means of energy conservation and all feasible uses of alternative energy supply sources; and

WHEREAS, at the June 2023 California Special Districts Association (CSDA) General Manager Summit, Centrica Business Solutions Services, Inc. (Centrica) presented a workshop on renewable energy and financing energy savings projects. At this meeting, District staff asked Centrica to look at the possibility of installing electric vehicle infrastructure, replacing the District's solar panel and invertors, and exploring the possibility of battery backup; among other things; and

WHEREAS, District staff have reviewed the qualifications presented by Centrica, a New York corporation, to conduct and provide an assessment of the District's energy usage, energy needs and opportunities to reduce energy expenses, and found Centrica's qualifications to appear bona fide and adequate; and

WHEREAS, in July 2023, Centrica met with District staff and the General Manager for a discovery meeting and site walk, and from August to November 2023, Centrica conducted a Preliminary Feasibility Assessment and conducted a Board Workshop to discuss the Preliminary Feasibility Assessment; and

WHEREAS, at the December 12, 2023, Board Meeting, the Board of Trustees approved that Centrica conduct an Investment Grade Audit which would include, but not be limited to:

(1) ASHRAE Level 3 Energy Audit
(2) Comprehensive field audit and data gathering
(3) Detailed savings and firm costs
(4) Measurement and verification methodology

(5) Detailed report

WHEREAS, in July 2024 Centrica delivered to the District an Investment Grade Audit which was reviewed by District staff and the ad hoc committee; and

WHEREAS, on December 10, 2024, the Board of Trustees provided additional direction to staff regarding the Energy Savings Contract to be negotiated with Centrica following a duly noticed public hearing to be held on January 14, 2025; and

WHEREAS, evidence of the provision of notice of such public hearing is on file with the Clerk of the Board of Trustees and incorporated herein by this reference; and

WHEREAS, the total estimated 25-year energy costs for the district is $4,280,957 and the expected net energy cost savings from on-site electricity generation is approximately $2,917,622 over a 25-year period; and

WHEREAS, the proposed Energy Services Contract between the District and Centrica includes energy measures whose costs will also be less than the anticipated marginal costs for thermal, electrical, or other energy that would have been consumed without implementing the improvements outlined in the Energy Services Contract; and

WHEREAS, the Board of Trustees of the District desire to authorize, approve and execute the Energy Savings Contract as referenced herein.

NOW, THEREFORE, BE IT DETERMINED AND RESOLVED, THE BOARD OF TRUSTEES OF THE COACHELLA VALLEY MOSQUITO AND VECTOR CONTROL DISTRICT DOES HEREBY RESOLVE AS FOLLOWS:

Section 1. Recitals.

The recitals set forth above are true and correct and are incorporated into this Resolution by this reference.

Section 2. Energy Conservation Services Contract Findings.

The Board of Trustees finds that the cost of the Energy Savings Contract to the District for the solar, electrical energy or conservation services provided thereunder is less than the anticipated marginal cost to the District of the electrical, or other energy that would have been consumed by the District in the absence of the Energy Savings Contract and that it is in the best interest of the District to approve and enter into the Energy Savings Contract.

Section 3. Energy Savings Contract Approval Execution and Delivery.

The form of the Energy Savings Contract by and between the District and Centrica, in substantially the form presented to the District and attached hereto as Exhibit “A”, is hereby approved. The President of the Board or designee(s) (each an “Authorized Representative(s)”), is hereby authorized and directed, for and in the name of and on behalf of the District, to execute and deliver to Centrica the Energy Savings Contract and related documents as necessary to carry out the Energy Savings Contract, subject to such minor changes thereto as such officer or person may require and approve, with the concurrence of Energy Savings Contract’s legal counsel, such approval to be conclusively evidenced by the execution and delivery thereof.

Section 4. Determination Under CEQA.

Determination Under CEQA. The Board of Trustees hereby determines that the transactions described herein is not a “project” for purposes of the California Environmental Quality Act (CEQA), Division 13 (commencing with Section 21000) of the Public Resources Code, and authorizes and directs the execution, posting and filing of a Notice of Exemption pursuant to the provisions and requirements of CEQA by the Authorized Representatives.

Section 5. Effective Date.

This Resolution shall take effect from and after the date of its passage and adoption.

PASSED, ADOPTED, AND APPROVED, this 11th day of February 2025

_____
John Pena, Jr., President
Board of Trustees

ATTEST:

_____
Megan Scarborough Eckel, Clerk of the Board

APPROVED AS TO FORM:

_____
Lena D. Wade, General Counsel

REVIEWED:

_____
Jeremy Wittie, M.S., General Manager

DESIGN-BUILD ENERGY SERVICES AGREEMENT

THIS DESIGN-BUILD ENERGY SERVICES AGREEMENT (this "Agreement") is made and effective **February 11, 2025** (the "Effective Date"), by and between **Coachella Valley Mosquito Vector and Control District** ("Owner"), with an address at **43-420 Trader Pl, Indio, CA 92201**, and **CENTRICA BUSINESS SOLUTIONS SERVICES, INC.** ("Centrica Business Solutions"), with an address at 3 Rosell Drive, Ballston Lake, New York 12019. Owner and Centrica Business Solutions Services, Inc. are sometimes referred to herein, individually, as a "Party", and, collectively, as the "Parties".

RECITALS

A. Owner is an independent special district operating under the Mosquito Abatement and Vector Control District Law (California Health and Safety Code §§ 2000 et seq.) is organized under the laws of the State of California, and is a Public Agency within the meaning of the California Government Code 4217.10 et seq. ("4217 Code")

B. Owner owns and operates certain facilities described on the attached Schedule 1 (the "Facilities"), and desires to procure long-term energy cost savings and reduce related expenses in the operation of such Facilities.

C. Centrica Business Solutions is a New York business corporation and is duly authorized to do business in the State of California, and is a Qualified Provider within the meaning of the 4217 Code, engaged in the business of and having experience and capabilities in providing energy efficiency services, including Energy Conservation Measures ("ECMs"), as defined in the 4217 Code.

D. Pursuant to Centrica Business Solutions' Proposal, Centrica Business Solutions and Owner entered into an Investment Grade Audit Agreement, pursuant to which Centrica Business Solutions conducted an investment grade audit and delivered to Owner a detailed engineering and economic report (the "IGA Report') that specifically identifies the ECMs that are recommended to be installed and/or implemented at the Facilities.

E. The Owner Governing Board has determined, in its lawful discretion, prior to approval or ratification of this Agreement, that this Agreement meets all criteria required pursuant to California Government Code 4217.10 et seq.

F. Pursuant to the IGA Report, Owner now desires to enter into this Agreement with Centrica Business Solutions as a Design-Build Energy Services Agreement for the installation and implementation of the ECMs at the Facilities (the "Project").

NOW, THEREFORE, the Parties agree as follows:

ARTICLE I
PRELIMINARY MATTERS

1.1 INCORPORATION. The Recitals set forth above are hereby incorporated into the body of this Agreement and made a binding part hereof.

1.2 THE IGA REPORT. The IGA Report is attached hereto as Exhibit A. Owner acknowledges that it has approved and accepted the IGA Report, which identifies all ECMs to be performed under this Agreement.

1.3 CONTRACT DOCUMENTS. The entire agreement of the Parties with respect to the Project is contained in the "Contract Documents", which consist of: 1) this Agreement ii) any Change Orders or other amendments to this Agreement, and iii) the following Exhibits and Schedules:

Exhibit A:	The IGA Report
Exhibit B;	Certificate of Substantial Completion
Exhibit C:	Savings Reconciliation Report
Schedule 1:	The Facilities
Schedule 2A:	Scope of ECM Work
Schedule 2B:	Scope of MM&V Services
Schedule 3:	ECM Work Schedule
Schedule 4:	As-Built Drawings Requirements
Schedule 5:	Energy Savings Schedule
Schedule 6A:	ECM Work Schedule of Values
Schedule 6B:	MM&V Services Schedule of Values

The provisions of this Agreement shall control in the event of any conflict between its terms and those contained in any of the Exhibits or Schedules

ARTICLE II
SCOPE AND TERM

2.1 SCOPE OF THE PROJECT. The Project shall consist of two phases: 1) the "Construction & Installation Phase", in which the Equipment (as hereinafter defined) will be designed, constructed and/or installed into the Facilities and the ECMs shall be otherwise implemented (the "ECM Work"), and 2) the "MM&V Services Phase", in which Centrica Business Solutions will provide ongoing energy savings monitoring and reporting services, and management and/or modification of the Equipment (the "MM&V Services"). The full scope of the ECM Work and the MM&V Services are set forth and detailed, respectively, on the "Scope of ECM Work" attached as Schedule 2A, and the "Scope of MM&V Services" attached as Schedule 2B. Centrica Business Solutions shall be responsible for the professional and technical accuracy of the ECM Work and the MM&V Services, whether performed by Centrica Business Solutions or by subcontractors or others on its behalf.

2.2 TERM. The term of this Agreement (the "Term") shall commence on the Effective Date, and, unless sooner terminated in accordance with the terms hereof, shall continue for a period of _____ (_____) years from the MM&V Services Commencement Date (as hereinafter defined), but subject to the termination rights provided in Sections 2.2.1.

2.2.1 RIGHT TO PARTIAL TERMINATION. At any time following the first (1st) anniversary of the MM&V Services Commencement Date, and upon at least sixty (60) days' prior written notice to Centrica Business Solutions, Owner shall have the right to terminate non-required MM&V Services set forth on Schedule 2B. If Owner so elects to partially terminate, all of the then-applicable terms and provisions of this Agreement shall continue in full force and effect, except that the MM&V Services Fee shall be equitably adjusted by the Parties in a manner consistent with Schedule 6B.

ARTICLE III
THE ECM WORK

3.1 CONSTRUCTION AND INSTALLATION OF THE ECM WORK. Subject to the other provisions of this Agreement, Centrica Business Solutions will act as a turn-key design-builder assuming total responsibility for the design, procurement of labor and materials for the improvements to the Facilities, and the installation and start-up of the energy efficiency equipment (the "Equipment"), as set forth in and in accordance with the Scope of ECM Work.

3.1.1 CONSTRUCTION SCHEDULE. The Construction and Installation Phase will commence upon either the issuance by Owner of a written notice to proceed or the written agreement of the Parties fixing such commencement date. The performance of the ECM Work shall be carried out and proceed in accordance with the schedule (the "ECM Work Schedule") attached as Schedule 3. The ECM Work Schedule may be amended from time to time by the Parties due to changes in the ECM Work or other events affecting the completion of the ECM Work.

3.1.2 STATUTORY COMPLIANCE. In the performance of the ECM Work, including the installation of the Equipment, Centrica Business Solutions shall, and shall require all of its contractors, subcontractors, and all subcontractors under them to, as applicable, comply with the requirements of all applicable statutes and regulations. Without limiting the foregoing, Centrica Business Solutions shall otherwise give all notices and comply with all laws and ordinances legally enacted at the date of execution of the Agreement that govern the proper performance of the ECM Work.

3.1.3 CALIFORNIA CONTRACTORS' LICENSE. At all times during performance of Construction Services, Contractor shall be duly licensed and in good standing by the California Contractors State License Board under License #947569.

3.1.4 CONTRACTOR/SUBCONTRACTOR REGISTRATION. Pursuant to Labor Code Section 1771.1, "A contractor or subcontractor shall not be qualified to bid on, be listed in a bid proposal, subject to the requirements of Section 4104 of the Public Contract

Code, or engage in the performance of any contract for public work, as defined in this chapter, unless currently registered and qualified to perform public work pursuant to Labor Code Section 1725.5." Contractor's public works contractor registration number, issued by the Department of Industrial Relations is 1000002103.

3.1.5 PERMITS AND APPROVALS. Centrica Business Solutions shall be responsible for obtaining all necessary permits and approvals for the ECM Work, including the installation of the Equipment, and shall pay any and all permit fees. Owner shall use its best efforts to assist Centrica Business Solutions in obtaining all such necessary permits and approvals. The Equipment and the operation of the Equipment by Centrica Business Solutions shall conform to all federal, state and local code requirements in effect at the time of installation. Before Centrica Business Solutions commences any portion of the ECM Work that requires a permit or license, Centrica Business Solutions shall furnish copies of each such permit or license to Owner.

3.1.6 PERFORMANCE. Owner and Centrica Business Solutions shall coordinate the activities associated with the installation of the Equipment by Centrica Business Solutions with any ECM Work or installations of Owner, its employees and agents. Centrica Business Solutions shall not commit or permit any act that will materially interfere with the performance of business activities conducted by Owner or its employees without the prior written approval of Owner, which shall not be unreasonably withheld, and provided that the ECM Work Schedule shall be modified if Owner requires Centrica Business Solutions to delay or re-sequence the ECM Work in order to accommodate Owner's operations. Centrica Business Solutions shall perform all of the ECM Work in such a manner so as not to harm the structural integrity of the Facilities or their operating systems. Centrica Business Solutions shall repair and restore to its original condition any area of damage caused by Centrica Business Solutions' performance under this Agreement. Owner reserves the right to review the ECM Work and to direct Centrica Business Solutions to take corrective action if, in the reasonable opinion of Owner, the structural integrity of the Facilities or its systems is or will be harmed. All costs associated with such corrective action to damage caused by Centrica Business Solutions' performance of the ECM Work shall be borne by Centrica Business Solutions In addition, Centrica Business Solutions shall be responsible for the professional and technical accuracy of all ECM Work performed, whether by its own forces or by its subcontractors or others on its behalf. Centrica Business Solutions is responsible for general broom cleaning, and shall, to the fullest extent practicable, at all times keep the Facilities clean and free of debris, rubbish and dust. At the completion of the ECM Work, Centrica Business Solutions shall remove from the worksite all construction equipment, tools, surplus materials, waste materials and debris.

3.2 DESIGN AND CONSTRUCTION DOCUMENTS. Drawings, specifications, and other documents, including those in electronic form, furnished or utilized by Centrica Business Solutions are instruments of service (the "Instruments of Service"). Centrica Business Solutions shall retain all common law, statutory and other reserved rights, including copyrights in the Instruments of Service. Drawings, specifications, and other documents and materials and electronic data are furnished for use solely with respect to the Project.

3.2.1 Centrica Business Solutions grants to Owner a non-exclusive license to reproduce and use the Instruments of Service solely in connection with the Project, provided that Owner shall comply with all obligations, including prompt payment of sums when due. Owner shall not assign or transfer any license herein to another party without prior written agreement of Centrica Business Solutions Any unauthorized reproduction or use of the Instruments of Service by Owner or others shall be at Owner's sole risk and expense without liability to Centrica Business Solutions, and its design professionals. Termination of this Agreement due to the default of Owner shall terminate this license. If this Agreement is terminated for any reason other than the default of Owner, Owner shall have a non-exclusive license to use the Instruments of Service for the completion, use and maintenance of the Project. Submission or distribution of Centrica Business Solutions' documents to meet official regulatory requirements or for similar purposes in connection with the Project is not to be construed as publication in derogation of the rights reserved here.

3.2.2 Centrica Business Solutions shall pay all royalties and license fees that may be due on the inclusion of any patented or copyrighted materials, methods or systems selected by Centrica Business Solutions and incorporated in the ECM Work. Centrica Business Solutions shall defend, indemnify and hold Owner harmless from all suits or claims for infringement of any patent rights or copyrights arising out of such selection. Owner agrees to defend, indemnify and hold Centrica Business Solutions harmless from all suits or claims of infringement of any patent rights or copyrights arising out of any patented or copyrighted materials, methods or systems specified by Owner.

3.2.3 Centrica Business Solutions shall prepare and submit to Owner final marked up as-built drawings to the extent and as set forth in the attached Schedule 4.

3.3 WARRANTIES.

3.3.1 Centrica Business Solutions warrants that all materials and equipment furnished under the Construction and Installation Phase of this Agreement will be new unless otherwise specified, of good quality, in conformance with the Scope of ECM Work and all documents associated therewith, and free from defective workmanship and materials. Warranties with respect to the ECM Work, or applicable portion of the ECM Work, as the case may be, shall commence on the date of Substantial Completion thereof (as hereinafter defined). Centrica Business Solutions agrees to correct all ECM Work that is defective in workmanship or materials within a period of one (1) year from the date of Substantial Completion, or such longer periods of time as may be set forth with respect to specific warranties required hereunder.

3.3.2 Centrica Business Solutions shall collect, deliver, and, to the extent permissible, assign all manufacturers' warranties and Equipment manuals to Owner. There are no warranties that extend beyond the description on the face of any such warranty.

3.3.3 EXCEPT AS SET FORTH IN SECTIONS 3.3.1 AND 3.3.2, ALL WARRANTIES, EXPRESS OR IMPLIED, INCLUDING THE WARRANTY OF MERCHANTABILITY AND THE WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE, ARE EXPRESSLY DISCLAIMED. In addition, the warranties under this Section 3.3 shall be void and do not extend to any ECM Work that has been abused, altered, or misused, or that has been repaired by Owner or third parties without the supervisions or prior written approval of Centrica Business Solutions

3.4 SAFETY OF PERSONS AND PROPERTY. Centrica Business Solutions shall endeavor to avoid injury, loss or damage to persons or property by taking reasonable steps to protect: a) its employees and other persons at the worksite, and b) and materials, supplies and equipment stored at the worksite for use in performance of the ECM Work. Centrica Business Solutions shall also oversee the safety precautions and programs of its subcontractors and suppliers at the worksite. Centrica Business Solutions' safety program shall include all actions and programs necessary for compliance with California or federally statutorily mandated workplace safety programs, including without limitation, compliance with the California Drug Free Workplace Act of 1990 (California Government Code 8350 et seq.).

3.5 HAZARDOUS MATERIALS.

3.5.1 A "Hazardous Material" is any substance or material identified now or in the future as hazardous under any federal, state or local law or regulation, or any other substance or material that may be considered hazardous or otherwise subject to statutory or regulatory requirements governing handling, disposal and/or clean-up. Centrica Business Solutions shall not be obligated to commence or continue the ECM Work until all Hazardous material discovered at the Project site has been removed, rendered or determined to be harmless by Owner as certified by an independent testing laboratory approved by the appropriate government agency.

3.5.2 If after the commencement of the ECM Work, Hazardous Material is discovered at the Project site, Centrica Business Solutions shall be entitled to immediately stop ECM Work in the affected area. Centrica Business Solutions shall report the condition to Owner and, if required, the government agency with jurisdiction. Owner shall be responsible for retaining any independent testing laboratory to determine the nature of the materials encountered and whether it is a Hazardous Material requiring corrective measures and/or remedial action. Such measures shall be the sole responsibility of Owner, and shall be performed in a manner minimizing any adverse effects upon the ECM Work. Centrica Business Solutions shall resume ECM Work in the area affected by any Hazardous Material only upon written agreement between the Parties after the Hazardous Material has been removed or rendered harmless and only after approval, if necessary, of the governmental agency or agencies with jurisdiction.

3.5.3 Centrica Business Solutions shall not be required to perform any ECM Work relating to or in the area of Hazardous Material without written mutual agreement.

3.5.4 If Centrica Business Solutions incurs additional costs and/or is delayed due to the presence or remediation of Hazardous Material, Centrica Business Solutions shall be entitled to an equitable adjustment in compensation and/or the ECM Work Schedule.

3.5.5 To the extent not caused by the negligent acts or omissions of Centrica Business Solutions, or its subcontractors or suppliers, and their agents, officers, and employees of each of them, Owner shall defend, indemnify and hold harmless Centrica Business Solutions, its subcontractors, suppliers, and their agents, officers and employees, from and against any and all claims, damages, penalties, losses, expenses, and other liabilities, including attorney's fees, arising out of or relating to the performance of the ECM Work in any area affected by Hazardous Material.

3.5.6 During the performance of the ECM Work, Centrica Business Solutions shall be responsible for the proper handling of all materials brought by it to the worksite. The provisions of this Section 3.5 shall also apply to the MM&V Services, and, without limiting the foregoing, on and after the MM&V Services Commencement Date, Owner shall be responsible under this Section 3.5 for materials and substances brought to the site by Centrica Business Solutions if such materials or substances are required by the Contract Documents.

3.5.7 The terms of this Section 3.5 shall survive the completion of the ECM Work and the termination of this Agreement.

3.6 SYSTEMS START-UP AND TRAINING.

3.6.1 Upon Substantial Completion of the ECM Work, with the assistance of Owner's personnel, Centrica Business Solutions shall direct the checkout of Equipment and start-up operations, and adjusting and balancing of Equipment and for readiness. Centrica Business Solutions shall also secure required certificates of inspection, testing or approval and deliver them to Owner.

3.6.2 Centrica Business Solutions shall conduct the training program described in Schedule 2A. The training specified in Schedule 2A shall be completed prior to Final Completion (as hereinafter defined) of the ECM Work.

3.7 SUBSTANTIAL COMPLETION/FINAL COMPLETION

3.7.1 **"**Substantial Completion" means that stage in the progress of the ECM Work when the ECM Work, or designated portion thereof, is sufficiently complete in accordance with this Agreement so that Owner can use or occupy the Facilities and utilize the ECM Work or designated portion thereof for its intended use. Upon Substantial Completion, the Parties shall execute a Certificate of Substantial Completion fixing the date of Substantial Completion and listing all unfinished items of ECM Work, in substantially the form attached hereto as Exhibit B.

3.**7.2** "Final Completion" means the point when all of the ECM Work is fully and finally complete in accordance with the requirements of this Agreement, and Owner has accepted the ECM Work, which acceptance shall not be unreasonably delayed or conditioned by Owner.

ARTICLE IV
THE MM&V SERVICES

4.1 COMMENCEMENT OF THE MM&V SERVICES. The date of the commencement of Centrica Business Solutions' obligations under the MM&V Services Phase (the "MM&V Services Commencement Date") shall be the date that: (i) Substantial Completion has been achieved for all portions of the ECM Work, and (ii) the systems start-up and training obligations under Section 3.6 have been completed. Centrica Business Solutions' obligations under the MM&V Services Phase shall thereafter continue until the conclusion of the Term or any earlier termination of this Agreement.

4.2 THE MM&V SERVICES.

4.2.1 During the MM&V Services Phase Centrica Business Solutions shall perform those MM&V Services set forth in and in accordance with the Scope of MM&V Services. Without limiting the foregoing, Centrica Business Solutions shall perform and carry out the duties and obligations set forth below in Section 4.2.2.

4.2.2 For each year of the Term after the MM&V Services Commencement Date, within sixty (60) days of the anniversary date of the MM&V Services Commencement Date, Centrica Business Solutions shall provide Owner with an annual energy savings guarantee reconciliation report (the "Savings Reconciliation Report") in substantially the form annexed hereto as Exhibit C, that calculates annual energy savings according to the Energy Savings Methodologies defined in the "Energy Savings Schedule" attached hereto as Schedule 5. Centrica Business Solutions will provide Owner with an explanation as to any variations between annual energy savings and the Guaranteed Energy Savings (as hereinafter defined) shown in the Savings Reconciliation Report. The Savings Reconciliation Report shall initially be submitted by Centrica Business Solutions to Owner in draft form whereupon Centrica Business Solutions and Owner shall use their best efforts to resolve any discrepancies in the draft Savings Reconciliation Report as soon as possible so as to arrive at mutually acceptable Savings Reconciliation Report. Centrica Business Solutions and Owner will indicate their acceptance of the Savings Reconciliation Report by signing at the end thereof. Failure of Owner to respond within 60 days of receipt of the report shall indicate Owner's acceptance of the report.

4.3 GUARANTEED ENERGY SAVINGS.

4.3.1 Centrica Business Solutions has formulated and hereby guarantees the energy and operations savings (the "Guaranteed Energy Savings") to be achieved as a result of the installation and operation of the ECM Work and the provisions of the MM&V Services, as set forth in the Energy Savings Schedule (Schedule 5). The amount of the Guaranteed

Energy Savings is subject to modification based upon i) changes in the ECM Work after the Effective Date, ii) changes in the MM&V Services after the Effective Date, and iii) Material Changes, and the Parties shall reflect all such modifications by revising accordingly the Guaranteed Energy Savings and any other applicable portions of the Energy Savings Schedule.

4.3.2 Commencing with the first twelve (12) month period following the MM&V Services Commencement Date, and for each twelve (12) month period within the Term thereafter, where the energy savings, as calculated using the method defined in the Energy Savings Schedule, are less than the Guaranteed Energy Savings, Centrica Business Solutions agrees to pay to Owner the difference between the Guaranteed Energy Savings and the sum of the actual energy savings as calculated. Centrica Business Solutions will make any such Guaranteed Energy Savings payment within ninety (90) days of the date of Owner's acceptance of the Savings Reconciliation Report pursuant to Section 4.3.1.

4.4 EQUIPMENT SERVICE AND MODIFICATION.

4.4.1 Owner shall not move, remove, modify, alter, or change the Equipment or any part thereof ("Alterations") in any way without the prior written approval of Centrica Business Solutions, except in the event of a *bona fide* emergency where it is not reasonably possible to notify Centrica Business Solutions before carrying out Alterations. In the event of such an emergency, Owner shall take reasonable steps to protect the Equipment from damage or injury, shall follow any instructions for emergency action provided in advance by Centrica Business Solutions, and shall notify Centrica Business Solutions within three (3) business days of such emergency. Any telephonic notice of such emergency shall be followed within one (1) business day by written notice to Centrica Business Solutions from Owner. Owner agrees to maintain the Facilities in good repair and to protect and preserve all portions thereof that may in any way affect the operation or maintenance of the Equipment.

4.4.2 In the event that any actions of Owner, including but not limited to the carrying out of Alterations, affect the performance of the Equipment, the Guaranteed Energy Savings shall be adjusted to reflect the impact of such actions. If Owner unreasonably delays in notifying Centrica Business Solutions of changes resulting from an emergency and/or Owner does not receive written approval to carry out Alterations, all Guaranteed Energy Savings obligations of Centrica Business Solutions under Section 4.3 and elsewhere in this Agreement shall automatically cease and be of no further force or effect.

4.4.3 At all times during the Term, Centrica Business Solutions shall have the right, subject to Owner's prior written approval, which approval shall not be unreasonably withheld, to change the Equipment or any related energy automation management systems, revise any procedures for the operation thereof, and/or implement other energy saving actions in the Facilities, provided that: (i) such modifications are necessary, in Centrica Business Solutions' reasonable judgment, to enable Centrica Business Solutions to achieve the Guaranteed Energy Savings at the Facilities, and (ii) any cost incurred relative to such modifications, additions or replacement of the Equipment, or operational changes or new

procedures shall be the responsibility of Centrica Business Solutions All such modifications, additions or replacements of the Equipment or revisions to operating or other procedures shall be described in a supplemental schedule to be provided to Owner.

ARTICLE V
OWNER'S RESPONSIBILITIES

5.1 GENERAL RESPONSIBILITIES.

5.1.1 Upon request of Centrica Business Solutions, Owner shall provide all available information in a timely manner regarding requirements for the Project, including all existing reports or studies regarding the physical characteristics of the site (such as surveys, site evaluations and existing conditions reports), legal descriptions, plans and drawings, building controls, systems, apparatus, equipment and machinery.

5.1.2 Owner shall promptly notify Centrica Business Solutions of all known unusual or materially change operating conditions that affect any Facilities, or any condition that may affect the ECM Work or the MM&V Services.

5.1.3 Owner shall appoint an authorized representative to facilitate Centrica Business Solutions' performance of the ECM Work and the MM&V Services. The representative shall:

a) be fully acquainted with the ECM Work and the MM&V Services;

b) agree to furnish the information and MM&V Services required of Owner so as not to delay Centrica Business Solutions' performance of its obligations under this Agreement; and

c) shall have authority to bind Owner in all matters requiring Owner's approval, authorization or written notice. If Owner changes its representative or the representative's authority as listed above, Owner shall notify Centrica Business Solutions in advance.

5.2 RESPONSIBILITIES DURING CONSTRUCTION & INSTALLATION PHASE.

5.2.1 Owner shall review the ECM Work Schedule as set forth in Section 3.1.1, timely approve any milestone dates set forth, and timely respond to its obligations thereunder.

5.2.2 Owner shall provide sufficient space at the site for the performance of the EPC Work. Owner shall provide access to the site and Facilities for Centrica Business Solutions to perform any function related to this Agreement during regular business hours, and at such other reasonable times as may be requested by Centrica Business Solutions Owner shall not unreasonably restrict Centrica Business Solutions' access to the site or Facilities to make emergency repairs or corrections as Centrica Business Solutions may determine are needed.

5.2.3 Owner shall provide inspection and testing services during construction as required by law or as mutually agreed.

5.2.4 Contractor shall have no responsibility for compliance with the California Environmental Quality Act, other than as may be expressly included in the Scope of Work in order to comply with mitigation measures designated by Owner.

5.2.5 Contractor and the Owner acknowledge that under California Government Code 4215, the Owner assumes the responsibility for the timely removal, relocation, or protection of existing main or trunkline utility facilities located on the Site which are not identified in the Drawings, Specifications or other Contract Documents. Prior to commencing any underground work on this Project, Contractor shall: take all reasonable steps to confirm the location of such utility facilities sufficient to assure itself that no conditions exist at or about the Site which would require revision to the Scope of Work, Contract Price, dates for Substantial or Final Completion, or any other material provision of this Agreement; and, contact Underground Service Alert of Northern California ("USA") and arrange to have the project area marked by USA for underground utilities. In addition, Contractor shall review the Owner's as-built drawings, survey's and other site documents produced and/or made available to Contractor to locate and verify all underground utilities or other underground obstacles or site conditions. In the event that underground utilities or other underground obstacles or site conditions are discovered by Contractor that were not reflected in the results of the USA underground service inspection or in the Owner's as-built drawings, survey's and other site documents produced to Contractor, such matters shall be deemed unforeseen circumstances and Contractor shall be entitled to a reasonable extension of time and a reasonable increase in the Contract Price based upon the time and increased costs and expenses incurred by Contractor as a result of such inaccuracies. Contractor and the Owner agree that the provisions of California Government Code 4215 requiring that the utilities be identified in the invitation for bids shall not apply to this Agreement insofar as Contractor has the responsibility for design of the Project as well as construction of the Project. Rather, Contractor and the Owner agree that the scope of Contractor's responsibilities relating to design of the Project includes review of Owner-provided existing condition information and interface with Underground Service Alert.

5.2.6 If Owner becomes aware of any error, omission or failure to meet the requirements of this Agreement or any fault or defect in the ECM Work, Owner shall give prompt written notice to Centrica Business Solutions

5.3 RESPONSIBILITIES DURING THE MM&V SERVICES PHASE.

5.3.1 Owner shall provide Centrica Business Solutions with complete energy usage information and energy-using equipment information, as requested by Centrica Business Solutions This information will include, but not be limited to:

a) Copies of all utility and fuel bills for the Facilities; for the two years prior to the MM&V Services Commencement Date and ongoing throughout the Term.

b) Direct access, by telephone modem or other reasonable means installed at Centrica Business Solutions' expense, to any and all energy management systems or building automation systems installed in or used in connection with the Facilities, with permission granted to Centrica Business Solutions to download any and all information from these systems and to store such information for the Term;

c) Permission to install, at Centrica Business Solutions' expense, add-on devices to any and all utility and energy use meters, to enable Centrica Business Solutions to directly observe Facility utility usage, with permission granted to Centrica Business Solutions to download any and all information from these systems and to store such information for the Term;

d) Permission, as an agent of Owner, to obtain and utilize any and all energy usage information from any and all utilities or energy suppliers providing service to the Facilities, with permission granted to Centrica Business Solutions to download any and all information from these systems and to store such information for the Term. In connection herewith, Owner agrees to execute such permission or authorization forms, which utilities or energy suppliers may from time to time require to release such information to Centrica Business Solutions; and

e) Copies of any and all energy-using equipment repair orders or invoices for repairs or maintenance ECM Work not subject to the direct control of Centrica Business Solutions

5.3.2 Failure by Owner to provide the information required in this Section 5.3 or otherwise comply with its obligations under this Agreement in timely fashion, will suspend the Energy Savings Guarantee described in the Energy Savings Schedule until the information is provided or other obligation is met. The failure of Owner to provide this information within ninety (90) days of the end of the applicable annual period shall be deemed a material breach of this Agreement in accordance with Section 8.2.1(d) hereof.

ARTICLE VI
COMPENSATION AND PAYMENT

6.1 COMPENSATION FOR THE ECM WORK.

6.1.1 For the performance of the ECM Work, and all obligations in connection therewith under this Agreement, Owner agrees to pay Centrica Business Solutions Services, Inc. the following sum (the "ECM Work Price"): **Two Million Two Hundred Sixty Two Thousand Seven Hundred Sixty Five Dollars and Eight Cents ($2,262,765.08).** A detailed "ECM Work Schedule of Values", setting forth the breakdown of the total ECM Work Price, is attached hereto as Schedule 6A.

6.1.2 Based upon itemized applications for payment submitted to Owner by Centrica Business Solutions during the Construction and Installation Phase, Owner shall make payment to Centrica Business Solutions of the ECM Work Price as follows:

a) The period covered by each application for payment shall be one calendar month ending on the last day of the month. Provided an application for payment is received by Owner not later than the 5th day of a month, Owner shall make payment pursuant to such application to Centrica Business Solutions not later than the 20th day of the same month. If an application for payment is received by Owner after the application date fixed above, payment shall be made by Owner not later than twenty (20) days after receipt of the application for payment.

b) Each application for payment shall provide such detail and back-up information or data as Owner may reasonably require, and shall be based upon the ECM Work completed and materials stored on site and/or at locations approved by Owner in its reasonable discretion for the period ending on the last day of the applicable month. The ECM Work Schedule of Values shall be used in establishing percentages of completion in payment applications.

c) Final payment, constituting the entire unpaid balance of the ECM Work Price, shall be made by Owner to Centrica Business Solutions within fifteen (15) days of the date of Final Completion.

d) Payments due and unpaid shall bear interest from the date due at the legal rate prevailing from time to time at the place where the Project is located.

6.2 COMPENSATION FOR THE MM&V SERVICES.

6.2.1 For the performance of the MM&V Services during the Term, Owner agrees to pay Centrica Business Solutions Services, Inc. the following fee (the "MM&V Services Fee"): **Fourteen Thousand Forty Three Dollars ($14,043)**. A detailed "MM&V Services Schedule of Values", setting forth the breakdown of the total MM&V Services Fee for each item of MM&V Services, is attached hereto as Schedule 6B.

6.2.2 Effective as of each anniversary of the MM&V Services Commencement Date, the MM&V Services Fee shall be increased by an amount equal to three (3%) percent of the amount of the Service Fee for the immediately preceding one (1) year period.

6.2.3 The Service Fee shall be paid in arrears in equal annual installments on the first (1st) day of the month in which the anniversary of the MM&V Services Commencement Date occurs.

ARTICLE VII
CHANGES

7.1 CHANGE ORDERS. Changes in the ECM Work or MM&V Services that are within the general scope of this Agreement, and that are not minor changes in the ECM Work or MM&V Services, shall be accomplished without invalidating this Agreement by a written instrument executed by both Parties in accordance with this Article VII (a "Change Order"). Centrica Business Solutions may request or Owner may order changes in the ECM Work or MM&V Services within the general scope of this Agreement consisting of adjustment to the ECM Work Price and/or MM&V Services Fee, respectively, or the ECM Work Schedule. All such changes in the ECM Work shall be authorized by applicable Change Order.

7.1.1 Owner and Centrica Business Solutions shall negotiate in good faith an appropriate adjustment, as applicable, to the ECM Work Price, MM&V Services Fee and/or the ECM Work Schedule, and shall conclude these negotiations as expeditiously as possible. Acceptance of the Change Order and any adjustment in the ECM Work Price, MM&V Services Fee and/or ECM Work Schedule shall not be unreasonably withheld. An increase or decrease in the ECM Work Price or MM&V Services Fee resulting from a change in the scope of the ECM Work or MM&V Services shall be determined by one or more of the following methods:

a) unit prices set forth in this Agreement or as subsequently agreed;

b) a mutually accepted, itemized lump sum; or

c) if an increase or decrease cannot be agreed upon as set forth in this Section 7.1, the adjustment in the ECM Work Price or MM&V Services Fee shall be determined by the reasonable expense and savings of the performance of the ECM Work resulting from the change. If there is a net increase in the ECM Work Price or MM&V Services Fee, then a reasonable adjustment shall be made for Centrica Business Solutions' overhead and profit. In the case of a net decrease in cost, the amount of the decrease in the ECM Work Price or MM&V Services Fee shall not include reduction for overhead and profit.

7.2 MINOR CHANGES IN THE ECM WORK. Centrica Business Solutions may make minor changes in the design and construction of the ECM Work consistent with the intent of this Agreement that do not involve an adjustment in the ECM Work Price or MM&V Services Fee or the ECM Work Schedule, so long as such changes do not materially and adversely affect the ECM Work, the quality of the materials or equipment specified herein, the performance of any materials, equipment or systems specified herein, or the quality of the workmanship required by this Agreement.

7.3 CHANGES AFFECTING THE GUARANTEED ENERGY SAVINGS. The Parties acknowledge that changes that negatively or positively affect the scope of the ECM Work will necessarily affect the Guaranteed Energy Savings set forth in Section 4.3. Change Order

documents containing such scope changes shall also delineate the corollary Guaranteed Energy Savings adjustments.

7.4 UNKNOWN CONDITIONS. If in the performance of the ECM Work or the MM&V Services Centrica Business Solutions finds latent, concealed or other conditions that materially differ from the conditions Centrica Business Solutions reasonably anticipated, or if the physical conditions are different from those normally encountered and generally recognized as inherent in the kind of ECM Work or MM&V Services provided for in this Agreement, then the ECM Work Price or the MM&V Services Fee shall be equitably adjusted, and, as applicable, the ECM Work Schedule and Guaranteed Energy Savings shall be appropriately modified, by a Change Order within a reasonable time after the conditions are first observed. Centrica Business Solutions shall provide Owner with written notice of its discovery of any of the foregoing conditions as soon as practicable after such discovery.

7.5 EMERGENCIES. In any emergency affecting the safety of persons or property, Centrica Business Solutions shall act, at its discretion, to prevent threatened damage, injury or loss. Any change in the ECM Work Price, MM&V Services Fee or ECM Work Schedule on account of such emergency ECM Work shall be determined as provided in this Article VII.

7.6 CHANGES IN LAW. In the event any changes in laws or regulations affecting the performance of the ECM Work are enacted after the date of this Agreement, the ECM Work Price, the MM&V Services Fee and/or the ECM Work Schedule or Guaranteed Savings shall be equitably adjusted by Change Order.

7.7 MATERIAL CHANGES.

7.7.1 Definition. A "Material Change" is any change in or to the Facilities, whether structural, operational or otherwise in nature that reasonably can be expected, in the judgment of Owner and Centrica Business Solutions to decrease annual energy savings in accordance with the provisions and procedures set forth in the Energy Savings Schedule (Schedule 5) after adjustments for climatic variations. Actions by Owner that may result in a Material Change include, but are not limited to the following;

a) The manner of use of the Facilities by Owner;

b) The hours of operation for the Facilities or for any Equipment or energy using systems operating at the Facilities;

c) Permanent changes in the comfort and service parameters set forth in Scope of ECM Work (Schedule 2A);

d) Occupancy of the Facilities;

e) The structure of the Facilities;

f) The types and quantities of equipment used at the Facilities;

g) The modification, renovation or construction at the Facilities (other than the ECM Work);

h) Owners' failure to provide maintenance of and repairs to the Equipment; or

i) Any other conditions other than climate affecting energy use at the Facilities.

7.7.2 Reported Material Changes. Owner shall use best efforts to deliver to Centrica Business Solutions a written notice describing all actual or proposed Material Changes at least thirty (30) days prior to the implementation of such Material Change, or as soon as is practicable after an emergency or other unplanned event. After Centrica Business Solutions' review of the notice, the Parties shall meet as soon as practicable to agree upon adjustments to the Energy Savings Schedule and the MM&V Services Fee, which adjustments shall be set forth in a Change Order.

ARTICLE VIII
TERMINATION

8.1 TERMINATION BY OWNER FOR CAUSE. Upon thirty (30) days' advance written notice to Centrica Business Solutions, Owner may terminate this Agreement for Cause (as hereinafter defined) if after giving Centrica Business Solutions written notice of such Cause, Centrica Business Solutions fails to cure the same within thirty (30) days following receipt of such notice or, if such cure cannot reasonably be effected within thirty (30) days, such cure is undertaken within such time period and is thereafter continued diligently until completion.

8.1.1 For purposes of this Agreement, "Cause" shall mean the occurrence of any of the following:

a) Any material failure on the part of Centrica Business Solutions to perform or comply with the terms and conditions of this Agreement; or

b) The commencement by or on behalf of Centrica Business Solutions of any voluntary or involuntary case or matter relating to or associated with the U.S. Bankruptcy Code, or for liquidation, reorganization, or an arrangement pursuant to any other U.S. or state bankruptcy Laws, or Centrica Business Solutions being adjudicated a debtor or declared bankrupt or insolvent under the U.S. Bankruptcy Code, or any other U.S. Federal or state laws relating to bankruptcy, insolvency, winding-up, or adjustment of debts, or Centrica Business Solutions making a general assignment for the benefit of creditors, or admitting in writing its inability to pay its debts generally as they become due, and/or if a custodian, receiver, trustee or liquidator of Centrica Business Solutions, all or substantially all of the assets or business of Centrica Business Solutions or of Centrica Business Solutions' interest in this Agreement, is appointed in any proceeding.

8.1.2 If termination occurs during the Construction and Installation Phase, Owner shall be responsible for paying for all ECM Work performed by Centrica Business Solutions through the effective date of termination, and Owner may deduct from the amount due to Centrica Business Solutions the reasonable cost to Owner of any necessary remediation required with respect to the matters resulting in such termination. In the event that Centrica Business Solutions is terminated by Owner under this provision and it is later determined that such termination was improper, Centrica Business Solutions shall be entitled to the remedies set forth in Section 8.3 below.

8.1.3 If termination occurs during the MM&V Services Phase, Owner shall be responsible for paying for all reasonable costs and expenses incurred by Centrica Business Solutions under Section 4.4 hereof prior to the effective date of termination, but subject to Owner's right to deduct its remediation costs in the same manner as provided in Section 8.1.2.

8.2 TERMINATION BY CENTRICA BUSINESS SOLUTIONS SERVICES, INC.

8.2.1 Upon ten (10) days' advance written notice to Owner, Centrica Business Solutions may, in addition to any other rights or remedies, terminate this Agreement for any of the following reasons:

a) If the ECM Work has been stopped for at least thirty-day period under court order or order of other governmental authorities having jurisdiction, or as a result of the declaration of a national emergency or other governmental act during which, through no fault of Centrica Business Solutions, materials, supplies, tools, and construction equipment and machinery for the ECM Work are not available;

b) If Owner has failed to pay any compensation due to Centrica Business Solutions in accordance with this Agreement for a period of thirty (30) days or more;

c) If the ECM Work has been suspended for any reason by Owner for a continuous period exceeding sixty (60) days;

d) If Owner has materially hindered or delayed Centrica Business Solutions in the performance of any of its obligations, or Owner has otherwise has materially breached any covenant, agreement, warranty or representation set forth in this Agreement, and if after giving Owner written notice of thereof Owner fails to cure the same within thirty (30) days following receipt of such notice or, if such cure cannot reasonably be effected within thirty (30) days, such cure is undertaken within such time period and is thereafter continued diligently until completion.

8.2.2 Upon such termination, Centrica Business Solutions shall be entitled to recover from Owner as provided in Section 8.3.

Upon the payment of amounts due under this Section 8.2, neither Party shall have any further liability to the other except for those obligations expressly specified in this Agreement to survive its termination.

8.3 TERMINATION BY OWNER WITHOUT CAUSE.

8.3.1 If Owner terminates this Agreement other than pursuant to Section 8.1, Centrica Business Solutions shall be entitled to recover from Owner as follows:

a) If termination occurs during the Construction and Installation Phase, Owner shall be responsible for paying for all ECM Work performed by Centrica Business Solutions through the effective date of termination;

b) If termination occurs during the MM&V Services Phase, Owner shall be responsible for paying for all reasonable costs and expenses incurred by Centrica Business Solutions under Section 4.2 hereof prior to the effective date of termination;

c) Owner shall pay for all demobilization costs incurred by Centrica Business Solutions, and purchase or rental costs incurred by Centrica Business Solutions, for any equipment acquired by the Centrica Business Solutions in connection with the ECM Work and MM&V Services;

8.3.2 In addition to the foregoing, Owner shall further assume and become liable for obligations, commitments, and unsettled claims that Centrica Business Solutions has previously undertaken or incurred in good faith on behalf of Owner in connection with the Project hereof.

8.4 GUARANTEED ENERGY SAVINGS. Upon the termination of this Agreement pursuant to either Section 8.2 or Section 8.3, all Guaranteed Energy Savings obligations of Centrica Business Solutions under Section 4.3 and elsewhere in this Agreement shall automatically cease and be of no further force or effect.

ARTICLE IX
INDEMNIFICATION/INSURANCE/BONDING/WAIVERS

9.1 INDEMNIFICATION.

9.1.1 Centrica Business Solutions shall indemnify and hold Owner its officers, officials, agents, employees, and volunteers harmless from and against all third party claims, demands, actions, losses, damage, injuries, and liability, direct or indirect, (including any and all costs and expenses in connection wherein), arising from the performance of the ECM Work or the MM&V Services provided that the same are attributable to bodily injury, death and/or damage to property, but only to the extent caused by the negligent, reckless or wrongful acts or omissions acts or omissions of Centrica Business Solutions or anyone for whose acts Centrica Business Solutions is liable. In no event shall this indemnification

apply to liability to the extent caused by the negligence or willful misconduct of the party to be indemnified or held harmless. This indemnification shall not be limited to damages, compensation or benefits payable under insurance policies, any worker's compensation act, or other employee benefit acts.

9.1.2 Owner shall indemnify and hold Centrica Business Solutions and its employees and subcontractors and agents harmless from and against all third party claims for bodily injury, death, and/or damage to property (excluding damage for which Owner assumes the risk of loss or damage to the ECM Work itself) that may arise in connection with the Project but only to the extent caused by the negligent, reckless or wrongful acts or omissions acts or omissions of Owner or anyone for whose acts Owner is liable. In no event shall this indemnification apply to liability to the extent caused by the negligence or willful misconduct of the party to be indemnified or held harmless. This indemnification shall not be limited to damages, compensation or benefits payable under insurance policies, any worker's compensation act, or other employee benefit acts.

9.2 CENTRICA BUSINESS SOLUTIONS SERVICES, INC.'S INSURANCE. At all times during the Term, Centrica Business Solutions shall provide and maintain the insurance set forth in this Section 9.2. All insurers shall be authorized and licensed to provide insurance in the State of California, and shall be rated as A- or better by A.M. Best

9.2.1 Workers' Compensation. Centrica Business Solutions shall obtain and maintain Worker's Compensation insurance with statutory limits and Employers' Liability insurance in the amount of $1,000,000.

9.2.2 Commercial General Liability. Centrica Business Solutions shall obtain and maintain Commercial General Liability Insurance written on an occurrence basis, with the following limits:

Each Occurrence Limit:	$1,000,000
General Aggregate Limit:	$2,000,000
Products/Completed Operations Aggregate Limit:	$2,000,000
Personal and Advertising Injury Limit:	$1,000,000
Medical Pay:	$5,000

9.2.3 Automobile Liability. Centrica Business Solutions shall obtain and maintain Business Automobile Liability Insurance covering owned, non-owned, and hired automobiles, with the following limits:

Combined Single Limit Bodily Injury and Property Damage:	$1,000,000 Each Occurrence

9.2.4 Professional Liability. Centrica Business Solutions shall obtain and maintain professional liability or errors & omissions insurance for claims arising from the negligent performance of any professional MM&V Services under this Agreement, which shall be General Office Coverage, with following limits:

Per claim:	$1,000,000
Aggregate:	$2,000,000

9.2.5 Excess Umbrella. All liability insurance may be arranged under a single policy for the full limits required or by a combination of primary, excess, and/or umbrella liability policies.

9.2.6 Policy Terms. Owner shall be named as an additional insured on all coverage obtained to the extent of the negligence of Centrica Business Solutions under all liability policies except Professional Liability and Workers' Compensation, on a primary and non-contributory with respect to any liability coverage maintained by Owner. The foregoing policies shall contain a provision that coverage will not be cancelled or not renewed until at least thirty (30) days' prior written notice has been given to Owner. Upon request a certificates of insurance will be provided to Owner.

9.3 OWNER'S INSURANCE.

9.3.1 Liability Insurance. Owner shall obtain and maintain its own liability insurance for protection against claims arising out of the performance of this Agreement.

9.3.2 Property Insurance.

a) Owner shall obtain and maintain Builder's Risk or equivalent property insurance in a form reasonably acceptable to Centrica Business Solutions upon the entire Project, including the Equipment and the Facilities and all other existing structures in which any of the ECM Work is to be performed, as well as all Project structures that are fully or partially owned or occupied by Owner or its affiliates, for the full cost of replacement at the time of any loss. This insurance shall include as insureds Owner, Centrica Business Solutions, Centrica Business Solutions' subcontractors, and all other subcontractors and suppliers, as their interests may appear. This insurance shall insure against loss from the perils of fire and extended coverage, and shall include "all risk" coverage including at a minimum coverage for theft, vandalism, malicious mischief, inland transit, collapse, temporary buildings, debris removal, flood, earthquake, wind, testing, and damage resulting from defective design, workmanship, or material. Owner shall increase limits of coverage, if necessary, to reflect estimated replacement cost. Owner shall be responsible

for all premiums and any co-insurance penalties, exclusions, sublimits, or deductibles.

b) On or before the MM&V Services Commencement Date, Owner shall procure and thereafter maintain at all times during the Term, at its sole cost and expense a policy or policies of property damage insurance on all fixtures and improvements and betterments to the Facilities, including the Equipment, against any peril generally included within the classification "all risks", including, but not limited to, risks covered by fire, extended coverage, vandalism and malicious mischief, in amounts at least equal to the full replacement cost thereof (without deduction for depreciation). Such coverage shall include boiler and machinery and equipment breakdown insurance. Centrica Business Solutions shall be included as an insured or loss payee on all such policies, as its interests may appear.

9.3.3 Policies. Upon Centrica Business Solutions' request, Owner shall provide Centrica Business Solutions with a copy of all policies including all endorsements thereto. Centrica Business Solutions shall be given thirty (30) days' prior written notice of cancellation, non-renewal, or any endorsements restricting or reducing coverage.

9.3.4 Loss Adjustment. Any insured loss shall be adjusted with Owner and Centrica Business Solutions and made payable to Owner as trustee for the insureds, as their interests may appear, subject to any applicable mortgagee clause.

9.4 WAIVER OF CLAIMS AND SUBROGATION.

9.4.1 Property Damage. Owner and Centrica Business Solutions waive all claims and other rights they may have against each other for loss of and/or damage to (i) the Project, including the Equipment and Facilities, (ii) all materials, machinery, equipment, and other items used in accomplishing the ECM Work and/or to be incorporated into the Project, while the same are in transit, at the Project site, during erection, and otherwise, and (c) all property owned by or in the custody of Owner and its affiliates, however such loss or damage shall occur, except the rights each Party has to the proceeds of such insurance held by Owner as trustee in accordance with Section 9.3.4.

9.4.2 Waiver of Subrogation. Owner and Centrica Business Solutions shall have their respective insurers waive all rights of subrogation they may have against one another for claims arising thereunder. If the policies of insurance referred to in this Article IX require an endorsement to provide for continued coverage where there is a waiver of subrogation, the Parties will cause them to be so endorsed.

9.4.3 Damages Waiver. Except to the extent of applicable insurance coverage under insurance policies procured pursuant to this Agreement, Owner and Centrica Business Solutions agree to waive all claims against the other for all special, indirect, consequential, remote, punitive, exemplary, or similar damages that may arise out of or relate to this Agreement. This waiver includes, but is not limited to, Owner's loss of use of the Facilities,

all rental expenses incurred, loss of services of employees, or loss of reputation, and Centrica Business Solutions' loss of business, loss of financing, principal office overhead and profits, loss of profits not related to this Project, or loss of reputation. The provisions of this Section 9.4.3 shall survive the termination of this Agreement.

9.4.4 Limitation of Liability. The Parties have discussed the risk and rewards associated with the ECP Work, as well as Centrica Business Solutions' compensation for the MM&V Services. The Parties agree that Centrica Business Solutions shall procure and maintain insurance policies with such coverages and amounts and for such periods of time as required by this Agreement. In light of the foregoing, Owner agrees that Centrica Business Solutions' liability under this Agreement, regardless of the form of action, shall in no event exceed the amount of the compensation actually received by Centrica Business Solutions pursuant to Section 6.1 and Section 6.2 of this Agreement. The provisions of this Section 9.4.4 shall survive the termination of this Agreement.

9.5 BONDING.

9.5.1 Performance and Payment Bonds are required of Centrica Business Solutions as a condition to the commencement and performance of the ECM Work. All Bonds must be acceptable to Owner, and its reasonable discretion, and shall: i) be issued by good and sufficient sureties licensed in the State of California, ii) The Surety on any bond required under the Contract Documents shall be an Admitted Surety Insurer as that term is defined in California Code of Civil Procedure 995.120.

ARTICLE X
CASUALTY AND CONDEMNATION

10.1 CASUALTY.

10.1.1 After the MM&V Services Commencement Date, Owner assumes and shall bear the risk of damage, loss, theft, or destruction, partial or complete, of the Equipment and the Facilities (a "Casualty Loss"), however arising, except to the extent that the same may be caused by the negligent or willful acts or omissions of Centrica Business Solutions that not covered by insurance to be procured pursuant to this Agreement. If Owner fails to repair or replace any Casualty Loss within a reasonable time, and in no event more than one hundred twenty (120) days from its occurrence (except to the extent that the same is the responsibility of Centrica Business Solutions in accordance with the foregoing), Centrica Business Solutions may, at its option: (i) terminate this Agreement by delivery of a written notice to Owner, and such termination shall be deemed a termination without Cause and will be subject to the provisions of Section 8.3 hereof, or (ii) require Owner to amend this Agreement in a manner that equitably accounts for the loss of such Equipment and/or Facilities.

10.1.2 In the event of a Casualty Loss caused by the negligent or willful acts or omissions of Centrica Business Solutions that is not covered by insurance to be procured pursuant to this Agreement, Owner may require Centrica Business Solutions to promptly repair or replace the damaged or destroyed Equipment and/or Facilities, and in the event of Centrica

Business Solutions' failure to do so, Owner may, at its option: (i) repair or replace such items and recover the reasonable cost thereof from Centrica Business Solutions, or (ii) terminate this Agreement for Cause pursuant to Section 8.1 hereof.

10.2 CONDEMNATION.

10.2.1 In the event of the condemnation resulting in a taking of substantially all of the Facilities, this Agreement shall terminate upon the effective date of such taking, and such termination shall be deemed a termination without Cause in accordance with Section 8.3 hereof, provided, however, that the proceeds of such condemnation shall belong to Owner.

10.2.2 In the event of a condemnation resulting in a taking of less than substantially all of the Facilities, the Parties shall amend this Agreement in a manner that equitably accounts for such taking.

ARTICLE XI
COMPLIANCE OBLIGATIONS

11.1 STATUTORY AND REGULATORY COMPLIANCE. Centrica Business Solutions will comply with all applicable provisions of federal, state and local law when performing the ECM Work AND the MM&V Services. Where required by law, all drawings, plans, reports, and other documents delivered to Owner as part of the ECM Work must bear the stamp or seal of architects or engineers licensed by the State of California.

11.2 FAILURE TO COMPLY. If Centrica Business Solutions performs and ECM Work or MM&V Services knowing or having reason to know that such Work or Services are contrary to applicable laws, rules and/or regulations, Centrica Business Solutions shall be responsible for payment of all reasonable costs and expenses arising therefrom.

ARTICLE XII
GENERAL PROVISIONS

12.1 NOTICE. All notices required under this Agreement shall be in writing and shall be given either by: (i) personal delivery; or (ii) a nationally-recognized overnight delivery service that provides proof of delivery and addressed to the other Party at such Party's address specified below. Such address may be changed by a Party giving notice thereof in accordance with this provision.

To Owner:
Coachella Valley Mosquito & Vector Control District
43-420 Trader Place
Indio, CA 92201
Email: JWittie@cvmosquito.org
Attn: Jeremy Wittie, General Manager

To Centrica Business Solutions: Centrica Business Solutions Services, Inc.
3 Rosell Drive, Ballston Lake
New York 12019
Email: _____
Attn: Christopher Covell

12.2 INDEPENDENT CAPACITY. The Parties agree that Centrica Business Solutions is an independent contractor, and that Centrica Business Solutions and its employees and agents, shall act in an independent capacity in the performance of this Agreement, and shall not be construed as officers, employees, or agents of Owner. In addition, this Agreement shall not be construed as creating any partnership or joint venture between the Parties.

12.3 FORCE MAJEURE. If causes beyond a Party's reasonable control delay, impair or prevent the performance of any of such Party's obligations hereunder, expressly excepting, however, the payment of money, the time for such performance shall be extended for a reasonable period of time commensurate with the time and nature of the cause. Such causes shall include, but not be limited to: changes ordered in the ECM Work, acts or omissions of the other Party or others beyond the control of the Party whose performance is required, adverse weather conditions not reasonably anticipated, fire, unusual transportation delays, general labor disputes impacting the ECM Work, acts of governmental agencies, or unavoidable accidents or circumstances, Hazardous Materials or differing site conditions.

12.4 FURTHER DOCUMENTS. The Parties agree to execute and deliver all further documents and perform all further acts that may be reasonably necessary to effectuate the provisions of this Agreement.

12.5 GOVERNING LAW. This Agreement shall be governed by and interpreted in accordance with the laws of the State of California. The titles of the various Sections of this Agreement and elsewhere in the Contract Documents are used for convenience of reference only and are not intended to, and shall in no way, enlarge or diminish the rights or obligations of the Owner or Contractor and shall have no effect upon the construction or interpretation of the Contract Documents. The Contract Documents shall be construed as a whole in accordance with their fair meaning and not strictly for or against the Owner or Contractor.

12.6 SEVERABILITY. The partial or complete invalidity of any one or more provisions of this Agreement shall not affect the validity or continuing force and effect of any other provision.

12.7 NO WAIVER OF PERFORMANCE. The failure of either Party to insist, in any one or more instances, on the performance of any of the terms, covenants or conditions of this Agreement, or to exercise any of its rights hereunder, shall not be construed as a waiver or relinquishment of such term, covenant, condition or right with respect to further performance.

12.8 INTERPRETATION. The Parties agree that the following shall govern the interpretation of this Agreement:

12.8.1 Headings and captions are for convenience of reference only and shall not affect the construction or interpretation of this Agreement.

12.8.2 The grouping of the articles in this Agreement and of specifications under the various headings is solely for the purpose of convenient organization and in no event shall the grouping of provisions, the use of paragraphs or the use of headings be construed to limit or alter the meaning of any provisions.

12.8.3 The terms "herein," "hereof" and "hereunder," and words of similar import, refer to this Agreement as a whole and not to any particular Section, Subsection or Schedule or Exhibit.

12.8.4 The Parties have participated jointly in the negotiation and drafting of this Agreement, and no presumption or burden of proof shall arise favoring or disfavoring either Party by virtue of the authorship of any of the provisions hereof.

12.9 CENTRICA BUSINESS SOLUTIONS SERVICES, INC. PROPERTY. All property used by Centrica Business Solutions in connection with the ECM Work and the MM&V Services, including equipment, tools, drawings, designs, documentation, schematics, test equipment, software, and associated media remain the exclusive property of Centrica Business Solutions Owner agrees not to use such property for any purpose at any time. Owner agrees to allow Centrica Business Solutions personnel to retrieve and to remove all such materials remaining after the ECM Work has been completed or at the end of the Term. Owner acknowledges that any Centrica Business Solutions software included in the ECM Work is proprietary and will be delivered only after execution of and pursuant to a Centrica Business Solutions standard licensing agreement.

12.10 BINDING EFFECT. This Agreement and the Contract Documents shall inure to the benefit of, and be forever binding upon, the Parties and their respective successors, legal representatives and permitted assigns.

12.11 AMENDMENT. This Agreement may be amended, modified or supplemented only by written agreement signed by the Parties.

12.12 ASSIGNMENT. Centrica Business Solutions acknowledges that Owner is induced to enter into this Agreement by, among other things, the qualifications of Centrica Business Solutions Accordingly, Centrica Business Solutions agrees that this Agreement shall not be assigned in whole or in part to another person or entity, without the prior written approval of Owner.

12.13 ENTIRE AGREEMENT. This Agreement, including all Schedules and Exhibits hereto, constitutes the entire agreement and understanding of the Parties and supersedes all prior agreements and understandings between the Parties with respect to the subject matter hereof. Each Party acknowledges that no Party has made any promises, representations, warranties, covenants or understandings other than those expressly set forth herein.

12.14 EXECUTION. This Agreement may be executed in several counterparts, each of which, when executed, shall be deemed to be an original, but all of which together shall constitute one and the same instrument. The transmission of the signature of a Party by facsimile, email or other electronic means shall be deemed an original thereof by the Party receiving such signature.

12.15 SUCCESSORS AND ASSIGNS. Except as otherwise expressly provided in the Contract Documents, all terms, conditions and covenants of the Contract Documents shall be binding upon, and shall inure to the benefit of the Owner and Contractor and their respective heirs, representatives, successors-in-interest and assigns.

12.16 NO WAIVER OF PERFORMANCE. The failure of either Party to insist, in any one or more instances, on the performance of any of the terms, covenants or conditions of this Agreement, or to exercise any of its rights hereunder, shall not be construed as a waiver or relinquishment of such term, covenant, condition or right with respect to further performance.

12.17 GENDER AND NUMBER. Whenever the context of the Contract Documents so require, the neuter gender includes the feminine and masculine, the masculine gender includes the feminine and neuter, the singular number includes the plural and the plural number includes the singular.

12.18 INDEPENDENT CONTRACTOR STATUS. Contractor is an independent contractor to the Owner and not an agent or employee of the Owner.

12.19 PROVISIONS REQUIRED BY LAW DEEMED INSERTED. Each and every provision of law and clause required by law to be inserted in the Contract Documents is deemed to be inserted herein and the Contract Documents shall be read and enforced as though such provision or clause are included herein, and if through mistake, or otherwise, any such provision or clause is not inserted or if not correctly inserted, then upon application of either party, the Contract Documents shall forthwith be physically amended to make such insertion or correction.

12.20 VENUE. All proceedings involving disputes over the terms, provisions, covenants or conditions contained in this Agreement and all proceedings involving any enforcement action related to this Agreement shall be initiated and conducted in the applicable court or forum in Riverside County, California.

12.21 LITIGATION EXPENSES AND ATTORNEY'S FEES. In the event any action, suit or proceeding is brought for the enforcement of, or the declaration of any right or obligation pursuant to this Agreement or as a result of any alleged breach of any provision of this Agreement, the prevailing party in such suit or proceeding shall be entitled to recover its costs and expenses, including reasonable attorney's fees, from the losing party, and any judgment or decree rendered in such a proceeding shall include an award thereof.

12.22 PREVAILING WAGES. Centrica Business Solutions shall comply with all applicable laws and regulations relating to prevailing wages. Wage rates for this project shall be in accordance with the "General Wage Determination Made by the Director of Industrial Relations Pursuant to California Labor Code, Part 7, Chapter 1, Article 2, Sections 1770, 1773 and 1773.1", for Riverside

County. Centrica Business Solutions shall indemnify, defend and hold harmless City from and against any claims for any alleged or actual violations of such prevailing wage laws.

IN WITNESS WHEREOF, the Parties have executed this Agreement by their duly authorized representatives as of the Effective Date.

CENTRICA BUSINESS SOLUTIONS:

CENTRICA BUSINESS SOLUTIONS SERVICES, INC.

By:_____
Name:
Title:

OWNER:

COACHELLA VALLEY MOSQUITO VECTOR AND CONTROL DISTRICT

_____
John Pena, President

ATTEST:

_____
Megan Scarborough-Eckel, Clerk of the Board

APPROVED AS TO FORM:

_____
Lena D. Wade, General Counsel

Investment Grade Audit

December 20, 2024

Coachella Valley Mosquito Vector Control District

Prepared by:

Ken Hoving
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centrica Business Solutions

Table of Contents

1.0 Executive Summary

1.1 PROJECT OVERVIEW

Centrica Business Solutions Inc. is pleased to provide this Investment Grade Audit for Coachella Velley Mosquito Vector Control District (CVMVCD). The following report identifies, documents, and presents a full complement of infrastructure improvements and cost reduction strategies for the district office.

The support received from numerous representatives of CVMVCD during the IGA has been greatly appreciated, and Centrica looks forward to expanding its partnership with the district by implementing the Facility Improvement Measures (FIM) described in the report through an Energy Performance Contract Agreement.

This report provides the scope of work, energy savings estimates, cost proposal for infrastructure improvements, and cost reduction strategies at the district's facility.

Centrica Business Solutions will complete the scope of work described in this proposal for an installed cost of **$2,262,765**. The Investment Tax Credit (ITC) for the solar installation in the scope of this project is **$585,485**. Thus, the project cost to the District after Federal incentives is $1,677,280.

1.2 SUMMARY OF PROPOSED FACILITY IMPROVEMENT MEASURES (FIMS)

Centrica Business Solutions conducted a Preliminary Feasibility Assessment (PFA) to document the potential energy savings and budgetary costs. The Facility Improvement Measures (FIMs) identified in the PFA were evaluated in detail during the IGA and the FIMs shown in *Table 1* were selected by CVMVCD for implementation.

Table 1 provides savings, implementation price, and utility incentives for the recommended FIMs.

Table 1 – Summary of Recommended Facility Improvement Measures

FIM Name	Annual Utility Savings ($/yr)	Annual Repair & Replacement Savings ($/yr)	FIM Cost	ITC
FIM 1 – Lighting Upgrades	$12,166	$3,268	$230,003	$0
FIM 2 – HVAC BMS Upgrade	$5,574	$0	$193,566	$0
FIM 3 – New Solar PV Installation	$37,348	$0	$1,127,823	$383,460
FIM 4 – Existing Solar PV Replacement	$16,988	$0	$711,373	$202,025
TOTAL	**$72,076**	**$3,268**	**$2,262,765**	**$585,485**

1.3 PROJECT GUIDELINES AND GOALS

Centrica Business Solutions has worked with the following objectives in mind for the CVMVCD Facilities:

- Reduce energy costs for the district's facility.
- Maintain or improve existing environment within each facility.
- Provide and improve operational control of the district's equipment and systems.

Additional benefits to CVMVCD will include:

- Work performed under a normal, properly planned and executed schedule and not under an emergency situation.
- Guarantees quality engineering, construction and long-term performance under a turnkey approach along with the support of Centrica's engineering team and field technicians.
- Portion of project will be offset by ITC of $585,485

1.4 ENVIRONMENTAL BENEFITS

In addition to reducing energy consumption, these facility improvements give CVMVCD the opportunity to reduce its carbon footprint, reducing harmful environmental impacts. The positive impact this project will have on the environment is quantifiable. Most of the energy generated by power plants in the United States comes from burning fossil fuels. By reducing energy consumption, fewer fossil fuels are consumed which means less pollution. For the Indio area, the project will reduce greenhouse gases by about:

- 303 metric tons CO2e each year

Figure 1 illustrates the reduction in greenhouse gases each year in terms of equivalencies of familiar items.

Figure 1 - Greenhouse Reduction Equivalencies

42 VEHICLES OFF THE ROAD

395 ACRES OF CARBON SEQUESTERED BY TREES

CO_2 EMISSIONS FROM 35 HOMES

1.5 OTHER MEASURES CONSIDERED BUT NOT RECOMMENDED

Five FIMs were evaluated during the IGA that did not meet the goals of the District. These items were presented during a scope review session and removed from consideration for the reasons described in *Table 2*.

Table 2 – FIMs Investigated but not Recommended

Potential FIM	Description	Reason Not Recommended
Battery Storage	Install on site battery storage for emergency back up in the event of grid blackouts to provide resiliency for the emergency operations staff.	Battery storage for the purpose of resiliency have no payback for their investment and are not financially viable.
Inverter only replacement for existing solar	Replace and move inverters for the 2009 solar system that aren't operating correctly.	After thorough investigation of the existing solar inverters, it became clear that a full system replacement was needed. The current system does not meet electrical code, and the cost of bringing the system up to current regulations is comparable to a full system replacement. Further, a full system replacement qualifies for a Federal tax incentive (ITC) and new warranties will ensure long system life.
HVAC Unit Replacement	Replace 6 aging package units across the facility's buildings with new higher efficiency in kind units.	CVMVCD CVMVCD has recently replaced numerous units due to unit failure. To expedite needed replacements, it was decided to use other District contractors for this work.
EV Charger Installation	Install a single EV charging station and the infrastructure to install the future 14 stations that would fully support an EV fleet change over.	Currently, the district does not see the benefit of this FIM with the unknowns on implementation of the CARB initiative. This FIM shall be considered at a later date.
Utility Upgrade	Replace the incoming service utility transformer and switchgear to allow for a high capacity of power to be delivered to the site and	EV charger scope has been removed from this project and the District does not require additional electrical service capacity.

	facilitate the increased demand of EV charging.	

2.0 Facility Description

Centrica Business Solution's Engineers audited the CVMVCD site and summarized the buildings in *Table 3*. The total square footage of the sites audited is about 34,200 ft^2.

Table 3 – CVMVCD Buildings

Facility	Address	Square Footage
Administration Building (Admin)	43-420 Trader Pl., Indio, CA 92201	5,300 sq ft^2
Operations	43-420 Trader Pl., Indio, CA 92201	8,700 sq ft^2
Cold Storage	43-420 Trader Pl., Indio, CA 92201	3,900 sq ft^2
Mobile Equipment	43-420 Trader Pl., Indio, CA 92201	4,500 sq ft^2
Laboratory	43-420 Trader Pl., Indio, CA 92201	6,400 sq ft^2
Tank Storage	43-420 Trader Pl., Indio, CA 92201	5,400 sq ft^2

ADMINISTRATION BUILDING

The admin building is a single-story building located at the front of the CVMVCD complex. It houses the offices of key personnel as well as the facilities reception and check in desk. The CVMVCD board meeting room is located inside this building and occupies approximately one third of the buildings floor space. The complex's break room is also located here.

OPERATIONS

The operations building is located directly south of the admin building, also at the front of the complex. This building includes the offices for the CVMVCD facility. The electrical room for this building and other buildings on site is attached to this location. This electrical room is where the existing solar system interconnects to.

COLD STORAGE

This building holds the cold storage warehouse where temperature sensitive materials are stored.

MOBILE EQUIPMENT

The mobile equipment shop is where CVMVCD technicians maintain and repair equipment and vehicles used in the flied by the staff.

LABORATORY

The laboratory is where CVMVCD conducts research and breeds mosquitos for the district. This building also contains the refrigerated storage for their experiments and mosquitos. These are the walk-in freezer and deep freeze units which are crucial to the facility's daily operations. The laboratory building also houses office spaces for staff as well as the location of the Building Management System (BMS).

TANK STORAGE

This building is a large warehouse for storage of CVMVCD equipment used out in the field.

3.0 Utility Usage Overview

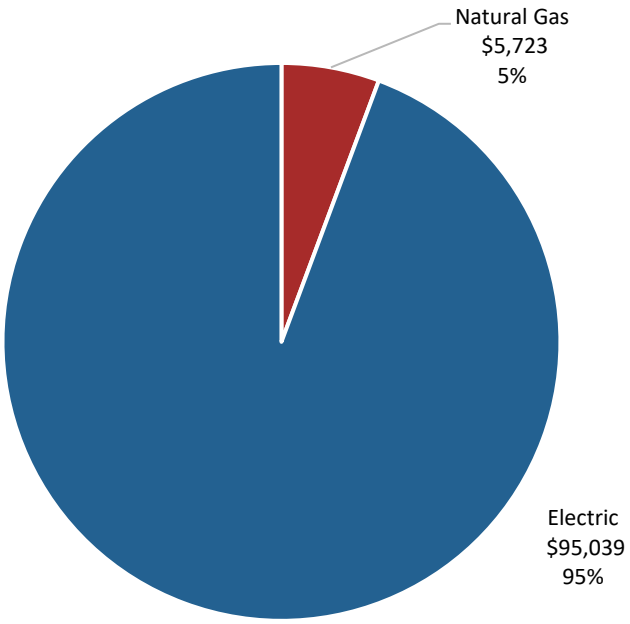
3.1 UTILITY USAGE AND COST SUMMARY

CVMVCD currently spends $100,762 annually on utilities for the district Complex. *Table 4* and *Figure 2* summarize the energy cost allocated to electricity and natural gas consumption for the buildings included in the IGA for the baseline period (May 2022 – April 2023) for electricity and (March 2023 – February 2024) for natural gas. *Figure 2* indicates that electricity accounts for the majority (95%) of the district's utility costs.

Table 4 – Annual Utility Usage & Cost Summary

Electricity		Natural Gas	
kWh/yr	$/yr	Therm/yr	$/yr
570,940	$95,039	3,366	$5,723

Figure 2 – Annual Utility Costs



3.2 UTILITY RATE REVIEW

The energy sources for the buildings reviewed at the district were electricity and natural gas. Below are the utilities for electricity and natural gas providing service to the site.

- Electrical Provider: Imperial Irrigation District
- Natural Gas Provider: SoCal Gas

To determine the cost savings potential for a reduction in energy usage, the incremental cost of the utilities was determined. Electricity and natural gas costs are determined using bills from the baseline period of May 2022 – April 2023 for electricity and March 2023 – February 2024 for natural gas. The rates used to calculate savings are summarized in *Table 5*.

Table 5 – Utility Rates Summary

Meter	Electricity ($/kWh)	Natural Gas ($/therm)
Lab Meter (5DY3B-203687)	$0.1688	N/A
Net Meter (5DY3BPV-200024)	$0.1624	N/A
Gas Meter (16293456)	N/A	$1.70

3.3 BASELINE ANNUAL ENERGY USAGE

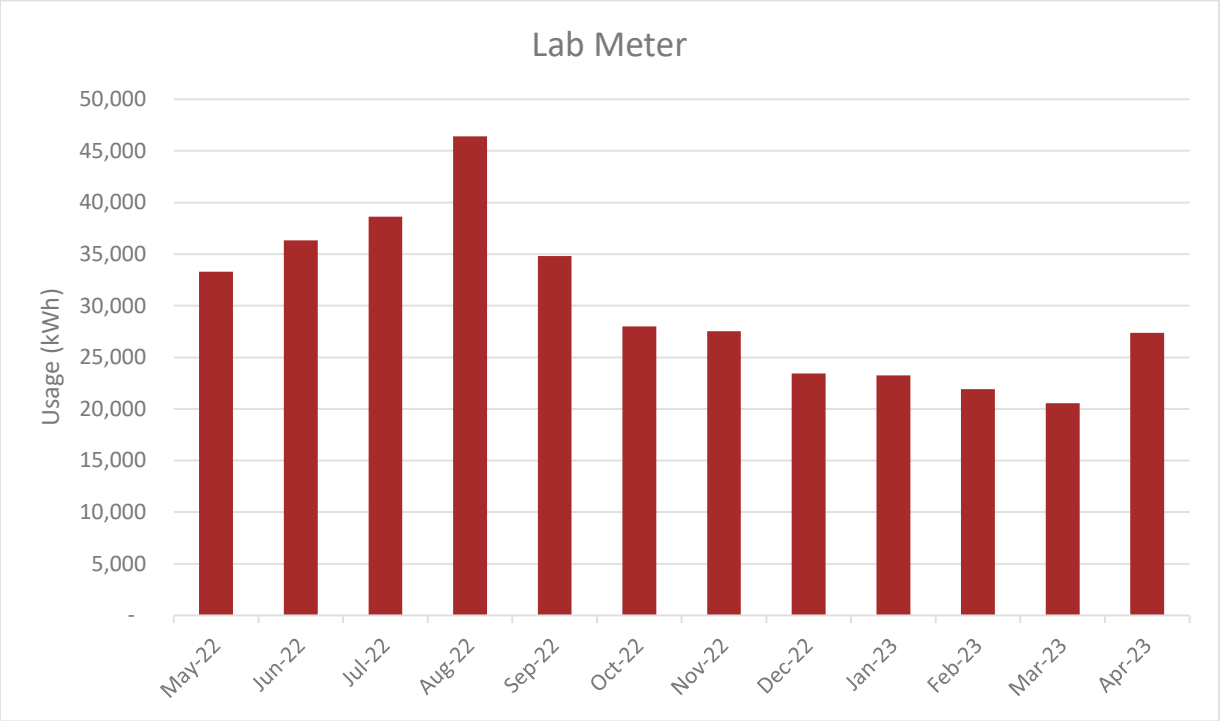
This section summarizes the baseline period energy usage for the CVMVCD facility. *Table 6* presents a summary of the utility consumption for each meter by energy source for the baseline year May 2022 – April 2023 for electricity and March 2023 – February 2024 for natural gas. A summary of the baseline period usage and cost data are provided in *Appendix A*.

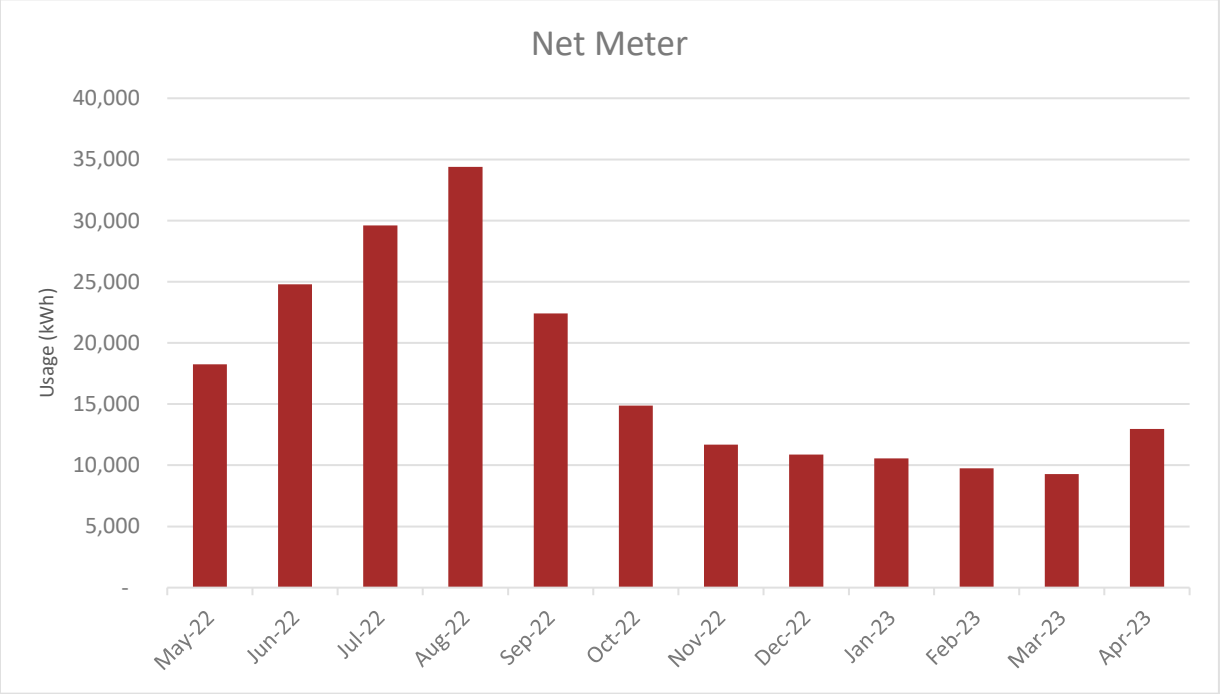
Table 6 – Baseline Utility Usage Summary

Facility	Electric Usage (kWh/yr)	Natural Gas Usage (therm/yr)	Annual Cost ($/yr)
Lab Meter (5DY3B-203687)	361,500	N/A	$61,034
Net Meter (5DY3BPV-200024)	209,440	N/A	$34,005
Gas Meter	N/A	3,366	$5,723
Total	**570,940**	**3,366**	**$100,762**

Figures 3 and *4* display the monthly utility usage for electricity and natural gas during the baseline period May 2022 – April 2023 for electricity and March 2023 – February 2024 for natural gas. Annual usage and cost data for energy is provided in *Appendix A* in tabular form.

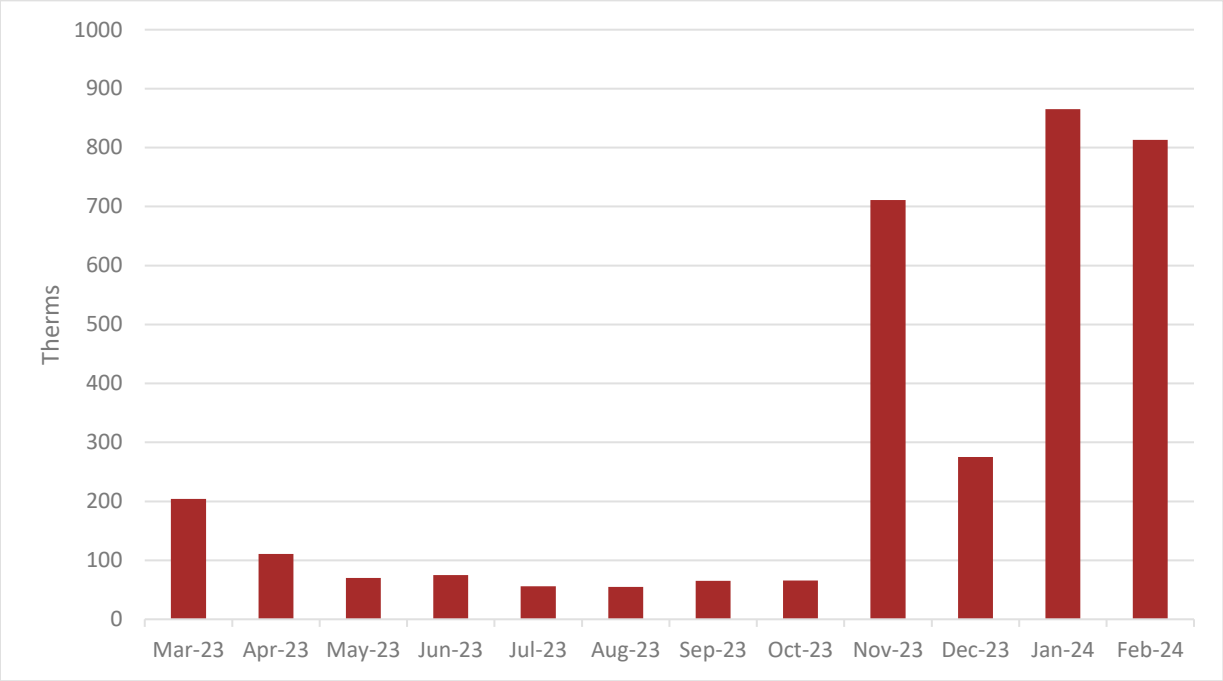
Figure 3 – Baseline Electrical Usage





Investment Grade Audit

Figure 4 – Baseline Natural Gas Usage



3.4 RECONCILIATION OF USAGE TO BASELINE

The data used for the energy baseline have been reviewed and no unusual findings were present. The meter readings were based on actual readings during the baseline period stated above.

3.5 UTILITY BENCHMARKING – ENERGY UTILIZATION INDEX

The Energy Utilization Index (EUI) provides a summary of a building's energy intensity. Tracking EUI over time provides insight into the energy usage behavior at this facility. *Table 7* summarizes the annual average energy usage and energy intensity for the baseline period.

Table 7 – Average Energy Intensity Summary

Facility	Square Footage	Annual Energy Usage (kBtu/yr)	EUI (kBtu/ft2)
Laboratory	6,400	1,233,489	192.7
Offices	27,800	1,051,159	37.8
TOTAL	**34,200**	**2,284,649**	**66.8**

4.0 Facility Improvement Measures (FIMs)

4.1 FIM #1: LIGHTING UPGRADES

Annual Cost Savings	Implementation Cost	Incentive/Rebate
$15,435	$230,003	N/A

FACILITIES AFFECTED

- Admin Building
- Cold Storage
- Laboratory Building
- Mobile Equipment
- Operations Building
- Tank Storage
- Carports
- Parking Lots

OBSERVATION

A detailed audit of the existing lighting was conducted at the above facilities including interior and exterior lighting. While on site, Centrica Business Solutions noticed a mix of lighting technologies including fluorescent, incandescent, and some LED lighting. A detailed space-by-space audit outlining the existing conditions is provided in *Appendix C*.

RECOMMENDATION

Centrica Business Solutions will replace the existing fluorescent and incandescent lighting with LED lighting technology. *Table 8* and *Table 9* provides a summary of the lighting upgrades by fixture type. Detailed summaries of the lighting upgrades and counts for each fixture type and space-by-space detail are provided in *Appendix C*.

Table 8 – Interior Lighting Fixture Upgrades Summary

Building Name	Location Description	Existing Fixture Type	Height	Qty	Proposed Solution
Admin	Lobby, Halls, Rooms	Fluorescent, Incandescent, and Electroluminescent Emergency EXIT/bug-eye	10	4	New LED EXIT and emergency bug-eye
	Restroom, Storage	Fluorescent Wrap fixtures (4ft)	10	9	New 4' Wrap luminaires
	Restroom, Storage	Fluorescent Wrap fixtures (8ft)	8	3	New 8' Wrap luminaires
	Lobby, Halls, Rooms	Fluorescent 2’ x 4’ Troffers on T-bar ceiling	9	18	Retrofit troffer kit
	Restroom	Cove over sink (4' Fluorescent strips)	8	2	Retrofit 4' 2-bar kits
	Boardroom	Fluorescent Pendant Strips	15	20	Rebuild w/ 2x4'tube + driver
	Network Comm room	4' Strip fixture	8	1	Retrofit strip kit
	Lobby	Fluorescent 8" diameter recessed can	22	12	Replace with LED recessed can kit
	Boardroom, MPR	Fluorescent 6" diameter recessed can	10	22	Replace with LED recessed can kit
	Boardroom	Fluorescent 6" diameter recessed can	15	10	Replace with LED recessed can kit
Cold Storage	Storage	Electroluminescent EXIT signs	10	2	New EXIT, requires new wiring, proper disposal
	Storage	Metal Halide EXIT signs	10	1	New EXIT signs
	Storage	Fluorescent 4' Vaportight on jack-chain	14	2	New LED vaportight
	Storage	Fluorescent 8' Strips on jack-chain	14	6	New LED strip luminaires
Laboratory	Entry, Halls, Open areas	Fluorescent EXIT signs	8	7	New EXIT sings
	Mechanical room	Incandescent 2' Wrap fixture	8	1	New LED Wrap luminaire
	Mechanical, Storage	Fluorescent 4' Strip fixture	8	6	New LED strip luminaires
	Offices, Halls, Lab Spaces	Fluorescent 2’ x 4’ Troffers on T-bar ceiling	8	60	Retrofit troffer kit
	Lab rooms	Fluorescent 4' Vaportight fixtures	8	20	Retrofit 4' 2-bar kits
	Rooms, Halls	Fluorescent 6" diameter recessed can	8	11	Replace with LED recessed can kit
Mobile Equipment	Restroom	Fluorescent 4' Wrap fixture	8	1	New LED Wrap luminaire
	Electrical Room	Fluorescent 4' Strip fixture on jack-chain	14	4	New LED strip luminaires
	Offices, Shower/Locker	Fluorescent Troffers on T-bar ceiling	8	5	Retrofit troffer kit
	Work Bays	Fluorescent 8' Strips on jack-chain	14	8	New LED strip luminaires
Operations	Halls, Rooms	Electroluminescent and Fluorescent Emergency EXIT signs	10	9	New LED EXIT signs
	Offices, Storage	Fluorescent Wrap fixtures (4ft)	10	23	New 4' Wrap luminaires
	Restrooms	Fluorescent Wrap fixtures (8ft)	8	4	New 8' Wrap luminaires
	Offices, Halls	Fluorescent 2’ x 4’ Troffers on T-bar ceiling	8	26	Retrofit troffer kit

	Restrooms, Storage	Fluorescent and Incandescent 4' Strip fixtures (various)	8	16	Retrofit 4' 2-bar kits
	Janitor, Electrical room	Fluorescent 4' Strip fixtures	10	4	Retrofit strip kit
	Restroom, Halls	Fluorescent 8" diameter recessed can	8	6	Replace with LED recessed can kit
Storage (tank)	Bay	Electroluminescent Emergency EXIT signs	10	3	New EXIT, requires new wiring
	Bay	Incandescent Emergency bug-eye	10	2	New LED emergency bug-eye
	Bay	Fluorescent High-Bay (6xCFL) pendant (2')	13	13	New LED High-Bay
	Storage	Fluorescent 4' Wrap fixture	8	6	New LED Wrap luminaire
	Electrical Room	Fluorescent 4' Strip fixture	8	1	Retrofit strip kit

Table 9 – Exterior Lighting Fixture Upgrades Summary

Building Name	Location Description	Existing Fixture Type	Height	Qty	Proposed Solution
Admin	Building Perimeter	Fluorescent 6" diameter recessed can	22	2	Replace with LED recessed can kit
Mobile Equipment	Building Perimeter	Metal Halide Wallpack	12	3	Replace with LED wallpack
	Canopy area	Fluorescent 4' Vaportight on jack-chain	15	6	Replace with LED vaportight
Cold Storage	Building Perimeter	Metal Halide Wallpack	14	6	Replace with LED wallpack
	Canopy area	Fluorescent 4' Vaportight on jack-chain	10	14	Replace with LED vaportight
Storage (tank)	Building Perimeter	Fluorescent Wallpack	10	2	Replace with LED wallpack
	over Sink area	Metal Halide and High Pressure Sodium 4' Vaportight wall-mount	6	2	Replace with LED vaportight
Laboratory	Building Perimeter	Fluorescent wall-mount disk	12	13	Replace with LED wall-mount luminaire
	Building Perimeter	Fluorescent 6" diameter recessed can	11	6	Replace with LED recessed can kit
Operations	Building Perimeter	Metal Halide Wallpack	8	5	Replace with LED wallpack
	Building Perimeter	Fluorescent 6" diameter recessed can	7	1	Replace with LED recessed can kit
Carports	Carport Perimeter	Metal Halide Wallpack	8	19	Replace with LED wallpack
	Carport Canopy	Fluorescent 4' Vaportight wall-mount	10	47	Replace with LED vaportight
Parking	Pole, 12-foot	High Pressure Sodium Pole fixture	12	7	Replace with LED Pole luminaire

SAVINGS SUMMARY

Savings associated with replacing the lighting systems are associated with the reduction in wattage of the existing fixtures to more efficient units (e.g., LED lighting) and through the use of improved lighting controls. Savings for lighting measures are based on three components:

- Energy savings associated with a reduction in lamp/fixture power and controls.
- Reduction in lamp heat and corresponding HVAC energy usage.
- Reduction in operating costs associated with the increased life of new LED lighting.

Detailed savings calculations are provided in *Appendix C*. For each building, the lighting energy savings for retrofits are based on the following calculation:

*Energy Savings (kWh/yr) = (kWbefore - kWafter) * Operating Hours*

The existing and retrofit wattages are based on each fixture type. The hours of operation were determined by using average historical data from similar facility use cases. The fixture type and use case were determined by a Centrica lighting engineer during the IGA phase.

The annual operating cost savings are based on the replacement costs for ballasts and lamps as shown in the equation below.

Replacement Cost Savings = Quantity x Unit Annual Cost per Item

BASELINE USAGE AND COST

The energy baseline for this FIM is defined as the existing annual electric energy usage and costs for lighting at the facilities as shown in the table below. This includes the interactive energy savings with HVAC. The cost and savings were calculated using the rates stated above in the Utility Rate Review section.

Lighting Electrical Consumption (kWh/yr)	Lighting Electrical Annual Cost ($/yr)
125,191	$20,541

POST RETROFIT ENERGY USE AND COST

The projected energy use and cost for this FIM are shown in the table below.

Lighting Electrical Consumption (kWh/yr)	Lighting Electrical Annual Cost ($/yr)
42,682	$7,022

The savings are the difference between the Baseline and the Post Retrofit energy usage and cost. The guaranteed savings are the savings gained through this FIM multiplied by a factor of 90%. In addition to the lighting savings, energy savings associated with a reduction in HVAC are shown as “HVAC Interactive” savings. This is associated with the lower heat output of the LED lamps and a reduction in cooling required as a result. The Annual Replacement savings are a result of the longer life of the LED

lamps (10+ years) as compared to the existing lamps. The guaranteed savings are summarized in the table that follows.

Guaranteed Lighting Electrical Consumption Savings (kWh/yr)	Guaranteed Lighting Electrical Annual Cost Savings ($/yr)	HVAC Interactive Annual Consumption Savings (kWh/yr)	HVAC Interactive Annual Cost Savings ($/yr)	Annual Replacement Cost Savings ($/yr)	Total Annual Cost Saving ($/yr)
72,253	$11,838	2,005	$329	$3,268	$15,434

UTILITY INCENTIVES

There are no utility incentives for this FIM.

4.2 FIM #2: HVAC BMS UPGRADE

Annual Cost Savings	Implementation Cost	Incentive/Rebate
$5,575	$193,566	N/A

FACILITIES AFFECTED

This FIM will be completed at the following facilities:

- Admin Building
- Operations Building
- Tank Storage
- Mobile Equipment
- Laboratory
- Cold Storage

OBSERVATION

CVMVCD uses a Johnson Controls BMS to monitor and maintain temperature control for the laboratory facility. This system does not have the desired capabilities to meet CVMVCD needs because of age and an unresponsive service contractor. This control system is also limited to the laboratory building. For these reasons a BMS upgrade and complete facility integration are being recommended.

RECOMMENDATION

Centrica recommends replacing the existing Laboratory Building Management System (BMS) with a new, open-source, BMS from Distech Controls. This will give CVMVCD better control over the facility's environment and have significantly improved controls contractor response time for service calls. This solution also integrates environmental controls of all buildings on site, providing a centralized control system for the entire complex. Below is a table summarizing the proposed upgrades.

Building Name	Equipment	Proposed Action
Lab	AHU 1 & 2	New DDC controls and wiring
Lab	Heating Hot Water System	New DDC controls and wiring
Lab	Chilled Water System	New DDC controls and wiring
Lab	Fan Coil Units	New DDC controls and wiring
Lab	Exhaust Fan	New DDC controls and wiring
Lab	Mini Splits	New BACnet thermostat and I/O device in field
Lab	Thermo Scientific Freezer (-80 freezer)	New BACnet thermostat, alarm contacts, and wiring to central switch
Lab	Phoenix Lab Controls	New BMS server and wiring to existing Phoenix Controls
Lab	Rearing Rooms (walk in freezer)	Temperature monitoring and alarming

Lab	Humidifier	New thermostat and humidity sensor connected to nearest DDC controls
Admin	AC units	New controller in units and new field device for monitoring
Operations	AC units	New controller in units and new field device for monitoring
Operations	Mini Splits	New BACnet thermostat and I/O device in field
Mobile Equipment	AC units	New controller in units and new field device for monitoring
Mobile Equipment	Swamp Coolers	New BACnet thermostat and I/O device in field
Mobile Equipment	Radiant Heaters	New BACnet thermostat and I/O device in field
Cold Storage	Fan Coil Unit	New BACnet thermostat and I/O device in field
Cold Storage	Bonn Fans	New BACnet thermostat and I/O device in field
Tank Storage	AC units	New controller in units and new field device for monitoring
Tank Storage	Swamp Cooler	New BACnet thermostat and I/O device in field

SAVINGS SUMMARY

Savings associated with upgrading the District's Building Management System are calculated using a spreadsheet model. The savings associated with this Fim come from temperature setpoint control, scheduling, and Variable Frequency Drive (VFD) programming. Details for each of these savings mechanisms are provided below:

Temperature Setpoint Control. The new BMS will control to the entire facility's HVAC network, where the current system only controls the laboratory. Savings associated with temperature setpoint control come from having direct control over the occupied and unoccupied temperature setpoints. This will ensure that each HVAC unit is operating efficiently and not excessively heating or cooling a space.

Scheduling. The savings associated with scheduling come from adjusting the unoccupied and occupied schedule across the facility. Some spaces currently have this capability while others do not. Savings will be seen from reducing the total hours in occupied mode, setting the units to unoccupied at 4pm rather than 5pm.

VFD Programming. VFD's will allow the fans in the laboratory air handler units (AHU's) to change their speed depending on the system load. The savings come from a reduction in power used by the fans.

BASELINE USAGE AND COST

The energy baseline for this FIM is defined as the existing annual electrical and gas usage for HVAC units and electrical usage of air handler fans. The electrical and gas rates used to calculate these savings are stated above in the Utility Rate Review section.

Baseline HVAC Usage and Cost

Meter	Electrical Consumption (kWh/yr)	Electrical Annual Cost ($/yr)	Natural Gas Consumption (therm/yr)	Natural Gas Annual Cost ($/yr)	Total Annual Cost
Laboratory	81,928	$13,832	1,282	$2,180	$16,012
Net Meter	140,738	$22,850	3,244	$5,515	$28,365

Baseline AHU Fan Motor Usage and Cost

Meter	Electrical Consumption (kWh/yr)	Electrical Annual Cost ($/yr)
Laboratory	43,564	$7,355

POST RETROFIT ENERGY USE AND COST SAVINGS

The post retrofit energy and cost savings guarantee 90% of the calculated savings. The HVAC savings assume an unoccupied schedule change in the laboratory and a schedule change for the Net Meter where equipment moves into unoccupied setpoints one (1) hour prior to the scheduled end of day at the facility. The fan VFD savings come from using only part of the fan motor's full power when full power is not needed. The setpoint and schedule changes are outlined below.

Adjustment Action	Baseline Settings	Post Installation Settings
Setpoint (Lab)	M-F: Occupied 5am – 5pm M-F: Unoccupied 6pm – 4am S,S: Unoccupied	M-F: Occupied 5am – 4pm M-F: Unoccupied 5pm – 4am S,S: Unoccupied
Schedule (Net Meter)	Occupied Cooling: 72° Occupied Heating: 72° Unoccupied Cooling: 72° Unoccupied Heating: 72°	Occupied Cooling: 72° Occupied Heating: 72° Unoccupied Cooling: 74° Unoccupied Heating: 68°

HVAC Usage and Cost Savings

Meter	Guaranteed Electrical Consumption Savings (kWh/yr)	Guaranteed Electrical Annual Cost Savings ($/yr)	Guaranteed Natural Gas Consumption Savings (therm/yr)	Guaranteed Natural Gas Annual Cost Savings ($/yr)	Guaranteed Total Annual Cost Saving ($/yr)
Laboratory	4,146	$699	458	$777	$1,476
Net Meter	888	$144	(5)	($7)	$137

AHU Fan Motor Usage and Cost Savings

Meter	Guaranteed Electrical Consumption Savings (kWh/yr)	Guaranteed Electrical Cost Savings ($/yr)
Laboratory	23,466	$3,962

UTILITY INCENTIVES

No incentives are available for this measure.

4.3 FIM #3: NEW SOLAR PV INSTALLATION

Solar System	Annual Cost Savings	Implementation Cost	Incentive/Rebate
New System (LAB) 210.1 kW Roof Mount	$37,347	$1,127,823	$383,460

FACILITIES AFFECTED

This FIM will be completed at the following meters:

- Lab Meter (5DY3B-203687)

OBSERVATION

The CVMVCD complex has two (2) incoming services on site. One is the Net Meter (Meter number 5DY3BPV-200024) and the other is the lab meter (Meter number 5DY3B-203687). The meter this FIM will focus on is the Lab Meter where the new solar installation is planned to interconnect to. The lab meter has no existing solar associated with it, meaning that the usage can be offset by a new solar construction.

RECOMMENDATION

Centrica recommends the installation of a new solar system for CVMVCD to offset grid usage at the Lab Meter. This system will offset 90% of the usage at the Lab meter. The system will be installed on existing carports across the facility. The size and expected annual production are outlined below.

Meter	Description	Size	Production (kWh/yr)
Lab Meter (5DY3B-203687)	Roof Mounted Solar	210.1 kW DC	326,235

SAVINGS SUMMARY

Savings from solar PV systems comes from two places. The first is using power generated during the day to provide electricity to the facility while the solar panels are producing. The second place that savings come from are Net Billing credits. How these savings affect the district are outlined below.

Solar Generation: The proposed solar system will offset a majority of the CVMVCD electrical consumption on site. While the panels are producing, they will supply power to the facility rather than pulling power from the grid. The savings for this part of the solar system is the reduction in grid usage.

Net Billing Credits: During the peak production times in the middle of the day the solar system will produce more energy than the site uses. This excess energy is sent back onto the grid to be consumed by other IID customers. Every kilowatt-hour pushed onto the grid this way is credited back to the district further reducing CVMVCD's utility bill cost.

BASELINE USAGE AND COST

These baselines are the total usage and cost at this utility meter based off the utility bills.

Meter	Baseline Electric Usage (kWh/yr)	Baseline Electric Usage Cost ($/yr)
Lab Meter (5DY3B-203687)	361,500	$64,605

ON-SITE ENERGY PRODUCTION AND COST SAVINGS

The guaranteed production and cost savings are 90% of the calculated new production, including a 2% solar degradation factor for year 1.

Meter	Guaranteed Solar Production (kWh/yr)	Guaranteed Cost Savings ($/yr)
Lab Meter (5DY3B-203687)	287,739	$37,347

UTILITY INCENTIVES

Centrica Business Solutions anticipates an Investment Tax Credit (ITC) of 34%. This comes from the standard ITC with an additional adder for CVMVCD being in a low-income community.

4.4 FIM #4: EXISTING SOLAR PV REPLACEMENT

Solar System	Annual Cost Savings	Implementation Cost	Incentive/Rebate
Existing System 168.5 kW Roof Mount	$16,987	$711,373	$202,025

FACILITIES AFFECTED

This FIM will be completed at the following meters:

- Net Meter (5DY3BPV-200024)

OBSERVATION

The CVMVCD complex has two (2) incoming services on site. One is the Net Meter (Meter number 5DY3BPV-200024) and the other is the lab meter (Meter number 5DY3B-203687). The Net Meter has 2 existing solar systems connected to it. One system that was installed in 2006 and had an inverter replacement approximately 8 years ago, and another system that was installed in 2009 which is in a state of disrepair. The opportunity for the Net Meter is to replace the existing 2009 system with a brand new one that will offset the full usage of this meter.

RECOMMENDATION

Centrica recommends the installation of a new solar system for CVMVCD to offset grid usage at the Net Meter. The Net Meter, because it already has solar installations interconnected to it, is being looked at as a system replacement. Initially Centrica's intent was to replace inverters to get the existing system back up to full functionality. After a more in-depth inspection of the system during IGA, it was determined that it would be more cost effective to remove and replace the 2009 system. This was the decision based on factors such as the desire to relocate the existing inverters, unknown solar panel and conductor conditions requiring extensive testing to troubleshoot, and the fact that a new installation would be eligible for the ITC. These factors combined made the price difference between the two solutions negligible, but the new system will have a 12 year product warrantee and a 30 year production lifetime. The other system currently installed, the 2006 system, is producing the expected amount of power and had its' inverters replaced less than 10 years ago. This led Centrica to determine that this system was not in need of a repair or replacement and should be looked at again in a couple years when it starts to fail. The system size and expected production are detailed in the table below.

Meter	Description	Size	Production (kWh/yr)
Net Meter (5DY3BPV-200024)	Roof Mounted Solar	168.5 kW DC	254,873

SAVINGS SUMMARY

Savings from solar PV systems comes from two places. The first is using power generated during the day to provide electricity to the facility while the solar panels are producing. The second place that savings come from are Net Billing credits. How these savings affect the district are outlined below.

Solar Generation: The proposed solar system will offset a majority of the CVMVCD electrical consumption on site. While the panels are producing, they will supply power to the facility rather than pulling power from the grid. The savings for this part of the solar system is the reduction in grid usage.

Net Billing Credits: During the peak production times in the middle of the day the solar system will produce more energy than the site uses. This excess energy is sent back onto the grid to be consumed by other IID customers. Every kilowatt-hour pushed onto the grid this way is credited back to the district further reducing CVMVCD's utility bill cost.

CVMVCD currently has two solar systems on site interconnected to the Net meter. These solar systems were installed in 2006 and 2009. The 2009 system has been identified as having major problems with its' current functionality. Based on Centrica's investigation into these systems as well as monitoring data provided by CVMVCD the following PV system productions were determined.

System	2023 Production (kWh)
2006	41,500
2009	64,390
Total	105,890

From the utility bills provided 18,240 kWh was back fed to the grid. This means that 87,650 kWh of the solar produced was used on site. This number was used to determine the baseline usage of the site in the following table.

BASELINE USAGE AND COST

These baselines are the total usage and cost at this utility meter based off the utility bills.

Meter	Baseline Electric Usage (kWh/yr)	Baseline Electric Usage Cost ($/yr)	Solar Production Used on site (kWh)	Total Usage (kWh)
Net Meter (5DY3BPV-200024)	209,440	$34,005	87,650	297,090

ON-SITE ENERGY PRODUCTION AND COST SAVINGS

The projected energy use and cost savings for this FIM are shown in the table below. For the Net Meter, Centrica is replacing an existing solar system. The existing solar system has a small amount of production, so the savings are the new systems production in excess of the existing system. The new guaranteed production and cost savings are 90% of the calculated new production, including a 2% solar degradation factor for year 1.

Meter	Solar Production (kWh/yr)	New Production (kWh/yr)	Guaranteed New Production (kWh/yr)	Guaranteed Cost Savings ($/yr)
Net Meter (5DY3BPV-200024)	254,873	190,483	168,006	$16,987

UTILITY INCENTIVES

Centrica Business Solutions anticipates an Investment Tax Credit (ITC) of 34%. This comes from the standard ITC with an additional adder for CVMVCD being in a low-income community.

5.0 Summary

5.1 FINANCIAL SUMMARY

Centrica Business Solutions will complete improvements valued at $2,262,765. In addition, the District shall receive a Federal Tax incentive of $585,485. *Table 11* provides an overview of the project costs and savings.

Table 11 – Cost and Savings Summary

Project Total Investment	$2,262,765
Investment Tax Credit (ITC)	$585,485
Net Project Cost	**$1,677,280**
Year 1 Electric Savings	$71,306
Year 1 Natural Gas Savings	$770
Year 1 Repair and Replacement Savings	$3,268
Year 1 Total Savings	**$75,344**

5.2 PROJECT MANAGEMENT AND SCHEDULE

Michel Maxsom, Project Manager, at Centrica Business Solutions will have the overall responsibility for managing and executing the construction phase of this project. A detailed Work Breakdown Schedule will be provided as part of the Project Management Plan presented during the construction phase.

Appendix A – Baseline Utility Data

Baseline Year (June 2018 – May 2019) Usage Summary by Building

Facility	Electric Usage (kWh/yr)	Natural Gas Usage (therms/yr)	Annual Utility Cost ($/yr)
Lab Meter (5DY3B-203687)	361,500		$61,034
Net Meter (5DY3BPV-200024)	209,440		$34,005
Gas Meter		3,366	$5,723
Total	**570,940**	**3,366**	**$100,762**

Baseline Year (May 2022 – April 2023) Monthly Usage Summary For Electricity

LAB METER (5DY3B-203687)

Electric		
Month	**kWh**	**Cost ($)**
May	33,280	$4,973.84
Jun	36,320	$5,424.23
Jul	38,640	$5,767.93
Aug	46,400	$7,489.19
Sept	34,800	$6,272.71
Oct	28,000	$5,073.81
Nov	27,520	$4,987.57
Dec	23,440	$3,881.47
Jan	23,260	$4,810.65
Feb	21,920	$3,804.66
Mar	20,560	$3,571.28
Apr	27,360	$4,976.71
Total	**361,500**	**$61,034.05**

Baseline Year (May 2022 – April 2023) Monthly Usage Summary For Electricity

NET METER (5DY3BPV-200024)

Electric		
Month	**kWh**	**Cost ($)**
May	18,240	$2,702.35
Jun	24,800	$3,749.75
Jul	29,600	$4,406.45
Aug	34,400	$5,388.72
Sept	22,400	$4,094.86
Oct	14,880	$2,785.30
Nov	11,680	$1,945.99
Dec	10,880	$1,820.32
Jan	10,560	$2,001.73
Feb	9,760	$1,475.28
Mar	9,280	$1,382.13
Apr	12,960	$2,252.54
Total	**209,440**	**$34,005.2**

Baseline Year (March 2023 – February 2024) Monthly Usage Summary For Natural Gas

GAS METER (16293456)

Natural Gas		
Month	**therm**	**Cost ($)**
Mar	204	$409.11
Apr	111	$209.81
May	70	$133.46
Jun	75	$144.31
Jul	56	$114.65
Aug	55	$118.66
Sept	65	$135.60
Oct	66	$127.62
Nov	711	$1,169.35
Dec	275	$521.45
Jan	865	$1,338.21
Feb	813	$1,300.29
Total	**3,366**	**$5,722.52**

Appendix B – FIM Calculations

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FIM 2A: HVAC BMS Upgrade – Schedule Adjustment

FIM #: 3
Title: Complete BMS upgrade
Project: Coachella Valley Mosquito vector Control District
Site: 43-420 trader Pl. Indio, CA 92201

Description: schedule adjustment from 5am - 5pm M-F occupied time to 5am - 4pm M-F occupied

SUMMARY	BASELINE	PROPOSED	SAVINGS	% SAVINGS
Cooling Load, MBtu/yr	1,395,748	1,385,961	9,787	
Heating Load, MBtu/yr	259,544	259,942	-398	
Cooling Energy, kWh/yr	140,738	139,751	987	0.7%
Cooling Energy Cost	$22,850/yr	$22,690/yr	$160/yr	
Heating Energy, therms/yr	3,244	3,249	-5	-0.2%
Heating Energy Cost	$5,515/yr	$5,524/yr	-$9/yr	
Total Energy Cost	$28,365/yr	$28,214/yr	$151/yr	0.5%

INPUTS	
Fuel Billing Unit	therm
Fuel Cost per Billing Unit	$1.7001
Fuel Cost per Therm	$1.7001
Electric Energy Cost	$0.1624/kWh
Wall Area Per Floor	18,928 ft²
Window Area Per Floor	997 ft²
Roof Area	27,800 ft²
No. of Floors	1
Total Floor Area	27,800 ft²
Total Envelope Area	47,725 ft²
Window U factor	0.5500 Btu/(h·ft²·°F)
Wall U factor	0.0600 Btu/(h·ft²·°F)
Roof U factor	0.0300 Btu/(h·ft²·°F)
Overall U Value	**0.0528 Btu/(h·ft²·°F)**

Infiltration Rate Per Env. Area	0.120 cfm/ft²
Air Infiltration & Leakage Volume	5,727 cfm

Supply Air Flow Rate	26,125 cfm
Outside Air Flow Rate	5,225 cfm
Return Air Flow Rate	20,900 cfm

Cooling Conversion Factor	12 MBtu/h per ton
Heating Btu Conversion Factor	100.000
Heating Btu Conversion Unit	MBtu/therm
Sensible Heat Conversion Factor	1.080 Btu/(h·cfm·°F)

Overall Heating System Efficiency	80.0%
Chiller Efficiency	1.21 kW/ton

UNITS CHART				
Mcf	1,030,000 Btu/Mcf	MBtu/Mcf	1,030 MBtu/Mcf	10.30 therm/Mcf
ccf	103,000 Btu/ccf	MBtu/ccf	103.0 MBtu/ccf	1.03 therm/ccf
cf	1,030 Btu/cf	MBtu/cf	1.030 MBtu/cf	0.0103 therm/cf
therm	100,000 Btu/therm	MBtu/therm	100 MBtu/therm	1 therm
MBtu	1,000 Btu/MBtu	Btu/MBtu	1 MBtu	0.010 therm/MBtu
MMBtu	1,000,000 Btu/MMBtu	MBtu/MMBtu	1,000 MBtu/MMBtu	10 therm/MMBtu
gal (LP Gas)	91,500 Btu/gal	MBtu/gal	91.5 MBtu/gal	0.9150 therm/gal
gal (Fuel Oil #2)	139,000 Btu/gal	MBtu/gal	139 MBtu/gal	1.3900 therm/gal
lbm (Steam)	975 Btu/lbm	MBtu/lbm	0.975 MBtu/lbm	0.00975 therm/lbm
kWh	3,412 Btu/kWh	MBtu/kWh	3.412 MBtu/kWh	0.03412 therm/kWh

Baseline Temperatures	Temperature	Rm Rel Humidity	Enthalpy	Internal Gain	Balance Point	Enthalpy at BP
Baseline Occ Cooling Temperature	74.0°F	40%	25.93 Btu/lbm d.a.	6.5°F	67.5°F	22.72 Btu/lbm d.a.
Baseline UnOcc Cooling Temperature	74.0°F	40%	25.93 Btu/lbm d.a.	5.0°F	69.0°F	23.43 Btu/lbm d.a.
Baseline Occ Heating Temperature	72.0°F			6.5°F	65.5°F	
Baseline UnOcc Heating Temperature	72.0°F			5.0°F	67.0°F	

Proposed Temperatures	Temperature	Rm Rel Humidity	Enthalpy	Internal Gain	Balance Point	Enthalpy at BP
Proposed Occ Cooling Temperature	74.0°F	40%	25.93 Btu/lbm d.a.	6.5°F	67.5°F	22.72 Btu/lbm d.a.
Proposed UnOcc Cooling Temperature	74.0°F	40%	25.93 Btu/lbm d.a.	5.0°F	69.0°F	23.43 Btu/lbm d.a.
Proposed Occ Heating Temperature	72.0°F			6.5°F	65.5°F	
Proposed UnOcc Heating Temperature	72.0°F			5.0°F	67.0°F	

FORMULAS

Sensible Heat Conversion Factor = Dry Air Density × Specific Heat of Dry Air × 60 min/h = 0.075 lbm/ft³ × 0.24 Btu/(lbm·°F) × 60 min/h = 1.08 Btu/(h·cfm·°F)
Overall U Factor [Btu/(h·ft²·°F)] = [(Window U factor × Window Area) + (Wall U factor × Wall Area) + (Roof U factor × Roof Area)] ÷ Total Envelope Area
Infiltration Rate (cfm) = Total Envelope Area × Infiltration & Leakage Rate per Envelope Area
Cooling Balance Point = Cooling Temperature - Internal Gains from Solar, Equipment, and Persons
Heating Balance Point = Heating Temperature - Internal Gains from Solar, Equipment, and Persons

Cooling Load Calculations - Calculated for Each Cooling Bin
Cooling occurs when the Outside Air Temperature is ABOVE the Cooling Balance Point
Mixed Air Temperature = (OA Temperature × OA Flow Rate + Return Air Flow Rate × Cooling Balance Point) ÷ Supply Air Flow Rate, where Return Air Flow Rate = Supply Air Flow Rate - OA Flow Rate
Sensible Heat Ratio = [Specific Heat of Dry Air × (OA Temperature - Cooling Balance Point)] ÷ (Enthalpy of Air at OAT - Enthalpy of Air at Cooling Balance Point and Room Relative Humidity)
Cooling Conduction Load (MBtu/yr) = Overall U Factor × Area × [(OA Temperature - Cooling Balance Point) × Hours in Bin] ÷ 1,000 Btu/MBtu
Cooling Infiltration Load (MBtu/yr) = Sensible Heat Conversion Factor × Infiltration Rate × (OA Temperature - Cooling Balance Point) × Hours in Bin ÷ (Sensible Heat Ratio × 1,000 Btu/MBtu)
Cooling Ventilation Load (MBtu/yr) = Sensible Heat Conversion Factor × OA Flow Rate × [(Mixed Air Temperature - Cooling Balance Point) ÷ Sensible Heat Ratio + Cooling Internal Gain] × Hours in Bin × 1,000 Btu/MBtu when OA Temperature is ABOVE the Cooling Balance Point
Cooling Ventilation Load (MBtu/yr) = Sensible Heat Conversion Factor × OA Flow Rate × Cooling Internal Gain × Hours in Bin ÷ 1,000 Btu/MBtu when OA Temperature is AT OR BELOW the Cooling Balance Point

Heating Load Calculations - Calculated for Each Heating Bin
Heating occurs when the Outside Air Temperature is BELOW the Heating Balance Point
For Ventilation, Heating occurs when the Mixed Air Temperature is BELOW the Heating Balance Point
Mixed Air Temperature = (OA Temperature × OA Flow Rate + Return Air Flow Rate × Heating Balance Point) ÷ Supply Air Flow Rate, where Return Air Flow Rate = Supply Air Flow Rate - OA Flow Rate
Heating Conduction Load (MBtu/yr) = Overall U Factor × Area × [(Heating Balance Point - OA Temperature) × Hours in Bin] ÷ 1,000 Btu/MBtu
Heating Infiltration Load (MBtu/yr) = Sensible Heat Conversion Factor × Infiltration Rate × (Heating Balance Point - OA Temperature) × Hours in Bin ÷ 1,000 Btu/MBtu
Heating Ventilation Load (MBtu/yr) = Sensible Heat Conversion Factor × OA Flow Rate × (Heating Balance Point - Heating Mixed Air Temperature) × Hours in Bin ÷ 1,000 Btu/MBtu

Baseline Cooling Load = Baseline Cooling Conduction Load + Baseline Cooling Infiltration Load + Baseline Cooling Ventilation Load
Proposed Cooling Load = Proposed Cooling Conduction Load + Proposed Cooling Infiltration Load + Proposed Cooling Ventilation Load
Baseline Cooling Energy = (Baseline Cooling Load × Chiller Efficiency) ÷ Cooling Conversion Factor
Proposed Cooling Energy = (Proposed Cooling Load × Chiller Efficiency) ÷ Cooling Conversion Factor
Baseline Heating Load = Baseline Heating Conduction Load + Heating Infiltration Load + Heating Ventilation Load
Proposed Heating Load = Proposed Heating Conduction Load + Heating Infiltration Load + Heating Ventilation Load
Baseline Heating Energy = Baseline Heat Load ÷ (Heating System Efficiency × Heating Btu Conversion Factor)
Proposed Heating Energy = Proposed Heat Load ÷ (Heating System Efficiency × Heating Btu Conversion Factor)

Baseline Occupied Energy Load Calculations

OA Bin Avg Temperature	Occupied Hours	OA Enthalpy	Mixed Air Temperature	Sensible Heat Ratio	Cooling Conduction	Heating Conduction	Cooling Infiltration	Heating Infiltration	Cooling Ventilation	Heating Ventilation
112.5°F	24 h	39.4 Btu/lbm	76.50°F	0.647	2,719 MBtu	0 MBtu	10,318 MBtu	0 MBtu	2,763 MBtu	0 MBtu
107.5°F	149 h	36.4 Btu/lbm	75.50°F	0.702	15,007 MBtu	0 MBtu	52,538 MBtu	0 MBtu	15,052 MBtu	0 MBtu
102.5°F	235 h	34.3 Btu/lbm	74.50°F	0.725	20,711 MBtu	0 MBtu	70,144 MBtu	0 MBtu	21,419 MBtu	0 MBtu
97.5°F	223 h	32.6 Btu/lbm	73.50°F	0.729	16,846 MBtu	0 MBtu	56,792 MBtu	0 MBtu	18,542 MBtu	0 MBtu
92.5°F	170 h	31.3 Btu/lbm	72.50°F	0.699	10,702 MBtu	0 MBtu	37,599 MBtu	0 MBtu	13,096 MBtu	0 MBtu
87.5°F	308 h	28.9 Btu/lbm	71.50°F	0.776	15,511 MBtu	0 MBtu	49,070 MBtu	0 MBtu	20,251 MBtu	0 MBtu
82.5°F	329 h	27.0 Btu/lbm	70.50°F	0.841	12,426 MBtu	0 MBtu	36,306 MBtu	0 MBtu	18,692 MBtu	0 MBtu
77.5°F	301 h	25.2 Btu/lbm	69.50°F	0.967	7,579 MBtu	0 MBtu	19,253 MBtu	0 MBtu	14,553 MBtu	0 MBtu
72.5°F	294 h	23.9 Btu/lbm	68.50°F	1.015	3,702 MBtu	0 MBtu	8,956 MBtu	0 MBtu	12,418 MBtu	0 MBtu
67.5°F	307 h	21.8 Btu/lbm	65.90°F	0.000	0 MBtu	0 MBtu	0 MBtu	0 MBtu	11,260 MBtu	0 MBtu
62.5°F	323 h	20.0 Btu/lbm	64.90°F	0.000	0 MBtu	2,440 MBtu	0 MBtu	5,993 MBtu	0 MBtu	1,094 MBtu
57.5°F	211 h	18.9 Btu/lbm	63.90°F	0.000	0 MBtu	4,250 MBtu	0 MBtu	10,441 MBtu	0 MBtu	1,905 MBtu
52.5°F	142 h	17.5 Btu/lbm	62.90°F	0.000	0 MBtu	4,648 MBtu	0 MBtu	11,418 MBtu	0 MBtu	2,083 MBtu
47.5°F	69 h	15.0 Btu/lbm	61.90°F	0.000	0 MBtu	3,127 MBtu	0 MBtu	7,682 MBtu	0 MBtu	1,402 MBtu
42.5°F	33 h	13.3 Btu/lbm	60.90°F	0.000	0 MBtu	1,911 MBtu	0 MBtu	4,695 MBtu	0 MBtu	857 MBtu
37.5°F	2 h	12.2 Btu/lbm	59.90°F	0.000	0 MBtu	141 MBtu	0 MBtu	346 MBtu	0 MBtu	63 MBtu
32.5°F			58.90°F	0.000	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
27.5°F			57.90°F	0.000	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
22.5°F			56.90°F	0.000	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
17.5°F			55.90°F	0.000	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
12.5°F			54.90°F	0.000	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
7.5°F			53.90°F	0.000	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
2.5°F			52.90°F	0.000	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
-2.5°F			51.90°F	0.000	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
-7.5°F			50.90°F	0.000	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
-12.5°F			49.90°F	0.000	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
SUBTOTALS	**3,120 h/yr**				**105,203 MBtu/yr**	**16,518 MBtu/yr**	**340,978 MBtu/yr**	**40,575 MBtu/yr**	**148,046 MBtu/yr**	**7,404 MBtu/yr**

Baseline Unoccupied Energy Load Calculations

OA Bin Avg Temperature	UnOccupied Hours	OA Enthalpy	Mixed Air Temperature	Sensible Heat Ratio	Cooling Conduction	Heating Conduction	Cooling Infiltration	Heating Infiltration	Cooling Ventilation	Heating Ventilation
112.5°F	9 h	37.3 Btu/lbm	77.70°F	0.753	986 MBtu	0 MBtu	3,217 MBtu	0 MBtu	841 MBtu	0 MBtu
107.5°F	148 h	37.0 Btu/lbm	76.70°F	0.681	14,348 MBtu	0 MBtu	51,755 MBtu	0 MBtu	13,619 MBtu	0 MBtu
102.5°F	214 h	35.8 Btu/lbm	75.70°F	0.650	18,052 MBtu	0 MBtu	68,216 MBtu	0 MBtu	18,485 MBtu	0 MBtu
97.5°F	305 h	33.9 Btu/lbm	74.70°F	0.653	21,888 MBtu	0 MBtu	82,290 MBtu	0 MBtu	23,621 MBtu	0 MBtu
92.5°F	283 h	32.7 Btu/lbm	73.70°F	0.608	16,746 MBtu	0 MBtu	67,602 MBtu	0 MBtu	20,320 MBtu	0 MBtu
87.5°F	493 h	30.9 Btu/lbm	72.70°F	0.594	22,966 MBtu	0 MBtu	94,896 MBtu	0 MBtu	31,225 MBtu	0 MBtu
82.5°F	574 h	28.5 Btu/lbm	71.70°F	0.639	19,512 MBtu	0 MBtu	74,985 MBtu	0 MBtu	29,877 MBtu	0 MBtu
77.5°F	516 h	26.5 Btu/lbm	70.70°F	0.665	11,044 MBtu	0 MBtu	40,812 MBtu	0 MBtu	22,006 MBtu	0 MBtu
72.5°F	484 h	24.4 Btu/lbm	69.70°F	0.867	4,266 MBtu	0 MBtu	12,087 MBtu	0 MBtu	15,861 MBtu	0 MBtu
67.5°F	601 h	22.5 Btu/lbm	67.10°F	0.000	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
62.5°F	771 h	20.7 Btu/lbm	66.10°F	0.000	0 MBtu	8,736 MBtu	0 MBtu	21,459 MBtu	0 MBtu	3,916 MBtu
57.5°F	587 h	19.0 Btu/lbm	65.10°F	0.000	0 MBtu	14,042 MBtu	0 MBtu	34,492 MBtu	0 MBtu	6,294 MBtu
52.5°F	443 h	17.1 Btu/lbm	64.10°F	0.000	0 MBtu	16,175 MBtu	0 MBtu	39,730 MBtu	0 MBtu	7,249 MBtu
47.5°F	166 h	15.1 Btu/lbm	63.10°F	0.000	0 MBtu	8,151 MBtu	0 MBtu	20,021 MBtu	0 MBtu	3,653 MBtu
42.5°F	45 h	13.1 Btu/lbm	62.10°F	0.000	0 MBtu	2,776 MBtu	0 MBtu	6,819 MBtu	0 MBtu	1,244 MBtu
37.5°F	1 h	12.2 Btu/lbm	61.10°F	0.000	0 MBtu	74 MBtu	0 MBtu	182 MBtu	0 MBtu	33 MBtu
32.5°F			60.10°F	0.000	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
27.5°F			59.10°F	0.000	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
22.5°F			58.10°F	0.000	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
17.5°F			57.10°F	0.000	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
12.5°F			56.10°F	0.000	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
7.5°F			55.10°F	0.000	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
2.5°F			54.10°F	0.000	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
-2.5°F			53.10°F	0.000	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
-7.5°F			52.10°F	0.000	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
-12.5°F			51.10°F	0.000	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
TOTALS	**5,640 h/yr**				**129,807 MBtu/yr**	**49,954 MBtu/yr**	**495,859 MBtu/yr**	**122,704 MBtu/yr**	**175,855 MBtu/yr**	**22,389 MBtu/yr**

Total Baseline Energy Load Calculations (Occupied and UnOccupied)

OA Temperature	Total Hours				Cooling Conduction	Heating Conduction	Cooling Infiltration	Heating Infiltration	Cooling Ventilation	Heating Ventilation
112.5°F	33 h				3,705 MBtu	0 MBtu	13,535 MBtu	0 MBtu	3,604 MBtu	0 MBtu
107.5°F	297 h				29,355 MBtu	0 MBtu	104,293 MBtu	0 MBtu	28,671 MBtu	0 MBtu
102.5°F	449 h				38,763 MBtu	0 MBtu	138,360 MBtu	0 MBtu	39,904 MBtu	0 MBtu
97.5°F	528 h				38,734 MBtu	0 MBtu	139,082 MBtu	0 MBtu	42,163 MBtu	0 MBtu
92.5°F	453 h				27,448 MBtu	0 MBtu	105,201 MBtu	0 MBtu	33,416 MBtu	0 MBtu
87.5°F	801 h				38,477 MBtu	0 MBtu	143,967 MBtu	0 MBtu	51,476 MBtu	0 MBtu
82.5°F	903 h				31,939 MBtu	0 MBtu	111,291 MBtu	0 MBtu	48,570 MBtu	0 MBtu
77.5°F	817 h				18,623 MBtu	0 MBtu	60,065 MBtu	0 MBtu	36,559 MBtu	0 MBtu
72.5°F	778 h				7,967 MBtu	0 MBtu	21,043 MBtu	0 MBtu	28,279 MBtu	0 MBtu
67.5°F	908 h				0 MBtu	0 MBtu	0 MBtu	0 MBtu	11,260 MBtu	0 MBtu
62.5°F	1,094 h				0 MBtu	11,176 MBtu	0 MBtu	27,453 MBtu	0 MBtu	5,009 MBtu
57.5°F	798 h				0 MBtu	18,292 MBtu	0 MBtu	44,932 MBtu	0 MBtu	8,199 MBtu
52.5°F	585 h				0 MBtu	20,823 MBtu	0 MBtu	51,148 MBtu	0 MBtu	9,333 MBtu
47.5°F	235 h				0 MBtu	11,278 MBtu	0 MBtu	27,703 MBtu	0 MBtu	5,055 MBtu
42.5°F	78 h				0 MBtu	4,687 MBtu	0 MBtu	11,514 MBtu	0 MBtu	2,101 MBtu
37.5°F	3 h				0 MBtu	215 MBtu	0 MBtu	529 MBtu	0 MBtu	96 MBtu
32.5°F	0 h				0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
27.5°F	0 h				0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
22.5°F	0 h				0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
17.5°F	0 h				0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
12.5°F	0 h				0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
7.5°F	0 h				0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
2.5°F	0 h				0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
-2.5°F	0 h				0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
-7.5°F	0 h				0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
-12.5°F	0 h				0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
TOTALS	**8,760 h/yr**				**235,010 MBtu/yr**	**66,472 MBtu/yr**	**836,837 MBtu/yr**	**163,279 MBtu/yr**	**323,901 MBtu/yr**	**29,793 MBtu/yr**

Investment Grade Audit

Proposed Occupied Energy Load Calculations										
OA Bin Avg Temperature	Occupied Hours	OA Enthalpy	Mixed Air Temperature	Sensible Heat Ratio	Cooling Conduction	Heating Conduction	Cooling Infiltration	Heating Infiltration	Cooling Ventilation	Heating Ventilation
112.5°F	16 h	39.8 Btu/lbm	76.50°F	0.632	1,813 MBtu	0 MBtu	7,044 MBtu	0 MBtu	1,872 MBtu	0 MBtu
107.5°F	120 h	36.3 Btu/lbm	75.50°F	0.707	12,087 MBtu	0 MBtu	42,003 MBtu	0 MBtu	12,066 MBtu	0 MBtu
102.5°F	197 h	34.2 Btu/lbm	74.50°F	0.732	17,362 MBtu	0 MBtu	58,294 MBtu	0 MBtu	17,862 MBtu	0 MBtu
97.5°F	203 h	32.6 Btu/lbm	73.50°F	0.729	15,335 MBtu	0 MBtu	51,699 MBtu	0 MBtu	16,879 MBtu	0 MBtu
92.5°F	158 h	31.4 Btu/lbm	72.50°F	0.691	9,946 MBtu	0 MBtu	35,352 MBtu	0 MBtu	12,246 MBtu	0 MBtu
87.5°F	282 h	29.0 Btu/lbm	71.50°F	0.764	14,202 MBtu	0 MBtu	45,655 MBtu	0 MBtu	18,674 MBtu	0 MBtu
82.5°F	302 h	27.1 Btu/lbm	70.50°F	0.822	11,407 MBtu	0 MBtu	34,105 MBtu	0 MBtu	17,300 MBtu	0 MBtu
77.5°F	279 h	25.4 Btu/lbm	69.50°F	0.895	7,025 MBtu	0 MBtu	19,284 MBtu	0 MBtu	13,752 MBtu	0 MBtu
72.5°F	267 h	24.0 Btu/lbm	68.50°F	0.936	3,362 MBtu	0 MBtu	8,821 MBtu	0 MBtu	11,403 MBtu	0 MBtu
67.5°F	283 h	21.8 Btu/lbm	65.90°F	0.000	0 MBtu	0 MBtu	0 MBtu	0 MBtu	10,380 MBtu	0 MBtu
62.5°F	301 h	20.0 Btu/lbm	64.90°F	0.000	0 MBtu	2,274 MBtu	0 MBtu	5,585 MBtu	0 MBtu	1,019 MBtu
57.5°F	206 h	18.9 Btu/lbm	63.90°F	0.000	0 MBtu	4,150 MBtu	0 MBtu	10,193 MBtu	0 MBtu	1,860 MBtu
52.5°F	142 h	17.5 Btu/lbm	62.90°F	0.000	0 MBtu	4,648 MBtu	0 MBtu	11,418 MBtu	0 MBtu	2,083 MBtu
47.5°F	69 h	15.0 Btu/lbm	61.90°F	0.000	0 MBtu	3,127 MBtu	0 MBtu	7,682 MBtu	0 MBtu	1,402 MBtu
42.5°F	33 h	13.3 Btu/lbm	60.90°F	0.000	0 MBtu	1,911 MBtu	0 MBtu	4,695 MBtu	0 MBtu	857 MBtu
37.5°F	2 h	12.2 Btu/lbm	59.90°F	0.000	0 MBtu	141 MBtu	0 MBtu	346 MBtu	0 MBtu	63 MBtu
32.5°F			58.90°F	0.000	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
27.5°F			57.90°F	0.000	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
22.5°F			56.90°F	0.000	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
17.5°F			55.90°F	0.000	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
12.5°F			54.90°F	0.000	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
7.5°F			53.90°F	0.000	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
2.5°F			52.90°F	0.000	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
-2.5°F			51.90°F	0.000	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
-7.5°F			50.90°F	0.000	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
-12.5°F			49.90°F	0.000	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
TOTALS	**2,860 h/yr**				**92,538 MBtu/yr**	**16,251 MBtu/yr**	**302,258 MBtu/yr**	**39,919 MBtu/yr**	**132,435 MBtu/yr**	**7,284 MBtu/yr**

Proposed Unoccupied Energy Load Calculations										
OA Bin Avg Temperature	UnOccupied Hours	OA Enthalpy	Mixed Air Temperature	Sensible Heat Ratio	Cooling Conduction	Heating Conduction	Cooling Infiltration	Heating Infiltration	Cooling Ventilation	Heating Ventilation
112.5°F	17 h	37.9 Btu/lbm	77.70°F	0.722	1,862 MBtu	0 MBtu	6,339 MBtu	0 MBtu	1,636 MBtu	0 MBtu
107.5°F	177 h	37.0 Btu/lbm	76.70°F	0.681	17,159 MBtu	0 MBtu	61,896 MBtu	0 MBtu	16,288 MBtu	0 MBtu
102.5°F	252 h	35.5 Btu/lbm	75.70°F	0.666	21,257 MBtu	0 MBtu	78,381 MBtu	0 MBtu	21,412 MBtu	0 MBtu
97.5°F	325 h	33.8 Btu/lbm	74.70°F	0.660	23,323 MBtu	0 MBtu	86,848 MBtu	0 MBtu	25,017 MBtu	0 MBtu
92.5°F	295 h	32.5 Btu/lbm	73.70°F	0.622	17,456 MBtu	0 MBtu	68,948 MBtu	0 MBtu	20,904 MBtu	0 MBtu
87.5°F	519 h	30.7 Btu/lbm	72.70°F	0.611	24,177 MBtu	0 MBtu	97,226 MBtu	0 MBtu	32,384 MBtu	0 MBtu
82.5°F	601 h	28.4 Btu/lbm	71.70°F	0.652	20,430 MBtu	0 MBtu	76,963 MBtu	0 MBtu	31,000 MBtu	0 MBtu
77.5°F	538 h	26.4 Btu/lbm	70.70°F	0.687	11,515 MBtu	0 MBtu	41,165 MBtu	0 MBtu	22,691 MBtu	0 MBtu
72.5°F	511 h	24.3 Btu/lbm	69.70°F	0.967	4,503 MBtu	0 MBtu	11,444 MBtu	0 MBtu	16,506 MBtu	0 MBtu
67.5°F	625 h	22.4 Btu/lbm	67.10°F	0.000	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
62.5°F	793 h	20.7 Btu/lbm	66.10°F	0.000	0 MBtu	8,986 MBtu	0 MBtu	22,072 MBtu	0 MBtu	4,027 MBtu
57.5°F	592 h	19.0 Btu/lbm	65.10°F	0.000	0 MBtu	14,161 MBtu	0 MBtu	34,785 MBtu	0 MBtu	6,347 MBtu
52.5°F	443 h	17.1 Btu/lbm	64.10°F	0.000	0 MBtu	16,175 MBtu	0 MBtu	39,730 MBtu	0 MBtu	7,249 MBtu
47.5°F	166 h	15.1 Btu/lbm	63.10°F	0.000	0 MBtu	8,151 MBtu	0 MBtu	20,021 MBtu	0 MBtu	3,653 MBtu
42.5°F	45 h	13.1 Btu/lbm	62.10°F	0.000	0 MBtu	2,776 MBtu	0 MBtu	6,819 MBtu	0 MBtu	1,244 MBtu
37.5°F	1 h	12.2 Btu/lbm	61.10°F	0.000	0 MBtu	74 MBtu	0 MBtu	182 MBtu	0 MBtu	33 MBtu
32.5°F			60.10°F	0.000	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
27.5°F			59.10°F	0.000	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
22.5°F			58.10°F	0.000	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
17.5°F			57.10°F	0.000	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
12.5°F			56.10°F	0.000	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
7.5°F			55.10°F	0.000	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
2.5°F			54.10°F	0.000	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
-2.5°F			53.10°F	0.000	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
-7.5°F			52.10°F	0.000	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
-12.5°F			51.10°F	0.000	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
TOTALS	**5,900 h/yr**				**141,683 MBtu/yr**	**50,323 MBtu/yr**	**529,210 MBtu/yr**	**123,610 MBtu/yr**	**187,838 MBtu/yr**	**22,555 MBtu/yr**

Total Proposed Energy Load Calculations (Occupied and UnOccupied)										
OA Bin Avg Temperature	Total Hours				Cooling Conduction	Heating Conduction	Cooling Infiltration	Heating Infiltration	Cooling Ventilation	Heating Ventilation
112.5°F	33 h				3,675 MBtu	0 MBtu	13,383 MBtu	0 MBtu	3,508 MBtu	0 MBtu
107.5°F	297 h				29,246 MBtu	0 MBtu	103,899 MBtu	0 MBtu	28,354 MBtu	0 MBtu
102.5°F	449 h				38,619 MBtu	0 MBtu	136,675 MBtu	0 MBtu	39,275 MBtu	0 MBtu
97.5°F	528 h				38,658 MBtu	0 MBtu	138,547 MBtu	0 MBtu	41,896 MBtu	0 MBtu
92.5°F	453 h				27,402 MBtu	0 MBtu	104,300 MBtu	0 MBtu	33,150 MBtu	0 MBtu
87.5°F	801 h				38,379 MBtu	0 MBtu	142,881 MBtu	0 MBtu	51,058 MBtu	0 MBtu
82.5°F	903 h				31,837 MBtu	0 MBtu	111,068 MBtu	0 MBtu	48,300 MBtu	0 MBtu
77.5°F	817 h				18,540 MBtu	0 MBtu	60,450 MBtu	0 MBtu	36,443 MBtu	0 MBtu
72.5°F	778 h				7,865 MBtu	0 MBtu	20,265 MBtu	0 MBtu	27,909 MBtu	0 MBtu
67.5°F	908 h				0 MBtu	0 MBtu	0 MBtu	0 MBtu	10,380 MBtu	0 MBtu
62.5°F	1,094 h				0 MBtu	11,259 MBtu	0 MBtu	27,657 MBtu	0 MBtu	5,046 MBtu
57.5°F	798 h				0 MBtu	18,311 MBtu	0 MBtu	44,978 MBtu	0 MBtu	8,207 MBtu
52.5°F	585 h				0 MBtu	20,823 MBtu	0 MBtu	51,148 MBtu	0 MBtu	9,333 MBtu
47.5°F	235 h				0 MBtu	11,278 MBtu	0 MBtu	27,703 MBtu	0 MBtu	5,055 MBtu
42.5°F	78 h				0 MBtu	4,687 MBtu	0 MBtu	11,514 MBtu	0 MBtu	2,101 MBtu
37.5°F	3 h				0 MBtu	215 MBtu	0 MBtu	529 MBtu	0 MBtu	96 MBtu
32.5°F	0 h				0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
27.5°F	0 h				0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
22.5°F	0 h				0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
17.5°F	0 h				0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
12.5°F	0 h				0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
7.5°F	0 h				0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
2.5°F	0 h				0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
-2.5°F	0 h				0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
-7.5°F	0 h				0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
-12.5°F	0 h				0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
TOTALS	**8,760 h/yr**				**234,221 MBtu/yr**	**66,574 MBtu/yr**	**831,468 MBtu/yr**	**163,529 MBtu/yr**	**320,272 MBtu/yr**	**29,839 MBtu/yr**

Investment Grade Audit

FIM 2B: HVAC BMS Upgrade – Setpoint Adjustment

FIM #: 3
Title: Complete BMS upgrade
Project: Coachella Valley Mosquito vector Control District
Site: 43-420 trader Pl. Indio, CA 92201

Description: Setpoint adjustement on unoccupied hours to reduce utility usage.

SUMMARY	BASELINE	PROPOSED	SAVINGS	% SAVINGS
Cooling Load, MBtu/yr	1,156,635	1,091,596	65,039	
Heating Load, MBtu/yr	102,597	61,938	40,659	
Cooling Energy, kWh/yr	81,928	77,321	4,607	5.6%
Cooling Energy Cost	$13,832/yr	$13,055/yr	$777/yr	
Heating Energy, therms/yr	1,282	774	508	39.6%
Heating Energy Cost	$2,180/yr	$1,316/yr	$864/yr	
Total Energy Cost	$16,012/yr	$14,371/yr	$1,641/yr	10.2%

INPUTS	
Fuel Billing Unit	therm
Fuel Cost per Billing Unit	$1.7001
Fuel Cost per Therm	$1.7001
Electric Energy Cost	$0.1688/kWh
Wall Area Per Floor	4,993 ft²
Window Area Per Floor	263 ft²
Roof Area	6,400 ft²
No. of Floors	1
Total Floor Area	6,400 ft²
Total Envelope Area	11,656 ft²
Window U factor	0.5500 Btu/(h·ft²·°F)
Wall U factor	0.0625 Btu/(h·ft²·°F)
Roof U factor	0.0300 Btu/(h·ft²·°F)
Overall U Value	**0.0557 Btu/(h·ft²·°F)**

Infiltration Rate Per Env. Area	0.200 cfm/ft²			
Air Infiltration & Leakage Volume	2,331 cfm			
Supply Air Flow Rate	7,650 cfm			
Outside Air Flow Rate	3,650 cfm			
Return Air Flow Rate	4,000 cfm			
Cooling Conversion Factor	12 MBtu/h per ton			
Heating Btu Conversion Factor	100.000			
Heating Btu Conversion Unit	MBtu/therm			
Sensible Heat Conversion Factor	1.080 Btu/(h·cfm·°F)			
Overall Heating System Efficiency	80.0%			
Chiller Efficiency	0.85 kW/ton			

UNITS CHART				
Mcf	1,030,000 Btu/Mcf	MBtu/Mcf	1,030 MBtu/Mcf	10.30 therm/Mcf
ccf	103,000 Btu/ccf	MBtu/ccf	103.0 MBtu/ccf	1.03 therm/ccf
cf	1,030 Btu/cf	MBtu/cf	1.030 MBtu/cf	0.0103 therm/cf
therm	100,000 Btu/therm	MBtu/therm	100 MBtu/therm	1 therm
MBtu	1,000 Btu/MBtu	Btu/MBtu	1 MBtu	0.010 therm/MBtu
MMBtu	1,000,000 Btu/MMBtu	MBtu/MMBtu	1,000 MBtu/MMBtu	10 therm/MMBtu
gal (LP Gas)	91,500 Btu/gal	MBtu/gal	91.5 MBtu/gal	0.9150 therm/gal
gal (Fuel Oil #2)	139,000 Btu/gal	MBtu/gal	139 MBtu/gal	1.3900 therm/gal
lbm (Steam)	975 Btu/lbm	MBtu/lbm	0.975 MBtu/lbm	0.00975 therm/lbm
kWh	3,412 Btu/kWh	MBtu/kWh	3.412 MBtu/kWh	0.03412 therm/kWh

Baseline Temperatures	Temperature	Rm Rel Humidity	Enthalpy	Internal Gain	Balance Point	Enthalpy at BP
Baseline Occ Cooling Temperature	72.0°F	40%	24.91 Btu/lbm d.a.	12.0°F	60.0°F	19.39 Btu/lbm d.a.
Baseline UnOcc Cooling Temperature	72.0°F	40%	24.91 Btu/lbm d.a.	7.0°F	65.0°F	21.57 Btu/lbm d.a.
Baseline Occ Heating Temperature	72.0°F			12.0°F	60.0°F	
Baseline UnOcc Heating Temperature	72.0°F			7.0°F	65.0°F	

Proposed Temperatures	Temperature	Rm Rel Humidity	Enthalpy	Internal Gain	Balance Point	Enthalpy at BP
Proposed Occ Cooling Temperature	72.0°F	40%	24.91 Btu/lbm d.a.	12.0°F	60.0°F	19.39 Btu/lbm d.a.
Proposed UnOcc Cooling Temperature	74.0°F	40%	25.93 Btu/lbm d.a.	7.0°F	67.0°F	22.48 Btu/lbm d.a.
Proposed Occ Heating Temperature	72.0°F			12.0°F	60.0°F	
Proposed UnOcc Heating Temperature	68.0°F			7.0°F	61.0°F	

FORMULAS

Sensible Heat Conversion Factor = Dry Air Density × Specific Heat of Dry Air × 60 min/h = 0.075 lbm/ft³ × 0.24 Btu/(lbm·°F) × 60 min/h = 1.08 Btu/(h·cfm·°F)
Overall U Factor [Btu/(h·ft²·°F)] = [(Window U factor × Window Area) + (Wall U factor × Wall Area) + (Roof U factor × Roof Area)] ÷ Total Envelope Area
Infiltration Rate (cfm) = Total Envelope Area × Infiltration & Leakage Rate per Envelope Area
Cooling Balance Point = Cooling Temperature - Internal Gains from Solar, Equipment, and Persons
Heating Balance Point = Heating Temperature - Internal Gains from Solar, Equipment, and Persons

Cooling Load Calculations - Calculated for Each Cooling Bin
Cooling occurs when the Outside Air Temperature is ABOVE the Cooling Balance Point
Mixed Air Temperature = (OA Temperature × OA Flow Rate + Return Air Flow Rate × Cooling Balance Point) ÷ Supply Air Flow Rate, where Return Air Flow Rate = Supply Air Flow Rate - OA Flow Rate
Sensible Heat Ratio = [Specific Heat of Dry Air × (OA Temperature - Cooling Balance Point)] ÷ (Enthalpy of Air at OAT - Enthalpy of Air at Cooling Balance Point and Room Relative Humidity)
Cooling Conduction Load (MBtu/yr) = Overall U Factor × Area × [(OA Temperature - Cooling Balance Point) × Hours in Bin] ÷ 1,000 Btu/MBtu
Cooling Infiltration Load (MBtu/yr) = Sensible Heat Conversion Factor × Infiltration Rate × (OA Temperature - Cooling Balance Point) × Hours in Bin ÷ (Sensible Heat Ratio × 1,000 Btu/MBtu)
Cooling Ventilation Load (MBtu/yr) = Sensible Heat Conversion Factor × OA Flow Rate × [(Mixed Air Temperature - Cooling Balance Point) ÷ Sensible Heat Ratio + Cooling Internal Gain] × Hours in Bin × 1,000 Btu/MBtu when OA Temperature is ABOVE the Cooling Balance Point
Cooling Ventilation Load (MBtu/yr) = Sensible Heat Conversion Factor × OA Flow Rate × Cooling Internal Gain × Hours in Bin ÷ 1,000 Btu/MBtu when OA Temperature is AT OR BELOW the Cooling Balance Point

Heating Load Calculations - Calculated for Each Heating Bin
Heating occurs when the Outside Air Temperature is BELOW the Heating Balance Point
For Ventilation, Heating occurs when the Mixed Air Temperature is BELOW the Heating Balance Point
Mixed Air Temperature = (OA Temperature × OA Flow Rate + Return Air Flow Rate × Heating Balance Point) ÷ Supply Air Flow Rate, where Return Air Flow Rate = Supply Air Flow Rate - OA Flow Rate
Heating Conduction Load (MBtu/yr) = Overall U Factor × Area × [(Heating Balance Point - OA Temperature) × Hours in Bin] ÷ 1,000 Btu/MBtu
Heating Infiltration Load (MBtu/yr) = Sensible Heat Conversion Factor × Infiltration Rate × (Heating Balance Point - OA Temperature) × Hours in Bin ÷ 1,000 Btu/MBtu
Heating Ventilation Load (MBtu/yr) = Sensible Heat Conversion Factor × OA Flow Rate × (Heating Balance Point - Heating Mixed Air Temperature) × Hours in Bin ÷ 1,000 Btu/MBtu

Baseline Cooling Load = Baseline Cooling Conduction Load + Baseline Cooling Infiltration Load + Baseline Cooling Ventilation Load
Proposed Cooling Load = Proposed Cooling Conduction Load + Proposed Cooling Infiltration Load + Proposed Cooling Ventilation Load
Baseline Cooling Energy = (Baseline Cooling Load × Chiller Efficiency) ÷ Cooling Conversion Factor
Proposed Cooling Energy = (Proposed Cooling Load × Chiller Efficiency) ÷ Cooling Conversion Factor
Baseline Heating Load = Baseline Heating Conduction Load + Heating Infiltration Load + Heating Ventilation Load
Proposed Heating Load = Proposed Heating Conduction Load + Heating Infiltration Load + Heating Ventilation Load
Baseline Heating Energy = Baseline Heat Load ÷ (Heating System Efficiency × Heating Btu Conversion Factor)
Proposed Heating Energy = Proposed Heat Load ÷ (Heating System Efficiency × Heating Btu Conversion Factor)

Baseline Occupied Energy Load Calculations										
OA Bin Avg Temperature	Occupied Hours	OA Enthalpy	Mixed Air Temperature	Sensible Heat Ratio	Cooling Conduction	Heating Conduction	Cooling Infiltration	Heating Infiltration	Cooling Ventilation	Heating Ventilation
112.5°F	28 h	39.4 Btu/lbm	85.05°F	0.630	954 MBtu	0 MBtu	5,879 MBtu	0 MBtu	5,716 MBtu	0 MBtu
107.5°F	193 h	36.6 Btu/lbm	82.66°F	0.662	5,947 MBtu	0 MBtu	34,852 MBtu	0 MBtu	35,166 MBtu	0 MBtu
102.5°F	300 h	34.4 Btu/lbm	80.28°F	0.679	8,271 MBtu	0 MBtu	47,251 MBtu	0 MBtu	49,490 MBtu	0 MBtu
97.5°F	274 h	32.6 Btu/lbm	77.89°F	0.681	6,666 MBtu	0 MBtu	37,982 MBtu	0 MBtu	41,335 MBtu	0 MBtu
92.5°F	190 h	31.2 Btu/lbm	75.51°F	0.660	4,006 MBtu	0 MBtu	23,547 MBtu	0 MBtu	26,579 MBtu	0 MBtu
87.5°F	288 h	28.3 Btu/lbm	73.12°F	0.740	5,138 MBtu	0 MBtu	26,931 MBtu	0 MBtu	33,742 MBtu	0 MBtu
82.5°F	299 h	26.3 Btu/lbm	70.74°F	0.781	4,364 MBtu	0 MBtu	21,687 MBtu	0 MBtu	30,345 MBtu	0 MBtu
77.5°F	252 h	24.5 Btu/lbm	68.35°F	0.821	2,861 MBtu	0 MBtu	13,519 MBtu	0 MBtu	22,020 MBtu	0 MBtu
72.5°F	264 h	23.2 Btu/lbm	65.96°F	0.787	2,141 MBtu	0 MBtu	10,563 MBtu	0 MBtu	20,379 MBtu	0 MBtu
67.5°F	290 h	21.4 Btu/lbm	63.58°F	0.894	1,411 MBtu	0 MBtu	6,127 MBtu	0 MBtu	18,295 MBtu	0 MBtu
62.5°F	302 h	19.5 Btu/lbm	61.19°F	5.263	490 MBtu	0 MBtu	361 MBtu	0 MBtu	14,556 MBtu	0 MBtu
57.5°F	122 h	18.3 Btu/lbm	58.81°F	0.000	0 MBtu	198 MBtu	0 MBtu	768 MBtu	0 MBtu	574 MBtu
52.5°F	41 h	16.5 Btu/lbm	56.42°F	0.000	0 MBtu	199 MBtu	0 MBtu	774 MBtu	0 MBtu	578 MBtu
47.5°F	13 h	14.4 Btu/lbm	54.04°F	0.000	0 MBtu	105 MBtu	0 MBtu	409 MBtu	0 MBtu	306 MBtu
42.5°F	4 h	13.4 Btu/lbm	51.65°F	0.000	0 MBtu	45 MBtu	0 MBtu	176 MBtu	0 MBtu	132 MBtu
37.5°F			49.26°F	0.000	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
32.5°F			46.88°F	0.000	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
27.5°F			44.49°F	0.000	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
22.5°F			42.11°F	0.000	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
17.5°F			39.72°F	0.000	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
12.5°F			37.34°F	0.000	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
7.5°F			34.95°F	0.000	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
2.5°F			32.57°F	0.000	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
-2.5°F			30.18°F	0.000	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
-7.5°F			27.79°F	0.000	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
-12.5°F			25.41°F	0.000	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
SUBTOTALS	**2,860 h/yr**				**42,247 MBtu/yr**	**548 MBtu/yr**	**228,699 MBtu/yr**	**2,127 MBtu/yr**	**297,623 MBtu/yr**	**1,589 MBtu/yr**

Baseline Unoccupied Energy Load Calculations										
OA Bin Avg Temperature	UnOccupied Hours	OA Enthalpy	Mixed Air Temperature	Sensible Heat Ratio	Cooling Conduction	Heating Conduction	Cooling Infiltration	Heating Infiltration	Cooling Ventilation	Heating Ventilation
112.5°F	5 h	35.5 Btu/lbm	87.66°F	0.818	154 MBtu	0 MBtu	731 MBtu	0 MBtu	684 MBtu	0 MBtu
107.5°F	104 h	36.9 Btu/lbm	85.28°F	0.665	2,867 MBtu	0 MBtu	16,729 MBtu	0 MBtu	15,367 MBtu	0 MBtu
102.5°F	149 h	36.1 Btu/lbm	82.89°F	0.619	3,625 MBtu	0 MBtu	22,718 MBtu	0 MBtu	21,083 MBtu	0 MBtu
97.5°F	254 h	34.1 Btu/lbm	80.51°F	0.622	5,355 MBtu	0 MBtu	33,398 MBtu	0 MBtu	31,958 MBtu	0 MBtu
92.5°F	263 h	32.8 Btu/lbm	78.12°F	0.588	4,692 MBtu	0 MBtu	30,994 MBtu	0 MBtu	30,411 MBtu	0 MBtu
87.5°F	513 h	31.1 Btu/lbm	75.74°F	0.566	7,488 MBtu	0 MBtu	51,308 MBtu	0 MBtu	52,485 MBtu	0 MBtu
82.5°F	604 h	28.8 Btu/lbm	73.35°F	0.581	6,857 MBtu	0 MBtu	45,836 MBtu	0 MBtu	50,908 MBtu	0 MBtu
77.5°F	568 h	26.8 Btu/lbm	70.96°F	0.573	4,582 MBtu	0 MBtu	31,022 MBtu	0 MBtu	38,766 MBtu	0 MBtu
72.5°F	514 h	24.8 Btu/lbm	68.58°F	0.557	2,501 MBtu	0 MBtu	17,438 MBtu	0 MBtu	27,219 MBtu	0 MBtu
67.5°F	618 h	22.7 Btu/lbm	66.19°F	0.529	1,002 MBtu	0 MBtu	7,352 MBtu	0 MBtu	22,545 MBtu	0 MBtu
62.5°F	792 h	20.9 Btu/lbm	63.81°F	0.000	0 MBtu	1,284 MBtu	0 MBtu	4,985 MBtu	0 MBtu	3,724 MBtu
57.5°F	676 h	19.1 Btu/lbm	61.42°F	0.000	0 MBtu	3,289 MBtu	0 MBtu	12,765 MBtu	0 MBtu	9,536 MBtu
52.5°F	544 h	17.3 Btu/lbm	59.04°F	0.000	0 MBtu	4,411 MBtu	0 MBtu	17,120 MBtu	0 MBtu	12,790 MBtu
47.5°F	222 h	15.1 Btu/lbm	56.65°F	0.000	0 MBtu	2,520 MBtu	0 MBtu	9,781 MBtu	0 MBtu	7,307 MBtu
42.5°F	74 h	13.1 Btu/lbm	54.26°F	0.000	0 MBtu	1,080 MBtu	0 MBtu	4,192 MBtu	0 MBtu	3,132 MBtu
37.5°F	3 h	12.2 Btu/lbm	51.88°F	0.000	0 MBtu	54 MBtu	0 MBtu	208 MBtu	0 MBtu	155 MBtu
32.5°F			49.49°F	0.000	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
27.5°F			47.11°F	0.000	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
22.5°F			44.72°F	0.000	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
17.5°F			42.34°F	0.000	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
12.5°F			39.95°F	0.000	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
7.5°F			37.57°F	0.000	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
2.5°F			35.18°F	0.000	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
-2.5°F			32.79°F	0.000	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
-7.5°F			30.41°F	0.000	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
-12.5°F			28.02°F	0.000	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
TOTALS	**5,900 h/yr**				**39,122 MBtu/yr**	**12,639 MBtu/yr**	**257,526 MBtu/yr**	**49,051 MBtu/yr**	**291,417 MBtu/yr**	**36,643 MBtu/yr**

Total Baseline Energy Load Calculations (Occupied and UnOccupied)										
OA Temperature	Total Hours				Cooling Conduction	Heating Conduction	Cooling Infiltration	Heating Infiltration	Cooling Ventilation	Heating Ventilation
112.5°F	33 h				1,108 MBtu	0 MBtu	6,610 MBtu	0 MBtu	6,400 MBtu	0 MBtu
107.5°F	297 h				8,814 MBtu	0 MBtu	51,582 MBtu	0 MBtu	50,533 MBtu	0 MBtu
102.5°F	449 h				11,896 MBtu	0 MBtu	69,969 MBtu	0 MBtu	70,572 MBtu	0 MBtu
97.5°F	528 h				12,021 MBtu	0 MBtu	71,380 MBtu	0 MBtu	73,294 MBtu	0 MBtu
92.5°F	453 h				8,698 MBtu	0 MBtu	54,542 MBtu	0 MBtu	56,990 MBtu	0 MBtu
87.5°F	801 h				12,626 MBtu	0 MBtu	78,239 MBtu	0 MBtu	86,227 MBtu	0 MBtu
82.5°F	903 h				11,221 MBtu	0 MBtu	67,523 MBtu	0 MBtu	81,253 MBtu	0 MBtu
77.5°F	817 h				7,442 MBtu	0 MBtu	44,542 MBtu	0 MBtu	60,786 MBtu	0 MBtu
72.5°F	778 h				4,642 MBtu	0 MBtu	28,001 MBtu	0 MBtu	47,589 MBtu	0 MBtu
67.5°F	908 h				2,413 MBtu	0 MBtu	13,479 MBtu	0 MBtu	40,840 MBtu	0 MBtu
62.5°F	1,094 h				490 MBtu	1,284 MBtu	361 MBtu	4,985 MBtu	14,556 MBtu	3,724 MBtu
57.5°F	798 h				0 MBtu	3,487 MBtu	0 MBtu	13,533 MBtu	0 MBtu	10,109 MBtu
52.5°F	585 h				0 MBtu	4,611 MBtu	0 MBtu	17,895 MBtu	0 MBtu	13,368 MBtu
47.5°F	235 h				0 MBtu	2,626 MBtu	0 MBtu	10,190 MBtu	0 MBtu	7,613 MBtu
42.5°F	78 h				0 MBtu	1,126 MBtu	0 MBtu	4,368 MBtu	0 MBtu	3,263 MBtu
37.5°F	3 h				0 MBtu	54 MBtu	0 MBtu	208 MBtu	0 MBtu	155 MBtu
32.5°F	0 h				0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
27.5°F	0 h				0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
22.5°F	0 h				0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
17.5°F	0 h				0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
12.5°F	0 h				0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
7.5°F	0 h				0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
2.5°F	0 h				0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
-2.5°F	0 h				0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
-7.5°F	0 h				0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
-12.5°F	0 h				0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
TOTALS	**8,760 h/yr**				**81,370 MBtu/yr**	**13,187 MBtu/yr**	**486,225 MBtu/yr**	**51,178 MBtu/yr**	**589,040 MBtu/yr**	**38,232 MBtu/yr**

Proposed Occupied Energy Load Calculations										
OA Bin Avg Temperature	Occupied Hours	OA Enthalpy	Mixed Air Temperature	Sensible Heat Ratio	Cooling Conduction	Heating Conduction	Cooling Infiltration	Heating Infiltration	Cooling Ventilation	Heating Ventilation
112.5°F	28 h	39.4 Btu/lbm	85.05°F	0.630	954 MBtu	0 MBtu	5,879 MBtu	0 MBtu	5,716 MBtu	0 MBtu
107.5°F	193 h	36.6 Btu/lbm	82.66°F	0.662	5,947 MBtu	0 MBtu	34,852 MBtu	0 MBtu	35,166 MBtu	0 MBtu
102.5°F	300 h	34.4 Btu/lbm	80.28°F	0.679	8,271 MBtu	0 MBtu	47,251 MBtu	0 MBtu	49,490 MBtu	0 MBtu
97.5°F	274 h	32.6 Btu/lbm	77.89°F	0.681	6,666 MBtu	0 MBtu	37,982 MBtu	0 MBtu	41,335 MBtu	0 MBtu
92.5°F	190 h	31.2 Btu/lbm	75.51°F	0.660	4,006 MBtu	0 MBtu	23,547 MBtu	0 MBtu	26,579 MBtu	0 MBtu
87.5°F	288 h	28.3 Btu/lbm	73.12°F	0.740	5,138 MBtu	0 MBtu	26,931 MBtu	0 MBtu	33,742 MBtu	0 MBtu
82.5°F	299 h	26.3 Btu/lbm	70.74°F	0.781	4,364 MBtu	0 MBtu	21,687 MBtu	0 MBtu	30,345 MBtu	0 MBtu
77.5°F	252 h	24.5 Btu/lbm	68.35°F	0.821	2,861 MBtu	0 MBtu	13,519 MBtu	0 MBtu	22,020 MBtu	0 MBtu
72.5°F	264 h	23.2 Btu/lbm	65.96°F	0.787	2,141 MBtu	0 MBtu	10,563 MBtu	0 MBtu	20,379 MBtu	0 MBtu
67.5°F	290 h	21.4 Btu/lbm	63.58°F	0.894	1,411 MBtu	0 MBtu	6,127 MBtu	0 MBtu	18,295 MBtu	0 MBtu
62.5°F	302 h	19.5 Btu/lbm	61.19°F	5.263	490 MBtu	0 MBtu	361 MBtu	0 MBtu	14,556 MBtu	0 MBtu
57.5°F	122 h	18.3 Btu/lbm	58.81°F	0.000	0 MBtu	198 MBtu	0 MBtu	768 MBtu	0 MBtu	574 MBtu
52.5°F	41 h	16.5 Btu/lbm	56.42°F	0.000	0 MBtu	199 MBtu	0 MBtu	774 MBtu	0 MBtu	578 MBtu
47.5°F	13 h	14.4 Btu/lbm	54.04°F	0.000	0 MBtu	105 MBtu	0 MBtu	409 MBtu	0 MBtu	306 MBtu
42.5°F	4 h	13.4 Btu/lbm	51.65°F	0.000	0 MBtu	45 MBtu	0 MBtu	176 MBtu	0 MBtu	132 MBtu
37.5°F	0 h	0.0 Btu/lbm	49.26°F	0.000	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
32.5°F	0 h	0.0 Btu/lbm	46.88°F	0.000	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
27.5°F	0 h	0.0 Btu/lbm	44.49°F	0.000	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
22.5°F	0 h	0.0 Btu/lbm	42.11°F	0.000	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
17.5°F	0 h	0.0 Btu/lbm	39.72°F	0.000	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
12.5°F	0 h	0.0 Btu/lbm	37.34°F	0.000	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
7.5°F	0 h	0.0 Btu/lbm	34.95°F	0.000	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
2.5°F	0 h	0.0 Btu/lbm	32.57°F	0.000	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
-2.5°F	0 h	0.0 Btu/lbm	30.18°F	0.000	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
-7.5°F	0 h	0.0 Btu/lbm	27.79°F	0.000	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
-12.5°F	0 h	0.0 Btu/lbm	25.41°F	0.000	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
TOTALS	2,860 h/yr				42,247 MBtu/yr	548 MBtu/yr	228,699 MBtu/yr	2,127 MBtu/yr	297,623 MBtu/yr	1,589 MBtu/yr

Proposed Unoccupied Energy Load Calculations										
OA Bin Avg Temperature	UnOccupied Hours	OA Enthalpy	Mixed Air Temperature	Sensible Heat Ratio	Cooling Conduction	Heating Conduction	Cooling Infiltration	Heating Infiltration	Cooling Ventilation	Heating Ventilation
112.5°F	5 h	35.5 Btu/lbm	88.71°F	0.839	148 MBtu	0 MBtu	683 MBtu	0 MBtu	648 MBtu	0 MBtu
107.5°F	104 h	36.9 Btu/lbm	86.32°F	0.674	2,732 MBtu	0 MBtu	15,728 MBtu	0 MBtu	14,619 MBtu	0 MBtu
102.5°F	149 h	36.1 Btu/lbm	83.94°F	0.626	3,431 MBtu	0 MBtu	21,283 MBtu	0 MBtu	20,011 MBtu	0 MBtu
97.5°F	254 h	34.1 Btu/lbm	81.55°F	0.630	5,026 MBtu	0 MBtu	30,952 MBtu	0 MBtu	30,131 MBtu	0 MBtu
92.5°F	263 h	32.8 Btu/lbm	79.17°F	0.593	4,351 MBtu	0 MBtu	28,462 MBtu	0 MBtu	28,519 MBtu	0 MBtu
87.5°F	513 h	31.1 Btu/lbm	76.78°F	0.571	6,822 MBtu	0 MBtu	46,368 MBtu	0 MBtu	48,794 MBtu	0 MBtu
82.5°F	604 h	28.8 Btu/lbm	74.40°F	0.589	6,073 MBtu	0 MBtu	40,019 MBtu	0 MBtu	46,563 MBtu	0 MBtu
77.5°F	565 h	26.8 Btu/lbm	72.01°F	0.584	3,848 MBtu	0 MBtu	25,581 MBtu	0 MBtu	34,701 MBtu	0 MBtu
72.5°F	514 h	24.8 Btu/lbm	69.62°F	0.570	1,834 MBtu	0 MBtu	12,488 MBtu	0 MBtu	23,512 MBtu	0 MBtu
67.5°F	618 h	22.7 Btu/lbm	67.24°F	0.556	200 MBtu	0 MBtu	1,400 MBtu	0 MBtu	18,099 MBtu	0 MBtu
62.5°F	792 h	20.9 Btu/lbm	61.72°F	0.000	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
57.5°F	676 h	19.1 Btu/lbm	59.33°F	0.000	0 MBtu	1,535 MBtu	0 MBtu	5,957 MBtu	0 MBtu	4,450 MBtu
52.5°F	544 h	17.3 Btu/lbm	56.94°F	0.000	0 MBtu	3,000 MBtu	0 MBtu	11,642 MBtu	0 MBtu	8,697 MBtu
47.5°F	222 h	15.1 Btu/lbm	54.56°F	0.000	0 MBtu	1,944 MBtu	0 MBtu	7,546 MBtu	0 MBtu	5,637 MBtu
42.5°F	74 h	13.1 Btu/lbm	52.17°F	0.000	0 MBtu	888 MBtu	0 MBtu	3,447 MBtu	0 MBtu	2,575 MBtu
37.5°F	3 h	12.2 Btu/lbm	49.79°F	0.000	0 MBtu	46 MBtu	0 MBtu	177 MBtu	0 MBtu	133 MBtu
32.5°F	0 h	0.0 Btu/lbm	47.40°F	0.000	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
27.5°F	0 h	0.0 Btu/lbm	45.02°F	0.000	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
22.5°F	0 h	0.0 Btu/lbm	42.63°F	0.000	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
17.5°F	0 h	0.0 Btu/lbm	40.25°F	0.000	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
12.5°F	0 h	0.0 Btu/lbm	37.86°F	0.000	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
7.5°F	0 h	0.0 Btu/lbm	35.47°F	0.000	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
2.5°F	0 h	0.0 Btu/lbm	33.09°F	0.000	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
-2.5°F	0 h	0.0 Btu/lbm	30.70°F	0.000	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
-7.5°F	0 h	0.0 Btu/lbm	28.32°F	0.000	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
-12.5°F	0 h	0.0 Btu/lbm	25.93°F	0.000	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
TOTALS	5,900 h/yr				34,466 MBtu/yr	7,413 MBtu/yr	222,963 MBtu/yr	28,768 MBtu/yr	265,598 MBtu/yr	21,491 MBtu/yr

Total Proposed Energy Load Calculations (Occupied and UnOccupied)										
OA Bin Avg Temperature	Total Hours				Cooling Conduction	Heating Conduction	Cooling Infiltration	Heating Infiltration	Cooling Ventilation	Heating Ventilation
112.5°F	33 h				1,101 MBtu	0 MBtu	6,561 MBtu	0 MBtu	6,364 MBtu	0 MBtu
107.5°F	297 h				8,679 MBtu	0 MBtu	50,580 MBtu	0 MBtu	49,785 MBtu	0 MBtu
102.5°F	449 h				11,702 MBtu	0 MBtu	68,534 MBtu	0 MBtu	69,500 MBtu	0 MBtu
97.5°F	528 h				11,691 MBtu	0 MBtu	68,933 MBtu	0 MBtu	71,466 MBtu	0 MBtu
92.5°F	453 h				8,356 MBtu	0 MBtu	52,009 MBtu	0 MBtu	55,098 MBtu	0 MBtu
87.5°F	801 h				11,960 MBtu	0 MBtu	73,299 MBtu	0 MBtu	82,537 MBtu	0 MBtu
82.5°F	903 h				10,437 MBtu	0 MBtu	61,706 MBtu	0 MBtu	76,908 MBtu	0 MBtu
77.5°F	817 h				6,709 MBtu	0 MBtu	39,101 MBtu	0 MBtu	56,721 MBtu	0 MBtu
72.5°F	778 h				3,975 MBtu	0 MBtu	23,051 MBtu	0 MBtu	43,891 MBtu	0 MBtu
67.5°F	908 h				1,611 MBtu	0 MBtu	7,527 MBtu	0 MBtu	36,395 MBtu	0 MBtu
62.5°F	1,094 h				490 MBtu	0 MBtu	361 MBtu	0 MBtu	14,556 MBtu	0 MBtu
57.5°F	798 h				0 MBtu	1,733 MBtu	0 MBtu	6,725 MBtu	0 MBtu	5,024 MBtu
52.5°F	585 h				0 MBtu	3,199 MBtu	0 MBtu	12,416 MBtu	0 MBtu	9,275 MBtu
47.5°F	235 h				0 MBtu	2,050 MBtu	0 MBtu	7,955 MBtu	0 MBtu	5,942 MBtu
42.5°F	78 h				0 MBtu	933 MBtu	0 MBtu	3,623 MBtu	0 MBtu	2,707 MBtu
37.5°F	3 h				0 MBtu	46 MBtu	0 MBtu	177 MBtu	0 MBtu	133 MBtu
32.5°F	0 h				0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
27.5°F	0 h				0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
22.5°F	0 h				0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
17.5°F	0 h				0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
12.5°F	0 h				0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
7.5°F	0 h				0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
2.5°F	0 h				0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
-2.5°F	0 h				0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
-7.5°F	0 h				0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
-12.5°F	0 h				0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu	0 MBtu
TOTALS	8,760 h/yr				76,713 MBtu/yr	7,961 MBtu/yr	451,663 MBtu/yr	30,896 MBtu/yr	563,220 MBtu/yr	23,081 MBtu/yr

Investment Grade Audit

FIM 2C: HVAC BMS Upgrade – Fan VFD Controls

FIM #: 3
Title: Complete BMS upgrade
Project: Coachella Valley Mosquito vector Control District
Site: 43-420 trader Pl. Indio, CA 92201

Description: Currently the AHU's on the lab building have no functional VFD's installed. Will integrate them into the BMS upgrade and reduce load based on demand.

SUMMARY	BASELINE	PROPOSED	SAVINGS	% SAVINGS
Electric Energy, kWh/yr	43,564	17,491	26,073	59.8%
Electric Energy Cost	$7,355/yr	$2,953/yr	$4,402/yr	

Unit Tag	Baseline Usage	Baseline Electric Cost	Proposed Usage	Proposed Electric Cost	Usage Savings	Electric Cost Savings
AHU-1	36,304 kWh/yr	$6,129/yr	14,575 kWh/yr	$2,461/yr	21,729 kWh/yr	$3,668/yr
AHU-2	7,260 kWh/yr	$1,226/yr	2,916 kWh/yr	$492/yr	4,344 kWh/yr	$734/yr
-	0 kWh/yr	$0/yr	0 kWh/yr	$0/yr	0 kWh/yr	$0/yr
-	0 kWh/yr	$0/yr	0 kWh/yr	$0/yr	0 kWh/yr	$0/yr
-	0 kWh/yr	$0/yr	0 kWh/yr	$0/yr	0 kWh/yr	$0/yr
-	0 kWh/yr	$0/yr	0 kWh/yr	$0/yr	0 kWh/yr	$0/yr
-	0 kWh/yr	$0/yr	0 kWh/yr	$0/yr	0 kWh/yr	$0/yr
-	0 kWh/yr	$0/yr	0 kWh/yr	$0/yr	0 kWh/yr	$0/yr
-	0 kWh/yr	$0/yr	0 kWh/yr	$0/yr	0 kWh/yr	$0/yr
TOTALS	43,564 kWh/yr	$7,355/yr	17,491 kWh/yr	$2,953/yr	26,073 kWh/yr	$4,402/yr

INPUTS	
Electric Energy Cost	$0.1688/kWh

Fan Description	Quantity of Fans	Motor Size	Motor Load Factor	Nameplate Motor Efficiency	Cooling "ON" Temperature	Cooling Max. Flow Temperature	Heating "ON" Temperature	Heating Max. Flow Temperature	Min. VFD Speed	Baseline Flow Control Method Code	Proposed Flow Control Method Code
AHU-1	1	5 hp	100%	90.0%	65.0°F	90.0°F	55.0°F	30.0°F	40%	1	7
AHU-2	1	1 hp	100%	90.0%	65.0°F	90.0°F	55.0°F	30.0°F	40%	1	7
				90.0%	60.0°F					1	1
				90.0%	60.0°F					1	1
				90.0%	60.0°F					1	1
				90.0%	60.0°F					1	1
				90.0%	60.0°F					1	1
				90.0%	60.0°F					1	1
				90.0%	60.0°F					1	1

Flow Control Method	Fan/Control	Q^3 Coefficient	Q^2 Coefficient	Q Coefficient	Y-intercept	Power Equation
1	Constant Volume	0	0	0	1	P = 100%
2	Discharge Damper for FC Fan	0	0.5	0.31	0.190667	$P = 0Q^3 + 0.5Q^2 + 0.31Q + 0.190667$
3	Discharge Damper for BC or AF Fan	0	-0.410714	1.178929	0.227143	$P = 0Q^3 + -0.410714Q^2 + 1.178929Q + 0.227143$
4	Inlet Vane for FC Fan	0	1.495671	-0.848139	0.339619	$P = 0Q^3 + 1.495671Q^2 + -0.848139Q + 0.339619$
5	Inlet Vane for BC or AF Fan	0	0.970238	-0.579167	0.584345	$P = 0Q^3 + 0.970238Q^2 + -0.579167Q + 0.584345$
6	Variable Pitch for Vane Axial Fan	0	1.6104	-0.9691	0.3544	$P = 0Q^3 + 1.6104Q^2 + -0.9691Q + 0.3544$
7	VFD on All Fan Types and Pumps	0	1.652597	-0.874784	0.219762	$P = 0Q^3 + 1.652597Q^2 + -0.874784Q + 0.219762$
8	MultiZone VAV VSD Fixed Static P	-0.0998	0.9506	0.147	0.0013	$P = -0.0998Q^3 + 0.9506Q^2 + 0.147Q + 0.0013$
9	MultiZone VAV VSD Static P Reset	0.9437	-0.0729	0.0881	0.04076	$P = 0.9437Q^3 + -0.0729Q^2 + 0.0881Q + 0.04076$
10	Centrifugal Pump w/ Throttle Valve	0	-0.18996	0.63701	0.55218	$P = 0Q^3 + -0.18996Q^2 + 0.63701Q + 0.55218$
11	User Defined 1 - Enter Coefficients	0	0.5625	0.0375	0.395	$P = 0Q^3 + 0.5625Q^2 + 0.0375Q + 0.395$
12	User Defined 2 - Enter %Pwr Below	0.4402	0.6419	-0.0872	0.0054	$P = 0.4402Q^3 + 0.6419Q^2 + -0.0872Q + 0.0054$

FORMULAS

Calculations for Each Temperature Bin

Fraction of Peak Cooling Load [Calculated for Each Cooling Bin] = (Cooling On Temperature - BIN OA Avg. Temperature) ÷ (Cooling On Temperature - Cooling Max Flow Design Temperature)
Fraction of Peak Heating Load [Calculated for Each Heating Bin] = (Heating On Temperature - BIN OA Avg. Temperature) ÷ (Heating On Temperature - Heating Max Flow Design Temperature)
Fraction of Total Flow = Maximum of the Fractions of Peak Heating and Peak Cooling Loads, Between the Limits of 100% Flow and the Minimum VFD Speed
Fraction of Baseline Power [For Selected Baseline Flow Control Method] = Q^3 Coefficient × (Fraction of Total Flow)^3 + Q^2 Coefficient × (Fraction of Total Flow)^2 + Q Coefficient × Fraction of Total Flow + Y-Intercept
Fraction of Proposed Power [For Each Bin for Selected Proposed Flow Control Method] = Q^3 Coefficient × (Fraction of Total Flow)^3 + Q^2 Coefficient × (Fraction of Total Flow)^2 + Q Coefficient × Fraction of Total Flow + Y-Intercept
Baseline Fan Load Per Fan (hp) = Fraction of Baseline Power × Motor Size × Motor Load Factor ÷ Motor Efficiency
Proposed Fan Load Per Fan (hp) = Fraction of Proposed Power × Motor Size × Motor Load Factor ÷ Motor Efficiency
Baseline Energy Usage (kWh) = Baseline Fan Load Per Fan × Qty of Fans × Hours in Bin × 0.746 kW/hp
Proposed Energy Usage (kWh) = Proposed Fan Load Per Fan × Qty of Fans × Hours in Bin × 0.746 kW/hp
Energy Savings (kWh) = Baseline Energy Usage - Proposed Energy Usage

Fan ID	OA Temp Bins	OA Avg. Temperature	Bin Hours	Fraction of Peak Cooling Load	Fraction of Peak Heating Load	Total % Flow	Baseline % Power	Baseline Fan Load Per Fan	Baseline Energy Usage	Proposed % Power	Proposed Fan Load per Fan	Proposed Energy Usage	Energy Savings
AHU-1	110 to 115	112.5°F	33 h	190%	0%	100.0%	100.0%	5.56 hp	137 kWh	99.8%	5.54 hp	136 kWh	1 kWh
	105 to 110	107.5°F	297 h	170%	0%	100.0%	100.0%	5.56 hp	1,231 kWh	99.8%	5.54 hp	1,228 kWh	3 kWh
	100 to 105	102.5°F	449 h	150%	0%	100.0%	100.0%	5.56 hp	1,861 kWh	99.8%	5.54 hp	1,856 kWh	5 kWh
	95 to 100	97.5°F	528 h	130%	0%	100.0%	100.0%	5.56 hp	2,188 kWh	99.8%	5.54 hp	2,183 kWh	5 kWh
	90 to 95	92.5°F	453 h	110%	0%	100.0%	100.0%	5.56 hp	1,877 kWh	99.8%	5.54 hp	1,873 kWh	4 kWh
	85 to 90	87.5°F	801 h	90%	0%	90.0%	100.0%	5.56 hp	3,320 kWh	77.1%	4.28 hp	2,560 kWh	760 kWh
	80 to 85	82.5°F	903 h	70%	0%	70.0%	100.0%	5.56 hp	3,742 kWh	41.7%	2.32 hp	1,561 kWh	2,181 kWh
	75 to 80	77.5°F	817 h	50%	0%	50.0%	100.0%	5.56 hp	3,386 kWh	19.6%	1.09 hp	662 kWh	2,724 kWh
	70 to 75	72.5°F	778 h	30%	0%	40.0%	100.0%	5.56 hp	3,224 kWh	13.4%	0.75 hp	433 kWh	2,791 kWh
	65 to 70	67.5°F	908 h	10%	0%	40.0%	100.0%	5.56 hp	3,763 kWh	13.4%	0.75 hp	505 kWh	3,258 kWh
	60 to 65	62.5°F	1,094 h	0%	0%	40.0%	100.0%	5.56 hp	4,534 kWh	13.4%	0.75 hp	609 kWh	3,925 kWh
	55 to 60	57.5°F	798 h	0%	0%	40.0%	100.0%	5.56 hp	3,307 kWh	13.4%	0.75 hp	444 kWh	2,863 kWh
	50 to 55	52.5°F	585 h	0%	10%	40.0%	100.0%	5.56 hp	2,425 kWh	13.4%	0.75 hp	326 kWh	2,099 kWh
	45 to 50	47.5°F	235 h	0%	30%	40.0%	100.0%	5.56 hp	974 kWh	13.4%	0.75 hp	131 kWh	843 kWh
	40 to 45	42.5°F	78 h	0%	50%	50.0%	100.0%	5.56 hp	323 kWh	19.6%	1.09 hp	63 kWh	260 kWh
	35 to 40	37.5°F	3 h	0%	70%	70.0%	100.0%	5.56 hp	12 kWh	41.7%	2.32 hp	5 kWh	7 kWh
	30 to 35	32.5°F		0%	90%	90.0%	100.0%	5.56 hp	0 kWh	77.1%	4.28 hp	0 kWh	0 kWh
	25 to 30	27.5°F		0%	100%	100.0%	100.0%	5.56 hp	0 kWh	99.8%	5.54 hp	0 kWh	0 kWh
				0%	100%	100.0%	100.0%	5.56 hp	0 kWh	99.8%	5.54 hp	0 kWh	0 kWh
				0%	100%	100.0%	100.0%	5.56 hp	0 kWh	99.8%	5.54 hp	0 kWh	0 kWh
				0%	100%	100.0%	100.0%	5.56 hp	0 kWh	99.8%	5.54 hp	0 kWh	0 kWh
SUBTOTALS FOR	AHU-1		8,760 h						36,304 kWh/yr			14,575 kWh/yr	21,729 kWh/yr
AHU-2	110 to 115	112.5°F	33 h	190%	0%	100.0%	100.0%	1.11 hp	27 kWh	99.8%	1.11 hp	27 kWh	0 kWh
	105 to 110	107.5°F	297 h	170%	0%	100.0%	100.0%	1.11 hp	246 kWh	99.8%	1.11 hp	246 kWh	0 kWh
	100 to 105	102.5°F	449 h	150%	0%	100.0%	100.0%	1.11 hp	372 kWh	99.8%	1.11 hp	371 kWh	1 kWh
	95 to 100	97.5°F	528 h	130%	0%	100.0%	100.0%	1.11 hp	438 kWh	99.8%	1.11 hp	437 kWh	1 kWh
	90 to 95	92.5°F	453 h	110%	0%	100.0%	100.0%	1.11 hp	375 kWh	99.8%	1.11 hp	375 kWh	0 kWh
	85 to 90	87.5°F	801 h	90%	0%	90.0%	100.0%	1.11 hp	664 kWh	77.1%	0.86 hp	512 kWh	152 kWh
	80 to 85	82.5°F	903 h	70%	0%	70.0%	100.0%	1.11 hp	748 kWh	41.7%	0.46 hp	312 kWh	436 kWh
	75 to 80	77.5°F	817 h	50%	0%	50.0%	100.0%	1.11 hp	677 kWh	19.6%	0.22 hp	132 kWh	545 kWh
	70 to 75	72.5°F	778 h	30%	0%	40.0%	100.0%	1.11 hp	645 kWh	13.4%	0.15 hp	87 kWh	558 kWh
	65 to 70	67.5°F	908 h	10%	0%	40.0%	100.0%	1.11 hp	753 kWh	13.4%	0.15 hp	101 kWh	652 kWh
	60 to 65	62.5°F	1,094 h	0%	0%	40.0%	100.0%	1.11 hp	907 kWh	13.4%	0.15 hp	122 kWh	785 kWh
	55 to 60	57.5°F	798 h	0%	0%	40.0%	100.0%	1.11 hp	661 kWh	13.4%	0.15 hp	89 kWh	572 kWh
	50 to 55	52.5°F	585 h	0%	10%	40.0%	100.0%	1.11 hp	485 kWh	13.4%	0.15 hp	65 kWh	420 kWh
	45 to 50	47.5°F	235 h	0%	30%	40.0%	100.0%	1.11 hp	195 kWh	13.4%	0.15 hp	26 kWh	169 kWh
	40 to 45	42.5°F	78 h	0%	50%	50.0%	100.0%	1.11 hp	65 kWh	19.6%	0.22 hp	13 kWh	52 kWh
	35 to 40	37.5°F	3 h	0%	70%	70.0%	100.0%	1.11 hp	2 kWh	41.7%	0.46 hp	1 kWh	1 kWh
	30 to 35	32.5°F	0 h	0%	90%	90.0%	100.0%	1.11 hp	0 kWh	77.1%	0.86 hp	0 kWh	0 kWh
	25 to 30	27.5°F	0 h	0%	100%	100.0%	100.0%	1.11 hp	0 kWh	99.8%	1.11 hp	0 kWh	0 kWh
	0	0.0°F	0 h	0%	100%	100.0%	100.0%	1.11 hp	0 kWh	99.8%	1.11 hp	0 kWh	0 kWh
	0	0.0°F	0 h	0%	100%	100.0%	100.0%	1.11 hp	0 kWh	99.8%	1.11 hp	0 kWh	0 kWh
	0	0.0°F	0 h	0%	100%	100.0%	100.0%	1.11 hp	0 kWh	99.8%	1.11 hp	0 kWh	0 kWh
SUBTOTALS FOR	AHU-2		8,760 h						7,260 kWh/yr			2,916 kWh/yr	4,344 kWh/yr

FIM 3: New Solar Installation for Lab Meter

(RMCP Bov 540) PFA CV Mosquito Coast (no utility upgrade) (5.8.24)

Coachella Valley Mosquito & Vector Control, 43420 Trader Pl, Indio CA 92201

Report

Project Name	Coachella Valley Mosquito & Vector Control
Project Address	43420 Trader Pl, Indio CA 92201
Prepared By	Derek Brosch derek.brosch@centrica.com

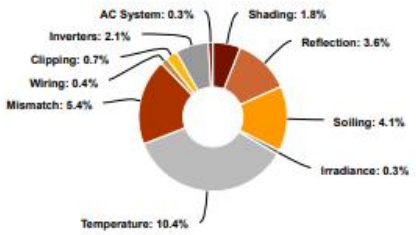
System Metrics

Design	(RMCP Bov 540) PFA CV Mosquito Coast (no utility upgrade) (5.8.24)
Module DC Nameplate	210.1 kW
Inverter AC Nameplate	197.0 kW Load Ratio: 1.07
Annual Production	326.2 MWh
Performance Ratio	74.2%
kWh/kWp	1,553.1
Weather Dataset	TMY, PALM SPRINGS THERMAL AP, NSRDB (tmy3, II)
Simulator Version	fb8d1addf1-a17db0e374-3b86ecbc4e-6ac4a3c4bd

Project Location

Monthly Production

Sources of System Loss



Annual Production

	Description	Output	% Delta
Irradiance (kWh/m²)	Annual Global Horizontal Irradiance	2,096.3	
	POA Irradiance	2,092.4	-0.2%
	Shaded Irradiance	2,055.6	-1.8%
	Irradiance after Reflection	1,982.1	-3.6%
	Irradiance after Soiling	1,900.8	-4.1%
	Total Collector Irradiance	**1,900.4**	**0.0%**
Energy (kWh)	Nameplate	399,935.4	
	Output at Irradiance Levels	398,895.3	-0.3%
	Output at Cell Temperature Derate	357,543.4	-10.4%
	Output After Mismatch	338,058.0	-5.4%
	Optimal DC Output	336,608.5	-0.4%
	Constrained DC Output	334,161.4	-0.7%
	Inverter Output	327,182.3	-2.1%
	Energy to Grid	**326,235.5**	**-0.3%**
Temperature Metrics			
	Avg. Operating Ambient Temp		28.0 °C
	Avg. Operating Cell Temp		42.1 °C
Simulation Metrics			
	Operating Hours		4385
	Solved Hours		4385

Condition Set

Description	CBS Standard											
Weather Dataset	TMY, PALM SPRINGS THERMAL AP, NSRDB (tmy3, II)											
Solar Angle Location	Meteo Lat/Lng											
Transposition Model	Perez Model											
Temperature Model	Sandia Model											
Temperature Model Parameters	Rack Type	a	b	Temperature Delta								
	Fixed Tilt	-3.56	-0.075	3°C								
	Flush Mount	-2.81	-0.0455	0°C								
	East-West	-3.56	-0.075	3°C								
	Carport	-3.56	-0.075	3°C								
Soiling (%)	J	F	M	A	M	J	J	A	S	O	N	D
	3	3	3	3	5	5	5	5	5	3	3	3
Irradiation Variance	5%											
Cell Temperature Spread	4° C											
Module Binning Range	-2.5% to 2.5%											
AC System Derate	0.50%											
Trackers	Maximum Angle			Backtracking								
	60°			Enabled								
Module Characterizations	Module			Uploaded By				Characterization				
	BVM7612M-540-H-HC-BF (1000V) (Boviet)			HelioScope				Spec Sheet Characterization, PAN				
Component Characterizations	Device				Uploaded By			Characterization				
	CPS SCA25KTL-DO-R/US-480 (Chint Power)				HelioScope			Spec Sheet				
	CPS SCA36KTL-DO/US-480 (2023) (CPS)				HelioScope			Spec Sheet				
	CPS SCA50KTL-DO/US-480 (2022) (CPS)				HelioScope			Spec Sheet				

Components

Component	Name	Count
Inverters	CPS SCA25KTL-DO-R/US-480 (Chint Power)	3 (75.0 kW)
Inverters	CPS SCA36KTL-DO/US-480 (2023) (CPS)	2 (72.0 kW)
Inverters	CPS SCA50KTL-DO/US-480 (2022) (CPS)	1 (50.0 kW)
AC Home Runs	1/0 AWG (Aluminum)	6 (4,828.0 ft)
Strings	10 AWG (Copper)	25 (1,479.8 ft)
Module	Boviet, BVM7612M-540-H-HC-BF (1000V) (540W)	389 (210.1 kW)

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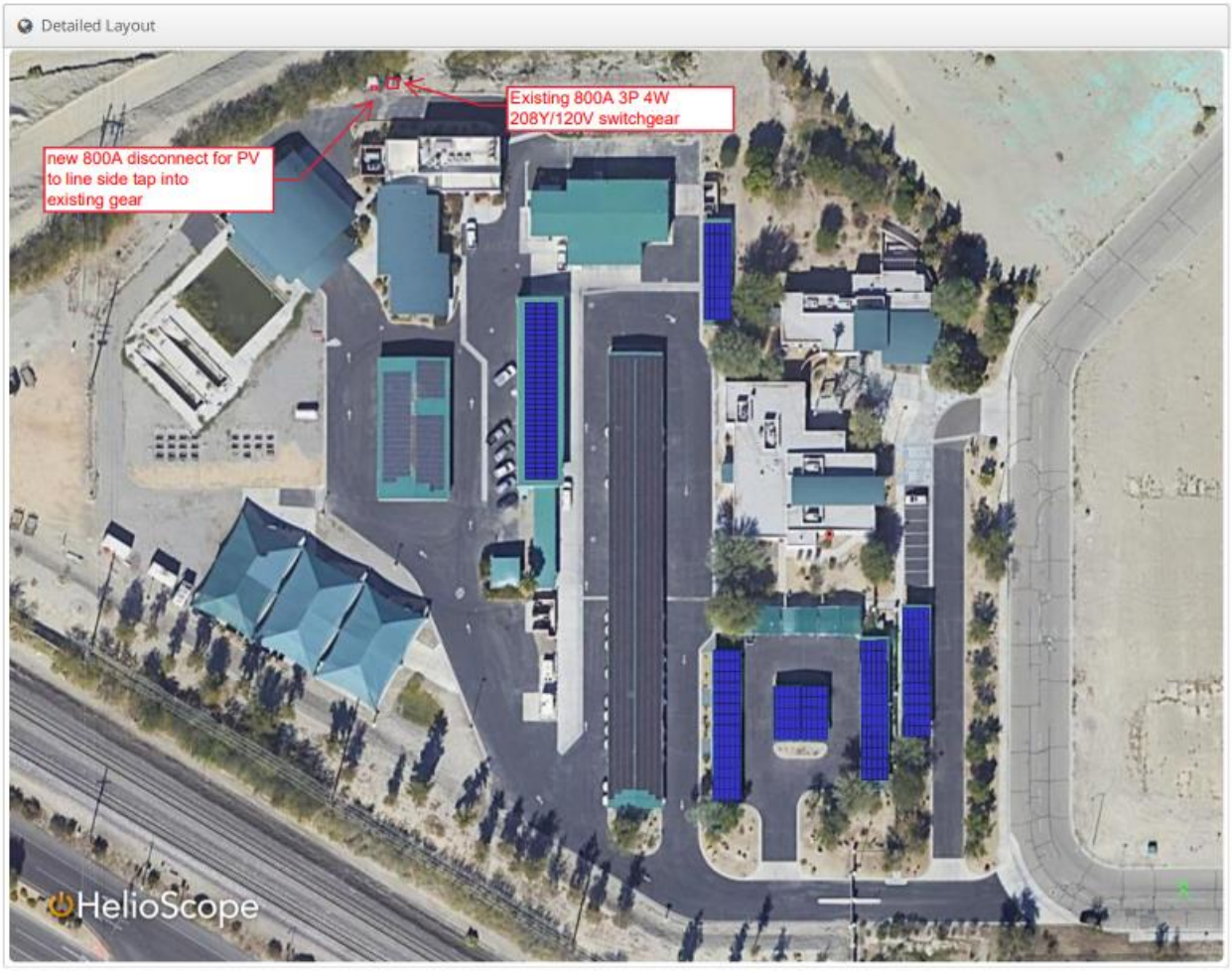
Wiring Zones

Description	Combiner Poles	String Size	Stringing Strategy
Wiring Zone	-	13-18	Along Racking
Wiring Zone 2	-	11-18	Along Racking
Wiring Zone 3	-	11-18	Along Racking
Wiring Zone 4	-	15-18	Along Racking
Wiring Zone 5	-	15-18	Along Racking
Wiring Zone 6	-	15-18	Along Racking
Wiring Zone 7	-	-	Along Racking

Field Segments

Description	Racking	Orientation	Tilt	Azimuth	Intrarow Spacing	Frame Size	Frames	Modules	Power
Carport 1	Carport	Landscape (Horizontal)	7°	270°	0.1 ft	1x1	70	70	37.8 kW
Carport 4	Carport	Landscape (Horizontal)	7°	89.53419°	0.1 ft	1x1	60	60	32.4 kW
Carport 3	Carport	Landscape (Horizontal)	7°	89.53419°	0.1 ft	1x1	65	65	35.1 kW
Carport 2-W	Carport	Landscape (Horizontal)	7°	270°	0.1 ft	1x1	25	25	13.5 kW
Carport 2-E	Carport	Landscape (Horizontal)	7°	90.07407°	0.1 ft	1x1	25	25	13.5 kW
Carport 5	Carport	Landscape (Horizontal)	7°	90.07407°	0.1 ft	1x1	45	45	24.3 kW
Roof 1	Flush Mount	Portrait (Vertical)	7°	270°	0.1 ft	1x1	99	99	53.5 kW



Investment Grade Audit

FIM 4: Existing Solar Replacement for Net Meter

(CP Bov 540) PFA CV Mosquito Coast 2.13.24(240V) Coachella Valley Mosquito & Vector Control, 43420 Trader Pl, Indio CA 92201

Report

Project Name	Coachella Valley Mosquito & Vector Control
Project Address	43420 Trader Pl, Indio CA 92201
Prepared By	Derek Brosch derek.brosch@centrica.com

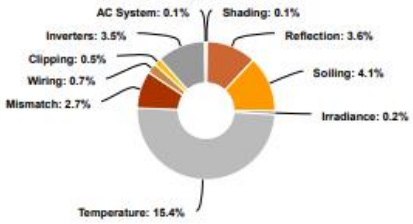
System Metrics

Design	(CP Bov 540) PFA CV Mosquito Coast 2.13.24(240V)
Module DC Nameplate	168.5 kW
Inverter AC Nameplate	119.9 kW Load Ratio: 1.41
Annual Production	254.9 MWh
Performance Ratio	72.3%
kWh/kWp	1,512.8
Weather Dataset	TMY, PALM SPRINGS THERMAL AP, NSRDB (tmy3, II)
Simulator Version	19628e094b-f6ad77da19-59dec14ede-01744ce7a4

Project Location

Monthly Production

Sources of System Loss



Annual Production

	Description	Output	% Delta
Irradiance (kWh/m²)	Annual Global Horizontal Irradiance	2,096.3	
	POA Irradiance	2,092.7	-0.2%
	Shaded Irradiance	2,091.0	-0.1%
	Irradiance after Reflection	2,015.0	-3.6%
	Irradiance after Soiling	1,932.5	-4.1%
	Total Collector Irradiance	**1,932.5**	**0.0%**
Energy (kWh)	Nameplate	326,209.1	
	Output at Irradiance Levels	325,430.7	-0.2%
	Output at Cell Temperature Derate	275,230.1	-15.4%
	Output After Mismatch	267,736.7	-2.7%
	Optimal DC Output	265,781.4	-0.7%
	Constrained DC Output	264,396.1	-0.5%
	Inverter Output	255,141.1	-3.5%
	Energy to Grid	**254,873.8**	**-0.1%**
Temperature Metrics			
	Avg. Operating Ambient Temp		28.0 °C
	Avg. Operating Cell Temp		51.1 °C
Simulation Metrics			
	Operating Hours		4385
	Solved Hours		4385

Condition Set

Description	CBS Standard											
Weather Dataset	TMY, PALM SPRINGS THERMAL AP, NSRDB (tmy3, II)											
Solar Angle Location	Meteo Lat/Lng											
Transposition Model	Perez Model											
Temperature Model	Sandia Model											
Temperature Model Parameters	Rack Type	a	b	Temperature Delta								
	Fixed Tilt	-3.56	-0.075	3°C								
	Flush Mount	-2.81	-0.0455	0°C								
	East-West	-3.56	-0.075	3°C								
	Carport	-3.56	-0.075	3°C								
Soiling (%)	J	F	M	A	M	J	J	A	S	O	N	D
	3	3	3	3	5	5	5	5	5	3	3	3
Irradiation Variance	5%											
Cell Temperature Spread	4° C											
Module Binning Range	-2.5% to 2.5%											
AC System Derate	0.50%											
Trackers	Maximum Angle	Backtracking										
	60°	Enabled										
Module Characterizations	Module	Uploaded By	Characterization									
	BVM7612M-540-H-HC-BF (1000V) (Boviet)	HelioScope	Spec Sheet Characterization, PAN									
Component Characterizations	Device	Uploaded By	Characterization									
	Sunny Boy 7.7-US (208V) (SMA)	HelioScope	Spec Sheet									

Components

Component	Name	Count
Inverters	Sunny Boy 7.7-US (208V) (SMA)	18 (119.9 kW)
AC Home Runs	4 AWG (Aluminum)	9 (6,985.5 ft)
AC Home Runs	1/0 AWG (Aluminum)	9 (6,857.2 ft)
Strings	10 AWG (Copper)	36 (3,545.5 ft)
Module	Boviet, BVM7612M-540-H-HC-BF (1000V) (540W)	312 (168.5 kW)

Wiring Zones

Description	Combiner Poles	String Size	Stringing Strategy
Wiring Zone	-	7-11	Along Racking
Wiring Zone 2	-	7-11	Along Racking

Field Segments

Description	Racking	Orientation	Tilt	Azimuth	Intrarow Spacing	Frame Size	Frames	Modules	Power
Carport W	Flush Mount	Landscape (Horizontal)	7°	270°	0.1 ft	1x1	156	156	84.2 kW
Carport E	Flush Mount	Landscape (Horizontal)	7°	90°	0.1 ft	1x1	156	156	84.2 kW

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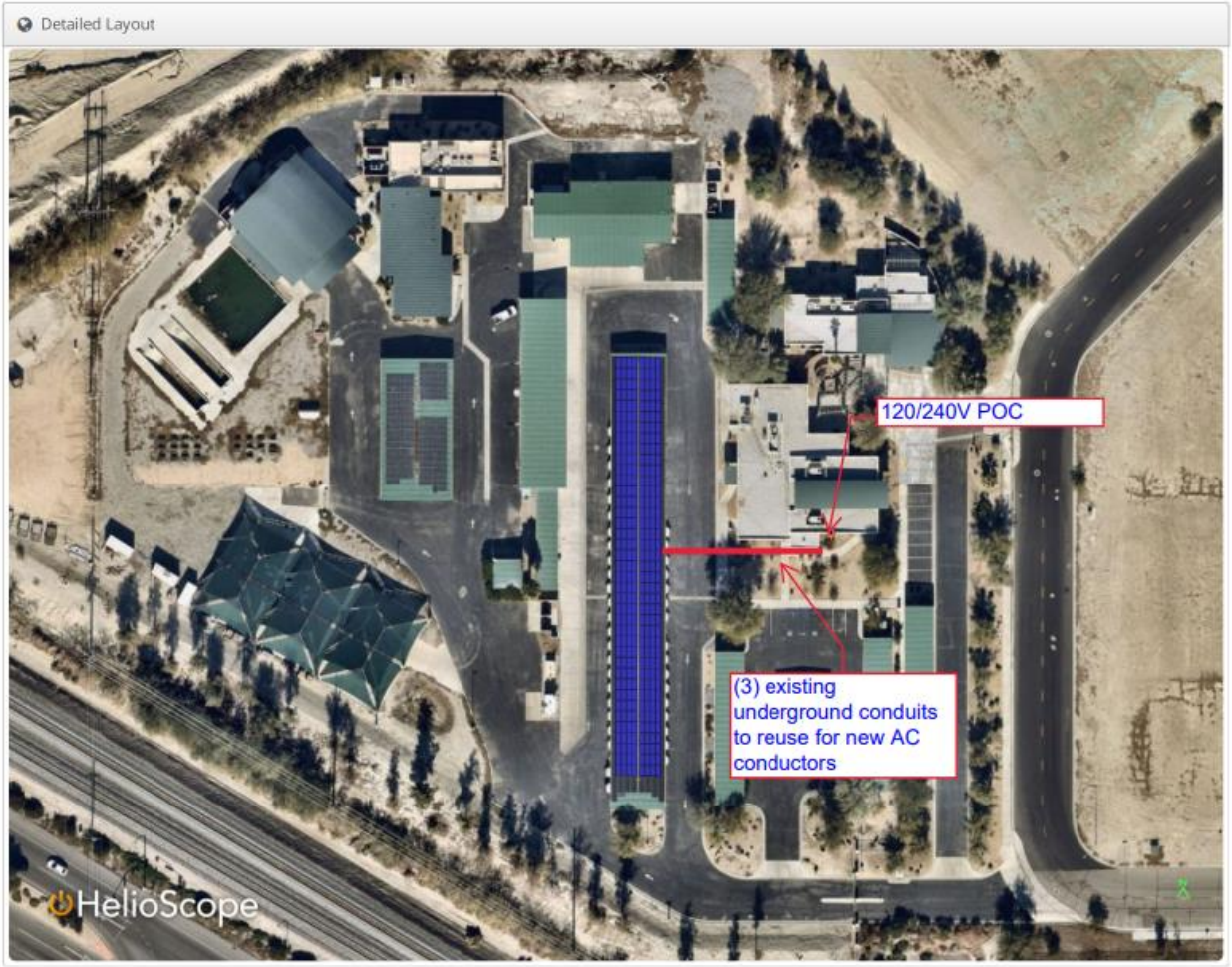

Investment Grade Audit

Appendix C – Lighting Survey and Savings Calculation

The lighting audit was completed by a Centrica Engineer during the IGA Audit. A visual inspection and documentation through pictures of all lighting fixtures in the facilities was completed to get accurate counts and types of each fixture. The following spreadsheets show the results of the audit as well as the proposed light fixture replacements and their calculated savings values.

					Pre-Install (Baseline)										Post-Install (Proposed)											Lighting Energy Savings	
Action #	Map Location #	Floor #	Building Name	Location Description	# of Baseline Fixtures	Pre Control Savings %	Pre Watts Per Fixture	Pre Watt per Fixture (Low)	Pre kW (high)	Peak kW Demand	Pre kW (Low)	Pre Hours of Annual Operation	Post Hours of Annual Operation (Low)	Pre kWh	Proposed # of Fixtures	Proposed Action Description	Additional Proposed Control Savings %	Proposed Watts per Fixture	Proposed Watts per Fixture (Low Mode)	Proposed kW (High)	Proposed kW Demand	Proposed kW (Low)	Proposed Hours of Annual Operation	Proposed Hours of Annual Operation (Low Mode)	Annual Proposed kWh	kW Demand Saved	kWh Saved
1	Admin	0	Admin	Lobby	12	0%	50	0	0.6	0.60	0.00	2,216	0	1,330	12	Retrofit w/ LED recessed can kit	30%	33	0	0.40	0.40	0.00	1,551	665	614	0.20	715
2	Admin	0	Admin	Lobby	1	0%	0	0	0.00025	0.00	0.00	8,760	0	2	1	Replace w/ new LED EXIT with bug-eye	0%	5	0	0.00	0.00	0.00	8,760	0	39	0.00	-37
3	Admin	0	Admin	Lobby	2	0%	85	0	0.17	0.17	0.00	2,216	0	377	2	Retrofit w/ LED 2x4 troffer kit	30%	31	0	0.06	0.06	0.00	1,551	665	96	0.11	281
4	Admin	0	Admin	RR-M	2	0%	59	0	0.118	0.12	0.00	2,216	0	261	2	Replace w/ new LED wrap luminaire	30%	26	0	0.05	0.05	0.00	1,551	665	79	0.07	182
5	Admin	0	Admin	RR-M	1	0%	59	0	0.059	0.06	0.00	2,216	0	131	1	Retrofit w/ LED bar kit	30%	22	0	0.02	0.02	0.00	1,551	665	34	0.04	97
6	Admin	0	Admin	RR-W	2	0%	112	0	0.224	0.22	0.00	2,216	0	496	2	Replace w/ new LED wrap luminaire	30%	50	0	0.10	0.10	0.00	1,551	665	155	0.12	341
7	Admin	0	Admin	RR-W	1	0%	59	0	0.059	0.06	0.00	2,216	0	131	1	Replace w/ new LED wrap luminaire	30%	26	0	0.03	0.03	0.00	1,551	665	40	0.03	91
8	Admin	0	Admin	RR-W	1	0%	59	0	0.059	0.06	0.00	2,216	0	131	1	Retrofit w/ LED bar kit	30%	22	0	0.02	0.02	0.00	1,551	665	34	0.04	97
9	Admin	0	Admin	MPR	16	0%	50	0	0.8	0.80	0.00	2,216	0	1,773	16	Retrofit w/ LED 8" recessed can kit	0%	22	0	0.35	0.35	0.00	2,216	0	780	0.45	993
10	Admin	0	Admin	MPR	1	0%	20	0	0.02	0.02	0.00	8,760	0	175	1	Replace w/ new LED EXIT sign	0%	1	0	0.00	0.00	0.00	8,760	0	9	0.02	166
11	Admin	0	Admin	MPR	1	0%	20	0	0.02	0.02	0.00	8,760	0	175	1	Replace w/ new LED EXIT sign	0%	1	0	0.00	0.00	0.00	8,760	0	9	0.02	166
12	Admin	0	Admin	MPR	1	0%	20	0	0.02	0.02	0.00	8,760	0	175	1	Replace w/ new LED EXIT with bug-eye	0%	5	0	0.00	0.00	0.00	8,760	0	39	0.02	136
13	Admin	0	Admin	>Storage	1	0%	112	0	0.112	0.11	0.00	521	0	58	1	Replace w/ new LED wrap luminaire	0%	50	0	0.05	0.05	0.00	521	0	26	0.06	32
14	Admin	0	Admin	>Janitor	1	0%	59	0	0.059	0.06	0.00	1,043	0	62	1	Replace w/ new LED wrap luminaire	0%	26	0	0.03	0.03	0.00	1,043	0	27	0.03	35
15	Admin	0	Admin	Boardroom	1	0%	20	0	0.02	0.02	0.00	8,760	0	175	1	Replace w/ new LED EXIT with bug-eye	0%	5	0	0.00	0.00	0.00	8,760	0	39	0.02	136
16	Admin	0	Admin	Boardroom	1	0%	0	0	0.00025	0.00	0.00	8,760	0	2	1	Replace w/ new LED EXIT with bug-eye	0%	5	0	0.00	0.00	0.00	8,760	0	39	0.00	-37
17	Admin	0	Admin	Boardroom	1	0%	85	0	0.085	0.09	0.00	2,216	0	188	1	Retrofit w/ LED 2x4 troffer kit with bi-level switching	0%	31	0	0.03	0.03	0.00	2,216	0	69	0.05	120

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18	Admin	0	Admin	Boardroom	3	0%	85	0	0.255	0.26	0.00	2,216	0	565	3	Retrofit w/ LED 2x4 troffer kit	0%	31	0	0.09	0.09	0.00	2,216	0	206	0.16	359
19	Admin	0	Admin	Boardroom	8	0%	85	0	0.68	0.68	0.00	2,216	0	1,507	8	Retrofit w/ 2xLED tube and driver	0%	26	0	0.21	0.21	0.00	2,216	0	461	0.47	1,046
20	Admin	0	Admin	Boardroom	12	0%	85	0	1.02	1.02	0.00	2,216	0	2,260	12	Retrofit w/ 2xLED tube and driver	0%	26	0	0.31	0.31	0.00	2,216	0	691	0.71	1,569
21	Admin	0	Admin	Boardroom	6	0%	50	0	0.3	0.30	0.00	2,216	0	665	6	Retrofit w/ LED 8" recessed can kit	0%	22	0	0.13	0.13	0.00	2,216	0	293	0.17	372
22	Admin	0	Admin	Boardroom	10	0%	50	0	0.5	0.50	0.00	2,216	0	1,108	10	Retrofit w/ LED 8" recessed can kit	0%	22	0	0.22	0.22	0.00	2,216	0	488	0.28	621
23	Admin	0	Admin	Boardroom	1	0%	30	0	0.03	0.03	0.00	2,216	0	66	1	Replace w/ new LED bug-eye	0%	2	0	0.00	0.00	0.00	2,216	0	4	0.03	62
24	Admin	0	Admin	>Storage	1	0%	59	0	0.059	0.06	0.00	521	0	31	1	Replace w/ new LED wrap luminaire	30%	26	0	0.03	0.03	0.00	365	156	9	0.03	21
25	Admin	0	Admin	>A/V	1	0%	59	0	0.059	0.06	0.00	521	0	31	1	Replace w/ new LED wrap luminaire	30%	26	0	0.03	0.03	0.00	365	156	9	0.03	21
26	Admin	0	Admin	Reception	3	0%	85	0	0.255	0.26	0.00	2,216	0	565	3	Retrofit w/ LED 2x4 troffer kit	0%	31	0	0.09	0.09	0.00	2,216	0	206	0.16	359
27	Admin	0	Admin	>Office	2	0%	59	0	0.118	0.12	0.00	2,216	0	261	2	Retrofit w/ LED 2x2 troffer kit with bi-level switching	30%	23	0	0.05	0.05	0.00	1,551	665	71	0.07	190
28	Admin	0	Admin	>Copy machine	2	0%	32	0	0.064	0.06	0.00	2,216	0	142	2	Retrofit w/ LED 2x2 troffer kit with bi-level switching	30%	23	0	0.05	0.05	0.00	1,551	665	71	0.02	70
29	Admin	0	Admin	Hallway	1	0%	85	0	0.085	0.09	0.00	521	0	44	1	Retrofit w/ LED 2x2 troffer kit with bi-level switching	0%	23	0	0.02	0.02	0.00	521	0	12	0.06	32
30	Admin	0	Admin	Hallway	2	0%	59	0	0.118	0.12	0.00	2,216	0	261	2	Retrofit w/ LED 2x2 troffer kit with bi-level switching	30%	23	0	0.05	0.05	0.00	1,551	665	71	0.07	190
31	Admin	0	Admin	Hallway	2	0%	21	0	0.042	0.04	0.00	8,760	0	368	2	Replace w/ new LED EXIT with bug-eye	0%	5	0	0.01	0.01	0.00	8,760	0	79	0.03	289
32	Admin	0	Admin	Finance	2	0%	23	0	0.046	0.05	0.00	2,216	0	102	0	No Action	0%	23	0	0.00	0.05	0.00	2,216	0	0	0.05	102
33	Admin	0	Admin	Network Communication	1	0%	59	0	0.059	0.06	0.00	521	0	31	1	Retrofit w/ LED strip kit	0%	27	0	0.03	0.03	0.00	521	0	14	0.03	17
34	Admin	0	Admin	File room	2	0%	59	0	0.118	0.12	0.00	1,043	0	123	2	Replace w/ new LED wrap luminaire	0%	26	0	0.05	0.05	0.00	1,043	0	53	0.07	70

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35	Admin	0	Admin	GM office	3	0%	23	0	0.069	0.07	0.00	2,216	0	153	0	No Action	0%	23	0	0.00	0.07	0.00	2,216	0	0	0.07	153
36	Admin	0	Admin	Storage	2	0%	85	0	0.17	0.17	0.00	521	0	89	2	Retrofit w/ LED 2x2 troffer kit with bi-level switching	0%	23	0	0.05	0.05	0.00	521	0	24	0.12	65
37	Admin	0	Admin	Admin Assistant	2	0%	23	0	0.046	0.05	0.00	2,216	0	102	0	No Action	0%	23	0	0.00	0.05	0.00	2,216	0	0	0.05	102
38	Admin	0	Admin	Office	2	0%	23	0	0.046	0.05	0.00	2,216	0	102	0	No Action	0%	23	0	0.00	0.05	0.00	2,216	0	0	0.05	102
39	Admin	0	Admin	Human Resources	1	0%	23	0	0.023	0.02	0.00	2,216	0	51	0	No Action	0%	23	0	0.00	0.02	0.00	2,216	0	0	0.02	51
40	Admin	0	Admin	Human Resources	1	0%	23	0	0.023	0.02	0.00	2,216	0	51	0	No Action	0%	23	0	0.00	0.02	0.00	2,216	0	0	0.02	51
41	Admin	0	Admin	Mechanical-ext access	1	0%	75	0	0.075	0.08	0.00	521	0	39	1	Replace w/ new LED wrap luminaire	0%	17	0	0.02	0.02	0.00	521	0	9	0.06	30
42	ext-Admin	0	Admin	ext-Main Entry	2	0%	34	0	0.068	0.07	0.00	3,650	0	248	2	Retrofit w/ LED recessed can kit	0%	33	0	0.07	0.07	0.00	3,650	0	241	0.00	7
43	ext-Admin	0	Admin	ext-Patio (front)	8	0%	20	0	0.16	0.16	0.00	3,650	0	584	0	No Action	0%	20	0	0.00	0.16	0.00	3,650	0	0	0.16	584
44	ext-Admin	0	Admin	ext-Patio (front)	1	0%	20	0	0.02	0.02	0.00	3,650	0	73	0	No Action	0%	20	0	0.00	0.02	0.00	3,650	0	0	0.02	73
45	ext-Admin	0	Admin	ext-Patio (back)	2	0%	20	0	0.04	0.04	0.00	3,650	0	146	0	No Action	0%	20	0	0.00	0.04	0.00	3,650	0	0	0.04	146
46	ext-Admin	0	Admin	ext-Entry (rear)	1	0%	20	0	0.02	0.02	0.00	3,650	0	73	0	No Action	0%	20	0	0.00	0.02	0.00	3,650	0	0	0.02	73
47	Carports	0	Carports	Carport 1	4	0%	59	0	0.236	0.24	0.00	3,650	0	861	4	Replace w/ new LED area luminaire	50%	51	0	0.20	0.20	0.00	1,825	1,825	372	0.03	489
48	Carports	0	Carports	Carport 1	2	0%	295	0	0.59	0.59	0.00	3,650	0	2,154	2	Replace w/ new LED wallpack	0%	22	0	0.04	0.04	0.00	3,650	0	161	0.55	1,993
49	Carports	0	Carports	Carport 2 (main)	11	0%	295	0	3.245	3.25	0.00	3,650	0	11,844	11	Replace w/ new LED wallpack	0%	22	0	0.24	0.24	0.00	3,650	0	883	3.00	10,961
50	Carports	0	Carports	Carport 2 (main)	15	0%	59	0	0.885	0.89	0.00	3,650	0	3,230	15	Replace w/ new LED area luminaire	50%	51	0	0.77	0.77	0.00	1,825	1,825	1,396	0.12	1,834
51	Carports	0	Carports	Carport 3	1	0%	295	0	0.295	0.30	0.00	3,650	0	1,077	1	Replace w/ new LED wallpack	0%	22	0	0.02	0.02	0.00	3,650	0	80	0.27	996
52	Carports	0	Carports	Carport 3	5	0%	59	0	0.295	0.30	0.00	3,650	0	1,077	5	Replace w/ new LED area luminaire	50%	51	0	0.26	0.26	0.00	1,825	1,825	465	0.04	611
53	Carports	0	Carports	Carport 4	4	0%	59	0	0.236	0.24	0.00	3,650	0	861	4	Replace w/ new LED area luminaire	50%	51	0	0.20	0.20	0.00	1,825	1,825	372	0.03	489
54	Carports	0	Carports	Carport 5	1	0%	295	0	0.295	0.30	0.00	3,650	0	1,077	1	Replace w/ new LED wallpack	0%	22	0	0.02	0.02	0.00	3,650	0	80	0.27	996
55	Carports	0	Carports	Carport 5	6	0%	59	0	0.354	0.35	0.00	3,650	0	1,292	6	Replace w/ new	50%	51	0	0.31	0.31	0.00	1,825	1,825	558	0.05	734

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																LED area luminaire											
56	Mobil Equipment	0	Mobile Equipment	Office	4	0%	85	0	0.34	0.34	0.00	2,086	0	709	4	Retrofit w/ LED 2x4 troffer kit	30%	31	0	0.12	0.12	0.00	1,460	626	181	0.22	528
57	Mobil Equipment	0	Mobile Equipment	Shower/Locker	1	0%	85	0	0.085	0.09	0.00	2,086	0	177	1	Retrofit w/ LED 2x4 troffer kit	30%	31	0	0.03	0.03	0.00	1,460	626	45	0.05	132
58	Mobil Equipment	0	Mobile Equipment	>RR	1	0%	59	0	0.059	0.06	0.00	2,086	0	123	1	Replace w/ new LED wrap luminaire	30%	26	0	0.03	0.03	0.00	1,460	626	37	0.03	86
59	Mobil Equipment	0	Mobile Equipment	Electrical	4	0%	59	0	0.236	0.24	0.00	521	0	123	4	Retrofit w/ LED strip kit	0%	27	0	0.11	0.11	0.00	521	0	56	0.13	67
60	Mobil Equipment	0	Mobile Equipment	Bays	8	0%	50	0	0.4	0.40	0.00	2,086	0	834	0	No Action	0%	50	0	0.00	0.40	0.00	2,086	0	0	0.40	834
61	Mobil Equipment	0	Mobile Equipment	Work Area 1	4	0%	59	0	0.236	0.24	0.00	2,086	0	492	4	Replace w/ new LED strip luminaire	30%	60	0	0.24	0.24	0.00	1,460	626	350	0.00	142
62	Mobil Equipment	0	Mobile Equipment	Work Area 2	2	0%	59	0	0.118	0.12	0.00	2,086	0	246	2	Replace w/ new LED strip luminaire	30%	60	0	0.12	0.12	0.00	1,460	626	175	0.00	71
63	Mobil Equipment	0	Mobile Equipment	>Work Area (2)	2	0%	59	0	0.118	0.12	0.00	2,086	0	246	2	Replace w/ new LED strip luminaire	30%	60	0	0.12	0.12	0.00	1,460	626	175	0.00	71
64	ext-Mobil Equipment	0	Mobile Equipment	Canopy 1	4	0%	59	0	0.236	0.24	0.00	2,086	0	492	4	Replace w/ new LED vapor-tight	30%	18	0	0.07	0.07	0.00	1,460	626	105	0.16	387
65	ext-Mobil Equipment	0	Mobile Equipment	Canopy 2	2	0%	59	0	0.118	0.12	0.00	2,086	0	246	2	Replace w/ new LED vapor-tight	30%	18	0	0.04	0.04	0.00	1,460	626	53	0.08	194
66	ext-Mobil Equipment	0	Mobile Equipment	building perimeter	3	0%	458	0	1.374	1.37	0.00	3,650	0	5,015	3	Replace w/ new LED wallpack	0%	79	0	0.24	0.24	0.00	3,650	0	865	1.14	4,150
67	Cold Storage	0	Cold Storage	Dry Storage	2	0%	112	0	0.224	0.22	0.00	2,086	0	467	2	Replace w/ new LED strip luminaire	0%	60	0	0.12	0.12	0.00	2,086	0	250	0.10	217
68	Cold Storage	0	Cold Storage	Dry Storage	1	0%	0	0	0.00025	0.00	0.00	8,760	0	2	1	Replace w/ new LED EXIT with bug-eye	0%	5	0	0.00	0.00	0.00	8,760	0	39	0.00	-37
69	Cold Storage	0	Cold Storage	Storage (small)	1	0%	0	0	0.00025	0.00	0.00	8,760	0	2	1	Replace w/ new LED EXIT with bug-eye	0%	5	0	0.00	0.00	0.00	8,760	0	39	0.00	-37
70	Cold Storage	0	Cold Storage	Storage (small)	2	0%	59	0	0.118	0.12	0.00	782	0	92	2	Replace w/ new LED vapor-tight	0%	18	0	0.04	0.04	0.00	782	0	28	0.08	64
71	Cold Storage	0	Cold Storage	Cold Storage	2	0%	112	0	0.224	0.22	0.00	2,086	0	467	2	Replace w/ new LED strip luminaire	0%	60	0	0.12	0.12	0.00	2,086	0	250	0.10	217
72	Cold Storage	0	Cold Storage	Cold Storage	1	0%	0	0	0.00025	0.00	0.00	8,760	0	2	1	Replace w/ new LED EXIT with bug-eye	0%	5	0	0.00	0.00	0.00	8,760	0	39	0.00	-37
73	Cold Storage	0	Cold Storage	>more Cold Storage	2	0%	112	0	0.224	0.22	0.00	2,086	0	467	2	Replace w/ new LED strip luminaire	0%	60	0	0.12	0.12	0.00	2,086	0	250	0.10	217
74	ext-Cold Storage	0	Cold Storage	building perimeter	4	0%	295	0	1.18	1.18	0.00	3,650	0	4,307	4	Replace w/ new LED wallpack	0%	79	0	0.32	0.32	0.00	3,650	0	1,153	0.86	3,154

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75	ext-Cold Storage	0	Cold Storage	Canopy	2	0%	295	0	0.59	0.59	0.00	3,650	0	2,154	2	Replace w/ new LED wallpack	0%	26	0	0.05	0.05	0.00	3,650	0	190	0.54	1,964
76	ext-Cold Storage	0	Cold Storage	>area 1	4	0%	59	0	0.236	0.24	0.00	3,650	0	861	4	Replace w/ new LED vapor-tight	50%	18	0	0.07	0.07	0.00	1,825	1,825	131	0.16	730
77	ext-Cold Storage	0	Cold Storage	>area 2	6	0%	59	0	0.354	0.35	0.00	3,650	0	1,292	6	Replace w/ new LED vapor-tight	50%	18	0	0.11	0.11	0.00	1,825	1,825	197	0.25	1,095
78	ext-Cold Storage	0	Cold Storage	>area 3	4	0%	59	0	0.236	0.24	0.00	3,650	0	861	4	Replace w/ new LED vapor-tight	50%	18	0	0.07	0.07	0.00	1,825	1,825	131	0.16	730
79	Tank	0	Storage (tank)	Bay	4	0%	270	0	1.08	1.08	0.00	2,086	0	2,253	4	Replace w/ new LED high-bay	30%	132	0	0.53	0.53	0.00	1,460	626	771	0.55	1,482
80	Tank	0	Storage (tank)	Bay	3	0%	30	0	0.09	0.09	0.00	8,760	0	788	3	Replace w/ new LED bug-eye	0%	2	0	0.01	0.01	0.00	8,760	0	53	0.08	736
81	Tank	0	Storage (tank)	Bay	2	0%	0	0	0.0005	0.00	0.00	8,760	0	4	2	Replace w/ new LED EXIT sign	0%	1	0	0.00	0.00	0.00	8,760	0	18	0.00	-13
82	Tank	0	Storage (tank)	Electrical roomext	1	0%	59	0	0.059	0.06	0.00	521	0	31	1	Retrofit w/ LED strip kit	0%	27	0	0.03	0.03	0.00	521	0	14	0.03	17
83	Tank	0	Storage (tank)	Storage-ext	4	0%	59	0	0.236	0.24	0.00	521	0	123	4	Replace w/ new LED wrap luminaire	0%	26	0	0.10	0.10	0.00	521	0	53	0.13	70
84	Tank	0	Storage (tank)	>storage	2	0%	59	0	0.118	0.12	0.00	521	0	62	2	Replace w/ new LED wrap luminaire	0%	26	0	0.05	0.05	0.00	521	0	27	0.07	35
85	ext-Tank	0	Storage (tank)	over exterior sink	2	0%	59	0	0.118	0.12	0.00	521	0	62	2	Retrofit w/ LED bar kit	0%	28	0	0.06	0.06	0.00	521	0	29	0.06	32
86	ext-Tank	0	Storage (tank)	Bay entry front	1	0%	128	0	0.128	0.13	0.00	4,380	0	561	1	Replace w/ new LED wallpack	0%	26	0	0.03	0.03	0.00	4,380	0	114	0.10	447
87	ext-Tank	0	Storage (tank)	Bay entry rear	1	0%	128	0	0.128	0.13	0.00	4,380	0	561	1	Replace w/ new LED wallpack	0%	26	0	0.03	0.03	0.00	4,380	0	114	0.10	447
88	ext-Tank	0	Carports	Carport 6	4	0%	138	0	0.552	0.55	0.00	3,650	0	2,015	4	Replace w/ new LED wallpack	0%	26	0	0.10	0.10	0.00	3,650	0	380	0.45	1,635
89	ext-Tank	0	Carports	Carport 6	2	0%	20	0	0.04	0.04	0.00	3,650	0	146	0	No Action	0%	20	0	0.00	0.04	0.00	3,650	0	0	0.04	146
90	ext-Tank	0	Carports	Carport 6	8	0%	59	0	0.472	0.47	0.00	3,650	0	1,723	8	Replace w/ new LED area luminaire	50%	51	0	0.41	0.41	0.00	1,825	1,825	745	0.06	978
91	0	0	Tents (3)	tent area	8	0%	50	0	0.4	0.40	0.00	3,650	0	1,460	0	No Action	0%	50	0	0.00	0.40	0.00	3,650	0	0	0.40	1,460
92	Operations	PO	Operations	Public Outreach	10	0%	23	0	0.23	0.23	0.00	2,477	0	570	0	No Action	0%	23	0	0.00	0.23	0.00	2,477	0	0	0.23	570
93	Operations	PO	Operations	>Office	1	0%	23	0	0.023	0.02	0.00	2,477	0	57	0	No Action	0%	23	0	0.00	0.02	0.00	2,477	0	0	0.02	57
94	Operations	PO	Operations	>Storage	3	0%	59	0	0.177	0.18	0.00	521	0	92	3	Replace w/ new LED wrap luminaire	0%	26	0	0.08	0.08	0.00	521	0	40	0.10	52
95	Operations	PO	Operations	>Storage2	2	0%	59	0	0.118	0.12	0.00	521	0	62	2	Retrofit w/ LED bar kit	0%	22	0	0.04	0.04	0.00	521	0	23	0.07	39
96	Operations	IT	Operations	transition	1	0%	85	0	0.085	0.09	0.00	2,477	0	211	1	Retrofit w/ LED 2x4 troffer kit	0%	31	0	0.03	0.03	0.00	2,477	0	77	0.05	134

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97	Operations	IT	Operations	>IT storage	2	0%	85	0	0.17	0.17	0.00	521	0	89	2	Retrofit w/ LED bar kit	0%	22	0	0.04	0.04	0.00	521	0	23	0.13	66
98	Operations	IT	Operations	>IT storage	1	0%	60	0	0.06	0.06	0.00	521	0	31	1	Replace w/ new LED surfacemount luminaire	0%	24	0	0.02	0.02	0.00	521	0	13	0.04	19
99	Operations	IT	Operations	>IT-Assistant office	2	0%	85	0	0.17	0.17	0.00	2,477	0	421	2	Retrofit w/ LED 2x4 troffer kit	30%	31	0	0.06	0.06	0.00	1,734	743	107	0.11	314
100	Operations	IT	Operations	>IT-Manager office	2	0%	85	0	0.17	0.17	0.00	2,477	0	421	2	Retrofit w/ LED 2x4 troffer kit	30%	31	0	0.06	0.06	0.00	1,734	743	107	0.11	314
101	Operations	IT	Operations	>IT-Analyst office	2	0%	85	0	0.17	0.17	0.00	2,477	0	421	2	Retrofit w/ LED 2x4 troffer kit	30%	31	0	0.06	0.06	0.00	1,734	743	107	0.11	314
102	Operations	0	Operations	Hallway	4	0%	85	0	0.34	0.34	0.00	8,760	0	2,978	4	Retrofit w/ LED 2x4 troffer kit	0%	31	0	0.12	0.12	0.00	8,760	0	1,086	0.22	1,892
103	Operations	0	Operations	Hallway	5	0%	85	0	0.425	0.43	0.00	2,477	0	1,053	5	Retrofit w/ LED 2x4 troffer kit	30%	31	0	0.16	0.16	0.00	1,734	743	269	0.27	784
104	Operations	0	Operations	Hallway	3	0%	21	0	0.063	0.06	0.00	8,760	0	552	3	Replace w/ new LED EXIT sign	0%	1	0	0.00	0.00	0.00	8,760	0	26	0.06	526
105	Operations	0	Operations	Hallway	1	0%	50	0	0.05	0.05	0.00	2,477	0	124	1	Retrofit w/ LED 6" recessed can kit	30%	16	0	0.02	0.02	0.00	1,734	743	28	0.03	96
106	Operations	0	Operations	>Ice machine	1	0%	85	0	0.085	0.09	0.00	2,477	0	211	1	Retrofit w/ LED 2x4 troffer kit	30%	31	0	0.03	0.03	0.00	1,734	743	54	0.05	157
107	Operations	0	Operations	>RR-W	1	0%	50	0	0.05	0.05	0.00	2,477	0	124	1	Retrofit w/ LED 6" recessed can kit	0%	16	0	0.02	0.02	0.00	2,477	0	40	0.03	84
108	Operations	0	Operations	>RR-W	2	0%	112	0	0.224	0.22	0.00	2,477	0	555	2	Replace w/ new LED wrap luminaire	0%	50	0	0.10	0.10	0.00	2,477	0	248	0.12	307
109	Operations	0	Operations	>RR-W	3	0%	59	0	0.177	0.18	0.00	2,477	0	438	3	Retrofit w/ LED bar kit	0%	28	0	0.08	0.08	0.00	2,477	0	208	0.09	230
110	Operations	0	Operations	>RR-W	1	0%	59	0	0.059	0.06	0.00	2,477	0	146	1	Retrofit w/ LED bar kit	0%	28	0	0.03	0.03	0.00	2,477	0	69	0.03	77
111	Operations	0	Operations	>>Locker	2	0%	59	0	0.118	0.12	0.00	2,477	0	292	2	Replace w/ new LED wrap luminaire	0%	26	0	0.05	0.05	0.00	2,477	0	126	0.07	166
112	Operations	0	Operations	>>>Shower	2	0%	59	0	0.118	0.12	0.00	2,477	0	292	2	Retrofit w/ LED bar kit	0%	28	0	0.06	0.06	0.00	2,477	0	139	0.06	154
113	Operations	0	Operations	>Breakroom	9	0%	85	0	0.765	0.77	0.00	2,477	0	1,895	9	Retrofit w/ LED 2x4 troffer kit	30%	31	0	0.28	0.28	0.00	1,734	743	484	0.49	1,411
114	Operations	0	Operations	>Breakroom	1	0%	0	0	0.00025	0.00	0.00	8,760	0	2	1	Replace w/ new LED EXIT sign	0%	1	0	0.00	0.00	0.00	8,760	0	9	0.00	-7
115	Operations	0	Operations	>Janitor closet	1	0%	59	0	0.059	0.06	0.00	1,043	0	62	1	Retrofit w/ LED strip kit	0%	27	0	0.03	0.03	0.00	1,043	0	28	0.03	33
116	Operations	0	Operations	>Network closet	1	0%	75	0	0.075	0.08	0.00	521	0	39	1	Replace w/ new LED wrap luminaire	0%	17	0	0.02	0.02	0.00	521	0	9	0.06	30

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117	Operations	0	Operations	>RR-M	1	0%	50	0	0.05	0.05	0.00	2,477	0	124	1	Retrofit w/ LED 6" recessed can kit	0%	16	0	0.02	0.02	0.00	2,477	0	40	0.03	84
118	Operations	0	Operations	>RR-M	2	0%	112	0	0.224	0.22	0.00	2,477	0	555	2	Replace w/ new LED wrap luminaire	0%	50	0	0.10	0.10	0.00	2,477	0	248	0.12	307
119	Operations	0	Operations	>RR-M	3	0%	59	0	0.177	0.18	0.00	2,477	0	438	3	Retrofit w/ LED bar kit	0%	28	0	0.08	0.08	0.00	2,477	0	208	0.09	230
120	Operations	0	Operations	>RR-M	1	0%	59	0	0.059	0.06	0.00	2,477	0	146	1	Retrofit w/ LED bar kit	0%	28	0	0.03	0.03	0.00	2,477	0	69	0.03	77
121	Operations	0	Operations	>>Locker/Shower	6	0%	59	0	0.354	0.35	0.00	2,477	0	877	6	Replace w/ new LED wrap luminaire	0%	26	0	0.15	0.15	0.00	2,477	0	379	0.20	498
122	Operations	0	Operations	transition rear	3	0%	50	0	0.15	0.15	0.00	2,477	0	372	3	Retrofit w/ LED 6" recessed can kit	0%	16	0	0.05	0.05	0.00	2,477	0	119	0.10	253
123	Operations	0	Operations	transition rear	2	0%	59	0	0.118	0.12	0.00	2,477	0	292	2	Retrofit w/ LED bar kit	0%	28	0	0.06	0.06	0.00	2,477	0	139	0.06	154
124	Operations	0	Operations	RIFA Ops	14	0%	23	0	0.322	0.32	0.00	2,477	0	798	0	No Action	0%	23	0	0.00	0.32	0.00	2,477	0	0	0.32	798
125	Operations	0	Operations	RIFA Ops	2	0%	21	0	0.042	0.04	0.00	8,760	0	368	2	Replace w/ new LED EXIT sign	0%	1	0	0.00	0.00	0.00	8,760	0	18	0.04	350
126	Operations	0	Operations	>Office 1	1	0%	59	0	0.059	0.06	0.00	2,477	0	146	1	Replace w/ new LED strip luminaire	30%	40	0	0.04	0.04	0.00	1,734	743	69	0.02	77
127	Operations	0	Operations	>Office 1	1	0%	112	0	0.112	0.11	0.00	2,477	0	277	1	Replace w/ new LED wrap luminaire	30%	26	0	0.03	0.03	0.00	1,734	743	44	0.09	233
128	Operations	0	Operations	>Office 2	1	0%	59	0	0.059	0.06	0.00	2,477	0	146	1	Replace w/ new LED strip luminaire	30%	40	0	0.04	0.04	0.00	1,734	743	69	0.02	77
129	Operations	0	Operations	>Office 2	1	0%	112	0	0.112	0.11	0.00	2,477	0	277	1	Replace w/ new LED wrap luminaire	30%	26	0	0.03	0.03	0.00	1,734	743	44	0.09	233
130	Operations	0	Operations	>Office 3	1	0%	59	0	0.059	0.06	0.00	2,477	0	146	1	Replace w/ new LED strip luminaire	30%	40	0	0.04	0.04	0.00	1,734	743	69	0.02	77
131	Operations	0	Operations	>Office 3	1	0%	112	0	0.112	0.11	0.00	2,477	0	277	1	Replace w/ new LED wrap luminaire	30%	26	0	0.03	0.03	0.00	1,734	743	44	0.09	233
132	Operations	0	Operations	>Copy machine	1	0%	59	0	0.059	0.06	0.00	2,477	0	146	1	Replace w/ new LED strip luminaire	30%	40	0	0.04	0.04	0.00	1,734	743	69	0.02	77
133	Operations	0	Operations	>Copy machine	1	0%	112	0	0.112	0.11	0.00	2,477	0	277	1	Replace w/ new LED wrap luminaire	30%	26	0	0.03	0.03	0.00	1,734	743	44	0.09	233
134	Operations	0	Operations	>Office 4	1	0%	59	0	0.059	0.06	0.00	2,477	0	146	1	Replace w/ new LED strip luminaire	30%	40	0	0.04	0.04	0.00	1,734	743	69	0.02	77
135	Operations	0	Operations	>Office 4	1	0%	112	0	0.112	0.11	0.00	2,477	0	277	1	Replace w/ new LED wrap luminaire	30%	26	0	0.03	0.03	0.00	1,734	743	44	0.09	233
136	Operations	0	Operations	Field Ops	14	0%	23	0	0.322	0.32	0.00	2,477	0	798	0	No Action	0%	23	0	0.00	0.32	0.00	2,477	0	0	0.32	798

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137	Operations	0	Operations	Field Ops	2	0%	21	0	0.042	0.04	0.00	8,760	0	368	2	Replace w/ new LED EXIT sign	0%	1	0	0.00	0.00	0.00	8,760	0	18	0.04	350
138	Operations	0	Operations	>Ops Manager office	2	0%	23	0	0.046	0.05	0.00	2,477	0	114	0	No Action	0%	23	0	0.00	0.05	0.00	2,477	0	0	0.05	114
139	Operations	0	Operations	Accounting	6	0%	23	0	0.138	0.14	0.00	2,477	0	342	0	No Action	0%	23	0	0.00	0.14	0.00	2,477	0	0	0.14	342
140	Operations	0	Operations	Accounting	1	0%	0	0	0.00025	0.00	0.00	8,760	0	2	1	Replace w/ new LED EXIT sign	0%	1	0	0.00	0.00	0.00	8,760	0	9	0.00	-7
141	Operations	0	Operations	Electrical roomext	3	0%	59	0	0.177	0.18	0.00	521	0	92	3	Retrofit w/ LED strip kit	0%	27	0	0.08	0.08	0.00	521	0	42	0.10	50
142	ext-Operations	0	Operations	Entries/perimet er	5	0%	128	0	0.64	0.64	0.00	3,650	0	2,336	5	Replace w/ new LED wallpack	0%	26	0	0.13	0.13	0.00	3,650	0	475	0.51	1,862
143	ext-Operations	0	Operations	Entries/perimet er	2	0%	30	0	0.06	0.06	0.00	3,650	0	219	0	No Action	0%	30	0	0.00	0.06	0.00	3,650	0	0	0.06	219
144	ext-Operations	0	Operations	Entries/perimet er	1	0%	31	0	0.031	0.03	0.00	3,650	0	113	1	Retrofit w/ LED 6" recessed can kit	0%	16	0	0.02	0.02	0.00	3,650	0	58	0.02	55
145	Carports	0	Carports	Carport 7	5	0%	59	0	0.295	0.30	0.00	4,380	0	1,292	5	Replace w/ new LED area luminaire	50%	51	0	0.26	0.26	0.00	2,190	2,190	558	0.04	734
146	Parking	0	Parking	Pathway west	5	0%	295	0	1.475	1.48	0.00	3,650	0	5,384	5	Replace w/ new LED area luminaire	0%	51	0	0.26	0.26	0.00	3,650	0	931	1.22	4,453
147	Parking	0	Parking	Pathway west	1	0%	50	0	0.05	0.05	0.00	3,650	0	183	0	No Action	0%	50	0	0.00	0.05	0.00	3,650	0	0	0.05	183
148	Parking	0	Parking	between Tent/Carport6	2	0%	295	0	0.59	0.59	0.00	3,650	0	2,154	2	Replace w/ new LED area luminaire	0%	51	0	0.10	0.10	0.00	3,650	0	372	0.49	1,781
149	Parking	0	Parking	Pathway south	3	0%	50	0	0.15	0.15	0.00	3,650	0	548	0	No Action	0%	50	0	0.00	0.15	0.00	3,650	0	0	0.15	548
150	Parking	0	Parking	West/Front	4	0%	50	0	0.2	0.20	0.00	3,650	0	730	0	No Action	0%	50	0	0.00	0.20	0.00	3,650	0	0	0.20	730
151	Laboratory	0	Laboratory	Electrical-ext access	1	0%	59	0	0.059	0.06	0.00	521	0	31	1	Retrofit w/ LED strip kit	0%	27	0	0.03	0.03	0.00	521	0	14	0.03	17
152	Laboratory	0	Laboratory	Mechanical-ext access	1	0%	59	0	0.059	0.06	0.00	521	0	31	1	Retrofit w/ LED strip kit	0%	27	0	0.03	0.03	0.00	521	0	14	0.03	17
153	Laboratory	0	Laboratory	Mechanical-ext access	2	0%	59	0	0.118	0.12	0.00	521	0	62	2	Retrofit w/ LED strip kit	0%	27	0	0.05	0.05	0.00	521	0	28	0.06	33
154	Laboratory	0	Laboratory	Mechanical Aext access	1	0%	46	0	0.046	0.05	0.00	521	0	24	1	Replace w/ new LED wrap luminaire	0%	17	0	0.02	0.02	0.00	521	0	9	0.03	15
155	Laboratory	0	Laboratory	Main Entry vestibule	2	0%	27	0	0.054	0.05	0.00	2,086	0	113	2	Retrofit w/ LED 6" recessed can kit with battery	0%	16	0	0.03	0.03	0.00	2,086	0	67	0.02	46

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156	Laboratory	0	Laboratory	Main Entry vestibule	1	0%	21	0	0.021	0.02	0.00	0	0	0	1	Replace w/ new LED EXIT sign	0%	1	0	0.00	0.00	0.00	0	0	0	0.02	0
157	Laboratory	0	Laboratory	>IT closet	1	0%	59	0	0.059	0.06	0.00	2,086	0	123	1	Retrofit w/ LED strip kit	0%	27	0	0.03	0.03	0.00	2,086	0	56	0.03	67
158	Laboratory	0	Laboratory	Open area 1	1	0%	85	0	0.085	0.09	0.00	8,760	0	745	1	Retrofit w/ LED 2x4 troffer kit	0%	31	0	0.03	0.03	0.00	8,760	0	272	0.05	473
159	Laboratory	0	Laboratory	Open area 1	5	0%	85	0	0.425	0.43	0.00	2,086	0	886	5	Retrofit w/ LED 2x4 troffer kit with bi-level switching	0%	31	0	0.16	0.16	0.00	2,086	0	323	0.27	563
160	Laboratory	0	Laboratory	Open area 1	1	0%	21	0	0.021	0.02	0.00	8,760	0	184	1	Replace w/ new LED EXIT sign	0%	1	0	0.00	0.00	0.00	8,760	0	9	0.02	175
161	Laboratory	0	Laboratory	Open area 1	1	0%	21	0	0.021	0.02	0.00	8,760	0	184	1	Replace w/ new LED EXIT sign	0%	1	0	0.00	0.00	0.00	8,760	0	9	0.02	175
162	Laboratory	0	Laboratory	>Office 1	4	0%	45	0	0.18	0.18	0.00	2,086	0	375	4	Retrofit w/ LED 2x2 troffer kit	0%	26	0	0.10	0.10	0.00	2,086	0	217	0.08	159
163	Laboratory	0	Laboratory	>Office 2	4	0%	45	0	0.18	0.18	0.00	2,086	0	375	4	Retrofit w/ LED 2x2 troffer kit	0%	26	0	0.10	0.10	0.00	2,086	0	217	0.08	159
164	Laboratory	0	Laboratory	>Office 3	4	0%	45	0	0.18	0.18	0.00	2,086	0	375	4	Retrofit w/ LED 2x2 troffer kit	0%	26	0	0.10	0.10	0.00	2,086	0	217	0.08	159
165	Laboratory	0	Laboratory	Open area 2	2	0%	85	0	0.17	0.17	0.00	8,760	0	1,489	2	Retrofit w/ LED 2x4 troffer kit	0%	31	0	0.06	0.06	0.00	8,760	0	543	0.11	946
166	Laboratory	0	Laboratory	Open area 2	3	0%	85	0	0.255	0.26	0.00	2,086	0	532	3	Retrofit w/ LED 2x4 troffer kit with bi-level switching	0%	31	0	0.09	0.09	0.00	2,086	0	194	0.16	338
167	Laboratory	0	Laboratory	Kitchen/Breakroom	6	0%	27	0	0.162	0.16	0.00	2,086	0	338	6	Retrofit w/ LED 6" recessed can kit	0%	16	0	0.10	0.10	0.00	2,086	0	200	0.07	138
168	Laboratory	0	Laboratory	Kitchen/Breakroom	1	0%	27	0	0.027	0.03	0.00	2,086	0	56	1	Retrofit w/ LED 6" recessed can kit with battery	0%	16	0	0.02	0.02	0.00	2,086	0	33	0.01	23
169	Laboratory	0	Laboratory	>Riser room	1	0%	59	0	0.059	0.06	0.00	521	0	31	1	Retrofit w/ LED strip kit	0%	27	0	0.03	0.03	0.00	521	0	14	0.03	17
170	Laboratory	0	Laboratory	Hallway	4	0%	85	0	0.34	0.34	0.00	2,086	0	709	4	Retrofit w/ LED 2x4 troffer kit with bi-level switching	0%	31	0	0.12	0.12	0.00	2,086	0	259	0.22	451
171	Laboratory	0	Laboratory	Hallway	1	0%	85	0	0.085	0.09	0.00	8,760	0	745	1	Retrofit w/ LED 2x4 troffer kit	0%	31	0	0.03	0.03	0.00	8,760	0	272	0.05	473
172	Laboratory	0	Laboratory	Hallway	3	0%	21	0	0.063	0.06	0.00	8,760	0	552	3	Replace w/ new LED EXIT sign	0%	1	0	0.00	0.00	0.00	8,760	0	26	0.06	526
173	Laboratory	0	Laboratory	Hallway	1	0%	27	0	0.027	0.03	0.00	8,760	0	237	1	Retrofit w/ LED 6" recessed can kit	0%	16	0	0.02	0.02	0.00	8,760	0	140	0.01	96
174	Laboratory	0	Laboratory	Workroom 109	6	0%	23	0	0.138	0.14	0.00	2,086	0	288	0	No Action	0%	23	0	0.00	0.14	0.00	2,086	0	0	0.14	288
175	Laboratory	0	Laboratory	Workroom 109	6	0%	33	0	0.198	0.20	0.00	2,086	0	413	0	No Action	0%	33	0	0.00	0.20	0.00	2,086	0	0	0.20	413

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176	Laboratory	0	Laboratory	RR-W	1	0%	23	0	0.023	0.02	0.00	2,086	0	48	0	No Action	0%	23	0	0.00	0.02	0.00	2,086	0	0	0.02	48
177	Laboratory	0	Laboratory	RR-M	1	0%	23	0	0.023	0.02	0.00	2,086	0	48	0	No Action	0%	23	0	0.00	0.02	0.00	2,086	0	0	0.02	48
178	Laboratory	0	Laboratory	RIFA 110	2	0%	59	0	0.118	0.12	0.00	2,086	0	246	2	Retrofit w/ LED bar kit	0%	28	0	0.06	0.06	0.00	2,086	0	117	0.06	129
179	Laboratory	0	Laboratory	RIFA 110	3	0%	33	0	0.099	0.10	0.00	2,086	0	206	0	No Action	0%	33	0	0.00	0.10	0.00	2,086	0	0	0.10	206
180	Laboratory	0	Laboratory	RIFA 110	1	0%	60	0	0.06	0.06	0.00	2,086	0	125	0	No Action	0%	60	0	0.00	0.06	0.00	2,086	0	0	0.06	125
181	Laboratory	0	Laboratory	BSL3 107A	2	0%	59	0	0.118	0.12	0.00	2,086	0	246	2	Retrofit w/ LED bar kit	0%	28	0	0.06	0.06	0.00	2,086	0	117	0.06	129
182	Laboratory	0	Laboratory	>BSL3 107	4	0%	59	0	0.236	0.24	0.00	2,086	0	492	4	Retrofit w/ LED bar kit	0%	28	0	0.11	0.11	0.00	2,086	0	234	0.12	259
183	Laboratory	0	Laboratory	BSL2A 106	4	0%	59	0	0.236	0.24	0.00	2,086	0	492	4	Retrofit w/ LED bar kit	0%	28	0	0.11	0.11	0.00	2,086	0	234	0.12	259
184	Laboratory	0	Laboratory	BSL2B 103	2	0%	59	0	0.118	0.12	0.00	2,086	0	246	2	Retrofit w/ LED bar kit	0%	28	0	0.06	0.06	0.00	2,086	0	117	0.06	129
185	Laboratory	0	Laboratory	BSL2B 103	1	0%	59	0	0.059	0.06	0.00	2,086	0	123	1	Retrofit w/ LED bar kit	0%	28	0	0.03	0.03	0.00	2,086	0	58	0.03	65
186	Laboratory	0	Laboratory	Autoclave 104	3	0%	59	0	0.177	0.18	0.00	2,086	0	369	3	Retrofit w/ LED bar kit	0%	28	0	0.08	0.08	0.00	2,086	0	175	0.09	194
187	Laboratory	0	Laboratory	Sorting Lab 101	9	0%	85	0	0.765	0.77	0.00	2,086	0	1,596	9	Retrofit w/ LED 2x4 troffer kit	0%	31	0	0.28	0.28	0.00	2,086	0	582	0.49	1,014
188	Laboratory	0	Laboratory	Sorting Lab 101	7	0%	33	0	0.231	0.23	0.00	2,086	0	482	0	No Action	0%	33	0	0.00	0.23	0.00	2,086	0	0	0.23	482
189	Laboratory	0	Laboratory	Insectary 105	3	0%	59	0	0.177	0.18	0.00	2,086	0	369	3	Retrofit w/ LED bar kit	0%	28	0	0.08	0.08	0.00	2,086	0	175	0.09	194
190	Laboratory	0	Laboratory	Insectary 105	1	0%	59	0	0.059	0.06	0.00	2,086	0	123	1	Retrofit w/ LED bar kit	0%	28	0	0.03	0.03	0.00	2,086	0	58	0.03	65
191	Laboratory	0	Laboratory	>room 105B	2	0%	59	0	0.118	0.12	0.00	4,380	0	517	2	Retrofit w/ LED bar kit	0%	28	0	0.06	0.06	0.00	4,380	0	245	0.06	272
192	Laboratory	0	Laboratory	>room 105A	6	0%	59	0	0.354	0.35	0.00	4,380	0	1,551	6	Retrofit w/ LED bar kit	0%	28	0	0.17	0.17	0.00	4,380	0	736	0.19	815
193	Laboratory	0	Laboratory	>room 105A	2	0%	59	0	0.118	0.12	0.00	4,380	0	517	2	Retrofit w/ LED bar kit	0%	28	0	0.06	0.06	0.00	4,380	0	245	0.06	272
194	Laboratory	0	Laboratory	>room 105C	6	0%	59	0	0.354	0.35	0.00	4,380	0	1,551	6	Retrofit w/ LED bar kit	0%	28	0	0.17	0.17	0.00	4,380	0	736	0.19	815
195	Laboratory	0	Laboratory	>room 105C	2	0%	59	0	0.118	0.12	0.00	4,380	0	517	2	Retrofit w/ LED bar kit	0%	28	0	0.06	0.06	0.00	4,380	0	245	0.06	272
196	Laboratory	0	Laboratory	Batteries 102	3	0%	59	0	0.177	0.18	0.00	2,086	0	369	3	Retrofit w/ LED bar kit	0%	28	0	0.08	0.08	0.00	2,086	0	175	0.09	194
197	Laboratory	0	Laboratory	exit vestibule	1	0%	27	0	0.027	0.03	0.00	2,086	0	56	1	Retrofit w/ LED 6" recessed can kit with battery	0%	16	0	0.02	0.02	0.00	2,086	0	33	0.01	23
198	Laboratory	0	Laboratory	exit vestibule	1	0%	21	0	0.021	0.02	0.00	8,760	0	184	1	Replace w/ new LED EXIT sign	0%	1	0	0.00	0.00	0.00	8,760	0	9	0.02	175
199	ext-Laboratory	0	Laboratory	building perimeter	13	0%	45	0	0.585	0.59	0.00	4,380	0	2,562	13	Replace w/ new LED wall-mount round	0%	15	0	0.20	0.20	0.00	4,380	0	854	0.39	1,708
200	ext-Laboratory	0	Laboratory	Entry main	2	0%	27	0	0.054	0.05	0.00	4,380	0	237	2	Retrofit w/ LED 6" recessed can kit	0%	16	0	0.03	0.03	0.00	4,380	0	140	0.02	96
201	ext-Laboratory	0	Laboratory	Entry 1	1	0%	27	0	0.027	0.03	0.00	4,380	0	118	1	Retrofit w/ LED 6" recessed can kit with battery	0%	16	0	0.02	0.02	0.00	4,380	0	70	0.01	48

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202	ext-Laboratory	0	Laboratory	Entry 2	1	0%	27	0	0.027	0.03	0.00	4,380	0	118	1	Retrofit w/ LED 6" recessed can kit	0%	16	0	0.02	0.02	0.00	4,380	0	70	0.01	48
203	ext-Laboratory	0	Laboratory	Entry 3 (by Fire entry)	2	0%	27	0	0.054	0.05	0.00	4,380	0	237	2	Retrofit w/ LED 6" recessed can kit	0%	16	0	0.03	0.03	0.00	4,380	0	140	0.02	96
					600										477											

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Interactive Energy Savings				Energy Savings				
kW Interactive Factor	kW Saved	kWh Interactive Factor	kWh Saved	kW Demand Saved	kWh Saved	Existing Quantity	Existing Fixture Description	Proposed Action Description
0.23	0.0	0.07	48	0.25	764	12	Recessed Can Hi-Hat Fixture w/(2) PL 26w CF Quad Lamps	Retrofit w/ LED recessed can kit
0.23	0.0	0.07	-3	-0.01	-40	1	EXIT Electroluminecent	Replace w/ new LED EXIT with bug-eye
0.23	0.0	0.07	19	0.13	300	2	2X4 Troffer - Fluorescent, (3) 48" T-8 lamps, Instant Start Ballast, NLO (0.85 < BF < 0.95)	Retrofit w/ LED 2x4 troffer kit
0.23	0.0	0.07	12	0.08	195	2	Wraparound 4' - Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95)	Replace w/ new LED wrap luminaire
0.23	0.0	0.07	7	0.05	103	1	Strip 4' - Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95)	Retrofit w/ LED bar kit
0.23	0.0	0.07	23	0.15	364	2	Wraparound 8' - Fluorescent, (4) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95)	Replace w/ new LED wrap luminaire
0.23	0.0	0.07	6	0.04	97	1	Wraparound 4' - Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95)	Replace w/ new LED wrap luminaire
0.23	0.0	0.07	7	0.05	103	1	Strip 4' - Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95)	Retrofit w/ LED bar kit
0.23	0.1	0.07	67	0.55	1,060	16	Recessed Can Hi-Hat Fixture w/(2) PL 26w CF Quad Lamps	Retrofit w/ LED 8" recessed can kit
0.23	0.0	0.07	11	0.02	178	1	EXIT Compact Fluorescent, (2) 5W lamp	Replace w/ new LED EXIT sign
0.23	0.0	0.07	11	0.02	178	1	EXIT Compact Fluorescent, (2) 5W lamp	Replace w/ new LED EXIT sign
0.23	0.0	0.07	9	0.02	145	1	EXIT Compact Fluorescent, (2) 5W lamp	Replace w/ new LED EXIT with bug-eye
0.23	0.0	0.07	2	0.08	35	1	Wraparound 8' - Fluorescent, (4) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95)	Replace w/ new LED wrap luminaire
0.23	0.0	0.07	2	0.04	37	1	Wraparound 4' - Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95)	Replace w/ new LED wrap luminaire
0.23	0.0	0.07	9	0.02	145	1	EXIT Compact Fluorescent, (2) 5W lamp	Replace w/ new LED EXIT with bug-eye
0.23	0.0	0.07	-3	-0.01	-40	1	EXIT Electroluminecent	Replace w/ new LED EXIT with bug-eye
0.23	0.0	0.07	8	0.07	128	1	2X4 Troffer - Fluorescent, (3) 48" T-8 lamps, Instant Start Ballast, NLO (0.85 < BF < 0.95)	Retrofit w/ LED 2x4 troffer kit with bi-level switching
0.23	0.0	0.07	24	0.20	383	3	2X4 Troffer - Fluorescent, (3) 48" T-8 lamps, Instant Start Ballast, NLO (0.85 < BF < 0.95)	Retrofit w/ LED 2x4 troffer kit
0.23	0.1	0.07	71	0.58	1,117	8	Strip 4' - Fluorescent, (3) 48" T-8 lamps, Instant Start Ballast, NLO (0.85 < BF < 0.95)	Retrofit w/ 2xLED tube and driver
0.23	0.2	0.07	106	0.87	1,675	12	Strip 4' - Fluorescent, (3) 48" T-8 lamps, Instant Start Ballast, NLO (0.85 < BF < 0.95)	Retrofit w/ 2xLED tube and driver
0.23	0.0	0.07	25	0.21	398	6	Recessed Can Hi-Hat Fixture w/(2) PL 26w CF Quad Lamps	Retrofit w/ LED 8" recessed can kit
0.23	0.1	0.07	42	0.34	663	10	Recessed Can Hi-Hat Fixture w/(2) PL 26w CF Quad Lamps	Retrofit w/ LED 8" recessed can kit

0.23	0.0	0.07	4	0.03	66	1	EXIT Incandescent, (2) 15W lamp	Replace w/ new LED bug-eye
0.23	0.0	0.07	1	0.04	23	1	Wraparound 4' - Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95)	Replace w/ new LED wrap luminaire
0.23	0.0	0.07	1	0.04	23	1	Wraparound 4' - Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95)	Replace w/ new LED wrap luminaire
0.23	0.0	0.07	24	0.20	383	3	2X4 Troffer - Fluorescent, (3) 48" T-8 lamps, Instant Start Ballast, NLO (0.85 < BF < 0.95)	Retrofit w/ LED 2x4 troffer kit
0.23	0.0	0.07	13	0.09	203	2	2X4 Troffer - Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95)	Retrofit w/ LED 2x2 troffer kit with bi-level switching
0.23	0.0	0.07	5	0.02	75	2	2X4 Troffer - Fluorescent, (1) 48", T-8 lamp, Rapid Start Ballast, NLO (BF: .85-.95)	Retrofit w/ LED 2x2 troffer kit with bi-level switching
0.23	0.0	0.07	2	0.08	35	1	2X4 Troffer - Fluorescent, (3) 48" T-8 lamps, Instant Start Ballast, NLO (0.85 < BF < 0.95)	Retrofit w/ LED 2x2 troffer kit with bi-level switching
0.23	0.0	0.07	13	0.09	203	2	2X4 Troffer - Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95)	Retrofit w/ LED 2x2 troffer kit with bi-level switching
0.23	0.0	0.07	20	0.04	309	2	EXIT Compact Fluorescent, (2) 7W lamp	Replace w/ new LED EXIT with bug-eye
0.23	0.0	0.07	7	0.06	109	2	"LED [Fixture Type] [##]w Luminaire - [Fixture Details e.g. OS, EMERG, etc.]" - See Cell A17 & C17	No Action
0.23	0.0	0.07	1	0.04	18	1	Strip 4' - Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95)	Retrofit w/ LED strip kit
0.23	0.0	0.07	5	0.08	75	2	Wraparound 4' - Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95)	Replace w/ new LED wrap luminaire
0.23	0.0	0.07	10	0.08	163	3	"LED [Fixture Type] [##]w Luminaire - [Fixture Details e.g. OS, EMERG, etc.]" - See Cell A17 & C17	No Action
0.23	0.0	0.07	4	0.15	69	2	2X4 Troffer - Fluorescent, (3) 48" T-8 lamps, Instant Start Ballast, NLO (0.85 < BF < 0.95)	Retrofit w/ LED 2x2 troffer kit with bi-level switching
0.23	0.0	0.07	7	0.06	109	2	"LED [Fixture Type] [##]w Luminaire - [Fixture Details e.g. OS, EMERG, etc.]" - See Cell A17 & C17	No Action
0.23	0.0	0.07	7	0.06	109	2	"LED [Fixture Type] [##]w Luminaire - [Fixture Details e.g. OS, EMERG, etc.]" - See Cell A17 & C17	No Action
0.23	0.0	0.07	3	0.03	54	1	"LED [Fixture Type] [##]w Luminaire - [Fixture Details e.g. OS, EMERG, etc.]" - See Cell A17 & C17	No Action
0.23	0.0	0.07	3	0.03	54	1	"LED [Fixture Type] [##]w Luminaire - [Fixture Details e.g. OS, EMERG, etc.]" - See Cell A17 & C17	No Action
0.00	0.0	0.00	0	0.06	30	1	Strip 3' - Fluorescent, (2) 36", STD lamps	Replace w/ new LED wrap luminaire
0.00	0.0	0.00	0	0.00	7	2	Recessed Can Hi-Hat Fixture w/(1) PL 32w CF Quad Lamp	Retrofit w/ LED recessed can kit
0.00	0.0	0.00	0	0.16	584	8	"LED [Fixture Type] [##]w Luminaire - [Fixture Details e.g. OS, EMERG, etc.]" - See Cell A17 & C17	No Action
0.00	0.0	0.00	0	0.02	73	1	"LED [Fixture Type] [##]w Luminaire - [Fixture Details e.g. OS, EMERG, etc.]" - See Cell A17 & C17	No Action
0.00	0.0	0.00	0	0.04	146	2	"LED [Fixture Type] [##]w Luminaire - [Fixture Details e.g. OS, EMERG, etc.]" - See Cell A17 & C17	No Action
0.00	0.0	0.00	0	0.02	73	1	"LED [Fixture Type] [##]w Luminaire - [Fixture Details e.g. OS, EMERG, etc.]" - See Cell A17 & C17	No Action
0.00	0.0	0.00	0	0.03	489	4	Vapor Tight 4' - Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95)	Replace w/ new LED area luminaire
0.00	0.0	0.00	0	0.55	1,993	2	Fixture Type - Metal-Halide, 250W	Replace w/ new LED wallpack
0.00	0.0	0.00	0	3.00	10,961	11	Fixture Type - Metal-Halide, 250W	Replace w/ new LED wallpack

0.00	0.0	0.00	0	0.12	1,834	15	Vapor Tight 4' - Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95)	Replace w/ new LED area luminaire
0.00	0.0	0.00	0	0.27	996	1	Fixture Type - Metal-Halide, 250W	Replace w/ new LED wallpack
0.00	0.0	0.00	0	0.04	611	5	Vapor Tight 4' - Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95)	Replace w/ new LED area luminaire
0.00	0.0	0.00	0	0.03	489	4	Vapor Tight 4' - Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95)	Replace w/ new LED area luminaire
0.00	0.0	0.00	0	0.27	996	1	Fixture Type - Metal-Halide, 250W	Replace w/ new LED wallpack
0.00	0.0	0.00	0	0.05	734	6	Vapor Tight 4' - Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95)	Replace w/ new LED area luminaire
0.23	0.0	0.07	36	0.27	564	4	2X4 Troffer - Fluorescent, (3) 48" T-8 lamps, Instant Start Ballast, NLO (0.85 < BF < 0.95)	Retrofit w/ LED 2x4 troffer kit
0.23	0.0	0.07	9	0.07	141	1	2X4 Troffer - Fluorescent, (3) 48" T-8 lamps, Instant Start Ballast, NLO (0.85 < BF < 0.95)	Retrofit w/ LED 2x4 troffer kit
0.23	0.0	0.07	6	0.04	92	1	Wraparound 4' - Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95)	Replace w/ new LED wrap luminaire
0.00	0.0	0.00	0	0.13	67	4	Strip 4' - Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95)	Retrofit w/ LED strip kit
0.00	0.0	0.00	0	0.40	834	8	"LED [Fixture Type] [##]w Luminaire - [Fixture Details e.g. OS, EMERG, etc.]" - See Cell A17 & C17	No Action
0.00	0.0	0.00	0	0.00	142	4	Strip 4' - Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95)	Replace w/ new LED strip luminaire
0.00	0.0	0.00	0	0.00	71	2	Strip 4' - Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95)	Replace w/ new LED strip luminaire
0.00	0.0	0.00	0	0.00	71	2	Strip 4' - Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95)	Replace w/ new LED strip luminaire
0.00	0.0	0.00	0	0.16	387	4	Strip 4' - Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95)	Replace w/ new LED vapor-tight
0.00	0.0	0.00	0	0.08	194	2	Strip 4' - Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95)	Replace w/ new LED vapor-tight
0.00	0.0	0.00	0	1.14	4,150	3	Fixture Type - Metal-Halide, 400W	Replace w/ new LED wallpack
0.23	0.0	0.07	15	0.13	232	2	Strip 8' - Fluorescent, (4) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95)	Replace w/ new LED strip luminaire
0.23	0.0	0.07	-3	-0.01	-40	1	EXIT Electroluminecent	Replace w/ new LED EXIT with bug-eye
0.23	0.0	0.07	-3	-0.01	-40	1	EXIT Electroluminecent	Replace w/ new LED EXIT with bug-eye
0.23	0.0	0.07	4	0.10	68	2	Vapor Tight 4' - Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95)	Replace w/ new LED vapor-tight
0.33	0.0	0.30	66	0.14	282	2	Strip 8' - Fluorescent, (4) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95)	Replace w/ new LED strip luminaire
0.33	0.0	0.30	-11	-0.01	-48	1	EXIT Electroluminecent	Replace w/ new LED EXIT with bug-eye
0.33	0.0	0.30	66	0.14	282	2	Strip 8' - Fluorescent, (4) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95)	Replace w/ new LED strip luminaire
0.00	0.0	0.00	0	0.86	3,154	4	Fixture Type - Metal-Halide, 250W	Replace w/ new LED wallpack
0.00	0.0	0.00	0	0.54	1,964	2	Fixture Type - Metal-Halide, 250W	Replace w/ new LED wallpack
0.00	0.0	0.00	0	0.16	730	4	Vapor Tight 4' - Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95)	Replace w/ new LED vapor-tight
0.00	0.0	0.00	0	0.25	1,095	6	Vapor Tight 4' - Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95)	Replace w/ new LED vapor-tight
0.00	0.0	0.00	0	0.16	730	4	Vapor Tight 4' - Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95)	Replace w/ new LED vapor-tight
0.00	0.0	0.00	0	0.55	1,482	4	High Bay - Compact Fluorescent, (6) 42w 4-pin lamps	Replace w/ new LED high-bay
0.00	0.0	0.00	0	0.08	736	3	EXIT Incandescent, (2) 15W lamp	Replace w/ new LED bug-eye

0.00	0.0	0.00	0	0.00	-13	2	EXIT Electroluminecent	Replace w/ new LED EXIT sign
0.00	0.0	0.00	0	0.03	17	1	Strip 4' - Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95)	Retrofit w/ LED strip kit
0.00	0.0	0.00	0	0.13	70	4	Strip 4' - Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95)	Replace w/ new LED wrap luminaire
0.00	0.0	0.00	0	0.07	35	2	Strip 4' - Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95)	Replace w/ new LED wrap luminaire
0.00	0.0	0.00	0	0.06	32	2	Vapor Tight 4' - Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95)	Retrofit w/ LED bar kit
0.00	0.0	0.00	0	0.10	447	1	Fixture Type - Metal-Halide, 100W	Replace w/ new LED wallpack
0.00	0.0	0.00	0	0.10	447	1	Fixture Type - Metal-Halide, 100W	Replace w/ new LED wallpack
0.00	0.0	0.00	0	0.45	1,635	4	Fixture Type - High-Pressure Soduim, 100W	Replace w/ new LED wallpack
0.00	0.0	0.00	0	0.04	146	2	"LED [Fixture Type] [##]w Luminaire - [Fixture Details e.g. OS, EMERG, etc.]" - See Cell A17 & C17	No Action
0.00	0.0	0.00	0	0.06	978	8	Vapor Tight 4' - Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95)	Replace w/ new LED area luminaire
0.00	0.0	0.00	0	0.40	1,460	8	"LED [Fixture Type] [##]w Luminaire - [Fixture Details e.g. OS, EMERG, etc.]" - See Cell A17 & C17	No Action
0.23	0.1	0.07	39	0.28	608	10	"LED [Fixture Type] [##]w Luminaire - [Fixture Details e.g. OS, EMERG, etc.]" - See Cell A17 & C17	No Action
0.23	0.0	0.07	4	0.03	61	1	"LED [Fixture Type] [##]w Luminaire - [Fixture Details e.g. OS, EMERG, etc.]" - See Cell A17 & C17	No Action
0.23	0.0	0.07	4	0.12	56	3	Wraparound 4' - Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95)	Replace w/ new LED wrap luminaire
0.23	0.0	0.07	3	0.09	41	2	2X4 Troffer - Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95)	Retrofit w/ LED bar kit
0.23	0.0	0.07	9	0.07	143	1	2X4 Troffer - Fluorescent, (3) 48" T-8 lamps, Instant Start Ballast, NLO (0.85 < BF < 0.95)	Retrofit w/ LED 2x4 troffer kit
0.23	0.0	0.07	4	0.15	70	2	2X4 Troffer - Fluorescent, (3) 48" T-8 lamps, Instant Start Ballast, NLO (0.85 < BF < 0.95)	Retrofit w/ LED bar kit
0.23	0.0	0.07	1	0.04	20	1	Incandescent, (1) 60W lamp	Replace w/ new LED surface-mount luminaire
0.23	0.0	0.07	21	0.13	335	2	2X4 Troffer - Fluorescent, (3) 48" T-8 lamps, Instant Start Ballast, NLO (0.85 < BF < 0.95)	Retrofit w/ LED 2x4 troffer kit
0.23	0.0	0.07	21	0.13	335	2	2X4 Troffer - Fluorescent, (3) 48" T-8 lamps, Instant Start Ballast, NLO (0.85 < BF < 0.95)	Retrofit w/ LED 2x4 troffer kit
0.23	0.0	0.07	21	0.13	335	2	2X4 Troffer - Fluorescent, (3) 48" T-8 lamps, Instant Start Ballast, NLO (0.85 < BF < 0.95)	Retrofit w/ LED 2x4 troffer kit
0.23	0.0	0.07	128	0.27	2,020	4	2X4 Troffer - Fluorescent, (3) 48" T-8 lamps, Instant Start Ballast, NLO (0.85 < BF < 0.95)	Retrofit w/ LED 2x4 troffer kit
0.23	0.1	0.07	53	0.33	837	5	2X4 Troffer - Fluorescent, (3) 48" T-8 lamps, Instant Start Ballast, NLO (0.85 < BF < 0.95)	Retrofit w/ LED 2x4 troffer kit
0.23	0.0	0.07	36	0.07	561	3	EXIT Compact Fluorescent, (2) 7W lamp	Replace w/ new LED EXIT sign
0.23	0.0	0.07	7	0.04	103	1	Recessed Can Hi-Hat Fixture w/(2) PL 26w CF Quad Lamps	Retrofit w/ LED 6" recessed can kit
0.23	0.0	0.07	11	0.07	167	1	2X4 Troffer - Fluorescent, (3) 48" T-8 lamps, Instant Start Ballast, NLO (0.85 < BF < 0.95)	Retrofit w/ LED 2x4 troffer kit
0.23	0.0	0.07	6	0.04	90	1	Recessed Can Hi-Hat Fixture w/(2) PL 26w CF Quad Lamps	Retrofit w/ LED 6" recessed can kit
0.23	0.0	0.07	21	0.15	328	2	Wraparound 8' - Fluorescent, (4) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95)	Replace w/ new LED wrap luminaire
0.23	0.0	0.07	16	0.11	246	3	Strip 4' - Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95)	Retrofit w/ LED bar kit

0.23	0.0	0.07	5	0.04	82	1	Strip 4' - Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95)	Retrofit w/ LED bar kit
0.23	0.0	0.07	11	0.08	177	2	Wraparound 4' - Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95)	Replace w/ new LED wrap luminaire
0.23	0.0	0.07	10	0.08	164	2	Vapor Tight 4' - Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95)	Retrofit w/ LED bar kit
0.23	0.1	0.07	96	0.60	1,507	9	2X4 Troffer - Fluorescent, (3) 48" T-8 lamps, Instant Start Ballast, NLO (0.85 < BF < 0.95)	Retrofit w/ LED 2x4 troffer kit
0.23	0.0	0.07	0	0.00	-7	1	EXIT Electroluminecent	Replace w/ new LED EXIT sign
0.23	0.0	0.07	2	0.04	36	1	Strip 4' - Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95)	Retrofit w/ LED strip kit
0.23	0.0	0.07	2	0.07	32	1	Strip 3' - Fluorescent, (2) 36", STD lamps	Replace w/ new LED wrap luminaire
0.23	0.0	0.07	6	0.04	90	1	Recessed Can Hi-Hat Fixture w/(2) PL 26w CF Quad Lamps	Retrofit w/ LED 6" recessed can kit
0.23	0.0	0.07	21	0.15	328	2	Wraparound 8' - Fluorescent, (4) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95)	Replace w/ new LED wrap luminaire
0.23	0.0	0.07	16	0.11	246	3	Strip 4' - Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95)	Retrofit w/ LED bar kit
0.23	0.0	0.07	5	0.04	82	1	Strip 4' - Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95)	Retrofit w/ LED bar kit
0.23	0.0	0.07	34	0.25	532	6	Wraparound 4' - Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95)	Replace w/ new LED wrap luminaire
0.23	0.0	0.07	17	0.13	270	3	Recessed Can Hi-Hat Fixture w/(2) PL 26w CF Quad Lamps	Retrofit w/ LED 6" recessed can kit
0.23	0.0	0.07	10	0.08	164	2	Vapor Tight 4' - Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95)	Retrofit w/ LED bar kit
0.23	0.1	0.07	54	0.40	852	14	"LED [Fixture Type] [##]w Luminaire - [Fixture Details e.g. OS, EMERG, etc.]" - See Cell A17 & C17	No Action
0.23	0.0	0.07	24	0.05	374	2	EXIT Compact Fluorescent, (2) 7W lamp	Replace w/ new LED EXIT sign
0.23	0.0	0.07	5	0.02	82	1	Strip 4' - Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95)	Replace w/ new LED strip luminaire
0.23	0.0	0.07	16	0.11	249	1	Wraparound 4' - Fluorescent, (4) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95)	Replace w/ new LED wrap luminaire
0.23	0.0	0.07	5	0.02	82	1	Strip 4' - Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95)	Replace w/ new LED strip luminaire
0.23	0.0	0.07	16	0.11	249	1	Wraparound 4' - Fluorescent, (4) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95)	Replace w/ new LED wrap luminaire
0.23	0.0	0.07	5	0.02	82	1	Strip 4' - Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95)	Replace w/ new LED strip luminaire
0.23	0.0	0.07	16	0.11	249	1	Wraparound 4' - Fluorescent, (4) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95)	Replace w/ new LED wrap luminaire
0.23	0.0	0.07	5	0.02	82	1	Strip 4' - Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95)	Replace w/ new LED strip luminaire
0.23	0.0	0.07	16	0.11	249	1	Wraparound 4' - Fluorescent, (4) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95)	Replace w/ new LED wrap luminaire
0.23	0.0	0.07	5	0.02	82	1	Strip 4' - Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95)	Replace w/ new LED strip luminaire
0.23	0.0	0.07	16	0.11	249	1	Wraparound 4' - Fluorescent, (4) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95)	Replace w/ new LED wrap luminaire

0.23	0.1	0.07	54	0.40	852	14	"LED [Fixture Type] [##]w Luminaire - [Fixture Details e.g. OS, EMERG, etc.]" - See Cell A17 & C17	No Action
0.23	0.0	0.07	24	0.05	374	2	EXIT Compact Fluorescent, (2) 7W lamp	Replace w/ new LED EXIT sign
0.23	0.0	0.07	8	0.06	122	2	"LED [Fixture Type] [##]w Luminaire - [Fixture Details e.g. OS, EMERG, etc.]" - See Cell A17 & C17	No Action
0.23	0.0	0.07	23	0.17	365	6	"LED [Fixture Type] [##]w Luminaire - [Fixture Details e.g. OS, EMERG, etc.]" - See Cell A17 & C17	No Action
0.23	0.0	0.07	0	0.00	-7	1	EXIT Electroluminecent	Replace w/ new LED EXIT sign
0.00	0.0	0.00	0	0.10	50	3	Strip 4' - Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95)	Retrofit w/ LED strip kit
0.00	0.0	0.00	0	0.51	1,862	5	Fixture Type - Metal-Halide, 100W	Replace w/ new LED wallpack
0.00	0.0	0.00	0	0.06	219	2	"LED [Fixture Type] [##]w Luminaire - [Fixture Details e.g. OS, EMERG, etc.]" - See Cell A17 & C17	No Action
0.00	0.0	0.00	0	0.02	55	1	Recessed Can Hi-Hat Fixture w/(2) PL 13w CF Twin Lamps	Retrofit w/ LED 6" recessed can kit
0.00	0.0	0.00	0	0.04	734	5	Vapor Tight 4' - Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95)	Replace w/ new LED area luminaire
0.00	0.0	0.00	0	1.22	4,453	5	Fixture Type - High-Pressure Soduim, 250W	Replace w/ new LED area luminaire
0.00	0.0	0.00	0	0.05	183	1	"LED [Fixture Type] [##]w Luminaire - [Fixture Details e.g. OS, EMERG, etc.]" - See Cell A17 & C17	No Action
0.00	0.0	0.00	0	0.49	1,781	2	Fixture Type - High-Pressure Soduim, 250W	Replace w/ new LED area luminaire
0.00	0.0	0.00	0	0.15	548	3	"LED [Fixture Type] [##]w Luminaire - [Fixture Details e.g. OS, EMERG, etc.]" - See Cell A17 & C17	No Action
0.00	0.0	0.00	0	0.20	730	4	"LED [Fixture Type] [##]w Luminaire - [Fixture Details e.g. OS, EMERG, etc.]" - See Cell A17 & C17	No Action
0.00	0.0	0.00	0	0.03	17	1	Strip 4' - Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95)	Retrofit w/ LED strip kit
0.00	0.0	0.00	0	0.03	17	1	Strip 4' - Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95)	Retrofit w/ LED strip kit
0.00	0.0	0.00	0	0.06	33	2	Strip 4' - Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95)	Retrofit w/ LED strip kit
0.00	0.0	0.00	0	0.03	15	1	Strip 3' - Fluorescent, (2) 36", T-8 lamps, Instant Start Ballast, NLO (0.85 < BF < 0.95)	Replace w/ new LED wrap luminaire
0.23	0.0	0.07	3	0.03	49	2	Recessed Can Hi-Hat Fixture w/(1) PL 26w CF Quad Lamps	Retrofit w/ LED 6" recessed can kit with battery
0.23	0.0	0.07	0	0.02	0	1	EXIT Compact Fluorescent, (2) 7W lamp	Replace w/ new LED EXIT sign
0.23	0.0	0.07	5	0.04	71	1	Strip 4' - Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95)	Retrofit w/ LED strip kit
0.23	0.0	0.07	32	0.07	505	1	2X4 Troffer - Fluorescent, (3) 48" T-8 lamps, Instant Start Ballast, NLO (0.85 < BF < 0.95)	Retrofit w/ LED 2x4 troffer kit
0.23	0.1	0.07	38	0.33	601	5	2X4 Troffer - Fluorescent, (3) 48" T-8 lamps, Instant Start Ballast, NLO (0.85 < BF < 0.95)	Retrofit w/ LED 2x4 troffer kit with bi-level switching
0.23	0.0	0.07	12	0.02	187	1	EXIT Compact Fluorescent, (2) 7W lamp	Replace w/ new LED EXIT sign
0.23	0.0	0.07	12	0.02	187	1	EXIT Compact Fluorescent, (2) 7W lamp	Replace w/ new LED EXIT sign

0.23	0.0	0.07	11	0.09	169	4	2X2 Toffer - Fluorescent, (3) 24", T-8 lamps, Instant Start Ballast, NLO (0.85 < BF < 0.95)	Retrofit w/ LED 2x2 troffer kit
0.23	0.0	0.07	11	0.09	169	4	2X2 Toffer - Fluorescent, (3) 24", T-8 lamps, Instant Start Ballast, NLO (0.85 < BF < 0.95)	Retrofit w/ LED 2x2 troffer kit
0.23	0.0	0.07	11	0.09	169	4	2X2 Toffer - Fluorescent, (3) 24", T-8 lamps, Instant Start Ballast, NLO (0.85 < BF < 0.95)	Retrofit w/ LED 2x2 troffer kit
0.23	0.0	0.07	64	0.13	1,010	2	2X4 Troffer - Fluorescent, (3) 48" T-8 lamps, Instant Start Ballast, NLO (0.85 < BF < 0.95)	Retrofit w/ LED 2x4 troffer kit
0.23	0.0	0.07	23	0.20	361	3	2X4 Troffer - Fluorescent, (3) 48" T-8 lamps, Instant Start Ballast, NLO (0.85 < BF < 0.95)	Retrofit w/ LED 2x4 troffer kit with bi-level switching
0.23	0.0	0.07	9	0.08	147	6	Recessed Can Hi-Hat Fixture w/(1) PL 26w CF Quad Lamps	Retrofit w/ LED 6" recessed can kit
0.23	0.0	0.07	2	0.01	24	1	Recessed Can Hi-Hat Fixture w/(1) PL 26w CF Quad Lamps	Retrofit w/ LED 6" recessed can kit with battery
0.23	0.0	0.07	1	0.04	18	1	Strip 4' - Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95)	Retrofit w/ LED strip kit
0.23	0.0	0.07	31	0.27	481	4	2X4 Troffer - Fluorescent, (3) 48" T-8 lamps, Instant Start Ballast, NLO (0.85 < BF < 0.95)	Retrofit w/ LED 2x4 troffer kit with bi-level switching
0.23	0.0	0.07	32	0.07	505	1	2X4 Troffer - Fluorescent, (3) 48" T-8 lamps, Instant Start Ballast, NLO (0.85 < BF < 0.95)	Retrofit w/ LED 2x4 troffer kit
0.23	0.0	0.07	36	0.07	561	3	EXIT Compact Fluorescent, (2) 7W lamp	Replace w/ new LED EXIT sign
0.23	0.0	0.07	7	0.01	103	1	Recessed Can Hi-Hat Fixture w/(1) PL 26w CF Quad Lamps	Retrofit w/ LED 6" recessed can kit
0.23	0.0	0.07	20	0.17	307	6	"LED [Fixture Type] [##]w Luminaire - [Fixture Details e.g. OS, EMERG, etc.]" - See Cell A17 & C17	No Action
0.23	0.0	0.07	28	0.24	441	6	Strip 4' - Fluorescent (1) 45.8" (1163mm) T-5 lamp; (1) PRS Electronic Ballast, HLO (.95 < BF < 1.1)	No Action
0.23	0.0	0.07	3	0.03	51	1	"LED [Fixture Type] [##]w Luminaire - [Fixture Details e.g. OS, EMERG, etc.]" - See Cell A17 & C17	No Action
0.23	0.0	0.07	3	0.03	51	1	"LED [Fixture Type] [##]w Luminaire - [Fixture Details e.g. OS, EMERG, etc.]" - See Cell A17 & C17	No Action
0.23	0.0	0.07	9	0.08	138	2	Vapor Tight 4' - Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95)	Retrofit w/ LED bar kit
0.23	0.0	0.07	14	0.12	220	3	Strip 4' - Fluorescent (1) 45.8" (1163mm) T-5 lamp; (1) PRS Electronic Ballast, HLO (.95 < BF < 1.1)	No Action
0.23	0.0	0.07	8	0.07	134	1	Incandescent, (1) 60W lamp	No Action
0.23	0.0	0.07	9	0.08	138	2	1x4 Troffer - Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95)	Retrofit w/ LED bar kit
0.23	0.0	0.07	18	0.15	276	4	1x4 Troffer - Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95)	Retrofit w/ LED bar kit
0.23	0.0	0.07	18	0.15	276	4	1x4 Troffer - Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95)	Retrofit w/ LED bar kit
0.23	0.0	0.07	9	0.08	138	2	1x4 Troffer - Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95)	Retrofit w/ LED bar kit
0.23	0.0	0.07	4	0.04	69	1	1x4 Troffer - Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95)	Retrofit w/ LED bar kit
0.23	0.0	0.07	13	0.11	207	3	1x4 Troffer - Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95)	Retrofit w/ LED bar kit
0.23	0.1	0.07	69	0.60	1,082	9	2X4 Troffer - Fluorescent, (3) 48" T-8 lamps, Instant Start Ballast, NLO (0.85 < BF < 0.95)	Retrofit w/ LED 2x4 troffer kit
0.23	0.1	0.07	33	0.28	514	7	Strip 4' - Fluorescent (1) 45.8" (1163mm) T-5 lamp; (1) PRS Electronic Ballast, HLO (.95 < BF < 1.1)	No Action
0.23	0.0	0.07	13	0.11	207	3	1x4 Troffer - Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95)	Retrofit w/ LED bar kit
0.23	0.0	0.07	4	0.04	69	1	1x4 Troffer - Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95)	Retrofit w/ LED bar kit
0.23	0.0	0.07	18	0.08	290	2	Vapor Tight 4' - Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95)	Retrofit w/ LED bar kit
0.23	0.0	0.07	55	0.23	870	6	Vapor Tight 4' - Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95)	Retrofit w/ LED bar kit
0.23	0.0	0.07	18	0.08	290	2	Vapor Tight 4' - Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95)	Retrofit w/ LED bar kit
0.23	0.0	0.07	55	0.23	870	6	Vapor Tight 4' - Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95)	Retrofit w/ LED bar kit
0.23	0.0	0.07	18	0.08	290	2	Vapor Tight 4' - Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95)	Retrofit w/ LED bar kit

0.23	0.0	0.07	13	0.11	207	3	1x4 Troffer - Fluorescent, (2) 48", T-8 lamp, Instant Start Ballast, NLO (BF: .85-.95)	Retrofit w/ LED bar kit
0.23	0.0	0.07	2	0.01	24	1	Recessed Can Hi-Hat Fixture w/(1) PL 26w CF Quad Lamps	Retrofit w/ LED 6" recessed can kit with battery
0.23	0.0	0.07	12	0.02	187	1	EXIT Compact Fluorescent, (2) 7W lamp	Replace w/ new LED EXIT sign
0.00	0.0	0.00	0	0.39	1,708	13	Compact Fluorescent, (1) 42W lamp	Replace w/ new LED wall-mount round
0.00	0.0	0.00	0	0.02	96	2	Recessed Can Hi-Hat Fixture w/(1) PL 26w CF Quad Lamps	Retrofit w/ LED 6" recessed can kit
0.00	0.0	0.00	0	0.01	48	1	Recessed Can Hi-Hat Fixture w/(1) PL 26w CF Quad Lamps	Retrofit w/ LED 6" recessed can kit with battery
0.00	0.0	0.00	0	0.01	48	1	Recessed Can Hi-Hat Fixture w/(1) PL 26w CF Quad Lamps	Retrofit w/ LED 6" recessed can kit
0.00	0.0	0.00	0	0.02	96	2	Recessed Can Hi-Hat Fixture w/(1) PL 26w CF Quad Lamps	Retrofit w/ LED 6" recessed can kit

EXHIBIT B

Form of Annual Savings Reconciliation Report

The annual M&V report will consist of the following items:

1. Executive Summary
    a. Project background
        i. Project acceptance date
        ii. Date of any contract modifications
    b. Brief Project and ECM Description
        i. What was done and how savings are generated
    c. Summary of Proposed Savings
    d. Summary of Verified Savings
    e. Savings Adjustments
        i. Summary of any energy or cost savings adjustments used in calculations
    f. Performance and O&M Issues
        i. Impact of operating deficiencies or enhancements on generation of savings.
        ii. Impact of maintenance deficiencies on generation of savings.
        iii. Any deficiencies needed to be addressed by contractor or agency.
    g. Energy and O&M Rate Data
        i. Detail energy rates used to calculate cost savings for this period.
        ii. Provide post-acceptance performance period rate adjustment factors for energy and O&M, if used.
    h. Summary of Verified Savings to Date

2. Details for each ECM
    a. Overview of ECM, M&V Plan, and Savings Calculations
        i. Summarize the scope of work, location, and how cost savings are generated. Describe source of all savings including energy, water, O&M, and other (if applicable).
        ii. Provide an overview of M&V Activities for ECM. Explain the intent of M&V plan, including what is being verified.
        iii. Provide an overview of savings calculation methods for ECM. Provide a general description of analysis methods used for savings calculations.
    b. M&V Activities Conducted This Period
        i. Measurement equipment used.
        ii. Dates/times of data collection
        iii. Include all measured values for this period
        iv. Describe how performance criteria have been met.
        v. Detail any performance deficiencies that need to be addressed by Company or Agency

vi. Note impact of performance deficiencies or enhancements on generation of savings.

c. Verified Savings Calculations and Methodology
    i. Provide detailed description of analysis methodology used.
    ii. Detail all assumptions and sources of data, including all stipulated values used in calculations.
    iii. Details of any baseline or savings adjustments made.
    iv. Detail energy and water rates used to calculate cost savings.
        1. Provide post-acceptance performance period energy and water rate adjustment factors, if used.
    v. Detail verified savings for this energy conservation measure for performance year in.
d. Details of O&M Savings
e. Details of other savings (if applicable)
f. O&M Activities
    i. Operating Requirements
        1. Organization responsible for operation
        2. Any deficiencies found
            a. If so, what impacts on operation did they have.
    ii. Preventative Maintenance Requirements
    iii. Scheduled Maintenance Requirements
    iv. Repair and Replacement Requirements

EXHIBIT C

Certificate of Substantial Completion

Project Name: _____

Date of Substantial Completion: _____

Customer Name: _____

Project Address: _____
_____

This Certificate of Substantial Completion applies to all Work under the Contract dated _____ and any Change Order or other documents subsequently executed in relation to the Contract.

The Work to which this Certificate applies has been inspected by authorized representatives of Owner and Contractor and is hereby declared substantially complete in accordance with Contract documents.

CBSS :	_____	Customer:	_____
Print Name:	_____	Print Name:	_____
Title:	_____	Title:	_____
Date:	_____	Date:	_____

Schedule 1

The Facilities

District Facilities:

- Coachella Valley Mosquito and Vector Control District: 43-420 Trader Pl, Indio, CA 92201

Schedule 2A

Scope of Work

This schedule provides the scope of work for the project conducted by Centrica Business Solutions for their client Coachella Valley Mosquito and Vector Control District (CVMVCD). The following is a documentation of the Facility Improvement Measures (FIM) that are to be implemented during this project as well as what the scope of work for each FIM will entail.

FIM Name
1 - LED Lighting Upgrades
2 – HVAC BMS Upgrade
3 – New Solar Installation
4 – Existing Solar Replacement

FIM #1: LED Lighting Upgrades

This FIM will be completed in the following facilities:

- Admin Building
- Cold Storage
- Laboratory Building
- Mobile Equipment
- Operations Building
- Tank Storage
- Carports
- Parking Lots

A. Scope of Work

a. Mechanical
   i. None
b. Controls
   i. Install title 24 Compliant Controls
c. Electrical
   i. Remove and dispose of existing light fixtures, lamps and ballasts where entire fixture is being replaced with a new LED fixture according to Section C
   ii. Remove and dispose of existing lamps and ballasts where fixture is to be retrofit with an LED kit according to Section C
   iii. Recycle existing interior lamps and ballasts in compliance with local regulations and codes
   iv. Install new LED lamps and luminaires as presented in Section C
d. Structural
   i. None
e. Commissioning
   i. Occupancy sensor programming compliant with Title 24 code

B. Scope of Services

a. Design
    i. Documents required for permitting purposes through AHJ for all sites
    ii. Title 24 approval documents for AHJ, as required for permitting
b. Implementation
    i. Pre-construction services:
        1. Product Submittals
        2. Pre-construction conference with CVMVCD representatives
        3. Site Mobilization
    ii. Project installation as stated in Schedule 3
    iii. Project Closeout:
        1. Operations and Maintenance manuals
        2. Warranty Documents
        3. Customer training
c. One-year workmanship warranty from date of Substantial Completion
d. Exemptions, Exclusions and Assumptions
    i. This measure has been priced with prevailing wage rates.
    ii. No modifications to existing circuits are included in this Scope of Work, including but not limited to:
        1. Relocation of fixtures, switches or circuits
        2. New conduit installation
        3. Removal of timeclocks
        4. Removal of circuit level photocells
    iii. Hazardous material abatement is excluded
    iv. Correction of unknown existing system deficiencies is excluded, including but not limited to:
        1. Electrical quality issues
    v. Cutting, patching, fireproofing and painting is excluded
    vi. Centrica Business Solutions Services assumes all electrical service is properly sized and electrical conduit is properly installed and undamaged.
    vii. Centrica Business Solutions Services assumes all work shall be conducted during 1st Shift Monday through Friday
    viii. LEED certification or evaluation is excluded
    ix. Photometric calculations are excluded
    x. Additional engineering services not listed in B.a above are excluded
    xi. Temporary facilities including but not limited to toilets, power and lighting are excluded

C. Equipment Details

Centrica Business Solutions Services will upgrade the existing fluorescent and HID lighting with LED lighting technology. Centrica Business Solutions Services will furnish and install lighting fixtures/kits for energy savings and occupancy sensors to automatically shut the lights off in certain identified areas.

The table below provides a summary of the lighting upgrades by fixture type.

Building Name	Location Description	Existing Fixture Type	Height	Qty	Proposed Solution
Admin	Lobby, Halls, Rooms	Emergency EXIT/bug-eye	10	4	New LED EXIT and emergency bug-eye
	Restroom, Storage	Wrap fixtures (4ft)	10	9	New 4' Wrap luminaires
	Restroom, Storage	Wrap fixtures (8ft)	8	3	New 8' Wrap luminaires
	Lobby, Halls, Rooms	Troffers on T-bar ceiling	9	18	Retrofit troffer kit
	Restroom	Cove over sink (4' strips)	8	2	Retrofit 4' 2-bar kits
	Boardroom	Fancy Pendant Strips	15	20	Rebuild w/ 2x4'tube + driver
	Network Comm room	4' Strip fixture	8	1	Retrofit strip kit
	Lobby	8" diameter recessed can	22	12	Replace with LED recessed can kit
	Boardroom, MPR	6" diameter recessed can	10	22	Replace with LED recessed can kit
	Boardroom	6" diameter recessed can	15	10	Replace with LED recessed can kit
Cold Storage	Storage	EXIT signs (radioactive)	10	2	New EXIT, requires new wiring, proper disposal
	Storage	EXIT signs	10	1	New EXIT signs
	Storage	4' Vaportight on jack-chain	14	2	new LED vaportight
	Storage	8' Strips on jack-chain	14	6	new LED strip luminaires
Laboratory	Entry, Halls, Open areas	EXIT signs	8	7	New EXIT sings
	Mechanical room	2' Wrap fixture	8	1	new LED Wrap luminaire
	Mechanical, Storage	4' Strip fixture	8	6	new LED strip luminaires
	Offices, Halls, Lab Spaces	Troffers on T-bar ceiling	8	60	Retrofit troffer kit
	Lab rooms	4' Vaportight fixtures	8	20	Retrofit 4' 2-bar kits
	Rooms, Halls	6" diameter recessed can	8	11	Replace with LED recessed can kit
Mobile Equipment	Restroom	4' Wrap fixture	8	1	new LED Wrap luminaire
	Electrical Room	4' Strip fixture on jack-chain	14	4	new LED strip luminaires
	Offices, Shower/Locker	Troffers on T-bar ceiling	8	5	Retrofit troffer kit
	Work Bays	8' Strips on jack-chain	14	8	new LED strip luminaires
Operations	Halls, Rooms	Emergency EXIT signs	10	9	New LED EXIT signs
	Offices, Storage	Wrap fixtures (4ft)	10	23	New 4' Wrap luminaires
	Restrooms	Wrap fixtures (8ft)	8	4	New 8' Wrap luminaires
	Offices, Halls	Troffers on T-bar ceiling	8	26	Retrofit troffer kit
	Restrooms, Storage	4' Strip fixtures (various)	8	16	Retrofit 4' 2-bar kits
	Janitor, Electrical room	4' Strip fixtures	10	4	Retrofit strip kit
	Restroom, Halls	8" diameter recessed can	8	6	Replace with LED recessed can kit
Storage (tank)	Bay	Emergency EXIT signs (Print)	10	3	New EXIT, requires new wiring
	Bay	Emergency bug-eye	10	2	New LED emergency bug-eye
	Bay	High-Bay (6xCFL) pendant (2')	13	13	New LED High-Bay
	Storage	4' Wrap fixture	8	6	new LED Wrap luminaire
	Electrical Room	4' Strip fixture	8	1	Retrofit strip kit

Building Name	Location Description	Existing Fixture Type	Height	Qty	Proposed Solution
Admin	Building Perimeter	6" diameter recessed can	22	2	Replace with LED recessed can kit
Mobile Equipment	Building Perimeter	Wallpack	12	3	Replace with LED wallpack
	Canopy area	4' Vaportight on jack-chain	15	6	Replace with LED vaportight
Cold Storage	Building Perimeter	Wallpack	14	6	Replace with LED wallpack
	Canopy area	4' Vaportight on jack-chain	10	14	Replace with LED vaportight
Storage (tank)	Building Perimeter	Wallpack	10	2	Replace with LED wallpack
	over Sink area	4' Vaportight wall-mount	6	2	Replace with LED vaportight
Laboratory	Building Perimeter	wall-mount disk	12	13	Replace with LED wall-mount luminaire
	Building Perimeter	6" diameter recessed can	11	6	Replace with LED recessed can kit
Operations	Building Perimeter	Wallpack	8	5	Replace with LED wallpack
	Building Perimeter	6" diameter recessed can	7	1	Replace with LED recessed can kit
Carports	Carport Perimeter	Wallpack	8	19	Replace with LED wallpack
	Carport Canopy	4' Vaportight wall-mount	10	47	Replace with LED vaportight
Parking	Pole, 12-foot	HID Pole fixture	12	7	Replace with LED Pole luminaire

Please note, equipment specified in the table above is contingent upon submittal and permitting acceptance.

FIM #2: HVAC BMS Upgrade

Facilities Affected

- Laboratory Building
- Admin Building
- Operations Building
- Tank Storage
- Mobile Equipment
- Cold Storage

Centrica Business Solutions Services will furnish and install a new Distech BMS System to replace the existing Johnson Control's system. Centrica will also integrate the climate control equipment from the entire site onto the BMS network so that all systems can be controlled and monitored by the BMS, where currently only the laboratory building is connected to the BMS network.

A. Scope of Work

a. Electrical
   i. Installation labor and material for the BMS control points in accordance with the design package (submittal)

b. Commissioning
   i. Startup and check out of the new control points shall be provided

B. Scope of Services

a. Design
   i. Programming of BMS with schedules and setpoints designed for energy savings and comfort

b. Implementation
   i. Project installation as stated in Schedule 3
   ii. Project Closeout:
      1. Operations and Maintenance manuals
      2. Warranty Documents
      3. Customer Training

c. User Interface that is accessible by customer with in-network computer

d. One-year workmanship warranty from date of Substantial Completion

e. Exemptions, Exclusions and Assumptions
   i. This measure has been priced with prevailing wage rates.
   ii. Hazardous material abatement is excluded.
   iii. Centrica Business Solutions Services assumes all electrical service is properly sized and electrical conduit is properly installed and undamaged
   iv. Patching, painting, or otherwise repairing walls is excluded
   v. Annual subscription fees for remote access to graphical user interface (GUI) us excluded
   vi. Centrica Business Solutions Services assumes all work shall be conducted during 1st Shift Monday through Friday
   vii. It is assumed that all HVAC units are operational (cooling, heating, and airflow). HVAC units found to have faults during BMS control point installation shall be communicated to CVMVCD representatives, but repairs are excluded from this scope of work

C. Equipment Details

Centrica Business Solutions Services will provide a comprehensive conversion of the existing Johnson Controls BMS with Distech. Below is a list of equipment that will be modified to facilitate the BMS upgrade and integration of equipment not controlled by current BMS system.

Building Name	Equipment	Proposed Action
Lab	AHU 1 & 2	New DDC controls and wiring
Lab	Heating Hot Water System	New DDC controls and wiring
Lab	Chilled Water System	New DDC controls and wiring
Lab	Fan Coil Units	New DDC controls and wiring
Lab	Exhaust Fan	New DDC controls and wiring
Lab	Mini Splits	New BACnet thermostat and I/O device in field
Lab	Thermo Scientific Freezer (-80 freezer)	New BACnet thermostat, alarm contacts, and wiring to central switch
Lab	Phoenix Lab Controls	New BMS server and wiring to existing Phoenix Controls
Lab	Rearing Rooms (walk in freezer)	Temperature monitoring and alarming
Lab	Humidifier	New thermostat and humidity sensor connected to nearest DDC controls
Admin	AC units	New controller in units and new field device for monitoring
Operations	AC units	New controller in units and new field device for monitoring
Operations	Mini Splits	New BACnet thermostat and I/O device in field
Mobile Equipment	AC units	New controller in units and new field device for monitoring
Mobile Equipment	Swamp Coolers	New BACnet thermostat and I/O device in field
Mobile Equipment	Radiant Heaters	New BACnet thermostat and I/O device in field
Cold Storage	Fan Coil Unit	New BACnet thermostat and I/O device in field
Cold Storage	Refrigeration System	New BACnet thermostat and I/O device in field
Tank Storage	AC units	New controller in units and new field device for monitoring
Tank Storage	Swamp Cooler	New BACnet thermostat and I/O device in field

FIM #3: New Solar Installation

Facility Affected

- Laboratory building
- Carports

Centrica Business Solutions Services has determined that this site is viable for solar PV on top of existing carports. The system was sized to achieve the maximum feasible production based on the site's electrical and space constraints.

The Solar PV systems will go through a detailed design process during implementation to determine the final product specifications and system sizing of the solar panels and inverters. **The system size may vary from preliminary design and expected annual production is contingent upon interconnection agreement with local utility**. The Solar PV systems will have the following characteristics:

- Tier 1 solar panels and inverters
- Solar production monitoring software
- Interconnection Agreement with utilities
- Change rate structure to Net Billing rate structure

The preliminary system size is as follows:

Site	PV Size/Type (kW DC)	Expected Annual Production
Coachella Valley Mosquito and Vector Control District	210.1 kW	326,235 kWh/yr

A. Scope of Work

a. Mechanical
   i. None

b. Controls
   i. None

c. Electrical
   i. Compliance with Imperial Irrigation District (IID) Interconnection Requirement Rules, Regulations 21, and UL 1741-SA compliant
   ii. Install positive attachment roof mounting system with associated roof protection and required seismic attachments
   iii. Install module on the module racks; run equipment ground wiring; wire DC strings to Inverters
   iv. Install Balance of System (BOS) components including switchgear (as required), AC combiner boxes (as required), disconnect switches (as required), and all wiring between electrical components

d. Structural
   i. Inspection of carport and roof structure
   ii. Structural Modifications as needed to support solar system

e. Commissioning
   i. Following installation, the system components will be tested according to manufacturer's recommendations to confirm proper functionality
   ii. Inspections by Utility Service Provider or the AHJ will be coordinated by Centrica Business Solutions Services

B. Scope of Services

a. Design
    i. A full set of California licensed structural and electrical stamped drawings for all solar PV Systems listed above, as required by the Authority Having Jurisdiction (AHJ).
b. Implementation
    i. Pre-construction services
        1. Product Submittals
        2. Pre-construction conference with CVMVCD representatives
        3. Site Mobilization
    ii. Procurement of all materials
    iii. Coordination with the AHJ for permits
    iv. Completion of all required field inspections and documentation.
    v. All utility interconnection application submittals and fees
    vi. Project installation as stated in Schedule 3
    vii. Installation of cloud based solar PV monitoring solution
    viii. Project Closeout:
        1. Operations and Maintenance manuals
        2. Warranty Documents
        3. Customer Training
c. Warranty service and labor within one year of substantial completion of this FIM.
d. Assumptions
    i. This measure has been priced with prevailing wage rates.
    ii. The utility has capacity to complete the utility service upgrade at time of project submittal to utility
    iii. Assumes no additional variance, historic district, special use or any other Special Permits will be required except for those defined herein. Street closure permits and police details are not included, and if needed will be presented as a change order request
    iv. All work will be performed during 1st shift Monday through Friday
    v. Re-striping as needed for accommodating carport ADA parking
e. Exemptions and Exclusions
    i. Impacts to the Work due to Concealed Conditions, or correction of such Concealed Conditions are excluded, including but not limited to:
        1. De-watering
        2. Removal of unsuitable soils
    ii. Correction, testing, or remediation of mold, fungus, mildew, or organic pathogens are excluded
    iii. Removing or repairing rot or insect infestation is excluded
    iv. Removal of, disposal of, or work involving any materials containing asbestos or any other Hazardous Conditions is excluded
    v. Moving or relocation any personal property belong to any Personal that in not Centrica or Centrica subcontractor or supplier is excluded
    vi. Painting of conduits, walls or other structural parts is excluded
    vii. Supply of a back-up lighting system for use during the installation of the System is excluded
    viii. Work at the site due to ADA requirements by the AHJ is excluded that are not listed above
    ix. Hiring of Health Safety Professional to monitor and track COVID-19

FIM #4: Existing Solar Refurbishment

Facilities Affected

- Operations Building
- Carports

Centrica Business Solutions Services has determined that this site is viable for carport solar PV replacement. The system was sized to replace the current failing solar system and regain full production of the original design.

The Solar PV systems will go through a detailed design process during implementation to determine the final product specifications and system sizing of the solar panels and inverters. **The system size may vary from preliminary design and expected annual production is contingent upon interconnection agreement with local utility**. The Solar PV systems will have the following characteristics:

- Tier 1 solar panels and inverters
- Solar production monitoring software
- Interconnection Agreement with utilities
- Continued rate structure of Net Energy Metering rate

The preliminary system sizes are as follows:

Site	PV Size/Type (kW DC)	Expected Annual Production
Coachella Valley Mosquito and Vector Control District	168.5 kW	254,873 kWh/yr

A. Scope of Work

a. Mechanical
   i. Decommissioning and demolition of existing solar carport system
   ii. Recycling and disposal of all waste from demolition

b. Controls
   i. None

c. Electrical
   i. Compliance with Imperial Irrigation District's Interconnection Requirement Rules, Regulations 21 and UL 1741-SA compliant
   ii. Install ballasted roof mounting system with associated roof protection and required seismic attachments
   iii. Install module on the module racks; run equipment ground wiring; wire DC strings to Inverters
   iv. Install Balance of System (BOS) components including switchgear (as required), AC combiner boxes (as required), disconnect switches (as required), and all wiring between electrical components

d. Structural
   i. Inspection of carport structure
   ii. Structural Modifications as needed to support solar system

e. Commissioning
    i. Following installation, the system components will be tested according to manufacturer's recommendations to confirm proper functionality
    ii. Inspections by Utility Service Provider or the AHJ will be coordinated by Centrica Business Solutions Services

B. Scope of Services

a. Design
    i. A full set of California licensed structural and electrical stamped drawings for all solar PV Systems listed above, as required by the Authority Having Jurisdiction (AHJ).
b. Implementation
    i. Pre-construction services
        1. Product Submittals
        2. Pre-construction conference with CVMVCD representatives
        3. Site Mobilization
    ii. Procurement of all materials
    iii. Coordination with the AHJ for permits
    iv. Completion of all required field inspections and documentation
    v. All utility interconnection application submittals and fees
    vi. Project installation as stated in Schedule 3
    vii. Installation of cloud based solar PV monitoring solution
    viii. Project Closeout:
        1. Operations and Maintenance manuals
        2. Warranty Documents
        3. Customer Training
c. Warranty service and labor within one year of substantial completion of this FIM.
d. Assumptions
    i. This measure has been priced with prevailing wage rates.
    ii. The existing electrical service is capable of being back fed and no major upgrades are required, and interconnection will be made using a supply-side connection in the existing switchgear that is in compliance with NEC requirements
    iii. Assumes no additional variance, historic district, special use or any other Special Permits will be required except for those defined herein. Street closure permits and police details are not included, and if needed will be presented as a change order request
    iv. All work will be performed during 1st shift Monday through Friday
    v. Re-striping as needed for accommodating carport ADA parking
e. Exemptions and Exclusions
    i. Impacts to the Work due to Concealed Conditions, or correction of such Concealed Conditions including but not limited to:
        1. De-watering
        2. Removal of unsuitable soils
        3. Structural modification to existing roofing
    x. Correction, testing, or remediation of mold, fungus, mildew, or organic pathogens.
    xi. Removing or repairing rot or insect infestation

xii. Removal of, disposal of, or work involving any materials containing asbestos or any other Hazardous Conditions
xiii. Moving or relocation any personal property belong to any Personal that in not Centrica or Centrica subcontractor or supplier
xiv. Painting of conduits, walls or other structural parts
xv. Supply of a back-up lighting system for use during the installation of the System
xvi. Work at the site due to ADA requirements by the AHJ is excluded that are not listed above
xvii. Hiring of Health Safety Professional to monitor and track COVID-19

SCHEDULE 2B

SCOPE OF MM&V AND O&M SERVICES

The date of the commencement of Contractor's obligations under the MM&V Services Phase shall be the same as the date of Substantial Completion under Exhibit 2 ("MM&V Services Commencement Date").

For each year of the MM&V Term after the MM&V Services Commencement Date, within sixty (60) days of the anniversary date of the MM&V Services Commencement Date, Contractor shall provide Owner with an annual energy savings guarantee reconciliation report that calculates annual energy savings according to the Energy Savings Methodologies defined in the "Energy Savings Schedule" below ("Savings Reconciliation Report"). Contractor will provide Owner with an explanation as to any variations between annual energy savings and the Guaranteed Energy Savings (as hereinafter defined). The Savings Reconciliation Report shall initially be submitted by Contractor to Owner in draft form whereupon Contractor and Owner shall use their best efforts to resolve any discrepancies in the report as soon as possible so as to arrive at mutually acceptable Savings Reconciliation Report. Contractor and Owner will indicate their acceptance of the Savings Reconciliation Report by signing at the end thereof.

Contractor has formulated and hereby guarantees the energy and operations savings (the "Guaranteed Energy Savings") to be achieved as a result of the installation and operation of the Scope of Work and the provisions of the MM&V services. The amount of the Guaranteed Energy Savings is subject to modification based upon i) changes in the Scope of Work after the Effective Date, ii) changes in the MM&V services after the Effective Date, and iii) changes to proposed material, and the Parties shall reflect all such modifications by revising accordingly the Guaranteed Energy Savings and any other applicable portions of the Energy Savings Schedule.

Commencing with the first twelve (12) month period following the MM&V Services Commencement Date, and for each twelve (12) month period within the MM&V Term thereafter, where the energy savings, as calculated using the method defined in the Energy Savings Schedule, are less than the Guaranteed Energy Savings, Contractor agrees to pay to Owner the difference between the Guaranteed Energy Savings and the sum of the actual energy savings as calculated. Contractor will make any such Guaranteed Energy Savings payment within ninety (90) days of the date of Owner's acceptance of the Savings Reconciliation Report.

Owner shall not move, remove, modify, alter, or change the Equipment or any part thereof ("Alterations") in any way without the prior written approval of Contractor, except in the event of a *bona fide* emergency where it is not reasonably possible to notify Contractor before carrying out Alterations. In the event of such an emergency, Owner shall take reasonable steps to protect the Equipment from damage or injury, shall follow any instructions for emergency action provided in advance by Contractor, and shall notify Contractor within three (3) business days of such emergency. Any telephonic notice of such emergency shall be followed within one (1) business day by written notice to Contractor from Owner. Owner agrees to maintain the facilities in good repair and to protect and preserve all portions thereof that may in any way affect the operation or maintenance of the Equipment.

In the event that any actions of Owner, including but not limited to the carrying out of Alterations, affect the performance of the Equipment, the Guaranteed Energy Savings shall be adjusted to reflect the impact of such actions. If Owner unreasonably delays in notifying Contractor of changes resulting from an

emergency and/or Owner does not receive written approval to carry out Alterations, all Guaranteed Energy Savings obligations of Contractor shall automatically cease and be of no further force or effect.

At all times during the MM&V Term, Contractor shall have the right, subject to Owner's prior written approval, which approval shall not be unreasonably withheld, to change the Equipment or any related energy automation management systems, revise any procedures for the operation thereof, and/or implement other energy saving actions in the facilities, provided that: (i) such modifications are necessary, in Contractor's reasonable judgment, to enable Contractor to achieve the Guaranteed Energy Savings at the facilities, and (ii) any cost incurred relative to such modifications, additions or replacement of the Equipment, or operational changes or new procedures shall be the responsibility of Contractor. All such modifications, additions or replacements of the Equipment or revisions to operating or other procedures shall be described in a supplemental schedule to be provided to Owner.

Section 1: MM&V Scope of Work

Table 1: Year 1 Total Energy Savings

FIM	Electric Usage Savings (kWh/yr)	Gas Usage Savings (Therms/yr)
1 – Lighting Upgrades	74,258	
2 – HVAC BMS Upgrade	28,500	453
3 – New Solar PV Installation	287,739	
4 – Existing Solar PV Replacement	168,006	
Total	**558,504**	**453**

REPAIR AND REPLACEMENT SAVINGS. Table 2 identifies the annual repair and replacement savings throughout the project term. The Repair & Replacement savings are associated with the annual material replacement savings associated with replacing the existing lighting with long-life LED lighting. The annual repair and replacement savings will be $3,208 for Year 1 and will be escalated annually for the remainder of the term. Repair and replacement savings are stipulated and shall not be measured or guaranteed.

UTILITY ESCALATION RATES. Annual energy savings are escalated using the following annual escalation factors:

Escalation Factor	Rate of Escalation
Electric Cost Escalation Rate	4.0%
Natural Gas Cost Escalation Rate	3.0%
Maintenance & Replacement Cost Escalation Rate	2.0%

TOTAL ANNUAL COST SAVINGS. The total annual savings for each year of the MM&V term applying the applicable escalation rates is provided in Table 2. The savings for the solar PV systems include a degradation rate of 2% for Year 1 and 0.6% for all subsequent years. The energy cost savings are calculated by multiplying the energy savings by the baseline rates described in section Baseline: Energy and Operating Conditions. The savings guarantee does not operate to guarantee the savings per FIM. Rather, the calculation of savings is based on aggregate performance of all FIMs contained in the project.

Table 2: Energy Savings Schedule for Contract Term

Annual Period	Guaranteed Utility Cost Savings	Stipulated Repair & Replacement Cost Savings	Total Savings
Year 1	$ 72,076	$ 3,268	$ 75,344
Year 2	$ 74,613	$ 3,333	$ 77,946
Year 3	$ 77,239	$ 3,400	$ 80,639
Year 4	$ 79,958	$ 3,468	$ 83,426
Year 5	$ 82,773	$ 3,537	$ 86,311
Year 6	$ 85,688	$ 3,608	$ 89,296
Year 7	$ 88,707	$ 3,680	$ 92,387
Year 8	$ 91,832	$ 3,754	$ 95,586
Year 9	$ 95,068	$ 3,829	$ 98,897
Year 10	$ 98,419	$ 3,906	$ 102,324

Baseline: Energy and Operating Conditions

BASELINE PERIOD. The baseline period is May 2022 – April 2023 for electricity and March 2023 – February 2024 for natural gas.

BASELINE UTILITY CONSUMPTION. Twelve months of utility data were compiled for electricity and natural gas for the buildings in the project. The annual utility baseline data is summarized in Table 3.

Table 3: Baseline Utility Usage Summary

Facility	Electric Usage (kWh/yr)	Natural Gas Usage (Therms/yr)
Lab Meter (5DY3B-203687)	361,500	
Net Meter (5DY3BPV-200024)	209,440	
Gas Meter		3,366

BASELINE UTILITY RATES. The utility rates presented in Table 4a are the current rates for distribution and supply of utilities at the time of this agreement and shall be used to calculate savings associated with the reduction of electricity in Year 1. After Year 1, these stipulated utility rates shall be increased by the utility escalation rates described in section Utility Escalation Rates to calculate the savings in each subsequent year after Year 1.

Table 4a: Baseline Utility Rates

Facility	Electricity Rate ($/kWh)	Natural Gas Rate ($/Therm)
Lab Meter (5DY3B-203687)	$0.1688	
Net Meter (5DY3BPV-200024)	$0.1624	
Gas Meter (16293456)		$1.70

The utility avoided utility cost rates presented in Table 4b are the current rates for solar PV production at the time of this agreement and shall be used to calculate savings associated with the avoided electricity usage in Year 1. After Year 1, these stipulated utility rates shall be increased by the utility escalation rates described in section Utility Escalation Rates to calculate the savings in each subsequent year after Year 1.

Table 4b: Baseline Avoided Utility Cost Rates for Solar PV Systems

System	Avoided Cost Rate ($/kWh)
FIM 3 - Solar PV Installation	$0.1298
FIM 4 - Solar PV Replacement	$0.1011

Baseline Operating Conditions. Baseline operating conditions provide a summary of the building use, equipment and operating modes during the baseline period. No significant changes are expected related to these conditions; however, if a change occurs in these conditions, the baseline energy usage may be adjusted (permanently or temporarily).

Table 5: Baseline Operating Conditions

Building	Address	Square Footage/ Park Acreage	Weekday Operating Schedule	Weekend Operating Schedule
Coachella Valley Mosquito Vector Control District	43-420 Trader Place, Indio, CA 92201	440,000 ft^2	5am – 5pm Monday - Friday	Not Operating

INDEPENDENT VARIABLES. Independent variables include factors that can affect a facility's energy consumption. The most influential independent variable is typically weather. A safety factor has been applied to the energy calculations to minimize the effect of likely changes to independent variables. If a change occurs that is outside the range accounted for by the safety factor, however, a routine adjustment to the baseline energy usage may be done to fairly represent this.

The relevant weather data and other independent variables associated with the energy savings calculations can be found below in the individual MM&V Method by FIM.

STATIC FACTORS. Static factors are components of the energy savings calculations that are not subject to change during the measurement and verification period. Within this document they are referred to as "Stipulated Parameters". An example of a stipulated parameter is often equipment and/or facility operating hours. These parameters were either measured or assumed during the investment grade audit and are non-variable from the baseline to the proposed energy consumption periods. If changes to the stipulated parameters are reported by the Owner to have occurred, a non-routine savings adjustment may be performed to represent this. If the change in the stipulated parameter cannot be adequately quantified, or the adjusted savings impacts the total project savings such that a savings shortfall were to occur, Centrica may return the parameter to its stipulated value outlined in this document and calculate the actual energy savings with said value.

The relevant operating hours and other stipulated parameters associated with the energy savings calculations can be found below in the individual MM&V Method by FIM.

MM&V Plan

MM&V PLAN OVERVIEW.

The purpose of the Monitoring, Measurement and Verification (MM&V) Plan is to identify the methods, measurements, procedures, and tools that will be used to verify the savings for each FIM. Savings are determined by comparing baseline usage and cost against the post FIM implementation usage and costs.

Measurement and verification of energy savings will be based on the International Performance Measurement and Verification Protocol (IPMVP) Option A - Retrofit Isolation: Key Parameter. This plan was developed by Steve Rickels, Certified Measurement & Verification Professional (CMVP).

Option A - Retrofit Isolation: Key Parameter Measurement. Savings are determined by field measurement of the key performance parameter(s) which define the energy use of the ECMs affected system(s) and/or the success of the Project. Measurement frequency ranges from short term to continuous, depending on the expected variations in the measured parameter and the length of the reporting period. Parameters not selected for field measurement are estimated.

Option B – Retrofit Isolation or System Level Approach: All Parameter Measurement. Savings are determined by field measurement of all parameters affected by the ECM. No parameter estimations will be made to determine the energy savings of the ECM. Measurements can be short term or continuous, depending on the expected variations in the measured parameters and the length of the reporting period.

Option C – Whole Facility: Savings are determined by measuring energy use at the whole facility or sub-facility level. Continuous measurements of the entire facility's energy use are taken annually throughout the reporting period. All changes that occur in the facility or sub-facility are captured in this measurement. Periodic inspections of the facility may be required to document the operating conditions and any changes that occur in the facility.

Option D – Calibrated Simulation: Savings are determined by modeling a ECM in computer software that has been calibrated to the facilities conditions. Simulations can be done for an entire facility affected by multiple ECMs or it can be done for a single ECM. Simulations will require calibration to the facilities utility bills or metering data to ensure accuracy. All assumptions and inputs for the model will need to be carefully documented.

Stipulation – This approach is intended for ECMs where end use capacity or operational efficiency; demand, energy consumption or power level; or manufacturer's measurements, industry standard efficiencies or operating hours are assumed and are used in a calculation or analysis method that has stipulated the savings outcome.

Table 6 provides an overview of the key parameters to be analyzed and their frequency. The MM&V schedule is broken down into two frequency types:

1. First Year Measurements – to be completed in the first MM&V period only
2. Annual Measurements – to be conducted in every year of the MM&V term

Table 6: MM&V Key Parameters, Option, and Frequency

Facility Improvement Measure	MM&V Option	Key Parameter(s)	First Year	Annual
1 – Lighting Upgrades	A	Fixture Power Measurements	Yes	No
2 – BMS Upgrade	A	Annual Hours of Operation	Yes	Yes
3 – New Solar Installation	A	Solar Production Monitoring	Yes	Yes
4 – Existing Solar Replacement	A	Solar Production Monitoring	Yes	Yes

M&V METHOD BY FIM

FIM-1: Lighting Upgrades

Centrica Business Solutions Services will replace the existing lighting with LED lighting technology equipped with occupancy controls where applicable and required by code. Centrica Business Solutions Services will furnish and install lighting and occupancy sensors to automatically turn off the lights where applicable. Energy savings have not been included for occupancy-based control of fixtures.

M&V Option

Option A was selected to provide a cost-effective means to evaluate savings.

Overview of MM&V Activities

The key parameter to be measured will be power draw of a representative sample of post-implementation fixtures. MM&V services for this measure will be performed in Year 1 only, after which the savings will be
stipulated and agreed upon by the Customer for the remaining term of the contract.

Pre-FIM Measurements

1. Count of existing fixture types (Appendix C of Exhibit A)
2. Lighting operating hours by space type

Post-FIM Measurements

1. Count of each fixture type
2. Identification and documentation of each fixture type
3. Fixture wattage for a representative sample
4. Visual inspection of all units and verification of wattage rating by referencing specification sheets for each fixture type not included in the representative sample

Sample Size for Power Measurements.

Post-FIM power will be measured for fixture types that make up at least 75% of the energy savings. Estimated sample sizes for these fixture types assume a coefficient of variation (Cv) of 0.1, 10% Precision, and 90% Confidence are shown in the table that follows.

Stipulated Parameters

1. Baseline and post install hours of operation for each facility/ facility usage type (Appendix C of Exhibit A)
2. Baseline fixture wattages (Appendix C of Exhibit A)
3. Post install fixture wattages for fixtures types not included in sample (Appendix C of the Exhibit A)

The table below summarizes the stipulated lighting operating hours by building type or usage group that have been agreed upon by the Customer.

Lighting Operating Hours by Fixture Type

Fixture Type	Hours / Year
New small wallpack	3,650
New flood	2,095
Retrofit 2x4 troffer kit	2,749
New large wallpack	3,650
New medium wallpack	3,762
Retrofit 4' bar kit HO	2,838
New vapor-tight	1,631
Retrofit 2xLED tube and driver	2,216
New 4' wrap	1,392
Retrofit 8" recessed can	2,216
New round wall-mount	4,380
New high-bay	1,460
Retrofit 6" recessed can	3,069
New 8' wrap	1,933
New 8' strip	1,728
Retrofit 8" recessed can HO	1,851
Retrofit 2x4 troffer kit LO	1,208
Retrofit 2x2 troffer kit	2,086
New 4' strip	1,734
Retrofit 4' strip kit	652
Retrofit 4' bar kit	865
New 2' wrap	521
New surface-mount	521

Savings Calculation Method

The average post installation wattage measured for each fixture type that make up 75% of the lighting savings were applied to the Post Install Fixture Wattages variable in the Post Install kW equation below to calculate realized energy savings. Appendix C of Exhibit A provides a summary of the retrofitted fixtures (as-built) for each space affected. The annual energy usage and cost savings are calculated using the following equations for each space.

$$kWh\ Savings\ =\ (Baseline\ kWh\ -\ Post\ Install\ kWh)$$

$$Baseline\ kW\ =\ \left(\frac{Fixture\ Count\ *\ \text{Baseline}\ Fixture\ Wattages}{1000}\right)$$

$$Baseline\ kWh\ =\ (Baseline\ KW\ *Hours\ of\ Operation)$$

$$Post\ Install\ kW\ =\ \left(\frac{Fixture\ Count\ *\ Post\ Install\ Fixture\ Wattages}{1000}\right)$$

$$Post\ Install\ kWh\ =\ (Post\ Install\ KW\ *\ Hours\ of\ Operation)$$

$$Cost\ Savings\ =\ (kWh\ Savings\ *\ \frac{\$}{kWh}\ Rate)$$

FIM-2: BMS Upgrade

Completion of this FIM includes the following energy efficiency measures:

- FIM 2A: Fan VFD Controls
- FIM 2B: Adjust Space Temperatures
- FIM 2C: Adjust Schedules

FIM 2A – Fan VFD Controls

Contractor will reduce laboratory air handling unit (AHU) fan motor operating speed by altering control sequences to allow for a reduction of fan speed based on space conditions, schedules, and setpoints.

Facilities Affected

This FIM will be accomplished in the following facilities:

- Laboratory

M&V Option

Option A was selected to provide a cost-effective means to evaluate savings for each item.

Overview of MM&V Activities

The key parameter to be measured will be the annual hours of operation of the VFD fan motors using the equipment data logged by newly installed BMS system. MM&V services for this measure will be performed annually for the term of the project.

In the event the annual data cannot be obtained from the BMS system, and the Customer is unable to provide the annual data, the savings for this FIM will be stipulated.

Baseline FIM Measurements

1. Survey of existing Air Handling Unit motors (Appendix B of Exhibit A)
2. Motor operating hours via BMS schedules and staff interviews (Appendix B of Exhibit A)

Post Installation FIM Measurements

1. Trended annual fan operating hours and fan speed via upgraded BMS (continuous annual data based on change of state). Data will be collected continuously and reviewed on an annual basis.

Stipulated FIM Parameters

1. Motor Size in Horsepower (Table 2.1)
2. Fan Part Load Factor – percentage of full load HP the motor runs at on average (40% of maximum load) (correlated to outside air temperatures from TMY 3 data)
3. Motor Efficiency (Table 2.1)

The stipulated parameters are utilized for variables that do not vary as a result of the changes made to the system. For example, the motor is not being changed and its size, load factor, and efficiency are not affected by reducing the motor run hours.

Table 2.1 summarizes the stipulated motor horsepower based on NEMA Premium Efficient motors utilizing the Department of Energy Motor Master database program Version 1.1.0.

Table 2.1: Motor Efficiency Summary by Motor Size

Motor Size (HP)	Efficiency
1	90%
5	90%

Savings Calculation Method

The average post installation operating hours measured for each fan were applied to the Post Install Operating Hours variable in the Post Install kWh equation below to calculate realized energy savings. A detailed AHU motor summary is provided in Appendix B of Exhibit A. To calculate energy and cost savings the following equations applied to the equipment in Appendix B of Exhibit A shall be used:

$$kWh\ Savings\ = Baseline\ kWh - Post\ Install\ kWh$$

$$Baseline\ kWh = \frac{Motor\ HP\ x\ Load\ Factor\ x\ 0.746 \frac{kW}{HP} x\ Baseline\ OperatingHours}{Motor\ Efficiency}$$

$$Post\ Install\ kWh = \frac{Motor\ HP\ x\ Load\ Factor\ x\ 0.746 \frac{kW}{HP} x\ Post\ Install\ Operating\ Hours}{Motor\ Efficiency}$$

$$Cost\ Savings\ = (kWh\ savings\ * \frac{\$}{kWh}\ Rate)$$

FIM 2B – Adjust Lab Space Temperatures

Contractor will adjust space temperatures to global setpoints agreed upon by the Customer using the upgraded Building Management System (BMS) as specified in Exhibit A Section 4.2.

Facilities Affected

This FIM will be accomplished in the following facilities:

- Laboratory

MM&V Option

The energy savings for this measure will be stipulated. The energy savings for this measure represent less than 3% of the total project utility savings, therefore stipulating the savings for this FIM is the best value for the Customer. No MM&V activities will be performed for this FIM.

Stipulated Parameters

The annual electric energy savings will be stipulated to 4,146 kWh/yr and the annual natural gas savings will be stipulated to 458 therms/yr.

FIM 2C – Adjust Facility Schedule

Contractor will adjust space schedules agreed upon by the Customer using the upgraded Building Management System (BMS) as specified in Exhibit A Section 4.2.

Facilities Affected

This FIM will be accomplished in the following facilities:

- Administration Building
- Operations Building
- Cold Storage
- Mobile Equipment
- Tank Storage

M&V Option

The energy savings for this measure will be stipulated. The energy savings for this measure represent less than 1% of the total project utility savings, therefore stipulating the savings for this FIM is the best value for the Customer. No MM&V activities will be performed for this FIM.

Stipulated Parameters

The annual electric energy savings will be stipulated to 888 kWh/yr and the annual natural gas savings will be stipulated to -5 therms/yr.

FIM-3: New Solar Installation

Centrica Business Solutions Services will install a new 210.1 kW DC roof mounted solar system connected to the laboratory meter as described in Schedule 2A.

MM&V Option

Option A was selected to provide a cost-effective means to evaluate savings.

Overview of MM&V Activities

The key parameter to be measured post-installation will be the annual electric (kWh) production of the PV system using the newly installed web-based monitoring system. MM&V services for this measure will be performed annually for the term of the contract.

Baseline FIM Measurements

1. Electric consumption for the facilities involved based on provided data from Imperial Irrigation District Utilities for the time period of May 2022 – April 2023.

Post Installation FIM Measurements

1. Annual electric (kWh) production for each PV system using the web-based monitoring system.

Savings Calculation Method

Energy savings are determined by the energy generation for each PV system as indicated in the equation below for each year of the term.

$$kWh\ Savings = Annual\ electric\ (kWh)\ production$$

$$Cost\ Savings = kWh\ Savings\ \times \left(\frac{\$}{kWh}\right) Avoided\ Cost\ Rate$$

FIM-4: Existing Solar Replacement

Centrica Business Solutions Services will replace the existing solar system and install a new 168.5 kW DC roof mounted solar system connected to the Net meter as described in Schedule 2A.

M&V Option

Option A was selected to provide a cost-effective means to evaluate savings.

Overview of MM&V Activities

The key parameter to be measured post-installation will be the annual electric (kWh) production of the PV system using the newly installed web-based monitoring system. MM&V services for this measure will be performed annually for the term of the contract.

Baseline FIM Measurements

1. Electric consumption for the facilities involved based on provided data from IID Utilities for the time period of May 2022 – April 2023.

Post Installation FIM Measurements

1. Annual electric (kWh) production for each PV system using the web-based monitoring system.

Stipulated Parameters

The existing solar PV system production will be stipulated at 64,390 kWh/yr as determined in Section 4.4 of Exhibit A.

Savings Calculation Method

Energy savings are determined by the additional energy production of the newly installed PV system compared to the existing solar PV system as indicated in the equation below for each year of the term.

$$kWh\ Savings\ = New\ PV\ System\ Production - Existing\ PV\ System\ Production$$

$$New\ PV\ System\ Production\ = New\ PV\ System\ Annual\ Electric\ (kWh)\ Production$$

$$Annual\ Cost\ Savings\ = kWh\ Savings\ \times \left(\frac{\$}{kWh}\right) Avoided\ Cost\ Rate$$

Section 2: O&M Service Scope of Work

FIM # 1 – Lighting Upgrade Annual Maintenance

This FIM will not have any annual service conducted.

FIM # 2 – BMS Upgrade Annual Maintenance

TERM

This Support Services Agreement, ("Agreement, Services") will be effective upon Provider signature date.

Once signed by both parties, this agreement will be effective for:

- Two (2) physical site visits of eight (8) hours each visit
- Ten (10) hours of remote support via Owners provided VPN access

TOTAL PRICE

Centrica agrees to provide the support services outlined in this proposal at a not-to-exceed price of:

- Six Thousand four Hundred Dollars and No Cents ($6,400)

"Additional Services" not listed in "Scope of Services" can be provided subject to the terms defined in this document at the applicable rates provided under Description of Services. All invoicing for Services performed will include a copy of the Site Support Services Report ("Customer Invoice") summarizing hours and services performed. All payments are due within thirty (30) days of invoicing.

Description of Services:

Agreement Overview

This Support Services Agreement is to provide maintenance and service of the existing control system, correcting control issues, training staff, and assisting with other controls related tasks listed under "Scope of Services". Any software or hardware required to correct issues or maintain the system in peak operating condition not under warranty will be provided by the "Owner" or quoted and then billed by the "Provider". Additional material or labor services not listed in "Scope of Services" requires an "Owner" provided purchase order separate from this Agreement and requires approval by "Owner" representative prior to procurement.

Scope of Services:

- Building Automation System - Maintenance
    - System Backups
    - System Review
    - Update Control Drawings as required to reflect field changes or additions
    - Customer Training
- Building Automation System – Service Calls
    - Troubleshooting control system issues to determine point of failure

- Field inspection of controls hardware components and wiring
- Replacement of failed controls components or controls hardware under warranty or billed under a separate Quote for non-warranty items.
- Provide written daily report of services provided

Requirements and Clarifications:

- CVMVCD will own and maintain Control system access levels for CVMVCD employees
- CVMVCD is to provide Centrica remote access to the onsite BMS server
- CVMVCD will provide reasonable access to buildings for site work as required
- All "Support Service Agreement" work will be performed during "Normal Working Hours" (7AM to 5PM Mon-Fri, PST)
- Overtime rate is 1.5 times the rate in the "Labor Description" table
- Holiday rate is 2.0 times the rate in the "Labor Description" table
- Services provided outside of normal working hours will be billed at a minimum of four (4) hours
- Equipment warranties are not provided by this Agreement
- No software, software licensing or software upgrades will be provided as part of this Agreement
- Hardware or field components not under warranty and Labor to replace will be provided under separate "Provider" Quote and require a "Owner PO" to proceed
- Administrative and Project Management labor to be billed at Controls Technician rate

Additional Labor Rates:

Requests for Additional Services or Labor billed outside normal business hours will be provided at the following rates and will be initiated by written request for support by CVMVCD management. CBSS is guaranteed a minimum of (4) technician hours per site visit.

LABOR DESCRIPTION	PRICE EACH
CBSS Controls Technician – As Needed Straight Time labor (pre-scheduled)	**$200.00/ HR**
3rd Party Controls Technician – As Needed Straight Time labor (pre-scheduled)	**$250.00/ HR**
CBSS Controls Technician – Overtime Time labor (Emergency Service)	**$300.00/ HR**
CBSS Controls Technician – Holiday Time labor (Emergency Service)	**$400.00/ HR**
Site Visit – for each onsite representation For CBSS technician or 3rd party controls technician	**$585.00 /Per Visit**

FIM # 3 and 4 – New Solar Photovoltaic and Existing Solar Photovoltaic Array Replacement Annual Maintenance

Schedule 1

(Scope of Services in respect of each System)

[#] of Solar PV Inspections (per annual term), included in Annual O&M Fee: **One (1)**

[#] of Module Washing services (per annual term), included in Annual O&M Fee: **Two (2)**

[#] of Thermal Aerial Inspections (per annual term), included in Annuals O&M Fee: **Zero (0)**

Water access **___X___ WILL** / _____ WILL NOT be provided on-site (by Owner) for module cleaning.

1. Solar Preventative Maintenance Inspection

- PV Modules and DC Electrical System
    - Onsite IR Inspections – DC
        - **DC Combiners and Disconnects**. Open combiners, inspect for discoloration, signs of arcing or faults, defects, missing or blown fuses. Capture IR images of combiners and DC disconnects. Re-torque any connections displaying high resistance heat (if possible). Capture before and after IR images of any corrective actions.
    - Visual Inspections and Maintenance – DC
        - **Arrays.** Inspect arrays for soiling, evidence of pest infestation, water pooling, vegetation growth, shading or damage. Photo-document general condition of each array, noting location of any issues requiring remediation beyond PM visit time allocation.
        - **Racking Structures, Ballast Blocks.** Inspect for mechanical integrity, corrosion, settling, damage, pest infestation, and any condition impacting safety, performance or serviceability. Photo-document general conditions and any abnormalities.
        - **DC Combiners, Disconnects and Raceways.** Inspect enclosures and raceways for mechanical integrity, corrosion, damage, and evidence of overheating, moisture intrusion, or pest infestation. Verify proper operation of DC disconnects.
        - **Modules.** Inspect for integrity of electrical and ground connections, wire management, visible defects or damage, and proper and secure attachment to racking structures or trackers. Photo-document any damaged modules, noting locations and serial numbers

        - **Grounding System.** Inspect grounding system connections for mechanical and electrical integrity, corrosion, and damage. Spot check torques.

    - Testing – DC

        - **Grounding System.** Perform electrical resistance testing to verify continuity of grounding systems on all major equipment. Measure current on ground conductors and test for ground faults.

        - **DC-Side Surge Protection Devices.** Determine status of SPDs through visual inspection or electrical testing as required by device manufacturer. Note deficiencies in service report.

- Inverters and AC Electrical System

    - Onsite IR Inspections – AC

        - **Inverters - IR Inspection.** Open inverter termination cabinets, inspect for discoloration, signs of arcing or faults, and defects. Capture IR images of inverter terminations. Re-torque any connections displaying high resistance heat (if possible). Capture before and after IR images of any corrective actions.

        - **AC Panels and Disconnects.** Capture IR images of AC Panels and Disconnects. Note any connections displaying high resistance heat. Capture before and after IR images of any corrective actions.

    - Visual Inspections and Maintenance – AC

        - **Inverters - Visual Inspection.** Inspect enclosures for corrosion, damage, mechanical integrity, and evidence of overheating, moisture intrusion, or pest infestation. Inspect inverter display screens for cracking or evidence of thermal fatigue. Verify proper operation of inverter circuit breakers. Verify fan operation, filter condition, and proper cooling airflow. Clean fans, heat sinks, and clean or replace filters as necessary to ensure optimal cooling. Photo-document each inverter during inspection, and before and after any corrective actions.

        - **Inverters - Warranty Preservation.** Perform all inspections and preventative maintenance procedures required by the manufacturer. Adequately document required inspections & service procedures to preserve inverter warranties.

        - **AC Panels, AC Disconnects and Raceways.** Inspect enclosures and raceways for mechanical integrity, corrosion, damage, and evidence of overheating, moisture intrusion, or pest infestation. Verify proper operation of AC disconnects and breakers.

    - Testing – AC

        - **Surge Protection Devices - AC.** Determine status of SPDs through visual inspection or electrical testing as required by device manufacturer and replace any that are faulted.

- Data Acquisition System and Instrumentation

- **DAS Equipment.** Inspect enclosures and raceways for mechanical integrity, corrosion, damage, and evidence of overheating, moisture intrusion, or animal nesting.

- **Meteorological Stations, Reference Cells and Soiling Stations.** If present, visually inspect sensor clusters and/or reference cells to verify secure mounting and free of debris and obstructions. Clean the dome or window of irradiance sensors per the manufacturer's recommended procedure even if there is no apparent soiling. If a soiling station is installed, wash the "clean" module and photo-document the station.

- **Module Temperature Sensor.** Inspect back of module temperature sensor to ensure proper and secure attachment. Re-attach sensor if improperly secured.

- Site Maintenance

  - **Roof & Site Condition Monitoring.** Inspect and photo-document general condition of roof surfaces including debris, drainage, pooling and staining, degradation of roofing materials, racking wear pads, and flashings. Inspect site for vegetation growth or accumulation which could shade arrays and impact PV production.

  - **Pest Infestations.** Inspect and photo-document evidence of any wildlife or pest infestations on the project site noting locations.

  - **Safety Equipment and Placards.** Confirm location and charge of fire extinguishers. Verify applicable signage and placards are present and legible. Photo-document any deficiencies noting locations.

  - **Erosion and Drainage.** Inspect project site for evidence of erosion greater than 3" wide and 3" deep, or which could reasonably be expected to hamper safety or project serviceability. Photo-document areas impacted by erosion noting locations.

  - **General Site - Roads, Fences, Gates, Lighting, Security.** Inspect and photo-document condition of any roads to access or traverse the project site. Inspect perimeter fences and gates for integrity and security. Inspect any lighting fixtures on project site. Inspect any security cameras or devices on project site for integrity and evidence of vandalism

  - **Housekeeping.** Inspect project site for excessive rubbish or debris buildup. Remove reasonable amounts of rubbish and debris. Photo-document excessive amounts noting locations.

2. Reporting

Within fifteen (15) business days after completion of the annual Maintenance Service, Contractor shall notify Client of the work performed by providing a report and interpretation of inspection results, recommendations for performance improvement, relevant observations, and photos of any equipment which shows signs of damage, disrepair, extreme weathering, requiring further attention or maintenance. Any items flagged during inspection will be assigned one of the following impacts:

High Priority: Finding of condition that currently exists, or could result in, a reduction of system output by greater than 10% of expected maximum power capacity. Examples include damage to or incapacitation of central inverter, transformers, or switchgear.

Medium Priority: Finding of damage to or incapacitation of minor equipment (combiner box/string inverter) or communication loss (for example, cell modem) that does not affect the maximum power capacity of the system by more than 10%.

Low Priority: Finding of damage to or incapacitation of a source circuit, module(s) or communication device (for example, weather station), or other minor issue identified at facility that may not be directly affecting output of system (pest or other infestation, as example).

3. Monitoring Services

Should PV facility be equipped with monitoring through the PowerTrack™ web-based monitoring platform, Centrica or designated Contractor shall utilize PowerTrack to create a reasonable monitoring alert scheme that shall alarm Centrica in the event of a performance anomaly. Centrica shall remotely investigate all alarms within 72 hours and if necessary, provide Owner with a proposal for investigative services on site. Centrica shall contact equipment manufacturer should any product warranties be intact and product replacement covered under warranty terms. Centrica shall not be responsible for any failure of manufacturers to provide remedy or replacement of parts under product warranty. All investigative service visits shall produce a service report outlining the work completed, any findings, and recommended next steps. This service report shall be included with any invoice for Additional Services.

4. Inverter and Panel warranty servicing

Centrica shall provide the technician labor services and submission responsibilities for inverter and module failures identified and approved for Return-Merchandise Authorization by the respective manufacturer during the term of this agreement. Centrica shall bear no responsibility for replacement parts except those provided directly from the manufacturer during the term. Centrica shall use all commercially reasonable efforts to pursue warranty replacement parts, including required documentation of failure under the manufacturer warranty terms, but shall not be responsible for failure of manufacturer to provide required parts under warranty.

5. Module Cleaning

Module washing services will be completed with industry methods and hardware with the exact tools and delivery of cleaning dependent upon the location of water access (if Owner supplied) and/or the physical layout of the modules on location (rooftop, ground mount, canopy, etc). Most cleanings will utilize a mobile water pump and a rotating soft-bristle brush to gently lift and rinse any debris from the face of the modules. Your system cleaning quote was prepared with the following assumptions:

- Water will be provided by the Owner, with water bib at least 200 feet from module location.
- Mounting type: Canopy/Carport, Pitched Metal Roof
- Carports, Canopies and pitched metal roofs are accessible to motor vehicles with boom or bucket lifts

6. Emergencies / Additional Services

"Emergency" means an event occurring at or impacting the Site or the System that (a) poses actual, or imminent risk of, (i) serious personal injury or death or (ii) material physical damage to the Site or the Facility; and (b) requires a good faith determination by Contractor or Owner that immediate preventative or remedial action is necessary. In the event of any emergency, Contractor shall take such action as may be reasonable and necessary. All labor, equipment, fees and costs for responding to and addressing such emergencies or other recommended work *are not included* in the Annual Maintenance Fee and shall be

billed as Additional Services as follows. All investigative service visits shall be billed at the Additional Services rate.

7. Warranty

The foregoing warranty shall last for the period of ninety (90) days following completion of the Maintenance Service.

Additional Services Rate Table

	Rate
Technician Travel	$115/hr
Licensed Electrician	$160/hr
Weekend/Overtime	2x Regular Rate
*4 Hour Service Call Minimum (includes travel)	

Schedule 3

FIM Work Schedule

Name	Duration	Start	Finish
Notice to Proceed	0 days	1/1/2025	1/1/2025
Design Engineering	45 days	1/1/2025	3/4/2025
Utility Interconnection Approval	45 days	3/4/2025	5/6/2025
Permitting	85 days	3/5/2025	7/1/2025
Material Procurement	66 days	7/2/2025	10/1/2025
Installation	150 days	10/2/2025	4/29/2026
Project Closeout	23 days	4/30/2026	6/1/2026
Substantial Completion	0 days	6/1/2026	6/1/2026

SCHEDULE 4
As-Built Drawing Requirement

The as-built requirements for each FIM are provided below:

FIM 1 – Interior and Exterior Lighting Upgrades
At the end of the installation, Centrica Business Solutions Services will supply an electronic PDF and 3 hard copies of the as-built lighting room-by-room scope, lighting cutsheets, and O&M manuals.

FIM 2 – BMS Upgrade
At the end of the installation, Centrica Business Solutions Services will supply an electronic PDF and 3 hard copies of the stamped as-built drawings, equipment cutsheets, and O&M manuals.

FIM 3 – New Solar PV Installation
At the end of the installation Centrica Business Solutions Services will provide stamped drawings of the new solar photovoltaic array(s). Centrica Business Solutions Services shall also provide an electronic PDF and 3 hard copies of the equipment cutsheets and O&M manuals.

FIM 4 – Existing Solar PV Replacement
At the end of the installation Centrica Business Solutions Services will provide stamped drawings of the new solar photovoltaic array(s). Centrica Business Solutions Services shall also provide an electronic PDF and 3 hard copies of the equipment cutsheets and O&M manuals.

SCHEDULE 5

ENERGY SAVINGS SCHEDULE

Energy Savings Schedule

FIM	Electric Usage Savings (kWh/yr)	Gas Usage Savings (Therms/yr)
1 – Lighting Upgrades	74,258	
2 – HVAC BMS Upgrade	28,500	453
3 – New Solar Installation	287,739	
4 – Existing Solar Replacement	168,006	
Total	**558,504**	**453**

SCHEDULE 6A
FIM Work Schedule of Values

Item	Work Item	Value
1	Project Kickoff, Mobilization, and Planning	$ 102,365.00
2	Engineering Design, Submittals, and Permits	$ 172,569.00
3	Interior & Exterior Lighting	$ 198,505.00
4	Equipment	$ 113,269.00
5	Installation	$ 85,236.00
6	BMS Upgrade	$ 166,450.00
7	Equipment	$ 68,265.00
8	Installation	$ 98,185.00
9	New Solar PV Installation	$ 973,556.08
10	Equipment	$ 328,269.08
11	Installation	$ 645,287.00
12	Existing Solar PV Replacement	$ 600,751.00
13	Equipment	$ 237,795.00
14	Installation	$ 362,956.00
15	As-Builts and Closeout Packs	$ 48,569.00
	Total Project Cost	$ 2,262,765.08

**The Investment Tax Credit (ITC) submission is the responsibility of the District. Centrica Business Solutions is available to assist with gathering the correct information, but Coachella Valley Mosquito and Vector Control District is responsible for the final submission to the Government for this tax credit.*

SCHEDULE 6B

MM&V Services Schedule of Values

Annual Period	Work Item	Value
1	Year 1 M&V	$14,043
2	Year 2 M&V	$6,583
3	Year 3 M&V	$6,775
4	Year 4 M&V	$6,978
5	Year 5 M&V	$7,182
6	Year 6 M&V	$7,397
7	Year 7 M&V	$7,612
8	Year 8 M&V	$7,841
9	Year 9 M&V	$8,069
10	Year 10 M&V	$8,311

O&M Services Schedule of Values

Annual Period	Work Item	Value
1	Year 1 O&M	$40,434
2	Year 2 O&M	$42,051
3	Year 3 O&M	$43,733
4	Year 4 O&M	$45,483
5	Year 5 O&M	$47,302
6	Year 6 O&M	$49,194
7	Year 7 O&M	$51,162
8	Year 8 O&M	$53,208
9	Year 9 O&M	$55,337
10	Year 10 O&M	$57,550

ITEMS OF GENERAL CONSENT

COACHELLA VALLEY MOSQUITO AND VECTOR CONTROL DISTRICT

Board of Trustees Meeting
Minutes

MEETING TIME: 6:00 p.m., January 14, 2025

LOCATION: 43420 Trader Place, Indio, CA 92201

TRUSTEES PRESENT

PRESIDENT: John Peña	La Quinta
VICE PRESIDENT: Benjamin Guitron	Indio
SECRETARY Dr. Doug Kunz	Palm Springs
Bito Larson	County at Large
Felipe Ortiz	County at Large
Nancy Ross	Cathedral City
John Vallat	Indian Wells
Doug Walker	Palm Desert

TRUSTEES ABSENT

TREASURER Dr. Frank Figueroa	Coachella
Steve Downs	Rancho Mirage
Gary Gardner	Desert Hot Springs

STAFF AND GENERAL COUNSEL PRESENT

Jeremy Wittie, General Manager
Bob Patterson, Legal Counsel, SBEMP
Greg Alvarado, Operations Manager
David l'Anson, Administrative Finance Manager
Jennifer A. Henke, Laboratory Manager
Crystal Moreno, Human Resources Risk Manager
Edward Prendez, Information Technology Manager
Megan Scarborough-Eckel, Clerk of the Board

MEMBERS OF THE PUBLIC PRESENT

Yes

1. **Call to Order**
   President Peña called the meeting to order at 6:04 p.m.

2. **Oath of Office**

3. **Roll Call**
   At roll call, eight (8) out of eleven (11) Trustees were present.

4. **Pledge of Allegiance**

Everyone in attendance recited the Pledge of Allegiance.

5. Confirmation of Agenda

President Peña inquired if there was a need to make adjustments to the agenda. With no objections from the Board, the agenda was confirmed as stands.

6. Public Comments

A. **PUBLIC Comments — NON-AGENDA Items:**
Mr. Brad Anderson of Rancho Mirage submitted written comments.

B. **PUBLIC Comments — AGENDA Items:**
Mr. Brad Anderson of Rancho Mirage submitted written comments.

7. Public Hearing

A. Centrica Public Hearing **— John Peña, Board President**
President Peña announced that the vote will be continued to Tuesday, February 11th Board of Trustees Meeting due to the absence of some Trustees and asked if a member of the Board would move to leave the Public Hearing open.

On a motion from Trustee Guitron, seconded by Trustee Ortiz, the Board of Trustees moved to leave the Public Hearing open until the February 11th Regular Board of Trustees Meeting.

Ayes: President Peña, Trustees Guitron, Kunz, Larson, Ortiz, Ross, Vallat, Walker

Noes: None

Abstained: None

Absent: Trustees Downs, Figueroa, Gardner

8. Announcements, Presentations, and Written Communications

A. Service Recognition

President Peña left the dais at 6:41 pm and Vice President Guitron resumed the meeting at 6:42 pm.

9. Items of General Consent

The following items are routine in nature and may be approved by one blanket motion upon unanimous consent. The President or any member of the Board of Trustees may request an item be pulled from Items of General Consent for a separate discussion.

A. Minutes for December 10, 2024, Board Meeting

B. Approval of expenditures for December 8, 2024, to January 10, 2025

C. Informational Items:

- Financials **— David I'Anson, Administrative Finance Manager**
- Correspondence

D. Approval to renew agreement with Ocean Air Helicopters Inc. to conduct aerial ultra-low volume (ULV) adulticiding and larviciding applications; Budgeted; Funds Available **— Greg Alvarado, Operations Manager**

E. Approval to purchase two (2) Polaris Ranger XP 1000 Premium Utility Vehicles, branding and accessories, in an amount not to exceed $50,000.00, from Capital Replacement Budget Fund #8415.13.,300.000- utilizing the Sourcewell Contract 091024-PSI **— Edward Prendez, Information Technology Manager**

On a motion from Trustee Walker, seconded by Trustee Ortiz, the Board of Trustees approved all Items of General Consent.

Ayes: Trustees Guitron, Kunz, Larson, Ortiz, Ross, Vallat, Walker

Noes: None

Abstained: None

Absent: President Peña, Trustees Downs, Figueroa, Gardner

10. Business Session

A. Old Business - **NONE**

B. New Business

I. Discussion and appointment of the Abatement Hearing Committee **— John Peña, Board President**

Vice President Guitron appointed Trustees Gardner, Guitron, Ortiz, and Ross (alternate) to the Abatement Hearing Committee.

On a motion from Trustee Ortiz, seconded by Trustee Kunz, the Board of Trustees approved Item (i) of New Business.

Ayes: Trustees Guitron, Kunz, Larson, Ortiz, Ross, Vallat, Walker

Noes: None

Abstained: None

Absent: President Peña, Trustees Downs, Figueroa, Gardner

II. Nomination and election of the Board of Officers for the 2025 Calendar Year **— ad hoc Nominations Committee**

Vice President Guitron appointed Trustees Peña, Guitron, Kunz, and Figueroa to the Executive Committee.

On a motion from Trustee Ortiz, seconded by Trustee Walker, the Board of Trustees approved Item (ii) of New Business.

Ayes: Trustees Guitron, Kunz, Larson, Ortiz, Ross, Vallat, Walker

Noes: None

Abstained: None

Absent: President Peña, Trustees Downs, Figueroa, Gardner

III. Discussion and/or approval of Resolution 2025-02 Amending the Purchasing Policy **— David l'Anson, Administrative Finance Manager**

On a motion from Trustee Kunz, seconded by Trustee Vallat, the Board of Trustees approved Item (iii) of New Business.

Ayes: Trustees Guitron, Kunz, Larson, Ortiz, Ross, Vallat, Walker

Noes: None

Abstained: None

Absent: President Peña, Trustees Downs, Figueroa, Gardner

11. Committee and Trustee Reports

A. Executive Committee **— John Peña, Board President**
Executive Committee oral report

Vice President Guitron stated there was nothing to report.

B. Finance Committee **— Doug Walker, Committee Member**
Finance Committee oral report and Finance Committee minutes from December 10, 2024

Finance Committee Member, Doug Walker, gave a brief update to the Board, staff, and public.

C. Trustee Comments, Requests for Future Agendas Items, Travel, and/ or Staff Actions

12. Reports

A. General Manager

i. General Manager's Report **— Jeremy Wittie, M.S., CSDM, General Manager**

General Manager, Jeremy Wittie, gave a brief update to the Trustees, staff, and public present.

B. General Counsel

None

13. Closed Session

Closed Session (s):

A. **Public Employee Performance Evaluation pursuant to Government Code Section 54957 (b)(1)**
Title: General Manager

B. **Conference with Labor Negotiators pursuant to Government Code Section 54957.6**
Agency designated representatives: President John Peña, Vice President Benjamin Guitron, and Trustee Felipe Ortiz
Unrepresented employee: General Manager

Items pulled for February 11, 2025, meeting.

14. Adjournment

There being no further business to discuss, President Peña adjourned the meeting at 7:02 p.m.

_____
John Peña
President

_____
Dr. Doug Kunz
Secretary

Megan Scarborough-Eckel

From: Brad Anderson [redacted]
Sent: Tuesday, January 14, 2025 11:01 AM
To: Megan Scarborough-Eckel
Cc: Jeremy Wittie
Subject: Public Comment - Agenda Item: 7. (Public Hearing) CVMVCD January 14, 2025 (6:PM) Open Public meeting

January 14, 2025

Coachella Valley Mosquito and Vector Control District (CVMVCD)
Board of Trustees
43420 Trader Pl.
Indio, CA. 92201
Attention: Clerk of the Board / Acting General Manager / Current Appointed Trustees / General Public

Re: Written letter to be entered in the Public record and made available for public Inspection for the January 14, 2025 (6:PM) CVMVCD Board of Trustees meeting - Agenda Item: 7 (PUBLIC HEARING)

Dear current CVMVCD appointees,

Please review my written statements listed below prior to the consideration of agenda Item: 7. (Resolution 2025-01 / proposed Energy Service Contract (agreement) with "Centrica Business Solutions")

Please oppose the consideration of approval of proposed CVMVCD Resolution No. 2025-01 with contract agreement(s) with the organization of "Centrica Business Solutions".
It's critical that "ALL" reasonable attempts be made to seek-out (review) interested candidates (companies) through active request for proposals (RFP's) to conduct CVMVCD organizations desire to reconstruct CVMVCD facilities.
It's reasonable to consider that CVMVCD facilities that are not maintained in an effective fashion will degrade and become inefficient. A prime example of CVMVCD willingness to allow public property to deteriorate would be the main CVMVCD administration building entry doors (not operational to the general public for an extended period of time). CVMVCD proposed replacement and installing of New Solar Photovoltaic panels should be recognized as an attempt to secure a new service agreement over any precived cost-saving from their replacement. It's important to mention, that CVMVCD lighting should of been "upgraded" with low-wattage devices (bulbs/timers) in privous years if those "upgrades" haven't already been accomplished.

Furthermore, the CVMVCD organization (posted agenda) Public Hearing Notice of this boards consideration of Resolution No. 2025-01 Incorrectly detailed "Public Hearing for Benefit Assessment". It's critical that Coachella Valley Resident's (Taxpayers) be informed of correct details related to CVMVCD attempts to expel (squander) tax collected resources. Other area's of concern are that the CVMVCD organizations January 14, 2025 released Board of Trustees meeting agenda packet refrained from including "Exhibits" (Investment Grade Audit - IGA) for public review for the January 14, 2025 (6:PM)

CVMVCD PUBLIC HEARING topic (again, it's critical that Coachella Valley Resident's have ALL related Public Hearing documents available and accessible for scheduled (posted) Public Hearings).
It's nonsensical that the CVMVCD General Manager and It's Administrative Finance Manager was assigned as the CVMVCD ad-hoc building committee (as stated within CVMVCD staff report). Of course having two (2) CVMVCD employees that work closely probably on a daily basis should have a "good" understanding of their ad-hoc committee mission. But it's not reasonable that an CVMVCD Board of Trustees member is not part of that unique ad-hoc committee.

Again, this letter is in opposition of this organization (Coachella Valley Mosquito and Vector Control District) imposing Resolution No. 2025-01. It's alarming the CVMVCD Board of Trustees (CVMVCD Administrators) gave direction at the CVMVCD Board of Trustees meeting of December 10, 2024 meeting for negotiations with the company "Centrica Business Solutions" after the January 14, 2025 duly noticed public hearing. It's reasonable to consider that the residents within the CVMVCD organizations service boundaries will have absolutely no affect over the governing CVMVCD body in regards to proposed Resolution No 2025-01.

Sincerely,

Brad Anderson | [redacted]

Cc:

Megan Scarborough-Eckel

From: Brad Anderson [redacted]
Sent: Tuesday, January 14, 2025 11:01 AM
To: mscarboroughel@cvmosquito.org
Cc: Jeremy Wittie
Subject: Public Comment , Non-Agenda for CVMVCD Board of Trustees meeting of January 14, 2025 (6:PM)

January 14, 2025

Coachella Valley Mosquito and Vector Control District (CVMVCD)
Board of Trustees
43420 Trader Pl.
Indio, CA. 92201
Attention: Clerk of the Board

Re: Written letter and attached email (dated: January 2, 2015) to be entered in the Public record and made available for public Inspection for the January 14, 2025 (6:PM) CVMVCD Board of Trustees meeting - Agenda Item: 6.A (Non-Agenda Public comment)

Dear current CVMVCD appointees,

Please review my written statements listed below along with the attached email dated: January 2, 2025 (10:45AM) for future reference and potential Implementation.

It's been repeatedly demonstrated that CVMVCD officials and It's contracted legal counsel have conspired to potentially reduce and or eliminate Public participation (verbal testimony) at public meetings held under CVMVCD authority. It's reasonable to consider that very unique and unusual political maneuvers to eliminate public testimony at the time that CVMVCD governing body considers each agenda Item listed at CVMVCD Public meeting(s) would disenfranchise potential public speakers and allow the CVMVCD organization to remain anonymous to most of the taxpayers that financially support the CVMVCD organization.

It's highly recommended to abandon the motivation to censor the public's ability to participate with Public testimony (if desired) at CVMVCD Public meetings when the CVMVCD governing body considers each agenda Item. It's critical that the general public has the same advantages to listen to staff reports and or view provide videos (documentation entered into the record) if made available to the governing body before the consideration of each agenda Item and before Public testimony is mandated. Of course the nonsensical restrictions set upon Public speakers at CVMVCD Public meetings to provide Public testimony (if desired) on CVMVCD organizations closed session topics (if available) far in advance of that agenda Item helps to illustrate that CVMVCD officials are compromised by radical political elements that could be potentially viewed as socialist party policies.

Furthermore, it's recommended to recognize and record CVMVCD organizations precived open Public meetings in an accurate fashion (summary formatted meeting minutes).
It's extremely embarrassing and sad to witness the CVMVCD organization degrade to a political driven tool to potentially accommodate increase health related diseases upon the Coachella Valley and surrounding communities.

Sincerely,

Brad Anderson [redacted]

Cc:

---------- Forwarded message ---------
From: **Brad Anderson** [redacted]
Date: Thu, Jan 2, 2025, 10:45 AM
Subject: Request to be notified of (pending) CVMVCD open public meetings (2025)
To: <cvmosquito@cvmvcd.org>, <mscarborougheckel@cvmosquito.org>, <cvmosquito.org@gmail.com>
Cc: <Assemblymember.Wallis@assembly.ca.gov>, B Anderson [redacted], Jeremy Wittie <JWittie@cvmosquito.org>, District 4 Supervisor V. Manuel Perez <district4@rivco.org>

January 2, 2025

Coachella Valley Mosquito and Vector Control District (CVMVCD)
43420 Trader Pl.
Indio, CA. 92201
(760) 342-8287 - cvmosquito.org
Attention: Current Clerk of the Board

Re: Request for prior notification(s) of ALL CVMVCD organizations Open Public meeting(s) held under it's authority.

Dear CVMVCD officials,
Attention: Clerk of the Board

Plesse accept this correspondence (email) as an official written request to be notified of "ALL" pending Coachella Valley Mosquito and Vector Control District (CVMVCD) open Public meetings held under CVMVCD authority. Please forward CVMVCD Public meeting notifications (copies (PDF formatted) of all the documents constituting the agenda packet of CVMVCD public meetings) to the "Email" address listed at the bottom of this email as they become available.

Please strive to perform the duty of meeting notifications as prescribed by California State law (CA. Gov. Code: 54950.) and (CA. Gov. Code: 54954.1) also (CA. Gov. Code: 54959.)

Please be advised that the CVMVCD organization previous desire to "Block"(disposal) of incoming e-mails addressed to CVMVCD from this Coachella Valley Resident pertaining to CVMVCD official Public meeting(s) and the CVMVCD deliberate termination of CVMVCD supplied Public meeting notifications (2024) from being delivered to this Resident is unconscionable and morally corrupt.

Thank you,

Brad Anderson | [redacted]

Cc:
Assembly member - 47 District
Riverside County - Supervisory District Four

Checks Issued for the Period of:
Jan 11-Feb 7, 2025

Check No	Payable To	Description	Check Amount	Total Amount
	Payroll Disbursement	January 17, 2025	293,007.63	
	Payroll Disbursement	January 31, 2025	268,373.96	
				561,381.59
Pre-Approved Expenditures Utilities/Benefits:				
45643	CalPERS - Retirement Acct	Retirement Contributions: 10/06-1/19	42,113.84	
45646	CalPERS Healthcare Acct	Cafeteria Plan	117,220.27	
45647	CalPERS - Retirement Acct	Retirement Contributions: 01/03PP, 01/17PP, 01/31PP, 10/25 Retro	149,605.29	
45648	Principal Life Insurance Co.	Cafeteria Plan	14,322.62	
				323,262.02
Pre-Approved Expenditures less than $10,000.00:				
45641	Coachella Valley Mosquito & Vector Control District	Reissue Holiday Savings checks	6,880.00	
45642	Jeremy Wittie	Professional Development	442.00	
45644	Jeremy Wittie	Professional Development	258.00	
45649	Abila, Inc.	Cloud Computing Services	1,009.83	
45650	Advance Imaging Systems	Contract Services	364.67	
45651	Airgas USA, LLC	Lab Supplies & Expenses	773.88	
45652	Auto Zone	Vehicle Parts & Supplies	64.38	
45653	Burrtec Waste Industries	Repair & Maintenance	17.69	
45654	Clairemont Equipment	Repair & Maintenance	120.47	
45655	CleanExcel	Janitorial Services	4,192.00	
45656	ClientFirst Consulting Group LLC	Professional Services	462.50	
45658	Consolidated Electrical Distributors, Inc.	Repair & Maintenance	179.10	
45659	CSI Ceja Security International	Contract Services	2,331.00	
45660	Darwin Chambers	Maintenance & Repair	690.69	
45661	Desert Air Conditioning Inc.	Repair & Maintenance	352.00	
45662	Desert Fire Extinguisher Co., Inc.	Repair & Maintenance	425.50	
45663	Excel Landscape South	Contract Services	3,240.00	
45664	Garcia Plumbing Co.	Repair & Maintenance	1,902.00	
45665	David I'Anson	Staff Training	257.28	
45666	Jernigan's Sporting Goods, Inc.	Safety Expense	493.60	
45668	Izzy Motors Inc. dba La Quinta Chevrolet	Vehicle Parts & Supplies	794.84	
45669	Linde Gas & Equipment Inc.	Offsite Vehicle Maintenance & Repair	69.50	
45670	Marlin Leasing Corporation	Contract Services	1,966.32	
45671	Graciela Morales	Tuition Reimbursement	693.07	
45672	NAPA Auto & Truck Parts	Vehicle Parts & Supplies	1,428.15	
45673	Pitney Bowes Purchase Power	Postage	64.43	
45675	Prudential Overall Supply	Uniform Expense	2,613.84	
45676	Puretec Industrial Water	Equipment Parts & Supplies	131.48	
45677	Quench USA Inc.	Employee Support	185.82	
45678	JEFF RUSHING	MVCAC Annual Conference	815.97	
45679	Shasta Fire Protection, Inc.	Repair & Maintenance	4,200.00	
45680	Slovak Baron Empey Murphey & Pinkney LLP	Attorney Fees	4,000.00	
45681	Veolia ES Technical Solutions, LLC	Lab Supplies & Expenses	131.61	
45682	Tops N Barricades, Inc.	Safety Expense	315.81	
45683	Valley Lock & Safe	Repair & Maintenance	35.68	
45684	WESCO, Western Scientific Company, Inc.	Maintenance & Calibration	895.00	
Cash - California Bank & Trust Checking				**42,798.11**
Cash - California Bank & Trust Checking				
45645	UMPQUA Bank Commercial Card OPS	Umpqua District Credit Card January 2025 Statement	115,374.45	
45657	Colorado State University	Research Projects	25,786.85	
45667	KYA Services	Repair & Maintenance	70,620.04	
45674	Polaris Sales Inc.	Capital Outlay	44,039.23	
45685	Wilbur-Ellis Holdings II, Inc. dba Wilbur-Ellis Company LLC	Control Products	37,410.00	
Cash - California Bank & Trust Check Run Total to be Approved				**293,230.57**
Total Expenditures: Jan 11-Feb 7, 2025				**1,220,672.29**

John Pena, President

Frank Figueroa, Treasurer

	Coachella Valley Mosquito and Vector Control District **Staff Report**	**February 11, 2025**

Agenda Item: Consent Calendar

Annual Statement of Economic Interests/Form 700 Annual Filing for the filing period of 2024/2025 **— Megan Scarborough-Eckel, Executive Assistant/Clerk of the Board**

Background:
The Political Reform Act of 1974 requires that any position designated in an agency's Conflict of Interest Code must file an annual Statement of Economic Interests (Form 700). All individuals listed in positions in our District's Conflict of Interest Code are required to file a Form 700 with the County of Riverside.

As the filing official for our District, I am responsible for distributing Form 700 to each designated filer and filing them with the County Clerk.

You will receive an email from me no later than Friday, February 16, 2024.

Please submit your completed Form 700 and schedules (if applicable) by **2 p.m. on Friday, March 14, 2025.**

You may complete/send the form(s) electronically to me, but I must receive your ***original signature*** on the paper form (Statement of Economic Interests Cover Page). If you will be mailing your form/paperwork to me, please allow sufficient time for mailing.

If you already file a Form 700 with another agency, city, and/or organization, you can submit copies of the paperwork that accompany the Form 700 Cover Page, but I still need an ***original signature*** on the Form 700 Cover Page.

Instructions are included with the form, but if you need more assistance in completing it, help is available on the Fair Political Practices Commission website www.fppc.ca.gov or by calling the toll-free helpline 1-866-ASK-FPPC.

The period covered by this annual statement is from January 1, 2024, through December 31, 2024.

FINANCE REPORTS

FINANCE

The financial reports show the balance sheet, receipts, and revenue and expenditure reports for the month ending December 31, 2024. The revenue and expenditure report shows that the operating budget expenditure for July 1, 2024 to December 31, 2024, is $8,566,125 total revenue is $6,343,673 resulting in excess revenue over (under) expenditure for the year to December 31, 2024, of ($2,222,452).

THREE YEAR FINANCIALS

	Actual	Budget	Actual	Actual
	12/31/2024	Budget	12/31/2023	12/31/2022
Revenue	6,343,673	6,214,527	1,943,497	5,034,483
Expenses				
Payroll	5,721,330	5,726,506	4,074,837	4,260,403
Administrative Expe	506,830	549,343	456,094	414,881
Utility	86,386	70,271	62,134	58,037
Operating Expense	1,304,750	1,665,318	1,381,104	1,098,849
Contribution to Capital	946,829	946,829	1,207,079	1,608,008
Total Expenses	8,566,125	8,958,267	7,181,248	7,440,178
Profit (Loss)	(2,222,452)	(2,743,740)	(5,237,751)	(2,405,695)

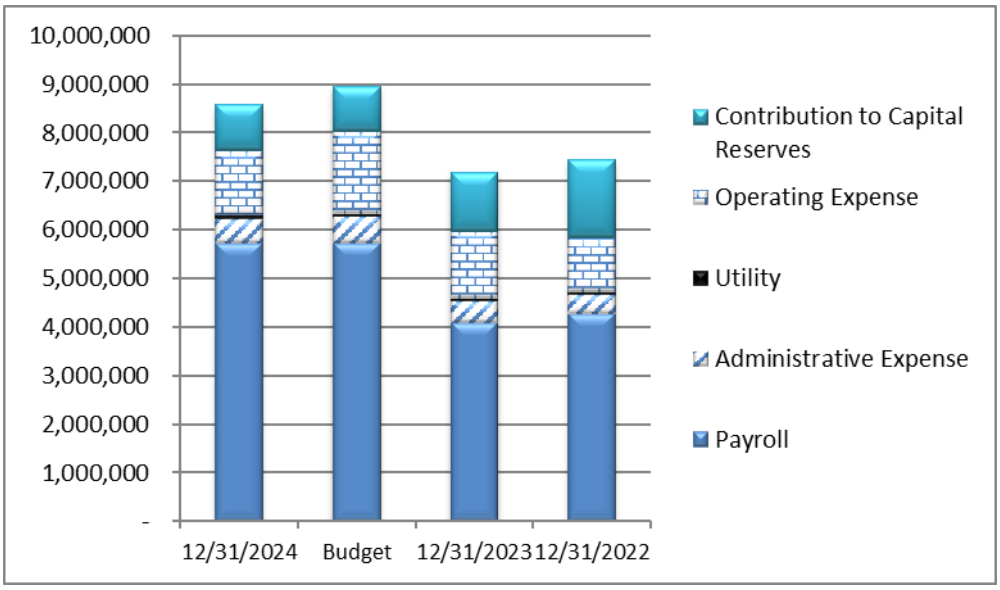


Figure 1 - Three Year Expenditure

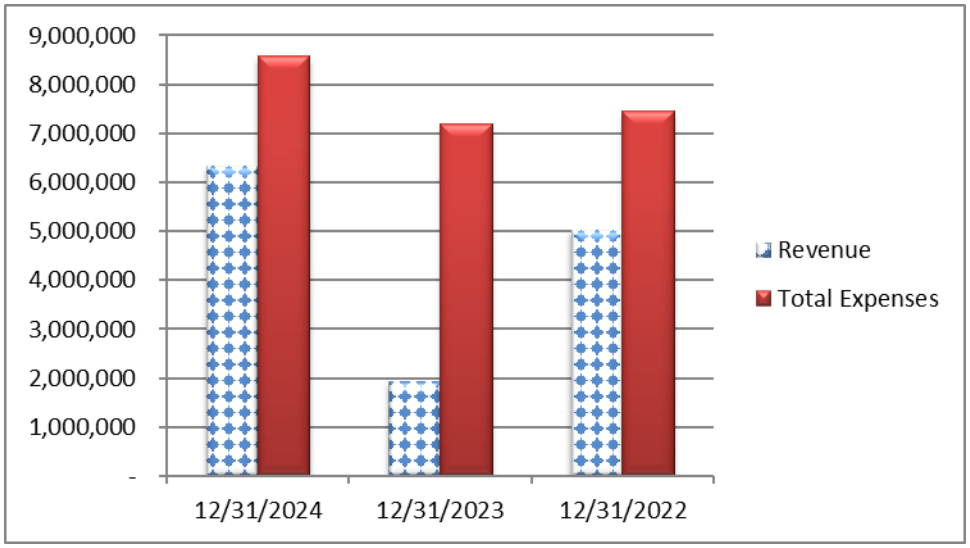


Figure 2 - Three-Year Revenue & Expenditure

THREE-YEAR CASH BALANCE

Cash Balances	12/31/2024	12/31/2023	12/31/2022
Investment Balance	14,663,634	12,842,208	14,076,731
Checking Accounting	233,921	55,017	28,619
Payroll Account	157,108	122,859	142,065
Petty Cash	2,000	2,000	2,000
Total Cash Balances	15,056,662	13,022,084	14,249,415

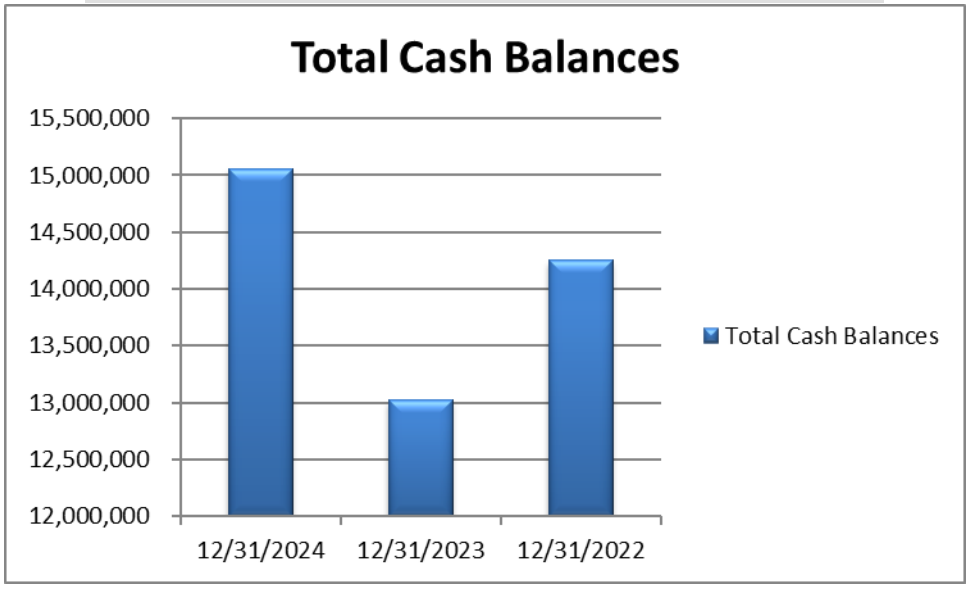


Figure 3 - Cash Balances

DISTRICT INVESTMENT PORTFOLIO 12/31/2024

The District's investment fund balance for the period ending December 31, 2024, is $14,663,634. The portfolio composition is shown in the pie chart. Local Agency Investment Fund (LAIF) accounts for 21% of the District's investments; the Riverside County Pooled Investment Fund is 52% of the total. The LAIF yield for the end of December was 4.434% and the Riverside County Pooled Investment Fund was 4.05%. This gives an overall weighted yield for District investments of 3.66%.

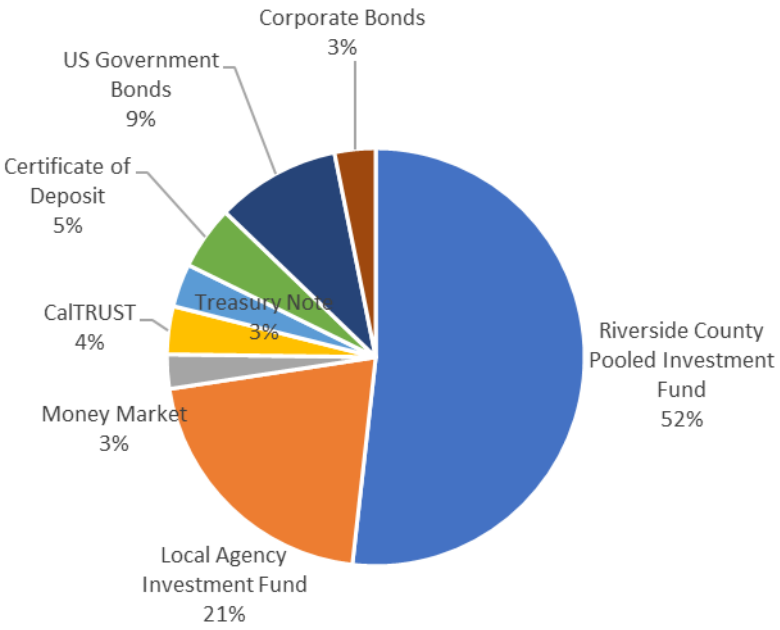


Figure 4 - Investment Portfolio 12/31/24

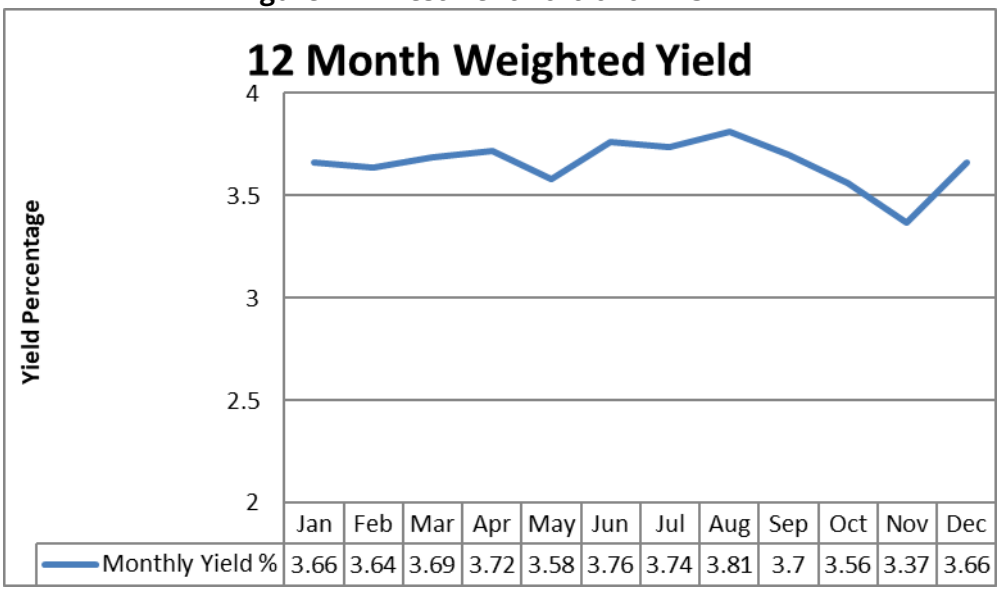
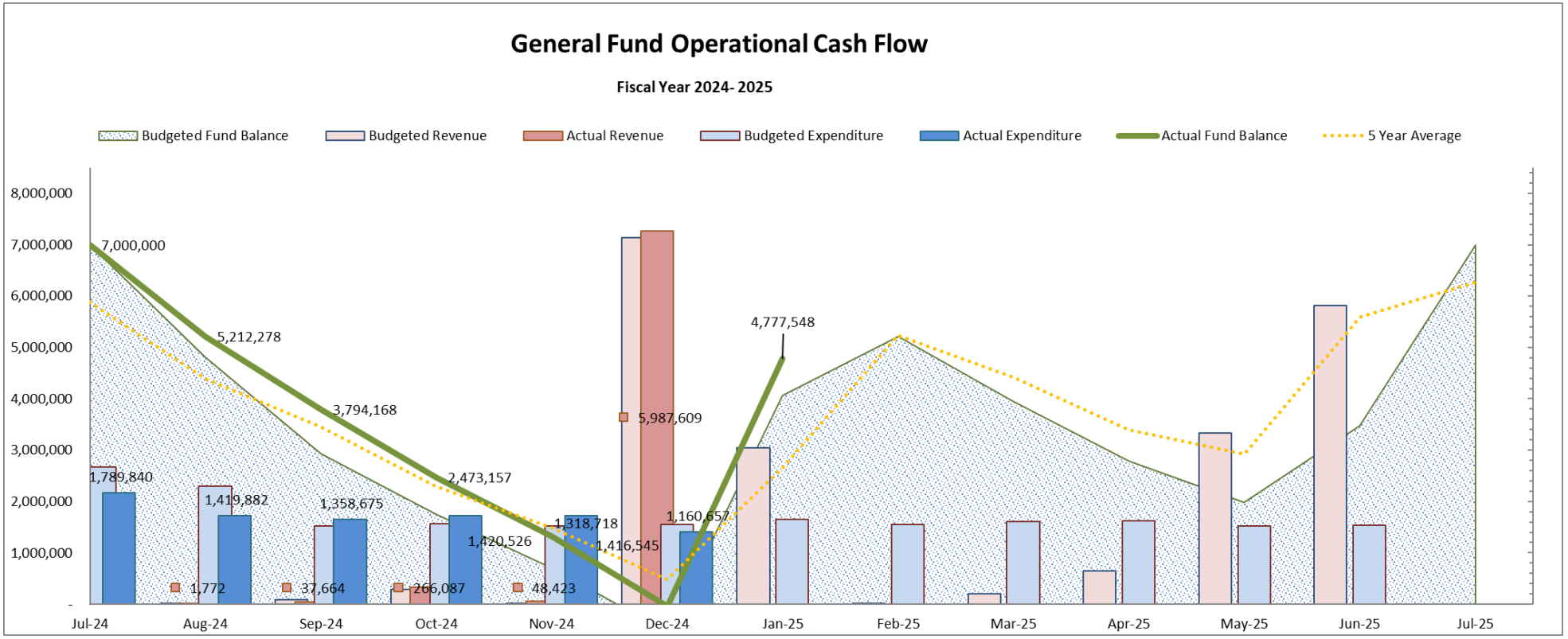


Figure 5 - District Investments Weighted Yield



The **General Fund Operational Cash Flow** graph outlines the District's working capital for the fiscal year July 1, 2024, to June 30, 2025. The beginning Operational Cash Flow fund balance is $7.0 million and the ending Operational Cash Flow fund balance is $7.0 million. Expenditure is approximately divided by 12 equal months, with some differences accounting for the seasonality of the program for example control products and seasonal employment which are greater in the mosquito breeding season. July expenditure is higher than average because of the prefunding lump sum of $0.6 million for CalPERS unfunded liability. The budget also accounts for prepayments. The revenue follows a different pattern, Riverside County distributes the property tax revenue in January and May with advancements in December and April. The *shaded area* represents the **Budgeted Operational Cash Flow Fund Balance** which has a formula of (beginning) **Fund Operational Cash Flow Balance** plus **Revenue** minus **Expenditure**. The *green line* represents the **Actual Operational Cash Flow Fund Balance** and is graphed against the *shaded area* **Budgeted Operational Cash Flow Fund Balance**. The *three-year average* Fund Operational Cash Flow Balance is the orange dash line.

The graph shows $7.0 million **Operational Cash Flow Fund Balance** plus total Revenue for July 1 to December 31, 2024, of $6,343,673 minus total Expenses of $8,566,125 is $4,777,548. Revenue shows a positive budget to actual variance of $129,147, expenditure shows a positive variance of $392,142, giving an overall positive variance of $521,289. For planning purposes, the District is under budget. As long as the green line stays out of the shaded area the District is within budget, as of December 31, 2024, the line is outside the shaded area.

Coachella Valley Mosquito and Vector Control District
FINANCES AT A GLANCE
ALL FUNDS COMBINED
For the Month Ended December 31, 2024

	Beginning of the Month	Change During the Month	End of the Month
INVESTMENTS	14,522,491	141,143	14,663,634
CASH	272,483	120,545	393,028
INVESTMENTS & CASH	14,794,974	261,688	15,056,662
RESTRICTED ASSETS	201,397		201,397
CURRENT ASSETS	1,873,078	4,270,725	6,143,803
FIXED ASSETS	8,735,019	-	8,735,019
OTHER ASSETS	5,712,600	-	5,712,600
TOTAL ASSETS	31,317,069	4,532,413	35,849,481
TOTAL LIABILITIES	5,671,359	(448,316)	5,223,044
TOTAL DISTRICT EQUITY	25,645,709	4,980,729	30,626,438
TOTAL LIABILITIES & EQUITY	31,317,069	4,532,413	35,849,481

RECEIPTS		$ 1,704,550
CASH DISBURSEMENTS		
Payroll	$ 814,367	
General Admin	$ 628,496	
Total Cash Disbursements		$ (1,442,862)
NON-CASH ENTRIES:		$ 4,270,725
Accrual Modifications - Changes in A/P, A/R & Pre-paid insurance		
Change during Month - Excess of Cash over Receipts & Non-Cash Adjustments		$ 4,532,413

CVMVCD

Cash Journal - deposits

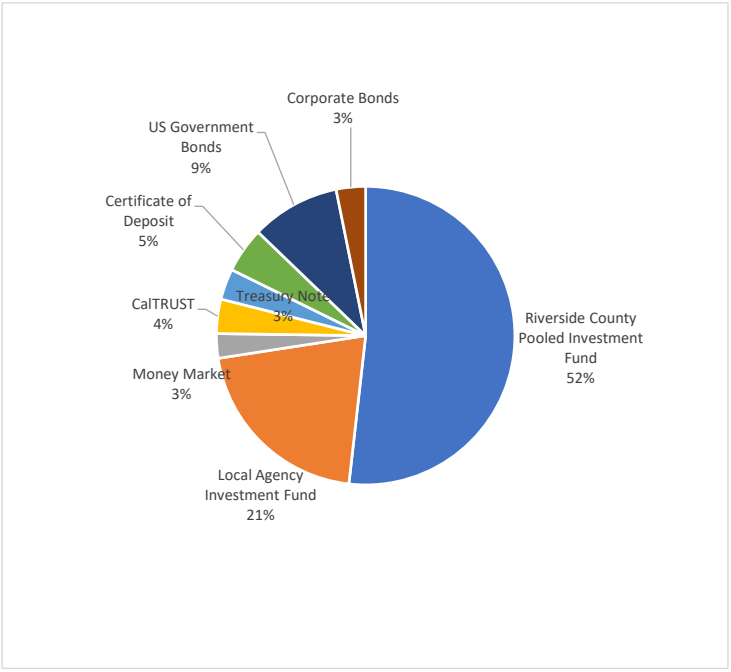
From 12/1/2024 Through 12/31/2024

Effective ...	Transaction Description	Deposits	Payee/Recipient Name
12/31/2024	December Receipts	878.04	California Bank & Trust
12/31/2024	December Receipts - CY SA1	1,585,652.99	Riverside County
12/31/2024	December Receipts - CY Unsecured	10,196.05	Riverside County
12/31/2024	December Receipts - HOX	5,617.43	Riverside County
12/31/2024	December Receipts - interest County Fund 51105	5,651.98	Riverside County
12/31/2024	December Receipts - interest County Fund 51115	94,590.02	Riverside County
12/31/2024	December Receipts - Pesticide Rebate	1,095.92	Syngenta Corp Protection LLC
12/31/2024	December Receipts - RDV	623.92	Riverside County
12/31/2024	December Receipts - WC Reimbursement	243.75	Vector Control Joint Powers Agency
Report Total		1,704,550.10	

COACHELLA VALLEY MOSQUITO AND VECTOR CONTROL DISTRICT
INVESTMENT FUND BALANCES AS OF DECEMBER 31, 2024

INSTITUTION	IDENTIFICATION	Issue Date	Maturity Date	YIELD	General Fund	Thermal Capital Fund	Capital Equipment Replacement Fund	Capital Facility Replacement Fund	Capital Project Insectory Fund	BALANCE
LAIF	Common Investments			4.44%	1,677,369	47,834	120,116	894,703	306,653	$ 3,046,675
Riverside County	Funds 51105 & 51115			4.05%	4,181,292	119,238	299,422	2,230,288	764,415	$ 7,594,654
CalTRUST	Medium Term Fund			4.64%	299,765	8,548	21,466	159,894	54,802	$ 544,475
CA Bank & Trust	Market Rate			1.10%	174,292	4,970	12,481	92,967	31,864	$ 316,573
Pershing	Market Rate			1.00%	39,846	1,136	2,853	21,254	7,285	$ 72,373
Federal Home Ln	US Government Bonds	11/24/2020	11/24/2025	0.63%		24,653	61,906	461,117	158,044	$ 705,720
Federal Natl Mtg Assn	US Government Bonds	11/25/2020	11/25/2025	0.63%		24,650	61,898	461,058	158,024	$ 705,630
Bank Amer Corp	Corporate Bonds	11/25/2020	11/25/2025	0.65%		16,276	40,870	304,425	104,339	$ 465,910
US Treasury Securities	Treasury Note	1/17/2023	1/15/2026	3.88%		17,135	43,028	320,499	109,849	$ 490,510
ALL IN American Cred	Certificate of Deposit	1/18/2023	1/19/2027	4.55%		8,631	21,673	161,434	55,330	$ 247,068
Austin Telco	Certificate of Deposit	1/27/2023	1/27/2028	4.75%		7,932	19,917	148,356	50,848	$ 227,052
Alaska USA Fed Cr	Certificate of Deposit	3/8/2023	3/8/2028	4.60%		8,628	21,666	161,385	55,314	$ 246,993
	Total Investments				6,372,562	289,630	727,297	5,417,378	1,856,766	**$ 14,663,634**

PORTFOLIO COMPOSITION AS OF DECEMBER 31, 2024
WEIGHTED YIELD 3.66%



In compliance with the California Code Section 53646; the Finance Administrator of the Coachella Valley Mosquito and Vector Control District hereby certifies that sufficient liquidity and anticpated revenue are available to meet the District's budgeted expenditure requirements for the next six months.

Investments in the report meet the requirements of the Coachella Valley Mosquito and Vector Control District's adopted investment policy

Respectfully submitted

NOTED AND APPROVED

CVMVCD
Statement of Revenue and Expenditures
December 31, 2024

		Annual Budget	YTD Budget	YTD Actual	YTD Budget Variance	Current Period Budget	Current Period Actual	Current Period Variance	Annual Budget Variance	Percent Annual Budget
Revenues										
4000	Property Tax - Current Secured	5,348,216	1,548,989	**1,585,653**	36,664	1,548,989	**1,585,653**	36,664	(3,762,563)	(70)%
4010	Property Tax - Curr. Supplmntl	67,646	0	**0**	0	0	**0**	0	(67,646)	(100)%
4020	Property Tax - Curr. Unsecured	252,667	245,213	**264,903**	19,690	13,568	**10,196**	(3,372)	12,236	5 %
4030	Homeowners Tax Relief	37,471	18,736	**5,617**	(13,118)	13,056	**5,617**	(7,439)	(31,854)	(85)%
4070	Property Tax - Prior Supp.	53,097	0	**0**	0	0	**0**	0	(53,097)	(100)%
4080	Property Tax - Prior Unsecured	12,532	0	**0**	0	0	**0**	0	(12,532)	(100)%
4090	Redevelopment Pass-Thru	8,465,177	4,232,589	**4,331,269**	98,680	4,232,589	**4,283,683**	51,095	(4,133,908)	(49)%
4520	Interest Income - LAIF/CDs	275,000	137,500	**154,411**	16,911	68,750	**101,120**	32,370	(120,589)	(44)%
4530	Other Miscellaneous Receipts	63,000	31,500	**1,820**	(29,680)	5,250	**1,340**	(3,910)	(61,180)	(97)%
4551	Benefit Assessment Income	2,370,094	0	**0**	0	0	**0**	0	(2,370,094)	(100)%
	Total Revenues	16,944,900	6,214,527	**6,343,673**	129,147	5,882,202	**5,987,609**	105,407	(10,601,227)	(63)%
Expenditures										
Payroll Expenses										
5101	Payroll - FT	6,656,349	3,328,175	**3,448,668**	(120,494)	554,696	**513,966**	40,730	3,207,681	48 %
5102	Payroll Seasonal	202,865	109,888	**51,460**	58,428	15,496	**2,964**	12,532	151,406	75 %
5103	Temporary Services	14,900	7,450	**0**	7,450	1,242	**0**	1,242	14,900	100 %
5105	Payroll - Overtime Expense	29,440	14,720	**15,278**	(558)	2,453	**1,307**	1,146	14,162	48 %
5150	CalPERS State Retirement	1,480,875	1,131,029	**999,089**	131,940	58,308	**135,743**	(77,436)	481,786	33 %
5155	Social Security Expense	409,979	205,514	**213,468**	(7,954)	34,078	**30,280**	3,798	196,511	48 %
5165	Medicare Expense	95,882	48,064	**51,219**	(3,156)	7,970	**7,604**	366	44,663	47 %
5170	Cafeteria Plan	1,381,508	690,754	**742,294**	(51,539)	115,126	**106,906**	8,220	639,215	46 %
5172	Retiree Healthcare	210,000	105,000	**130,195**	(25,195)	17,500	**19,408**	(1,908)	79,805	38 %
5180	Deferred Compensation	137,156	68,578	**54,131**	14,447	11,430	**22,496**	(11,066)	83,025	61 %
5195	Unemployment Insurance	34,236	17,335	**15,529**	1,806	2,817	**12,222**	(9,405)	18,708	55 %
	Total Payroll Expenses	10,653,191	5,726,506	**5,721,330**	5,176	821,114	**852,895**	(31,781)	4,931,861	46 %

CVMVCD
Statement of Revenue and Expenditures
December 31, 2024

		Annual Budget	YTD Budget	YTD Actual	YTD Budget Variance	Current Period Budget	Current Period Actual	Current Period Variance	Annual Budget Variance	Percent Annual Budget
Administrative Expenses										
5250	Tuition Reimbursement	20,000	10,000	**5,699**	4,301	1,667	**0**	1,667	14,301	72 %
5300	Employee Incentive	10,000	5,000	**8,570**	(3,570)	833	**1,417**	(584)	1,430	14 %
5302	Wellness	10,600	5,300	**339**	4,961	883	**36**	848	10,261	97 %
5305	Employee Assistance Program	2,500	1,250	**617**	633	208	**0**	208	1,883	75 %
6000	Property & Liability Insurance	317,738	151,369	**157,561**	(6,192)	12,728	**23,356**	(10,628)	160,177	50 %
6001	Workers' Compensation Insurance	228,798	89,399	**88,999**	400	(26,767)	**(25,734)**	(1,033)	139,799	61 %
6050	Dues & Memberships	56,147	44,318	**37,056**	7,263	10,619	**600**	10,019	19,091	34 %
6060	Reproduction & Printing	41,950	20,975	**9,080**	11,895	3,496	**2,393**	1,103	32,870	78 %
6065	Recruitment/Advertising	6,000	3,000	**1,855**	1,145	500	**202**	298	4,145	69 %
6070	Office Supplies	23,035	10,917	**6,396**	4,522	1,820	**620**	1,199	16,639	72 %
6075	Postage	6,300	3,150	**2,886**	264	525	**255**	270	3,414	54 %
6080	Computer & Network Systems	13,399	6,700	**0**	6,700	1,117	**0**	1,117	13,399	100 %
6085	Bank Service Charges	500	250	**335**	(85)	42	**88**	(46)	165	33 %
6090	Local Agency Formation Comm.	3,000	3,000	**3,196**	(196)	0	**0**	0	(196)	(7)%
6095	Professional Fees	136,850	45,925	**56,475**	(10,550)	20,154	**33,337**	(13,183)	80,375	59 %
6100	Attorney Fees	97,000	56,000	**35,335**	20,665	6,833	**7,967**	(1,133)	61,665	64 %
6106	HR Risk Management	8,000	4,000	**9,245**	(5,245)	667	**1,625**	(958)	(1,245)	(16)%
6110	Conference Expense	60,400	12,100	**19,615**	(7,515)	1,933	**6,664**	(4,730)	40,785	68 %
6115	In-Lieu	13,200	6,600	**6,600**	0	1,100	**1,100**	0	6,600	50 %
6120	Trustee Support	7,600	3,800	**3,741**	59	633	**461**	173	3,859	51 %
6200	Meetings Expense	11,380	5,690	**3,089**	2,601	948	**0**	948	8,291	73 %
6210	Promotion & Education	33,200	16,600	**10,283**	6,317	2,767	**2,136**	630	22,917	69 %
6220	Public Outreach Advertising	56,000	28,000	**22,525**	5,475	4,667	**3,532**	1,134	33,475	60 %
6500	Benefit Assessment Expenses	83,000	16,000	**17,335**	(1,335)	0	**0**	0	65,665	79 %
Total Administrative Expenses		1,246,597	549,343	**506,830**	42,513	47,374	**60,056**	(12,682)	739,766	59 %
Utilities										
6400	Utilities	137,783	68,891	**85,717**	(16,826)	11,482	**10,446**	1,036	52,066	38 %
6410	Telecommunications	2,760	1,380	**669**	711	230	**0**	230	2,091	76 %
Total Utilities		140,543	70,271	**86,386**	(16,115)	11,712	**10,446**	1,266	54,157	39 %

CVMVCD
Statement of Revenue and Expenditures
December 31, 2024

		Annual Budget	YTD Budget	YTD Actual	YTD Budget Variance	Current Period Budget	Current Period Actual	Current Period Variance	Annual Budget Variance	Percent Annual Budget
Operating										
7000	Uniform Expense	61,749	30,574	**23,353**	7,222	4,896	**4,876**	19	38,396	62 %
7050	Safety Expense	45,220	22,610	**19,304**	3,306	3,935	**864**	3,071	25,916	57 %
7100	Physican Fees	3,000	1,500	**820**	680	250	**0**	250	2,180	73 %
7150	IT Communications	94,980	47,490	**44,485**	3,005	7,915	**7,243**	672	50,495	53 %
7200	Household Supplies	3,000	1,500	**2,309**	(809)	250	**0**	250	691	23 %
7300	Repair & Maintenance	47,000	23,500	**19,756**	3,744	3,917	**8,016**	(4,099)	27,244	58 %
7310	Maintenance & Calibration	6,800	0	**0**	0	0	**0**	0	6,800	100 %
7350	Permits, Licenses & Fees	9,242	6,412	**3,756**	2,657	555	**80**	475	5,487	59 %
7360	Software Licensing	64,529	24,890	**17,199**	7,691	6,000	**1,746**	4,254	47,330	73 %
7400	Vehicle Parts & Supplies	59,700	29,850	**25,267**	4,583	4,975	**3,558**	1,417	34,433	58 %
7420	Offsite Vehicle Maint & Repair	19,378	9,689	**14,866**	(5,177)	1,615	**215**	1,400	4,512	23 %
7450	Equipment Parts & Supplies	34,380	17,640	**22,468**	(4,828)	3,140	**286**	2,854	11,912	35 %
7500	Small Tools Furniture & Equip	6,500	3,250	**2,256**	994	542	**0**	542	4,244	65 %
7550	Lab Supplies & Expense	55,275	28,775	**20,635**	8,140	2,525	**1,566**	959	34,640	63 %
7570	Aerial Pool Surveillance	25,000	0	**0**	0	0	**0**	0	25,000	100 %
7575	Surveillance	134,610	100,055	**68,784**	31,271	40,093	**15,625**	24,467	65,826	49 %
7600	Staff Training	141,774	63,929	**61,393**	2,536	6,641	**7,645**	(1,004)	80,381	57 %
7650	Equipment Rental	1,500	750	**3,115**	(2,365)	125	**1,864**	(1,739)	(1,615)	(108)%
7675	Contract Services	170,258	93,620	**83,872**	9,749	11,206	**7,932**	3,274	86,386	51 %
7680	Cloud Computing Services	235,037	124,068	**45,844**	78,224	3,366	**2,687**	679	189,193	80 %
7700	Motor Fuel & Oils	159,800	79,900	**56,005**	23,895	13,317	**0**	13,317	103,795	65 %
7750	Field Supplies	23,000	11,500	**3,157**	8,343	1,917	**222**	1,695	19,843	86 %
7800	Control Products	832,830	733,946	**650,219**	83,727	50,875	**0**	50,875	182,611	22 %
7850	Aerial Applications	150,000	75,000	**0**	75,000	12,500	**0**	12,500	150,000	100 %
8415	Capital Outlay	101,350	57,075	**37,243**	19,832	14,179	**2,063**	12,116	64,107	63 %
8510	Research Projects	250,000	77,794	**77,795**	(1)	12,961	**12,966**	(5)	172,205	69 %
9000	Contingency Expense	275,000	0	**849**	(849)	0	**0**	0	274,151	100 %
Total Operating		3,010,912	1,665,318	**1,304,750**	360,568	207,693	**79,455**	128,238	1,706,162	57 %

CVMVCD
Statement of Revenue and Expenditures
December 31, 2024

		Annual Budget	YTD Budget	YTD Actual	YTD Budget Variance	Current Period Budget	Current Period Actual	Current Period Variance	Annual Budget Variance	Percent Annual Budget
Contribution to Capital Reserves										
8900	Transfer to other funds	1,893,658	946,829	**946,829**	0	157,805	**157,805**	0	946,829	50 %
Total Contribution to Capital Reserves		1,893,658	946,829	**946,829**	0	157,805	**157,805**	0	946,829	50 %
Total Expenditures		16,944,900	8,958,267	**8,566,125**	392,142	1,245,698	**1,160,657**	85,041	8,378,776	49 %
Net revenue over/(under) expenditures		0	(2,743,740)	**(2,222,451)**	521,289	4,636,505	**4,826,953**	190,448		

CVMVCD

Balance Sheet - Unposted Transactions Included In Report

As of 12/31/2024

		Current Year
	Assets	
	Cash and Investments	
1000	Cash - Investments	14,663,633.81
1016	Petty Cash	500.00
1017	Petty Cash Checking	1,500.00
1035	CB&T General Checking	233,920.72
1036	CB&T Payroll Checking	157,107.61
	Total Cash and Investments	15,056,662.14
	Restricted Cash Assets	
1040	Restricted Assets - Pension Stabilization CEPPT	201,396.89
	Total Restricted Cash Assets	201,396.89
	Current Assets	
1050	Accounts Receivable	4,333,620.91
1051	Lease Payments Receivable	14,645.58
1080	Interest Receivable	12,107.97
1085	Inventory	417,938.78
1166	Prepaid IT Service	5,237.50
1167	Prepaid Research Proposals	0.06
1168	Prepaid Expenses	302,157.59
1169	Deposits	1,058,095.00
	Total Current Assets	6,143,803.39
	Fixed Assets	
1170	Construction in Progress	72,606.36
1300	Equipment/Vehicles	2,305,558.91
1310	Computer Equipment	827,649.76
1311	GIS Computer Systems	301,597.91
1320	Office Furniture & Equipment	1,348,648.73
1330	Land	417,873.30
1335	Oleander Building	5,665,861.83
1336	Signage	23,651.39
1340	Structures & Improvements	3,485,233.50

CVMVCD

Balance Sheet - Unposted Transactions Included In Report

As of 12/31/2024

		Current Year
1341	Bio Control Building	6,923,882.74
1342	Bio Control Equip/Furn	43,986.77
1399	Accumulated Depreciation	(12,681,531.98)
	Total Fixed Assets	8,735,019.22
	Other Assets	
1520	Resources to Be Provided	3,514,102.32
1525	Deferred Outflows of Resources	1,301,492.00
1530	Deferred Outflows of Resources - OPEB	897,005.31
1900	Due to/from	0.12
	Total Other Assets	5,712,599.75
	Total Assets	35,849,481.39
	Liabilities	
	Short-term Liabilities	
	Accounts Payable	
2015	Credit Card Payable	68,894.40
2020	Accounts Payable	200,000.00
2030	Accrued Payroll	(18,552.02)
2040	Payroll Taxes Payable	13,314.05
2185	Employee Dues	17,035.88
	Total Accounts Payable	280,692.31
	Total Short-term Liabilities	280,692.31
	Long-term Liabilities	
2100	Pollution Remediation Obligation	2,100,000.00
2200	Net Pension Liability	1,522,076.00
2230	Deferred Inflows - OPEB	483,696.00
2235	Deferred Inflow of Resources - Leases	14,472.55
2300	Net OPEB Liaibility	44,168.00
2500	Compensated Absences Payable	777,938.78
	Total Long-term Liabilities	4,942,351.33
	Total Liabilities	5,223,043.64

CVMVCD

Balance Sheet - Unposted Transactions Included In Report

As of 12/31/2024

		Current Year
	Fund Balance	
	Non Spendable Fund Balance	
3920	Investment in Fixed Assets	10,673,170.66
3945	Reserve for Prepaids & Deposit	1,041,259.68
3960	Reserve for Inventory	459,270.86
	Total Non Spendable Fund Balance	12,173,701.20
	Committed Fund Balance	
3965	Public Health Emergency	4,851,276.00
	Total Committed Fund Balance	4,851,276.00
	Assigned Fund Balance	
3910	Reserve for Operations	5,800,000.00
3925	Reserve for Future Healthcare Liabilities	453,746.00
3955	Thermal Remediation Fund	63,688.00
3970	Reserve for Equipment	726,018.00
3971	Reserve for Facility & Vehicle Replacement	2,659,312.00
	Total Assigned Fund Balance	9,702,764.00
	Unassigned Fund Balance	
3900	Fund Equity	(568,650.76)
3991	Prior Year Adjustment GASB87	20,909.82
3999	P&L Summary	5,832,842.99
	Total Unassigned Fund Balance	5,285,102.05
	Current YTD Net Income	
		(1,386,405.50)
	Total Current YTD Net Income	(1,386,405.50)
	Total Fund Balance	30,626,437.75
	Total Liabilities and Net Assets	35,849,481.39

FY2025-26 BUDGET CALENDAR				
STAGE	**TASK TO BE COMPLETED**	**ACTIVITIES**	**STAKEHOLDERS**	**DEADLINE**
STAFF	Budget Templates created	Templates in Microix Budget Workflow Created. Sent to Department Budget managers	Administrative Finance Manager	January 17, 2025
	Personnel Salary & Benefits	Updated information from Payroll & benefits added to Workflow. Budget spreadsheets & formulae created.	Administrative Finance Manager	Ongoing
	Budget Workshop for Managers	Help facilitate & train staff to build budget in Workflow	Management Team	February 3, 2025
	Budget docs to AFM & GM	General Manager to review and approve budget documents	GM, Management Team	March 14, 2025
	Completion of first draft	Team to review and adjust budget according to GM & AFM suggestion & direction	GM, Management & Supervisory Team	March 21, 2025
	Draft 1 Budget	Preparation of first draft of FY2025/2026 Budget for Finance Committee Budget Meeting. PDF and hard copy to FC Trustees	Finance	March 25, 2025
FINANCE COMMITTEE	Draft 1 for Finance Committee	Emailed to Finance Committee For Review email questions or meet. Reserve Study to be emailed with draft Budget	Finance Committee Department heads, General Manager & Administrative Finance Manager	April 4, 2025
	Draft 1 for Finance Committee	Finance Committee to review draft budget & reserve study & discuss in meeting ****FINANCE COMMITTEE MEETING**	Finance Committee General Manager & Administrative Finance Manager	Tuesday April 8, 2025 1:00 p.m.-2:30 p.m.
STAFF	Updated salary	Salary & Benefits Proposals & scenarios	Administrative Finance Manager	April 25, 2025

FINANCE COMMITTEE	Final Draft for Finance Committee	Final draft of FY2025/2026 Budget for Finance Committee Budget Meeting, attended by General Manager, Finance Committee, and Administrative Finance Manager. ****FINANCE COMMITTEE MEETING**	Finance Committee General Manager & Administrative Finance Manager	Friday May 2, 2025, 1:00pm to 3pm **TBD**
BOARD	Final Draft for Budget Workshop	Budget Workshop for in depth discussion **BOARD MEETING**	Board of Trustees Workshop	**May 13, 2025** 4:30 pm – 5:30 pm
	Adoption of Final Draft	Adoption of FY2025/2026 Budget **BOARD MEETING**	Board of Trustees Board Meeting	**June 10, 2025**
	Set Benefit Assessment Rate	Adopt Resolution – Intention to Levy Assessment, Preliminary approval of engineer's report, and providing notice of hearing for the CVMVCD mosquito, fire ant, and disease surveillance and vector control assessment **BOARD MEETING**	Board of Trustees Board Meeting	**June 10, 2025**
	Adopt Benefit Assessment Resolution	Adopt Resolution approving Engineer's Report, Confirming Diagram and Assessment, and Ordering the Levy of Assessments for fiscal year 2025/2026 for the Coachella Valley Mosquito and Vector Control District Mosquito, Fire Ant and Disease Control Assessment Public Hearing **BOARD MEETING**	Public Hearing	**July 8 2025**

	Coachella Valley Mosquito and Vector Control District **Staff Report**	**February 11, 2025**

Agenda Item: Informational Item

Government Finance Officers Association Budget Academy, January 6 to 9, 2025, Garden Grove, CA

Report:

The GFOA Budget Academy is an immersion training course that focuses on skills and techniques critical to public sector budget analyst. Using a combination of exercises, discussions, and lectures, the course provided an overview of the budget development process, including best practices and techniques required in effective budgeting. This course covered essential elements of public sector budgeting such as goal setting, program development, revenue and expense analysis, position budgeting, capital budgeting, and more.

ATTENDEES:
David I'Anson

SEMI-ANNUAL RESEARCH REPORTS

	Coachella Valley Mosquito and Vector Control District **Staff Report**	**February 11, 2025**

Agenda Item: Informational Item

Semi-annual research reports from the University of California, Davis; University of California, Riverside; Mount Sinai School of Medicine; and the USDA for 2024 **— Jennifer A. Henke, M.S., BCE, Laboratory Manager**

Background:

The Research Department (Department 600) supports cooperative work with the University of California system and other research institutions for conducting mosquito-borne disease and vector research, optimizing control measures for vectors, and understanding vector biology. The proposals include using mosquito excreta as another method of virus testing for remote locations; understanding the interaction in viruses to impact bird immunity and virus transmission cycles; examining control interventions to predict when to better time future applications; using botanical repellents targeted at adult mosquitoes in storm water systems; and examining different delivery methods to control red imported fire ants. Each of the proposals was approved by the Research Committee and later approved by the full Board of Trustees at a November Board Meeting. The work is part of the 2022 Strategic Plan goal 5.2.

As described in the District's Research Funding Policy and Procedure, researchers are to provide semiannual progress reports. Projects 2-5 were approved for funding at the November 2023 board meeting. The reports are from the following proposals:

1. **UC Davis (Dr. L. Coffey –** funded in 2022**)**
    - Evaluating metagenomic arbovirus detection using nanopore sequencing: a field-forward sequencing approach
2. **Colorado State University (Dr. A. Bosco-Lauth) and UC Davis (Dr. L. Coffey)**
    - Exploring viral infection kinetics and immune response in an avian reservoir host for St. Louis encephalitis and West Nile viruses
3. **Icahn School of Medicine at Mount Sinai (Dr. N. DeFelice)**
    - Environmental drivers of St. Louis encephalitis in Coachella Valley, California
4. **UC Riverside (Dr. A. Gerry and Dr. K. Chandrasegaran)**
    - Restricting mosquito use of underground storm drain systems in the Coachella Valley by application of botanical repellents
5. **USDA (Dr. D. Oi)**
    - Determining a fast-acting treatment for the rapid elimination of fire ant colonies

Dr. Coffey's project was started in January 2023. The project was delayed due to changes in personnel. A no-cost extension was granted, and that project is now complete.

Recommendation:
To accept the reports as presented

Attachments:
Reports from Dr. Coffey, Dr. Bosco-Lauth, Dr. DeFelice, Dr. Gerry, Dr. Chandrasegaran, and Dr. Oi

Strategic Business Plan Alignment:
Goal 5 – Research leads to ongoing improvements in the District's performance

Strategic Response – Validate and improve vector control programs through applied scientific research.

January 13, 2025
Progress Report
Lark L. Coffey
University of California, Davis

This report details progress from June-December 2024 on our 2022 CVMVCD project *Evaluating metagenomic arbovirus detection using nanopore sequencing: a field-forward sequencing approach*. The objective of this project is to evaluate and optimize a system for unbiased metagenomic arbovirus detection using hand-held low-cost nanopore sequencers from samples collected for arbovirus surveillance using mosquito pool excreta in locations around the Salton Sea in the Coachella Valley.

We continue working to develop a protocol for metagenomic arbovirus detection from mosquito pools and excreta samples collected in remote and arid locations using nanopore sequencing (**Figure 1A**). Despite many delays from our original project timeline, our efforts continue in the laboratory with experimentally infected mosquitoes. In our June 2024 report we noted low feeding success of our 2023 *Culex tarsalis* colony from Sacramento & Yolo Mosquito & Vector Control that was adapted at the District to survive without bloodfeeding. Despite multiple rearing and bloodfeeding attempts, we failed to get this colony to thrive. We therefore pivoted to our 2002 colony of *Culex tarsalis* that bloodfeeds with high success. Since much of our current parallel work is also with St. Louis encephalitis virus (SLEV) and not West Nile virus (as shown in Figure 1), we also moved to using SLEV as our test virus.

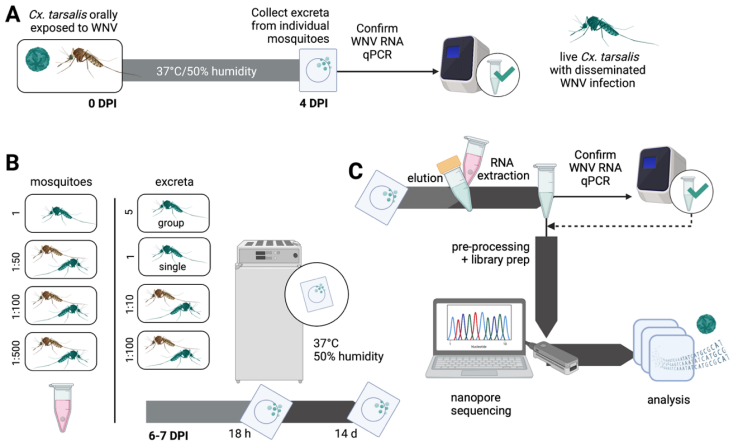


Figure 1. Evaluation of metagenomic arbovirus detection from mosquito excreta in arid conditions. **A**) Production of *Culex tarsalis* mosquitoes with disseminated WNV infection, confirmed on day four post-exposure to oral WNV by testing their excreta by RT-qPCR. **B**) Experimental design for generating WNV+ pools and excreta samples in arid conditions. Each experiment will be conducted in duplicate. **C**) Sample processing, sequencing, and analyses to generate WNV genomes.

Before implementing mosquito excreta testing experiments, we performed dose response studies in the 2002 *Culex tarsalis* with a goal of identifying SLEV dose(s) that infect the majority of the cohort to maximize the chances of viral RNA detection in excreta from individually housed mosquitoes. Female *Culex tarsalis* were exposed to artificial bloodmeals containing 10^3, 10^5, or 5 X 10^6 plaque forming units (PFU)/ml of 2 SLEV strains, one each from 2003 or 2015. Fourteen days after ingesting the SLEV spiked bloodmeal, we harvested surviving mosquitoes and assayed infection rates based on SLEV RNA detections by RT-qPCR in individual homogenized mosquitoes. Both SLEV strains presented at 10^3 and 10^5 PFU/ml infected less than 50% of the cohorts (data not shown). The highest dose (5 X 10^6 PFU/ml) of both strains infected a larger fraction of each cohort (**Figure 2**). Forty-three percent of *Culex tarsalis* that ingested bloodmeals containing the 2003 strain became infected, compared to 65% of the cohort that ingested the 2015 strain. Although these rates are not statistically different at $p<0.05$ by chi-squared analysis, we will use the 2015 for future excreta studies since the majority of mosquitoes became infected. Our next steps for winter 2025 studies are to perform excreta detections from group and individually housed mosquitoes exposed to 5 X 10^6 PFU/ml SLEV 2015. We will also generate pools of mosquitoes with 1, 1:50, 1:100, and 1:500 infection rates for use in sequencing analyses (**Figure 1B**).

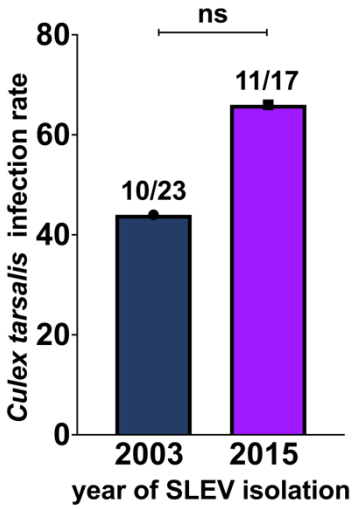


Figure 2: Infection rates in *Culex tarsalis* from a 2002 colony exposed to bloodmeals spiked with 5 X 106 PFU/ml of SLEV.

Coachella Valley Mosquito and Vector Control District Research Program Project Report
July 2024-January 2025

Project Title: Exploring viral infection kinetics and immune response in an avian reservoir host for St. Louis encephalitis and West Nile viruses

PI: Angela Bosco-Lauth, Colorado State University Department of Biomedical Sciences

Collaborators: Co-PI: Lark Coffey, University of California Davis

Brief background and specific aims:

St. Louis encephalitis virus (SLEV) is a mosquito-borne flavivirus that causes febrile illness and can, in rare cases, lead to fatal encephalitis in humans. It has been endemic in California since the 1940's, but between 2003 and 2014, no human cases or mosquito isolations were recorded for this virus (1-4). By contrast, in 2003, the closely related West Nile virus (WNV) had reached California, leading to 7,597 cases in humans between 2003-2022, as well as causing disease in horses and many species of birds (5). In 2015, SLEV re-emerged and has since been detected in humans and mosquitoes throughout California in every subsequent year, despite continued WNV presence. The reasons for the 11-year hiatus and re-reemergence of SLEV are unclear, but one hypothesis is that WNV "out-competed" the original SLEV in natural reservoir hosts (birds) and that immunity to WNV prevented SLEV from infecting new bird hosts, thereby effectively eliminating SLEV. **Our hypothesis is that post-2015 contemporary SLEV effectively evades avian reservoir host immunity such that prior infection with WNV does not protect against contemporary SLEV infection.** To investigate this, we propose a set of experiments in a common avian reservoir host species, the house sparrow (*Passer domesticus)*, for both of these viruses to evaluate how exposure to one virus elicits an antibody response and whether that response prevents infection by a secondary exposure to a heterologous (i.e. related but genetically distinct) virus exposure.

Aim 1: Evaluate viral-host infection kinetics in house sparrows with pre-2003 SLEV, WNV and post-2015 SLEV.
Groups of house sparrows will be experimentally inoculated with each of these flaviviruses and infection kinetics measured by evaluating viremia and neutralizing antibody response.

Aim 2: Compare host response to secondary infection by heterologous flavivirus infection.
Following initial experimental infection studies, house sparrows from Aim 1 will be exposed to one of the heterologous flaviviruses to measure response to secondary viral infection.

Aim 3: Evaluate passive antibody as a protective mechanism against infection
Antibody levels wane over time, and corresponding protection against re-exposure to the same or related virus may be reduced as a result of this decrease. To simulate this, house sparrows will receive WNV antisera in varying concentrations prior to exposure to either historic or contemporary SLEV to determine whether WNV antibody titer correlates with prevention against infection.

The primary goals of this proposal are to **1) determine the infection kinetics (viremia and antibody response) to contemporary SLEV compared to historic SLEV and WNV in an avian reservoir host, and 2) determine if contemporary SLEV is distinct enough from WNV and historic SLEV to evade immunity induced by previous exposure in an avian**

reservoir host. This proposal specifically addresses **CVMVCD Research Interest 4a: Role of birds as hosts in co-circulating virus transmission cycles.** In

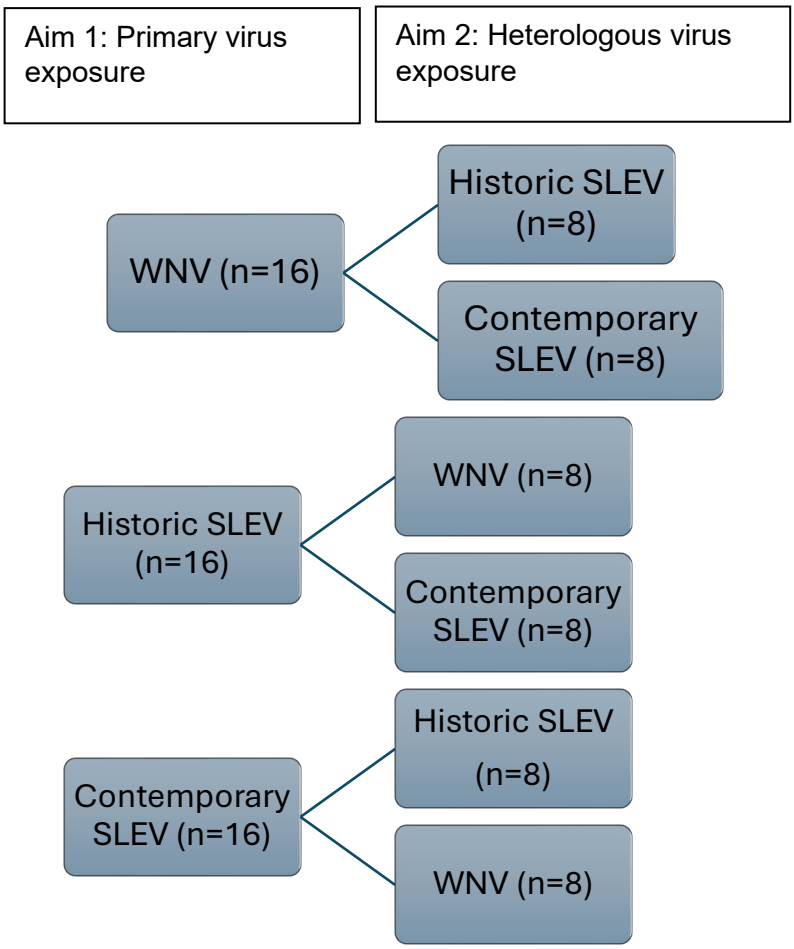
Research Design and Methods

We will perform experimental infection studies in house sparrows to determine infection kinetics of historic SLEV, contemporary WNV and contemporary SLEV. House sparrows are a primary reservoir host for both SLEV and WNV in California and elsewhere in the U.S. These birds are abundant, ubiquitous, and invasive and as such are often considered a pest or nuisance species in areas inhabited by humans. Therefore, trapping wild house sparrows is often considered a benefit to landowners. We will trap house sparrows from pre-determined locations in Larimer and Weld counties of Colorado, where WNV is endemic but SLEV is not known to occur, thus reducing the risk of trapping birds with pre-existing SLEV immunity. Trapping will be performed in early spring (pre-nesting) or late summer (post-fledging) using mist nets. Birds will be pre-screened for WNV antibodies and those birds that are seropositive will be excluded from the study. A total of 48 WNV-seronegative birds will be trapped for experimental infection studies during **year 1 (Aims 1 and 2).** Pending year 2 funding from CVMVCD, an additional 48 house sparrows will be trapped for year 2, Aim 3. All trapping and subsequent animal work will be performed in accordance with the Institutional Animal Care and Use Committee (IACUC) at Colorado State University and with permission from Colorado Parks and Wildlife.

Research Methods Aim 1: House sparrows will be acclimated to indoor caged housing in animal biosafety level 2 or 3 (ABSL-2, -3) aviaries and then inoculated subcutaneously (SC) with either historic SLEV, contemporary WNV, or contemporary SLEV in groups of 16 birds per virus. Blood will be collected serially from the jugular vein on days 1-5, 7, and 28 post-inoculation and serum evaluated for viremia (infection virus in the blood) for the first week and antibody response at the latest timepoint. Birds will be evaluated clinically at least once per day for the duration of the study, and, while not expected, any animals that exhibit moderate to severe signs of disease (lethargy, anorexia, neurologic signs, moribund) will be humanely euthanized. Viremia will be assessed using plaque assays, a standard laboratory procedure for quantifying infectious virus, and antibody response will be measured by plaque-reduction neutralization assays, which determines the level of antibody in serum capable of neutralizing infectious virus. Both of these assays are well described in the literature (15,16) and our lab has significant experience performing them.

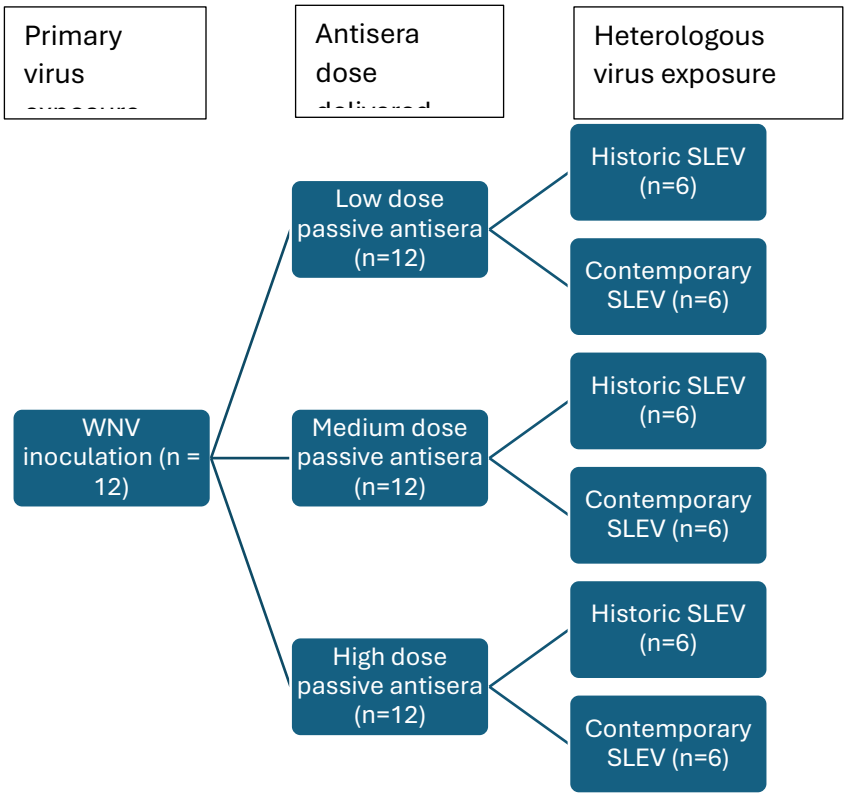
Research Methods Aim 2: On day 28 following the initial exposures to one of the three flaviviruses described, each group of 16 birds will be divided into 2 groups of 8 birds, and those groups will be exposed to the other two viruses in the study design (See Figure 1). The procedures following heterologous virus challenge will be identical to those described in Aim 1 (blood collection for viremia and seroconversion) with the exception of a 14 day post-infection terminal blood sample to collect sufficient blood to perform additional serological tests. Viremia and neutralizing antibody will be measured by plaque assay and plaque reduction neutralization assay as previously described.

Figure 1: House sparrow groups for Aims 1 and 2)



Research Methods Aim 3: Forty-eight house sparrows will be trapped and acclimated to captivity prior to experimental infection. Serum will be collected and assayed for pre-existing exposure to WNV, as measured by PRNT. WNV seropositive birds will be excluded from the study. A total of 12 birds will be inoculated with WNV, blood collected on days 1-5 and 7 for viremia characterization, and again on day 28, at which time humane euthanasia will be performed in order to collect as much serum as possible for use in the passive transfer study. The remaining 36 birds will be divided into groups of 12 and administered intravenously either low, medium or high concentrations of WNV immune sera from the inoculated birds (dose to be determined based on titer of WNV-infected birds). Twenty-four hours post-serum administration, a blood sample will be collected to measure circulating passive antibody levels and each group of twelve will be further divided into groups of 6 such that 6 birds per antisera concentration will be inoculated with either historic or contemporary SLEV (see Figure 2).

Figure 2: House sparrow groups for Aim 3



Progress as of January 31, 2025:

Scientific collection permits for house sparrows and IACUC approvals were obtained in February of 2024. Scouting for house sparrows began in March 2024 and permissions were received for trapping sparrows at several locations:

- Colorado State Forest Service land located on LaPorte Avenue, Fort Collins
- Mile High Dairy, Mead, CO
- Rocky Mountain Dairy, Wellington, CO
- Several private residences in Larimer and Weld County

Trapping began in June 2024 and continued through September until sufficient numbers of birds were acquired to perform Aims 1 and 2 (total of 48 West Nile seronegative sparrows).

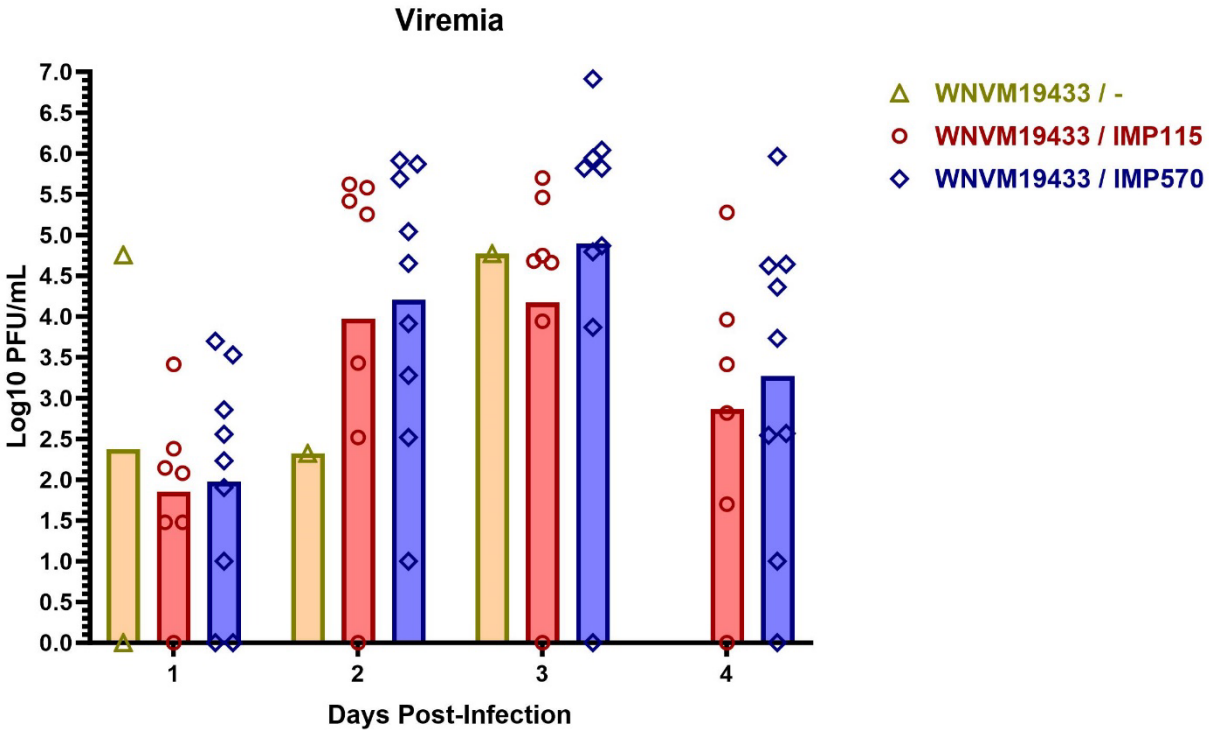
Dr. Lark Coffey and her team have identified and sequenced a contemporary SLEV strain from California that will be used to compare against historic SLEV in heterologous virus challenges. The CSU team received the virus in July 2024 and used it to perform infections.

August, 2024 through November 2024: Sparrows were divided into 3 groups of 16, and each group was inoculated with 100ul WNV, SLEV IMP115 (historical strain) or SLEV IMPR570.

- Blood was collected on days 1-5,7 post-inoculation and prior to heterologous virus challenges
- 28 days post-inoculation, each group of birds was divided in half, and those birds received heterologous viral inoculations. Blood was collected on days 1-5 and 7 post-infection and all birds were euthanized on day 14 post-heterologous infection.
- All in vivo work for Aims 1 and 2 was completed by November, 2024.

All pre-challenge serology is complete and backtitrations of viral inoculations confirmed. Early data shows that house sparrows infected primarily with West Nile virus became infected (viremia shown in Figure 3) and in subsequent infections with SLEV, all of these birds were fully protected against infection (no viremia).

Figure 3. West Nile virus viremia in birds following primary challenge



Most of these birds had some levels of cross-neutralizing antibodies against SLEV following WNV exposure, although the titers ranged from 10-160, with 10 being the lowest measurable titer. These preliminary data support the hypothesis that West Nile virus exposure is protective against SLEV infection, at least in the short term, and provide a baseline for measuring the level of cross-neutralizing antibody that is protective against secondary challenge. The studies in Aim 2 will explore this further by delivering varying doses of WNV antisera to house sparrows to determine if the threshold for protection is dependent on the antibody titer present at the time of exposure, and if there is any variability among SLEV isolates (historic vs. contemporary) in this response. This will have important implications for understanding the ecology of these viruses, particularly as antibody levels wane over time between mosquito seasons.

The remaining samples from Year 1 studies are currently being processed for virus isolation and serology post-challenge; anticipated completion of this work is March, 2025 prior to the onset of trapping additional birds for the Year 2 Aim 3 portion of this project.

Environmental drivers of St. Louis encephalitis in Coachella Valley, California.

Nicholas DeFelice, Rishi Kowalski, Aman Patel, Matthew J. Ward

Narrative.

Infectious disease forecasting is no longer just theoretical but is an achievable reality. St. Louis Encephalitis virus (SLE) is a re-emerging mosquito-borne arbovirus in the United States and historically endemic to Coachella Valley (Danforth et al., 2022). Environmentally informed forecast tools of SLE transmission hold promise for improving management decisions for abatement and public health entities. Recently, we developed an environmentally informed real-time forecast system for West Nile virus (WNV) mosquito infection rates in Coachella that captures both space and time predictions (DeFelice et al., 2017; DeFelice, 2018; N.B. DeFelice, 2019; Ward, Sorek-Hamer, Henke, et al., 2023).

We adapted our previously developed forecast systems for WNV and applied it to SLE, by tailoring it to SLE's highly similar vector-virus-host ecology. Integrating real-time environmental and mosquito monitoring data in a biologically informed mathematical model that describes the interactions between vector and host allows for more certainty in developing SLE spatial/temporal risk predictions. We coalesced monitoring data with real-time environmental modeling data. This provides fine spatial resolution of the variability in physical environmental factors (e.g., temperature and hydrology), all of which influence mosquito development, SLE transmission dynamics, and the potential risk of human spillover infections. We leveraged statistical techniques and environmental monitoring to develop spatially refined risk maps of SLE on an interactive, web-based platform, thus giving public health and vector abatement districts additional fine-scale tools to help inform the decision-making processes. We are in the process of utilizing these high-resolution environmental variables to identify groupings and relationships between trap data and environmental indicators of viral activity over time.

This comprehensive depiction of the combination of how environmental fluctuations are associated with viral amplification can provide insight into the transmission process. These two models provide decision support for appropriately timed interventions, such as public health messaging and case detection, or more intense and targeted mosquito control efforts. More targeted control efforts will ideally reduce the amount of pesticide that goes into the environment while maximizing their impact on disrupting arboviral transmission.

Aim 1. Develop an epidemiological disease transmission model of the zoonotic transmission of SLE between mosquito vectors and avian hosts.

Aim 2. Develop a multi-model inference system that combines a series of environmental conditions to generate a statistically informed model to make real time spatially refined predictions of SLE infection rates.

Aim 3. Integrate models from Aims 1 & 2 predicting the probability of SLE infected mosquitoes into a web-based platform to better communicate the spatial risk of SLE and the ecological process driving increased risk.

Aim 1. Develop an epidemiological disease transmission model of the zoonotic transmission of SLE between mosquito vectors and avian hosts.

The *Culex* mosquito population, when normalized by trap night, exhibits a pronounced bimodal structure. The overall population peaks in late spring to early summer (~CDC week 16) before drastically declining during the summer (~CDC week 30) before it rebounds during the fall (~CDC week 40) (Figure 1). The bi-modal structure is driven by the extreme heat of the summer and is primarily composed of *Cx. tarsalis* in the Southern agricultural portion of the Coachella Valley (Figure 1). In contrast, *Cx. quinquefasciatus* in the South do not appear to recover to the same degree following the high heat events of the summer and neither species recovers in the Northern portion of the valley (Figure 1). This trend is likely the result of the type and availability of larval habitat availability in the South compared to the North. Conversely, the infection rate per 1,000 mosquitoes tested (I_M) peaks during the summer (~CDC week 30) corresponding to the peak in average minimum daily temperature. While WNV was seen in both *Cx. tarsalis* and *Cx. quinquefasciatus; nearly 90% of detected SLE was in Cx. tarsalis* (Table 1). The bimodal trend is also notable when comparing the mosquito population to relative humidity (RH) (Figure 2) where the drop in RH is associated with the initial drop in mosquito populations in early summer.

Further work is needed to fully understand the relationship of vector infection rates with SLE, WNV and the interaction between SLE and WNV at the abatement district level (Figures 3 and 4). It is highly likely these two viruses interact both in the mosquito vector and avian hosts and that to accurately forecast either, we will need to incorporate both in the same model. High infection rates for WNV were seen in 2017 and 2019, then following the early season WNV, SLE was seen late in the season (Figure 3). WNV+/SLE+ traps (Purple) and WNV-/SLE+ traps (green) are predominantly in the southern part of Coachella Valley while WNV+/SLE- traps (blue) are distributed throughout the valley demonstrating the variation in the spatial range of the two viruses and their primary vectors (Figure 4).

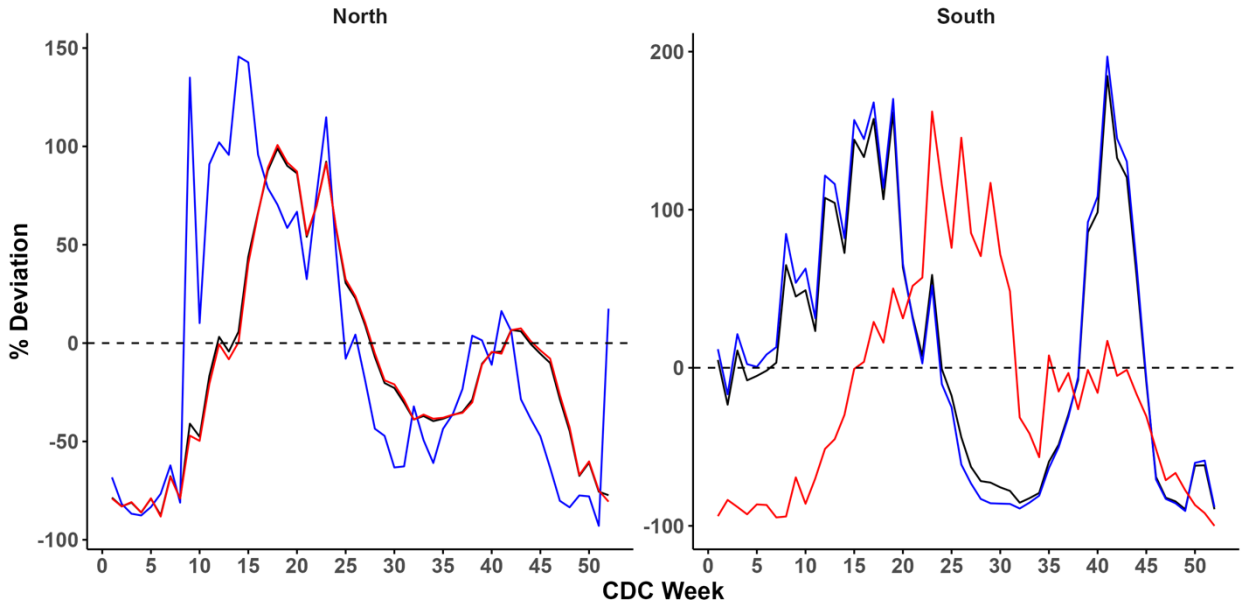


Figure 1. Percent deviation of the two-week rolling mean of mosquitoes per trap night from the five-year historical mean in the North and South of the Coachella Valley for 2015 - 2024 (all *Culex* – black, *Cx. tarsalis* – blue, *Cx. quinquefasciatus* – red). Only traps with at least ten years of data from 2006 - 2024 and at least five weeks of data per year were included.

Table 1. Mosquito testing by species and virus in the Coachella Valley, CA (2015 – 2024).

Species	Virus	Pools tested	Mosquitoes tested	Positive pools	% positives by virus
Aedes aegypti	SLEV	490	1496	0	0.0
Aedes aegypti	WNV	490	1496	1	0.1
Culex pipiens	SLEV	1	25	0	0.0
Culex pipiens	WNV	1	25	0	0.0
Culex quinquefasciatus	SLEV	29686	787169	76	11.3
Culex quinquefasciatus	WNV	29688	787269	611	44.8
Culex tarsalis	SLEV	25283	1046100	596	88.7
Culex tarsalis	WNV	25286	1046227	752	55.1

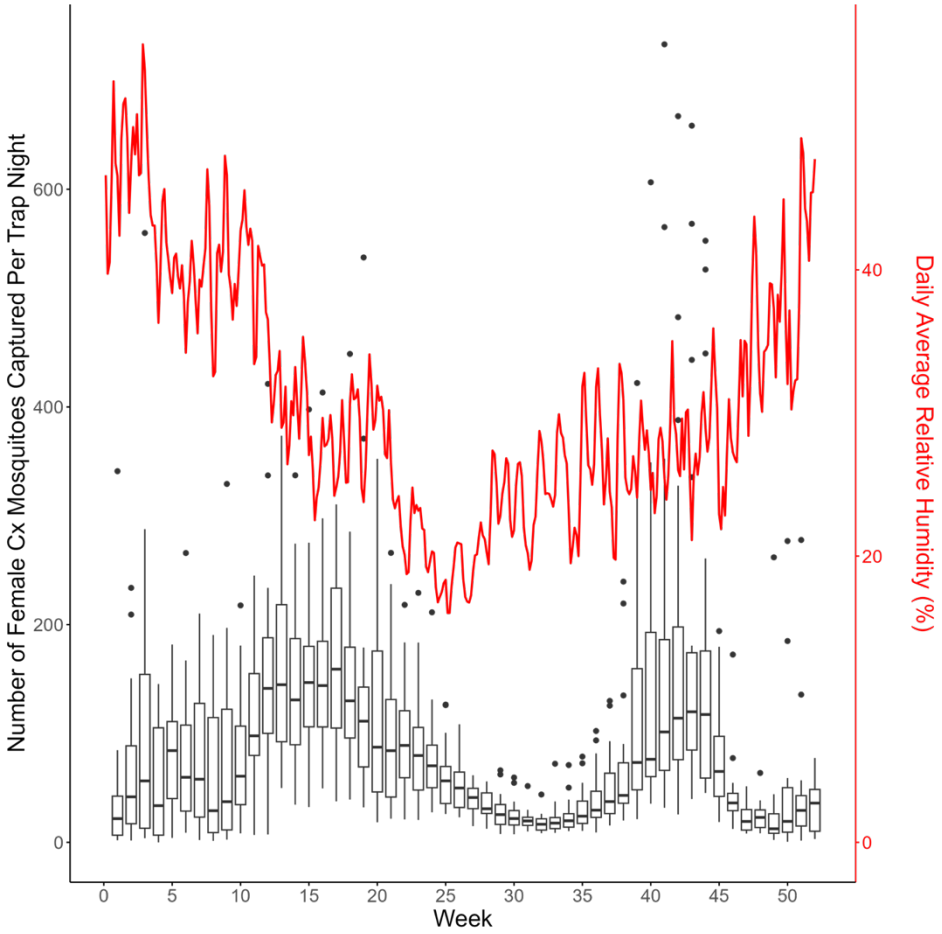


Figure 2. Historical Coachella Valley female *Culex* mosquito abundance between 2006 - 2024. Weekly mean number of mosquitoes trapped per night (boxplot, dots = outliers > 1.5*IQR), daily relative humidity (red line).

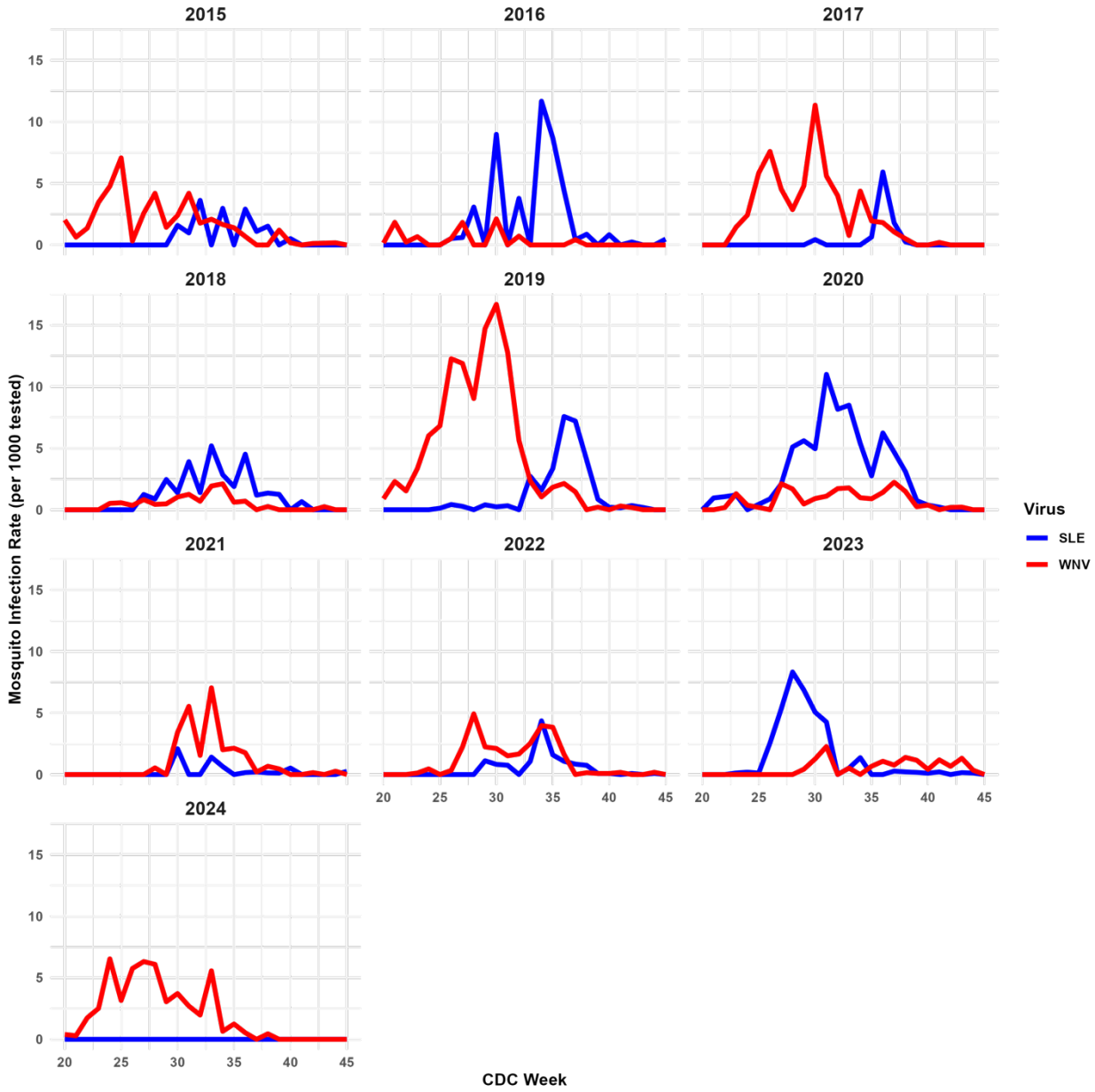


Figure 3. Weekly mosquito infection rates for WNV (red), and SLE (blue) (2015 - 2024).

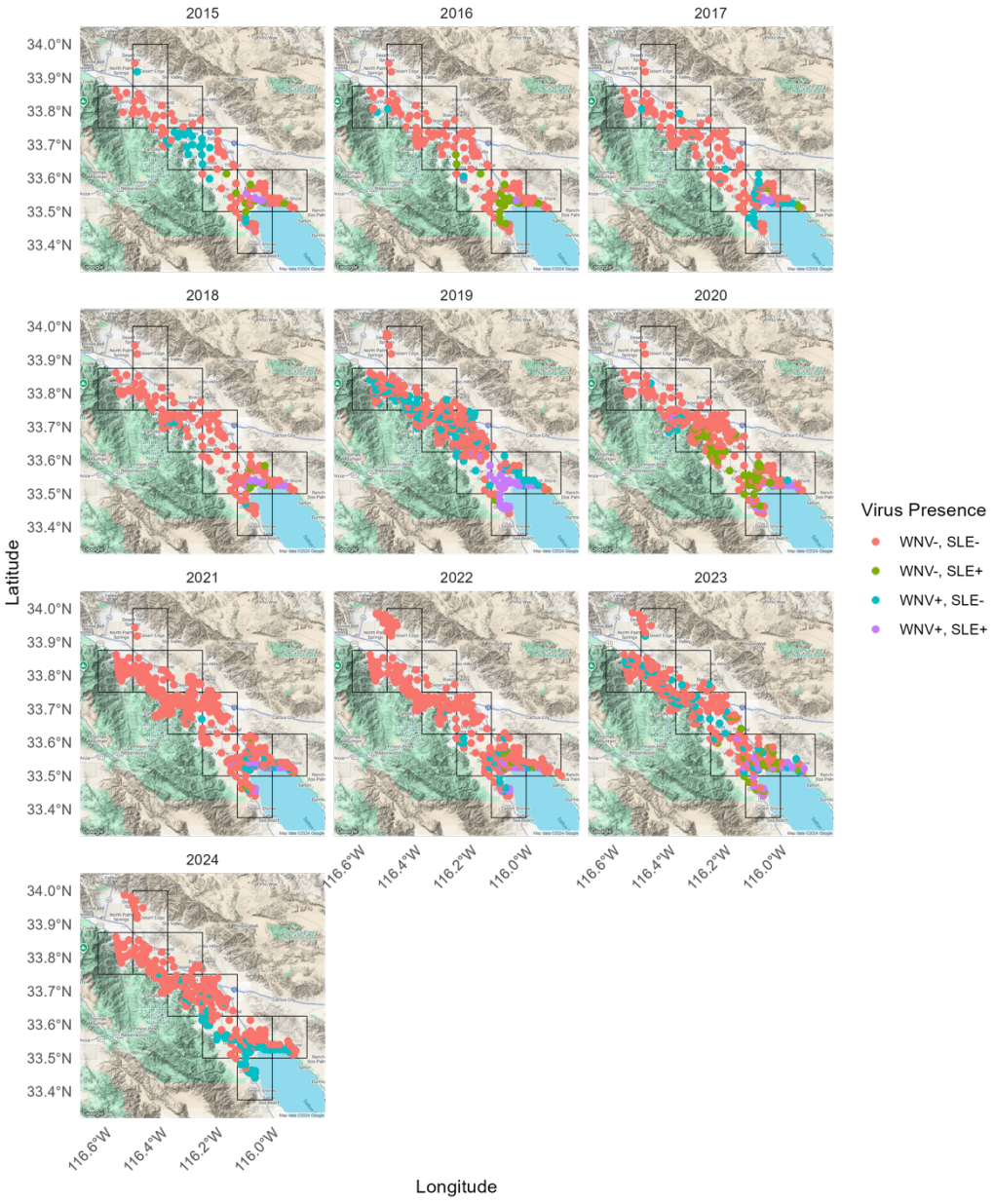


Figure 4. North American Land Data Assimilation System (NLDAS) grid cells (~13 km^2) with all historical trap locations and test status by year and virus (2015 - 2024). WNV-/SLE- (Red); WNV-/SLE+ (Green); WNV+/SLE- (Blue); WNV+/SLE+ (Purple).

Aim 2. Develop a multi-model inference system that combines a series of environmental conditions to generate a statistically informed model to make real time spatially refined predictions of SLE infection rates.

Building on Aim 1, we generated environmental groupings from a combination of hydrology and meteorological conditions to identify the most relevant combination of environmental conditions for viral amplification of SLE. We are using these environmental conditions to develop an inference system able to improve our current understanding of how meteorological and hydrological conditions over time influence SLE activity. Mosquito trapping data of *Cx. tarsalis* was used to calculate the annual SLE infection rate using the maximum likelihood estimate (MLE) at the North American Land Data Assimilation System (NLDAS) grid cells (~13 km^2) level (Figure 5).

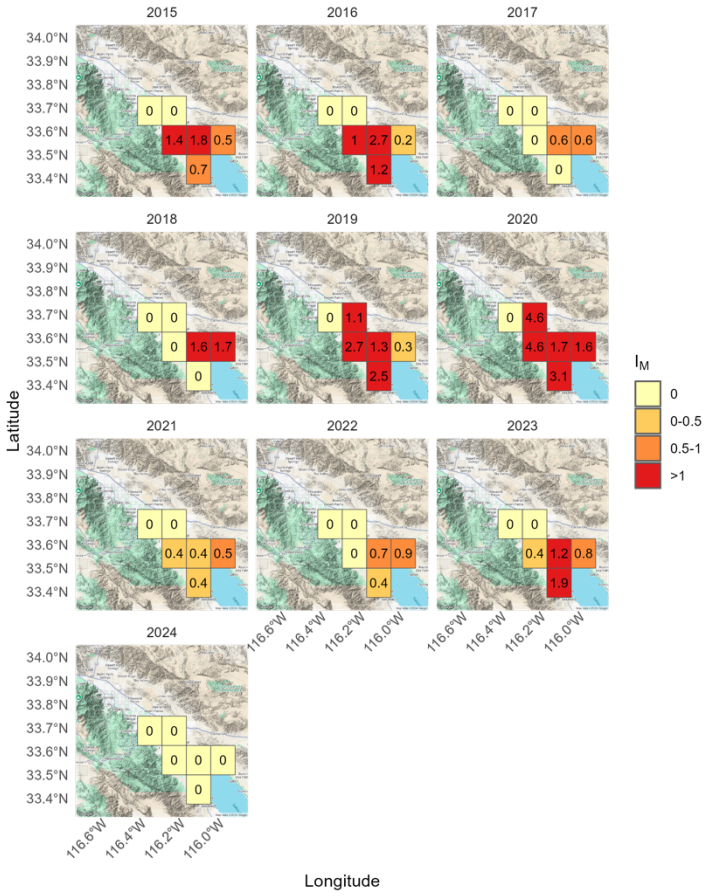


Figure 5. Annual SLE infection rate per 1,000 *Cx. tarsalis* mosquitoes tested (I_M) for 2015-2024 at the NLDAS scale (13 km^2 grid) in the Coachella Valley, CA.

Based on the historical absence of SLE in the Northern portion of the Coachella Valley we modeled out the Southern six grids using at the NLDAS spatial scale (Figure 5). Additionally, historically *Cx. tarsalis* is 89% of the SLE infected mosquitoes (Table 1), thus we evaluated our model of SLE with only *Cx. tarsalis*. We evaluated precipitation (PREC), relative humidity (RH), evapotranspiration (ET), and atmospheric temperature (TEMP). We employed a multi-model average prediction of different combinations of these meteorological and hydrological data. This multi-model inference system provides a formal probabilistic interpretation across the disparate

individual model predictions. This allows us to determine which models align with the ensemble, indicating an association between environmental conditions and the increased risk of SLE infection rates. The model results demonstrate that a cool wet winter, followed by a cool humid spring, and a warmer humid May, is associated with an increased risk of SLE (Figure 6).

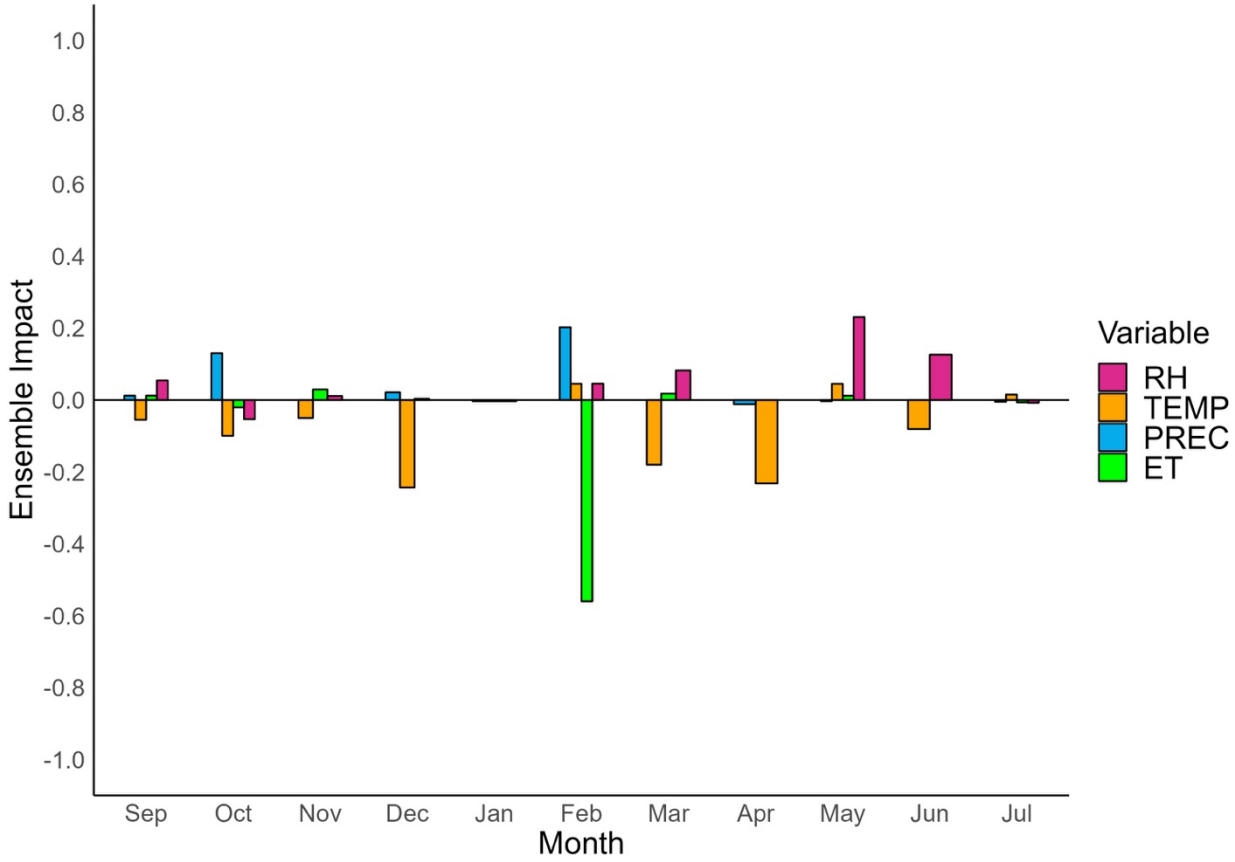


Figure 6. Effect and contribution of PREC (blue), RH (red), ET (green), and TEMP (yellow) to the ensemble model associated with the estimated change of I_M at the monthly NLDAS grid scale (0.125° or ~ 13 km^2) for 2015 - 2023. Bars indicate the weight and direction of deviation of RH, ATMP, PREC, and ET in the ensemble from the average that causes an increase in I_M.

Aim 3. Integrate models from Aims 1 & 2 predicting the probability of SLE infected mosquitoes into a web-based platform to better communicate the spatial risk of SLE and the ecological process driving increased risk.

Building on Aims 1 & 2 we have used our ensemble model results and both seasonal and geographical (NLDAS) scales to map the infection rate of WNV and SLE in the CV. To date Coachella Valley has had no positive SLE traps, but our annual multi-model inference forecast and weekly EAKF forecasts for WNV are below (Figures 8 - 11). We have integrated these forecasts into a Web-based platform and are currently building out this platform to include SLE.

Ensemble Forecast for 2024. We applied an environmentally informed ensemble to forecast the annual *Culex* mosquito WNV annual infection rates at a 13 km^2 resolution for 2024 in the Coachella Valley, CA. This forecast was generated in August of 2024 for using a multi-model inference system that was calibrated with data from 2006 to 2021 and forecast based on environmental data from November 2023 - July 2024 (Figure 8). The multimodel inference system was generated using a 4-parameter model, which accounted for all monthly combinations of evapotranspiration and atmospheric temperature from November to July. We used a combination of the best fitting models based on their goodness of fit (Akaike Information Criteria [AICc]), where all models with all parameters statistically significant were included. The AICc weights are calculated to include the top 95% of models. Four models were identified to provide a combination of environmental events that explain the environmental factors associated with WNV amplification in mosquitoes. These factors were a cooler than normal December, a drier than normal January, followed by a wetter than normal February, a warm April, and a cooler July. Retrospectively, this 4-predictor ensemble forecast was able to correctly predict if an area was above or below the annual infection rate greater than one infectious mosquito per 1,000 tested 80% of the time in 2022 & 2023. We generated monthly forecasts for 2024 annual mosquito infection rates to show how incorporating all environmental data from months prior to the listed forecast date impacts the predictions (Figure 8). The high temperatures in July of 2024, which were seen at the 99 percentile of July temperatures changed the progression of the 2024 WNV outbreak. As noted int the 2024 forecast when July was integrated into the model, our estimated annual infections dropped significantly relative to the forecast using data through April. We estimated 7 of the 10 NLDAS squares correctly in 2024.

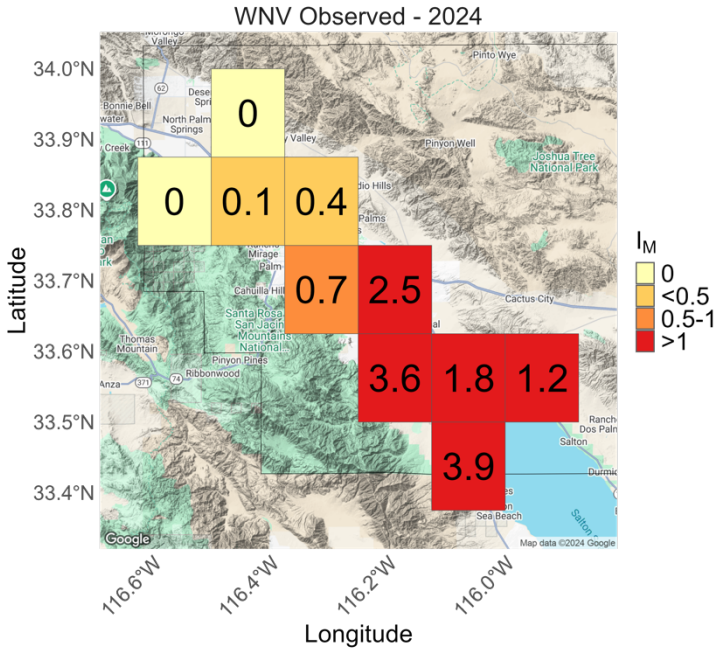


Figure 7. Observed WNV annual infection rate per 1000 mosquitoes tested for 2024 at the NLDAS scale (13 km^2 grid) in the Coachella Valley, CA.

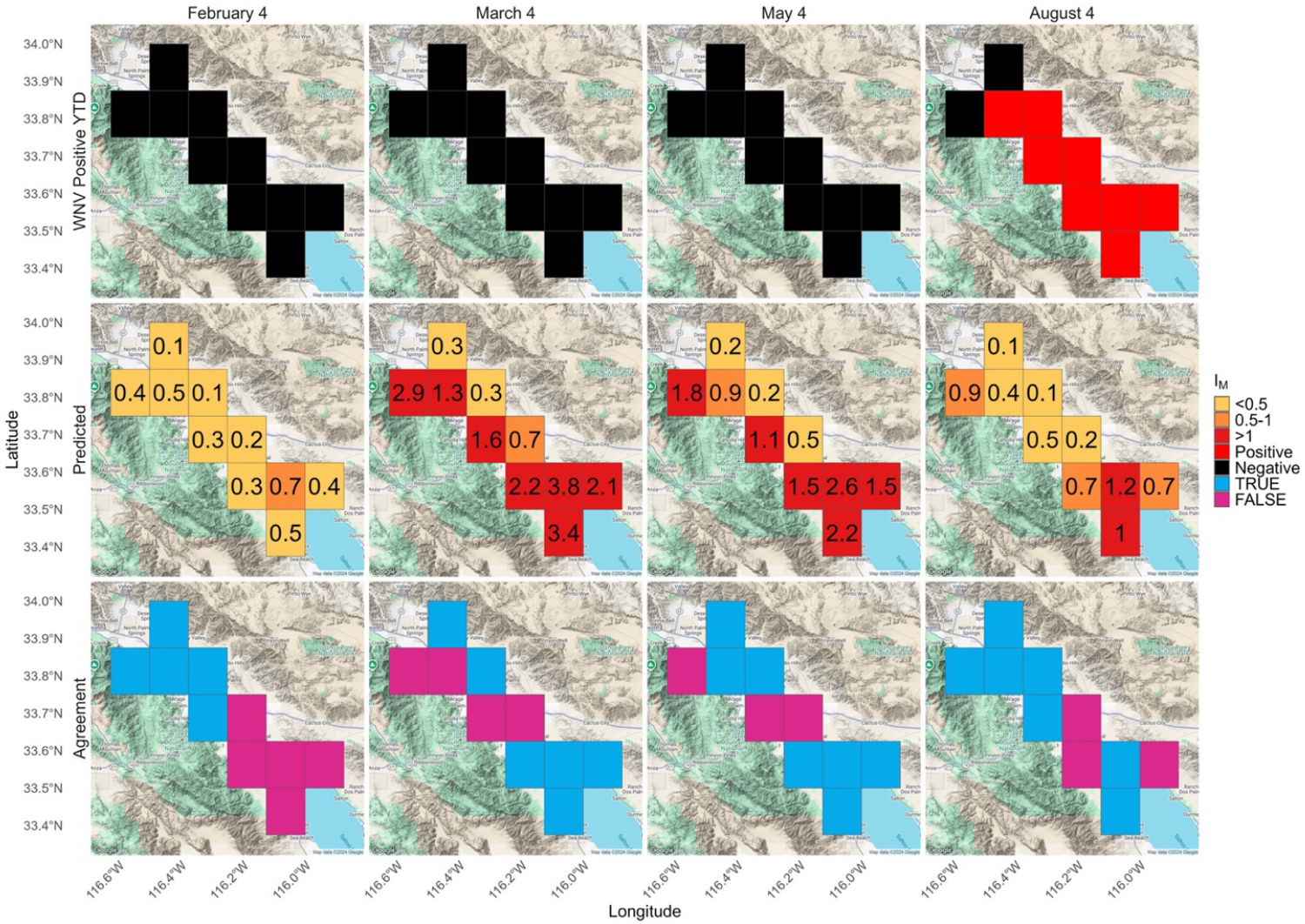


Figure 8. Real-time forecasting of WNV-infected mosquito pools from February- August of 2024 using available NLDAS environmental data (13 km^2) and the –parsimonious hierarchical negative binomial ensemble model. Row 1: Grid cells in which WNV was identified in the Coachella Valley mosquito population year to date (Red = WNV+, Black = WNV not identified). Row 2: Predicted annual I_M. Row 3: Cells where observed, and ensemble model predicted infection rates are in agreement based on the one infected mosquito per 1,000 tested threshold.

Real-Time EAKF Forecast for the Week of July 20, 2024. Here we present the July 20, 2024, CDC week 29, real-time ensemble forecast of *Culex* mosquito West Nile virus (WNV) infection rates and human cases of West Nile illness. This forecast was generated for Coachella Valley, CA, using mosquito infection and human case observations during 2024. A baseline model-inference forecasting system assimilates all reported observations to date prior to generating a forecast.

Due to the often-large reporting lag between the onset of illness and health department confirmation of a human case of WNV, we advise users that the current forecast system is a *beta* version under development. More work is being done to understand the impact associated with and how to account this reporting lag. Historically confirming human cases of WNV has taken from 2 to 14 weeks. This delay in data provision appears to degrade the real time forecasting accuracy of human WNV cases; however, the system still provides robust forecasts for infectious mosquitoes. In this report, we will present a prediction range for human cases and an expected probability for infected mosquitoes.

The baseline forecast model predicts that mosquito infection rates will peak the week of 15-Jun-2024 (week 24, -5 weeks in the future or 5 weeks ago), and during this peak week 6 mosquitoes per 1,000 tested will be infected. The model also forecasts 1 human cases (50 % PI: 0 - 1) in total during all of 2024 in Coachella Valley. The prediction interval over the next 4 weeks indicates a 50% likelihood there will be between 0 and 1 human cases. There is a 59% chance mosquito infection rates will peak within 1 week of 15-Jun-2024, week 24, and a 53% chance peak infection rates will be within ±25% of 6 mosquitoes per 1,000 tested. These low probabilities indicate high uncertainty in the current forecast.

The temperature forced forecast model predicts a 70% chance that mosquito infections rates will peak within ±1 week of 18-Jun-2024 (week 25, -5 weeks in the future) and an 57% chance that peak mosquito infection rates will fall within ±25% of 7 infected mosquitoes per 1,000 tested. The model also predicts 2 human cases (50% PI: 0 - 4) will be reported during 2024 and in the next 4 weeks a 50% chance of between 0 and 2 human WNV cases. 'The two models have diverged, the baseline model predicts that mosquito infection rates have peaked, while the temperature-informed forecast model estimates that the infection rate will peak at the end of the summer. The WNV outbreak this year may have a bimodal peak and is to early to predict what will happen in early fall.

At the end of the year we went back and evaluated the forecast accuracy. There were no human cases and 203 positive mosquito samples. Our model did a nice job of predicting the peak magnitude and timing of infected mosquitoes along with providing guidance on the total number of human cases. The forecast for July 20th, week 29, captured these dynamics, Figures 9 to 12. The temperature-forced model predicted higher infection rates and human cases than the baseline mode. The baseline model tends to do better in the desert ecology due to the high temperatures, resulting in overestimating the extrinsic incubation period because it underestimated vector survival. This is an area we are working on to improve the model dynamics.

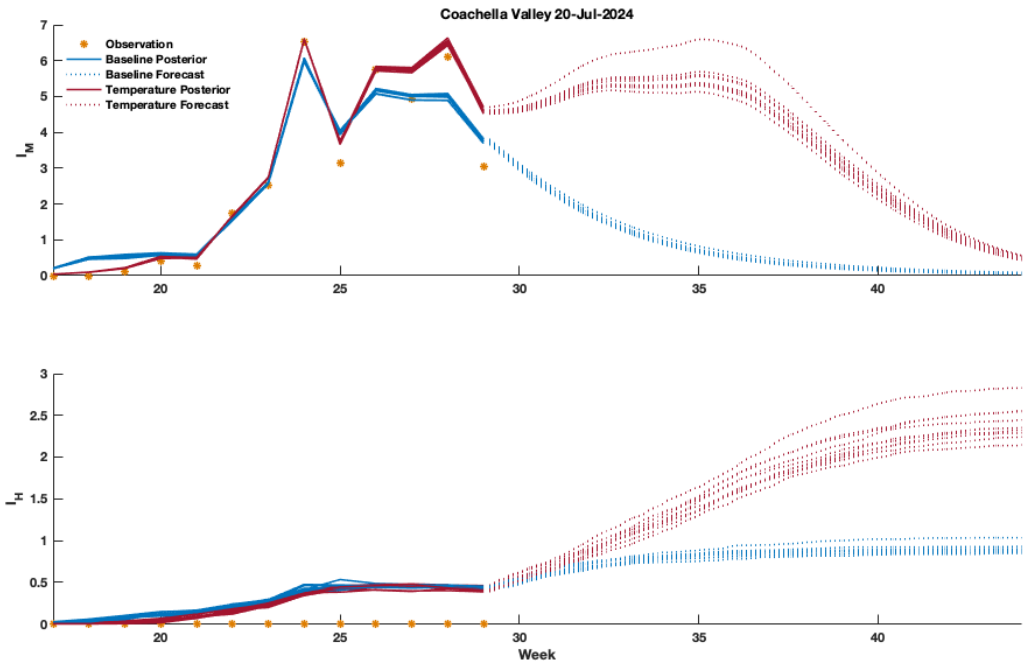


Figure 9. Forecasts generated for July 20th, 2024. Both the temperature-forced forecast (red) and a baseline model forecast (blue) are shown. The solid red lines are ensemble mean posterior distribution and the dotted red lines are the ensemble mean forecasts for the temperature-forced model. The solid blue lines are ensemble mean posterior distribution and the dotted blue lines are the ensemble mean forecasts for the non-temperature forced model. The gold *'s are data points assimilated into the model.

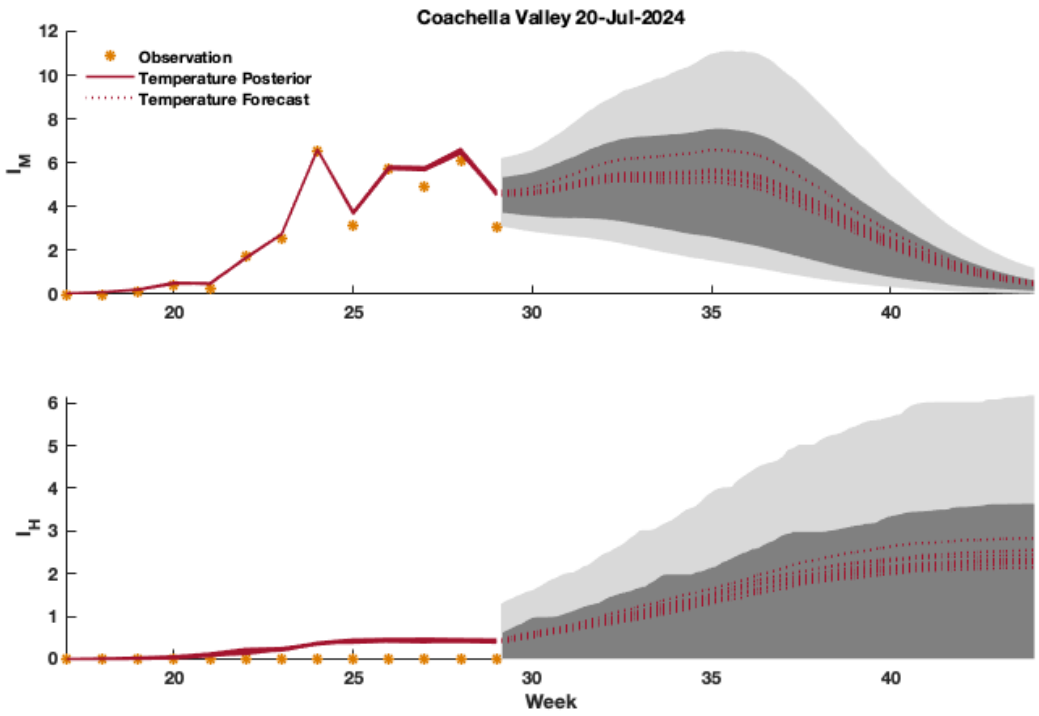


Figure 10. Temperature-forced forecasts of mosquito infection rates, I_M, and human WNV cases, I_H. The solid red lines are the ensemble mean posterior distribution and the dotted red lines are the ensemble mean forecasts. The grey area is the spread of the ensemble forecast (light grey represents the area between the 10th and 90th percentiles and the darker grey area represents the spread between the 25th and 75th percentiles, i.e. the 50% prediction interval); gold *'s are data points assimilated into the model.

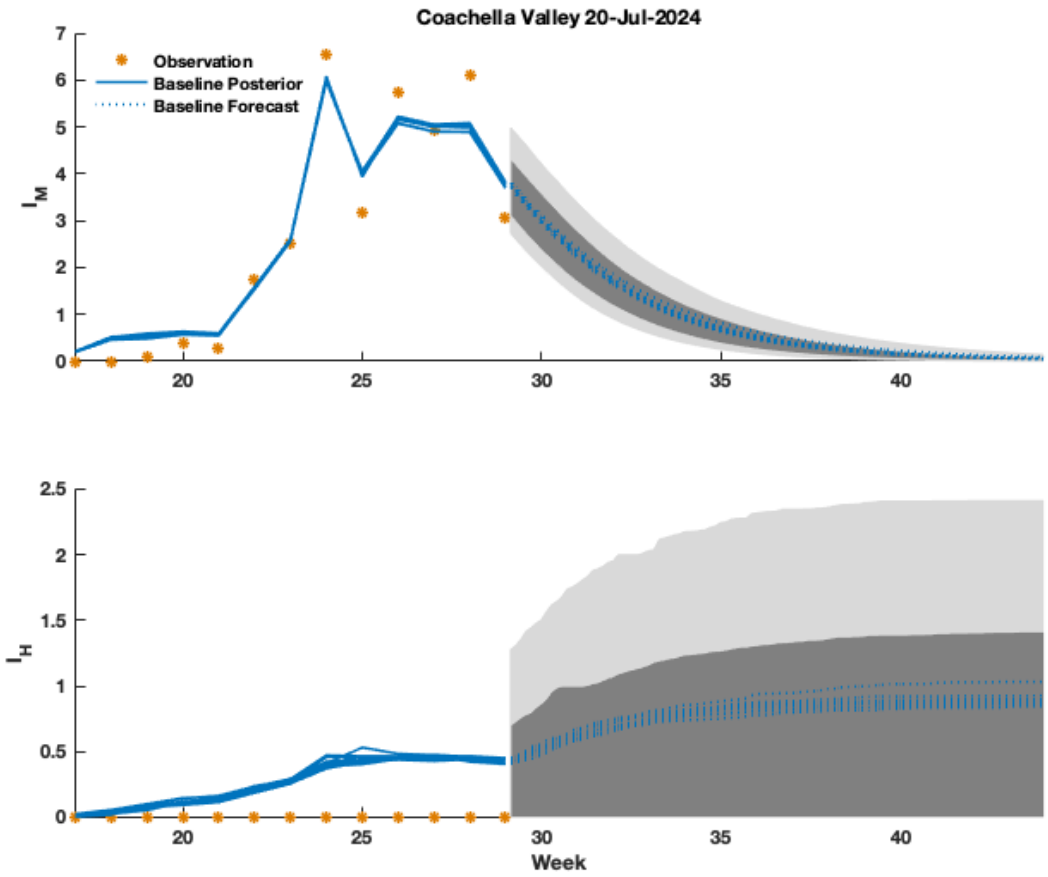


Figure 11. Baseline model forecasts of mosquito infection rates, I_M, and human WNV cases, I_H. The solid blue lines are the ensemble mean posterior distribution and the dotted blue lines are the ensemble mean forecasts. The grey area is the spread of the ensemble forecast (light grey represents the area between the 10th and 90th percentiles and the darker grey area represents the spread between the 25th and 75th percentiles, i.e. the 50% prediction interval); gold *'s are data points assimilated into the model.

Web Application for Data and Forecast Visualization. We are currently finalizing an R Shiny App for mosquito and environmental data visualization, as well as WNV forecast visualizations at county and NLDAS spatial scales. Users can log in at:

https://rstudio-connect.hpc.mssm.edu/cv_wnv_forecast_viz/
Username: COAV_WNV
Password: WNV_forecast_CV_2024

Users will be able to simulate how future environmental conditions will affect the annual WNV infection rate prediction (Figures 12 & 13). The application is undergoing final testing and should be available online for end-user testing in the spring of 2024. We are also working to build out the application to include SLE forecasts.

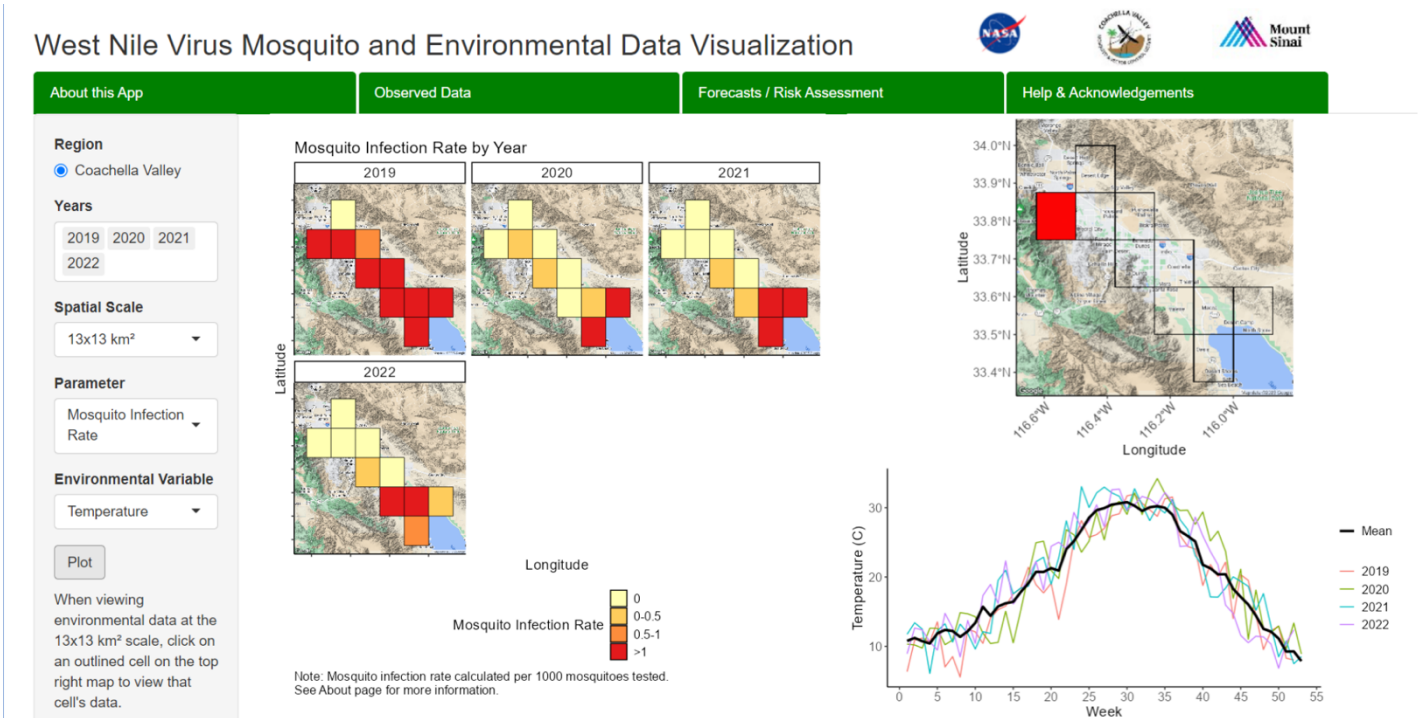


Figure 12. Mosquito and environmental data visualization at 13x13km^2 (NLDAS) spatial scale. **Left:** Sidebar with user inputs for plot generation. **Center:** Mosquito WNV mosquito infection rates by NLDAS cell for 2019 - 2022. **Right:** Weekly mean 2-meter atmospheric temperature in 2019 - 2022 for the selected NLDAS cell (red) and overall weekly mean atmospheric temperature for the selected NLDAS cell (black line).

Figure 13. Real-time 2024 forecast of mosquito WNV infection rates (I_M) at the NLDAS spatial scale. **Left Sidebar:** User inputs for plot generation. **Top:** Forecast map of annual 2024 predicted mosquito WNV infection rate (I_M) by NLDAS cell. **Row 2:** Baseline and updated monthly forecasts of I_M as environmental data becomes available. **Row 3.** Environmental data assimilated into the ensemble model for monthly forecasts in Row 2. **Bottom:** Effect and contribution of ET and ATMP to the ensemble model associated with the estimated change of I_M at the monthly NLDAS grid scale (0.125° or ~ 13 km^2) for 2006 - 2021. Bars indicate the weight and direction of deviation of atmospheric temperature (ATMP, pink) and evapotranspiration (ET, blue) in the ensemble from the average that increases I_M.

General Outcomes

This project has resulted in two conference presentations, the development of a prototype version of web-based application for WNV/SLE infection forecasting in mosquitoes, a Springer-Nature book chapter, and a manuscript published in AGU's GeoHealth.

Deliverables and accomplishments

- Developed 13 km^2 environmentally informed forecasts and compared to annual WNV infection observations in real time in 2024 for months available
- Generated weekly Coachella Valley, CA WNV forecasts
- Evaluated the WNV and SLE viral interactions developing temporal and spatial maps
- Presented at EEID, Stanford CA, June 2024
- Develop 13 km^2 environmentally informed forecasts and compared to annual WNV infection observations in real time in 2024 for months available
- Forecasting has been accurate for 76% of predictions from 2022 to 2024
- Manuscript published in AGU's GeoHealth
- Developed prototype web-based Shiny application

Publications, Submitted Manuscripts, Manuscripts in Preparation, Presentations

- Patel, Aman, Matthew J. Ward, Sunita Dewpal, Nicholas DeFelice. *Communicating arboviral forecast models: A decision tool for West Nile & St. Louis Encephalitis virus transmission.* Poster Presentation. American Society for Tropical Medicine and Hygiene. New Orleans, Louisiana. November 15, 2024.
- Ward MJ, Sorek-Hamer M, Henke JA, Patel A, DeFelice NB. *A Spatially Resolved and Environmentally Informed Forecast Model of West Nile Virus in Coachella Valley, California.* Ecology of Evolution of Infectious Disease, Stanford, CA, June 26, 2024.
- Ward MJ, Sorek-Hamer M, Henke JA, Little E, Patel A, Shaman J, Vemuri K, DeFelice NB. *A Spatially Resolved and Environmentally Informed Forecast Model of West Nile Virus in Coachella Valley, California.* Geohealth. 2023 Dec 7;7(12):e2023GH000855. doi: 10.1029/2023GH000855. PMID: 38077289; PMCID: PMC10702611.
- Ward, Matthew J., Meytar Sorek-Hamer, Yuxuan Chen, Jennifer Henke, Aman Patel, Nicholas DeFelice. *Disparities in risk of West Nile virus transmission in Coachella Valley, CA.* Poster Presentation. International Society for Environmental Epidemiology. OSU, Corvallis, Oregon. June 20, 2023.
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Prospects

We are in the final phase of running models to developing an environmentally forced forecasts system for WNV & SLE that maximizes our understanding how meteorological conditions are most appropriate for WNV/SLE amplification in the Coachella Valley. We will use this fine scale to develop an understanding of the temporal role climatic and hydrological parameters play in WNV/SLE transmission. We will then generate environmentally informed early season risk forecast maps. Additionally, we will continue development of a web-based tool allowing for real time visualization of risk driven by our ensemble model system.

Table 2. Project timeline.

	Year 1			
	Q1	Q2	Q3	Q4
Task #1				
Epidemiological disease transmission model of the zoonotic transmission of WNV/SLE				
Task #2				
Develop downscaled weights for NLDAS grid and EAKF & Ensemble models				
Task #3				
Verify decision support system complete. Implement in real time. Integrate into Shiny Application.				

Year-End Report, December 2024: Restricting Mosquito Use of Underground Storm Drain Systems in the Coachella Valley by Application of Botanical Repellents

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Objectives: *Identify effective spatial repellent treatments for mosquito abatement in the underground storm drain system (USDS) of the Coachella Valley. We aim to prevent mosquito resting and oviposition within USDS chambers using botanical repellents.*

Specifically, this project will:

1. Determine the relative efficacy and optimal concentration of repellents that achieve spatial repellency against Culex quinquefasciatus mosquitoes in cage-scale laboratory assays, with outcomes projected to the USDS environment.
2. Assess the synergistic effects of multiple repellent combinations.
3. Evaluate the impact of water samples containing volatile organic compounds (VOCs) naturally present within USDS chambers on the efficacy of these repellents.

Introduction

Mosquito-borne diseases continue to pose a profound and persistent threat to global health, annually claiming over a million lives and debilitating millions more through illnesses such as malaria, dengue, Zika, and West Nile virus. These diseases exact not only a devastating toll on human health but also impose considerable socioeconomic burdens, particularly in tropical and subtropical regions (Achee et al., 2012). Rapid urbanization has compounded this challenge, as human-engineered environments inadvertently create ideal breeding grounds for mosquitoes. Among these, Underground Storm Drain Systems (USDS) have emerged as significant yet underappreciated habitats for mosquito proliferation. These subterranean networks, characterized by dark, humid, wind-protected conditions and often containing stagnant water, are particularly conducive to the survival and reproduction of *Culex quinquefasciatus*, a principal vector of West Nile virus and lymphatic filariasis (Strickman & Lang, 1986; Reisen et al., 1990; Suman et al., 2022).

The intricate vulnerability of urban landscapes is vividly illustrated by the role of USDS in sustaining mosquito populations. Designed to manage stormwater and runoff in urban areas such as southern California, these systems often hold stagnant pools of runoff water, providing optimal developmental and resting sites for mosquitoes. This dynamic is particularly pronounced for *Cx. quinquefasciatus*, whose remarkable adaptability to polluted environments allows it to exploit these urban refuges (Wangai et al., 2020). As an opportunistic feeder on both humans and animals, *Cx. quinquefasciatus* functions as an efficient bridge vector for zoonotic diseases, posing an acute challenge to public health (Sutthanont et al., 2022). Consequently, mosquito production within USDS exacerbates nuisance issues and significantly amplifies the risk of arbovirus transmission (Strickman & Lang, 1986; Reisen et al., 1990; Su et al., 2002).

Managing mosquito populations within USDS presents unique and multifaceted challenges. These systems often deliver untreated water directly to natural water bodies, limiting the applicability of conventional insecticides. Additionally, the dynamic hydrology of USDS frequently flushes away larvicides, while high organic content compromises the efficacy of microbial agents (Des Lauriers et al., 2006; Mulla et al., 1986). While physical barriers and insecticides such as Bti and pyriproxyfen have been explored, their success has been inconsistent, often constrained by water replacement rates and organic interference (Mian et al., 2020; Mian et al., 2017). Furthermore, the reliance on chemical insecticides for mosquito control has become increasingly untenable, as excessive use has led to widespread resistance in mosquito populations, eroding the efficacy of organophosphates and pyrethroids (Bisset et al., 1990; Low et al., 2013; Peiris et al., 1993; Suman et al., 2022). This escalating resistance underscores the imperative for innovative and sustainable alternatives in vector control.

Spatial repellents (SRs) offer a transformative approach to mosquito management by altering mosquito behavior rather than relying on direct lethality. These SR compounds emit volatile chemicals that disrupt host-seeking, resting, and/or oviposition behaviors, thereby reducing human-vector interactions (Achee et al., 2012; Fongnikin et al., 2024; Swai et al., 2023). SRs have demonstrated significant efficacy against *Cx. quinquefasciatus*, with notable reductions in feeding and resting activities (Sathantriphop et al., 2015). While synthetic SRs such as transfluthrin and metofluthrin have shown promise, the growing interest in botanical repellents reflects an increasing emphasis on environmental sustainability (Peach et al., 2019).

Botanical essential oils (EOs) stand out as compelling alternatives to synthetic compounds due to their rich composition of bioactive compounds such as terpenoids, phenols, and aldehydes. These compounds offer robust mosquito repellency while minimizing environmental impact. For instance, citronella oil has achieved repellency rates exceeding 90% against *Cx. quinquefasciatus*, and peppermint oil demonstrates both larvicidal and repellent properties (Ansari et al., 2000; Nerio et al., 2010; Ramar et al., 2017). Recent studies have also highlighted the synergistic potential of EO combinations, such as lemongrass and cinnamon bark oils, which effectively reduce human-vector contact in field trials (Peach et al., 2019). Despite these advances, the application of spatial repellents to manage mosquitoes in complex urban systems like USDS remains largely uncharted. The volatile organic compounds (VOCs) emitted from decomposing organic matter in USDS may interact with repellent chemicals, potentially modulating their efficacy (Suman et al., 2022). Investigating these interactions is essential to optimizing repellent performance in such challenging environments.

This study systematically evaluates the efficacy of spatial repellents in simulated USDS conditions through three primary objectives. First, it quantifies the spatial repellency of botanical and synthetic repellents using controlled assays to assess behavioral effects on mosquitoes. Second, it examines synergistic interactions between repellents to determine whether combinations enhance efficacy. Third, it explores the influence of VOCs emanating from USDS water on repellent performance, addressing critical environmental factors.

By integrating robust experimental methodologies with an environmentally conscious framework, this study aims to redefine mosquito control strategies in urban settings. The findings are intended to inform evidence-based public health policies, mitigate mosquito-borne disease transmission, and promote ecological sustainability. By focusing on the potential of botanical spatial repellents, this research addresses the pressing need for effective and sustainable mosquito control solutions tailored to urban environments.

Materials and methods

Mosquito rearing: The mosquitoes used in this study (*Culex quinquefasciatus*) were laboratory-reared from a strain collected from the Coachella Valley. Colonies were maintained under controlled laboratory conditions, including a temperature of 26 ± 1°C, relative humidity of 70 ± 10%, and a 12:12 light-dark cycle. Adult females aged 5–9 days, nulliparous, non-blood-fed, and sugar-fed, were selected for experiments to standardize responses. Mosquitoes were deprived of sugar but provided water for 12 hours prior to assays to enhance their behavioral responsiveness to repellents. Mosquitoes were chilled before being transferred to the assay chambers to facilitate handling.

Repellent compounds: The study evaluated a range of repellents, including botanical oils (citronellol, geraniol, eugenol, and cinnamaldehyde), essential oil mixtures (peppermint and geranium oil) and positive controls (0.25% pyrethrum extract with >50% pyrethrins and DEET). Botanical oils were selected based on prior published evidence of their efficacy against mosquitoes and were acquired commercially. To ensure consistent chemical properties, all repellents were confirmed for purity through gas chromatography-mass spectrometry (GC-MS). Mineral oil was used as a negative control. Combinations of individual repellents were also tested to identify potential synergistic interactions that might enhance their efficacy.

Excito-repellency assay: Repellent efficacy was assessed using a modified excito-repellency chamber based on Roberts et al. (1997). The assay chamber included two compartments: a repellent cage and an escape cage, with the two cages connected by a 6-inch diameter PVC pipe (Figure 1). The top of the repellent cage contained five slots to hold 15 ml plastic tubes that were perforated along the upper half of the tube to allow release of volatiles from compounds within each tube. The tubes either remained empty (dummy tube) or contained a cotton wick saturated with approximately 6 mL of a single repellent compound (volatile release tube). Airflow from a vinyl tubing circuit connected to each tube with a mean flow rate of 0.7 m/s measured over 40 seconds per connector ensured consistent volatile distribution into the repellent cage. The repellent cage was covered with plastic wrap to concentrate volatiles, while the escape cage remained uncovered. For additional details of this assay design, please refer to the Mid-year Report (submitted in June 2024).

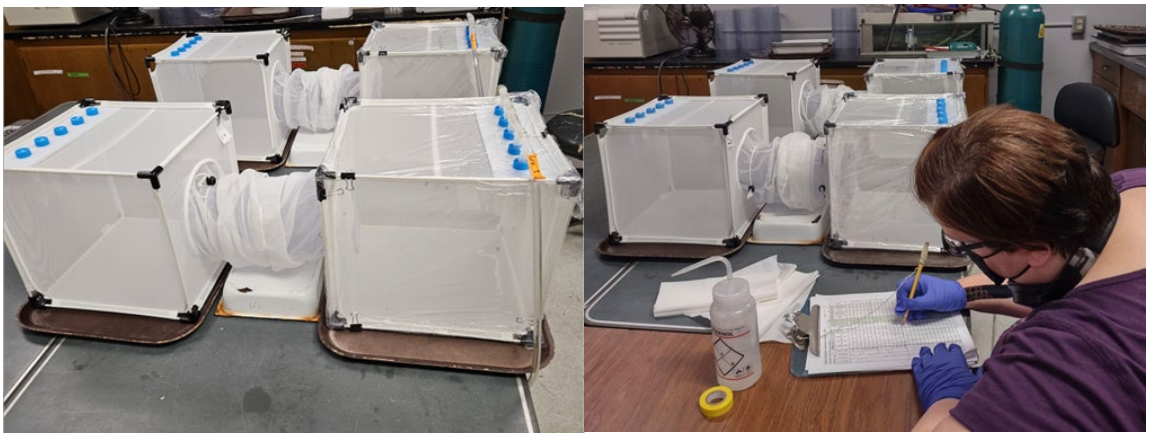

Figure 1. Assay chamber for repellent testing: Left image - Adult mosquitoes moved freely between repellent (right) and escape (left) cages via a connected PVC pipe. Right image - A spatial repellency trial being conducted in the laboratory.

For each assay, 30 female mosquitoes were introduced into the repellent cage and acclimated for 5 minutes. The repellent treatment was then initiated by replacing dummy tubes with 1-5 volatile release tubes. Mosquito behavior and location were observed at 1, 5, 10, 20, 30, and 40 minutes. Observations included mosquito position across six areas (four quadrants within the repellent cage, within the escape port, and within the escape cage), level of excitatory activity (e.g., flying or walking), and evidence of knockdown effect. At the end of the assay, mosquitoes were transferred to clean containers and monitored for mortality after 24 hours.

To evaluate synergistic effects, combinations of the most promising individual repellents were tested. Individual repellents were placed into separate volatile release tubes to prevent interactions in the liquid phase. Assays monitored mosquito escape rates to determine additive or synergistic effects. Different combinations of repellents were tested across multiple replicates to ensure statistical robustness.

Data Analysis: Escape rates in excito-repellency testing were evaluated using survival analysis with Cox proportional hazards models to account for time-dependent variations in mosquito behavior. Synergistic effects were assessed using generalized linear models (GLMs) incorporating interaction terms to detect additive or multiplicative effects. Post hoc pairwise comparisons were conducted using Tukey's test with p values adjusted for multiple comparisons. All analyses were conducted using R (version 4.2.2), with statistical significance set at $p < 0.05$ to ensure rigorous evaluation of results.

Results: The percentage of mosquitoes escaping from the release chamber varied significantly across treatments and demonstrated a concentration-dependent effect. Repellency increased with higher exposure to eugenol, with escape rates rising progressively from 1 tube to 3 tubes to 5 tubes (Fig. 2A). The highest escape rates were observed with eugenol (3 and 5 tubes) and geraniol (5 tubes), indicating strong spatial repellency effects. In contrast, the control treatment with mineral oil consistently showed the lowest percentage of escape, serving as the baseline for repellency in the assays (Fig. 2A).

Walking behavior was more prominent in treatments with peppermint (3 and 5 tubes), geranium (5 tubes), and combinations of peppermint and eugenol (Fig. 2B). These treatments showed higher percentages of mosquitoes walking within the release cage rather than escaping, indicating a partial repellent effect. This suggests that while these oils influenced mosquito activity, they did not consistently trigger escape behavior. In contrast, the control treatment with mineral oil exhibited minimal walking behavior, indicating that the absence of repellents led to lower mosquito activity, with mosquitoes predominantly resting in the release cage (Fig. 2B).

The percentage of walking behavior provides valuable insight into how a spatial repellent influences mosquito movement. Higher walking percentages suggest that mosquitoes are disturbed by the presence of the volatile compound but are not sufficiently repelled to leave the chamber. This may indicate a partial repellent effect, where the repellent disrupts mosquito behavior but does not overcome the threshold needed to prompt escape or that the repellent prevents mosquitoes from taking flight, which is a key precursor to escape. A high walking percentage, coupled with a low flying percentage, may indicate that the repellent is effective at grounding mosquitoes, reducing their likelihood of escaping the treated area. Alternatively, increased walking behavior can suggest that mosquitoes are irritated/disturbed by the treatment but that this irritation does not rise to the level of directed repellency.

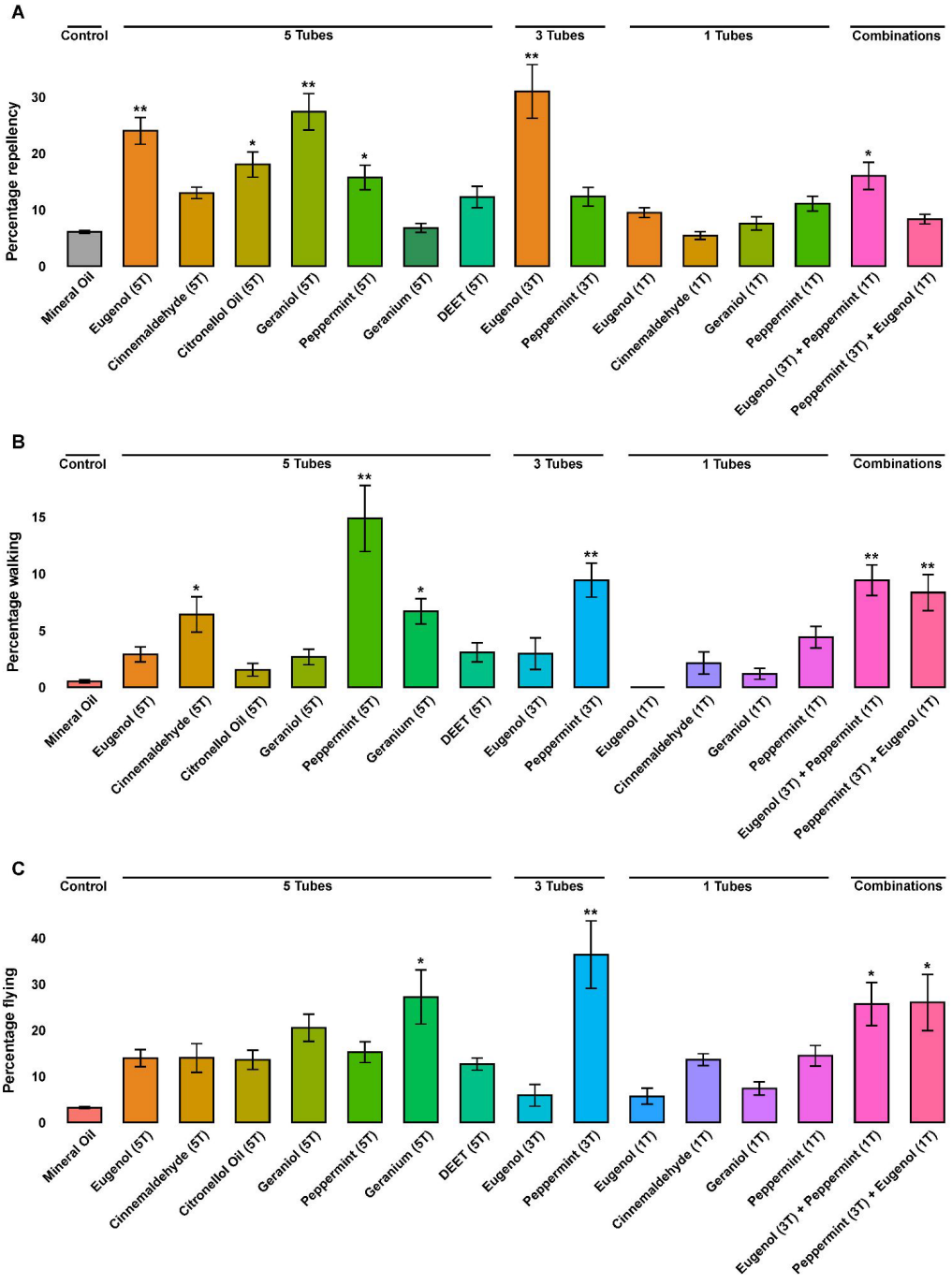

Figure 2. Spatial repellent effects of botanical oils on mosquito behavior. A) Percentage of mosquitoes escaping from the release chamber across treatments, indicating spatial repellency. **B)** Percentage of mosquitoes exhibiting walking behavior, reflecting partial repellency or agitation. **C)** Percentage of mosquitoes exhibiting flying behavior, suggesting agitation rather than escape. Error bars represent the standard error of the mean (SEM), and asterisks indicate statistically significant differences compared to Mineral oil (control) ($p < 0.05$).

Interestingly, the combination of eugenol (3 tubes) and peppermint (1 tube) was repellent, but resulted in lower escape rates compared to the same concentration of eugenol alone (3 tubes) without the peppermint oil. Additionally, the combination of peppermint (3 tubes) and eugenol (1 tube) had no significant spatial repellency effect (Fig. 2A). This could be attributed to behavioral interference, where peppermint's agitation effect masks or counteracts eugenol's escape-inducing signals, leading to increased mosquito activity (walking and flying) within the release cage rather than successful escape. This combination may also overstimulate mosquito sensory receptors, causing confusion and reducing their ability to process repellent cues effectively.

The percentage of mosquitoes exhibiting flying behavior also varied across treatments. Significant flying activity was observed in assays with peppermint (3 tubes), geranium (5 tubes), and combinations of peppermint and eugenol (Fig. 2C). These treatments caused mosquitoes to remain active and fly within the release cage, despite not escaping the repellent treated cage.

Walking and flying behaviors provide valuable insights into how spatial repellents influence mosquito activity. A high percentage of walking or flying, coupled with a low percentage of escape, suggests agitation or excitation rather than a directed escape response. This behavior may reflect a dose-dependent effect, where volatile concentrations fall below the critical threshold needed to induce escape or knockdown. At these sub-optimal doses, the repellents may disrupt mosquito behavior without providing a clear directional cue, prompting mosquitoes to engage in increased undirected movement within the chamber. This exploratory behavior likely reflects an attempt to locate microhabitats to avoid the irritant, rather than a directed escape from the treated area. Conversely, a low percentage of flying coupled with a high percentage of escape indicates effective spatial repellency with directed movement, where the repellent drives mosquitoes out of the exposure chamber with minimal agitation or disturbance.

Understanding the balance between walking, flying, and escape behaviors is essential when evaluating the effectiveness and dose-dependent effects of spatial repellents. A combination of these metrics can help distinguish between agitation-based responses and true spatial repellency, providing deeper insights into how different oils influence mosquito activity and resting behavior in treated environments, such as USDS chambers.

Discussion: This study successfully evaluated the effectiveness of various botanical oils as spatial repellents for potential use in mosquito abatement within the Coachella Valley's underground storm drain systems (USDS). Laboratory assays demonstrated that several botanical oils induced spatial repellency in *Culex quinquefasciatus* mosquitoes compared to the negative control (mineral oil). In particular, eugenol and geraniol were highly effective at driving mosquitoes to escape from treated areas, showing significant spatial repellency. Peppermint oil and combinations of peppermint and eugenol also showed significant repellency, though their primary effect appeared to be increased mosquito activity rather than directed escape.

The data revealed a clear dose-response relationship for all botanical oils tested, with increasing volatile concentrations resulting in progressively greater spatial repellency. The highest escape rates were observed with eugenol and geraniol at 3-5 tube concentrations, indicating their potential as strong spatial repellents in enclosed environments like USDS chambers. In contrast, peppermint oil and cinnamaldehyde primarily caused agitation, reflected by increased walking and flying behaviors rather than escape. Notably, combining eugenol and peppermint oil in a 3:1 ratio enhanced excitatory behavior relative to either oil alone, suggesting a synergistic effect. However, reversing this ratio to 1:3 (eugenol:peppermint) did not yield additional benefits beyond peppermint oil alone.

These findings emphasize the importance of understanding both escape behavior (a direct indicator of spatial repellency) and excitatory behavior (walking or flying) when evaluating the efficacy of spatial repellents. While escape behavior directly reduces mosquito presence in treated areas, increased mosquito activity may also reduce resting behavior and potentially impact mosquito survival by increasing energy expenditure. This dual action could be particularly valuable in reducing mosquito populations in enclosed environments such as USDS chambers, where mosquitoes seek shelter from harsh outdoor conditions. The increase in mosquito activity, and likely associated decrease in mosquito survival, could be especially useful to limit transmission of arboviruses that require mosquitoes to survive a virus extrinsic incubation period in otherwise harsh outdoor environmental conditions.

Recently conducted assays focused on evaluating the potential interaction between botanical oils and volatiles emanating from water samples collected from USDS chambers have also been performed and are awaiting statistical analyses. These experiments will help determine whether compounds naturally present in USDS water interfere with the spatial repellency effects observed with botanical oils. Mosquito behavior will be assessed in the presence of botanical oils alone, water samples alone, and a combination of both to identify any synergistic or antagonistic interactions that may alter escape, walking, or flying behaviors. These tests will provide insight into whether USDS water volatiles affect the efficacy of botanical oils as spatial repellents and help refine strategies for optimizing the use of repellents in real-world USDS environments. Understanding these interactions will be critical to improving the application of botanical oils in field settings to achieve effective mosquito control.

In conclusion, the results of this study demonstrate that botanical oils, particularly eugenol and geraniol, have strong potential as environmentally friendly spatial repellents. Combining highly repellent oils with those that increase mosquito activity, such as peppermint oil or cinnamaldehyde, may provide a more comprehensive approach to mosquito control by both driving mosquitoes out of treated areas and reducing the likelihood of mosquitoes resting within the treated environment. These insights underscore the importance of developing sustainable mosquito management practices to mitigate the risks associated with mosquito-borne diseases in urban settings.

Additional field studies utilizing the tested spatial repellent compounds should be performed to evaluate the impact of these compounds to reduce mosquito use of USDS in natural field settings. Compounds shown to induce spatial repellency when used in combination with compounds shown to increase mosquito activity and decrease mosquito resting may provide the greatest reduction in mosquito use of USDS, leading to reduced populations of mosquitoes in areas with treated USDS.

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Semiannual Research Progress Report #2 for CVMVCD grant:

Determining a fast-acting treatment for the rapid elimination fire ant colonies

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December 31, 2024

Summary of Activity January 2024 through December 2024.

The goal of the proposed 2-year (2024–25) project is to determine an implementable method to rapidly eliminate red imported fire ant (fire ant) colonies in urban landscapes. A fast-acting fire ant mound treatment would complement the CVMVCD's fire ant baiting program by adding to the District's ability to respond effectively when the fast elimination of visible fire ant colonies in public facing areas is needed. The specific objective in 2024 was to: *Determine the time to colony death of after spraying fire ant nests with non-repellent insecticides in Florida.*

- In 2024 (year 1) two field trials were conducted where the non-repellent insecticides with the active ingredients dinotefuran and indoxacarb showed promising results. The first trial occurred during a dry spell with minimal rain and high temperatures that started soon after the treatments were applied. During the second trial, there were frequent afternoon thundershowers and a tropical storm after treatments were applied. Results under the dry and wet conditions yielded less consistent results with the indoxacarb and dinotefuran, respectively. These varying rainfall extremes most likely affected colony splitting and movement.

- Trial 1 resulted in the elimination of all fire ant colonies treated with dinotefuran insecticide (Alpine WSG). Of the 11 treated nests (mounds), all were inactive 1–5 days after treatment. None of the dinotefuran treated colonies split or moved to new locations. The indoxacarb (Advion WDG) treatment had colonies moving or splitting in 4 of the 5 mound clusters which resulted in an addition of 4 mounds by the end of the study. Half of the 14 monitored mounds were active at the end of the study. In contrast, over 80% of the control mounds remained active, with mounds splitting in one cluster. The sum of the Population Indices (PIs) per cluster for the dinotefuran and indoxacarb treatments were significantly lower than the controls.

- In Trial 2 the dinotefuran treatment had 6 new mounds appear, probably due to colony splitting or moving from an original mound. At the end of the study, 19% (3/16) of the mounds in the dinotefuran clusters were active. Of the original mounds that received the dinotefuran sprays 50% (5/10) were inactive by day 4. In the indoxacarb treatment, colonies also split/moved resulting in the appearance of 4 additional mounds. Of the original treated mounds, 8 of 10 were rated as inactive by day 4. When the trial ended, 14% of the mounds were active. The control mounds had an increase of 10 mounds from the original 7 mounds. When the study ended, 53% (9/17) of the control mounds were active. The final sum of the

PIs per cluster for the dinotefuran and indoxacarb treatments were significantly lower than the controls.

##

Brief Background

Unlike traditional contact insecticides which are repellent to fire ants, the non-repellent insecticides are not detected by fire ants as evidenced by fire ant tunnelling in treated soil (DHO unpublished data). This results in more fire ant contact with the insecticide. In contrast, fire ants will avoid or move out of soil treated with repellent insecticides (e.g., bifenthrin). Based on our data and observations of nursery stock (i.e., ball and burlap root balls) treatments against fire ants, we hypothesized that spraying the surfaces of fire ant mounds in the field with non-repellent insecticides (e.g., dinotefuran, indoxacarb) will result in colony death within a week.

- **Objective: Speed of fire ant colony death with non-repellent insecticides applied to nests in Florida.**

Methods

Experimental design: Trials were conducted in Gainesville, Florida on May 22 – June 7 and July 22 – Aug. 7, 2024, to determine the time required for the non-repellent insecticides containing either dinotefuran or indoxacarb to inactivate red imported fire ant colonies. Testing was conducted on field colonies with sizes estimated by mound dimensions (sum of maximum length and width), fire ant activity, and population index ratings. We used the population index (PI) method of Lofgren and Williams (1982) which estimates of the number of adult worker ants and records the presence or absence of brood in nests (mounds) by assigning a numerical rating of 1–25 for each mound. Mounds with any worker brood present received PI ratings of 5, 10, 15, 20, or 25, depending on the number of workers in the mound. We modified the PI method by assigning a rating of zero to a mound when live ants were not present. Thus, PIs ranged from 0 to 25 (Table 1). For 14 consecutive days after treatment applications (excluding days 8 and 9 in Trial 1; and days 6, 12, and 13 in Trial 2), each treated mound and any satellite mounds that appeared due to colonies moving or splitting were evaluated for fire ant activity. The degree of fire ant activity was rated according to the following scale after probing the mound several times with a ¼-inch diameter rod: 0 = no or only moribund ants present; 1 = 1–20 live ants present; 2 = >20 live fire ants present. Colony survivorship was determined by obtaining PI ratings when no fire ant activity was observed over five (Trial 1) and three (Trial 2) consecutive days, or on the 14th day after treatment.

Table 1. Fire ant colony population indices and corresponding colony classes based on the number of worker ants and presence or absence of worker caste brood (modified from Lofgren and Williams1982).

	Population Index	
No. worker ants	Worker brood absent	Worker brood present
0	0	0
1–100	1	5
101–1,000	2	10
1,001–10,000	3	15
10,001–50,000	4	20
>50,000	5	25

Treatments: Active mounds were sprayed once with Alpine WSG (40% dinotefuran, BASF), Advion WDG (20% indoxacarb, Syngenta), both at 0.1% dilution, or sprayed with water (control). We thoroughly wet the mound surface to about ¼-inch depth. We used separate sprayers (Scotts, model #190660; battery pressurized to 20-25 psi) for each treatment. The spray volume applied per mound was based on the maximum length and width of each mound. The summed mound dimensions corresponded to the volume of liquid spray that was required to wet an entire mound surface to ¼-inch depth. This was based on several trial applications to mounds. The sprayers' liquid output per 15 sec. interval averaged 313 ml. Table 2 lists the volume of spray that was applied for the following categories of mound size. The average volume of insecticide spray applied was 21 mL per 1 sq. ft. This volume of insecticide applied is much less than the traditional application rate of 1-2 gallons of insecticide applied as a drench per mound.

Table 2. Spray volume applied to various mound sizes.

Mound size (L+W in.)	Spray time (sec.)	Spray volume applied (ml)
≤17	15	313
18–29	30	626
30–41	45	939
>42	60	1,252

Fig. 1. Spray of non-repellent insecticide was applied to thoroughly wet surface of RIFA mound.

Analysis: Mounds within 2 m of the nearest mound were designated as a mound cluster and received the same treatment. The study followed a randomized complete block design with blocking based on PIs sums of mounds within a cluster. Analyses of variance and Ryan-Einot-Gabriel-Welsch multiple range test were conducted for each trial to compare pretreatment and final average PI sums per cluster of mounds. There were five clusters, or replicates, per treatment. Analyses were conducted on transformed PI sums using either the logarithmic ($\log_{10}(x+1)$) or angular ($\sqrt{(x+0.5)}$) transformation to meet the assumption of homogeneous variances.

For **Trial 1** there were 1–5 mounds per cluster with an average of 2 mounds per cluster prior to treatment. Pretreatment PIs and mound dimensions (max. length, width, height) were obtained 2 days prior to treatment. Mounds were generally small to medium in size, with mound dimensions ranging from 4 L x 3 W to 34 L x 19 W inches, and an average dimension of 15 x 12 inches. Mound heights averaged 2-inches and because mound heights were highly variable, they were not included when estimating mound size. Sums of the PIs per cluster of mounds had an average PI sum per cluster of 19.4 (range, 6–55). The average PI per mound was 9.5 (range, 1–20).

For **Trial 2** there were there were 1–4 mounds per cluster with an average of 1.8 mounds per cluster prior to treatment. Pretreatment PIs and mound dimensions (max. length, width, height) were obtained 2 days prior to treatment. Mounds were generally small to medium in size, with mound dimensions ranging from 6 L x 5 W to 36 L x 30 W inches, and an average dimension of 16 x 14 inches. Mound heights averaged 2-inches but were not included when estimating mound size due to variability over the mound surface. Sums of the PIs per cluster of mounds had an average PI sum per cluster of 25 (range, 15–51). The average PI per mound was 13.9 (range, 1–25).

Results

Trial 1. The average PI sums per cluster provided an indication of the status of the fire ant population based on an estimate of the number of fire ants and reproductive status of the colonies observed in the mounds within each cluster. Pretreatment PIs were not significantly ($P > 0.05$) different among the treatments. At the end of the study, PI sums were significantly lower than the control for the two non-repellent insecticide mound treatments (Table 3).

This field study demonstrated elimination of all fire ant colonies treated with the nonrepellent dinotefuran (Alpine WSG). Of the 11 treated mounds, all were inactive 1–5 days after treatment and 8 of 11 mounds were inactive in 3 days. None of the dinotefuran treated colonies split or moved to new locations. While the dinotefuran treated mound clusters were inactive by the fifth day after treatment, on days 6–13, activity was reported at some mounds, however these seemed to be random fire ant foragers and not indicative of active mounds. The indoxacarb treatment had colonies moving or splitting in 4 of the 5 mound clusters which resulted in an additional 4 mounds by the end of the study. Half of the 14 monitored mounds from the indoxacarb clusters were inactive at the end of the study, with five mounds being inactive on the first or second day after treatment. Among the control mounds, over 80% remained active, with mounds splitting in one cluster (Table 3).

After treatment applications, the next 14 days were unusually hot and dry (Fig. 2, Table 5). Some daily fluctuations in the activity ratings were likely due to inconsistent and slow alarm responses of fire ants due to the heat and nesting deep into the dry soil. Typically, fire ants rapidly swarm out of mounds when their mounds are probed. Nevertheless, we are confident of the results because they were based on the final PI ratings, where mounds were excavated to determine if colonies were present.

Trial 2. Pretreatment PI sums were not significantly ($P > 0.05$) different among the treatments. At the end of the study, PI sums were significantly lower for the dinotefuran and indoxacarb individual mound treatments than the control (Table 4).

In the dinotefuran treatment there were 10 original mounds that all died during the study. In addition, 6 new mounds appeared (probably split/moved from an original mound) where 3 died and 3 remained active. The 13 dead mounds were deemed inactive and stayed inactive 1-14 days after treatment (DAT); 50% of original mounds were inactive by day 4. Dead mounds were confirmed dead 9-14 DAT. By the end of the trial, 19% (3/16) of the mounds in the dinotefuran clusters were active (Table 4).

For the indoxacarb-treatment, there were 10 original mounds and the trial ended with 14 mounds being monitored, probably due to colony splitting/movement. All original mounds were dead at end of the observation period. Additionally, 2 new mounds died and 2 survived. The 12 dead mounds were deemed inactive and stayed inactive 1-14 DAT. All original mounds were inactive and stayed inactive 1-8 DAT. Of the original mounds, 8 of 10 were rated as inactive by day 4. All dead mounds were confirmed dead 3-14 DAT. By the end of the trial, 14% (2/14) of the mounds in the indoxacarb clusters were active (Table 4).

Lastly for the controls, from 7 original mounds, the trial ended with 17 total mounds due to colonies moving and splitting. Four of the original mounds were dead at the end of the 14-day observation period. The remaining 3 original and all but 1 new mound stayed alive. Five mounds were rated as inactive and stayed inactive 7-11 DAT. These mounds were confirmed inactive 9-14 DAT. Overall, 53% (9/17) of the mounds in the control clusters were active at the end of the trial (Table 4).

In summary, for the spray application of the two nonrepellent insecticides to the surface of fire ant mounds, the dinotefuran eliminated 85% (23/27) of these colonies in the two, 14-day trials, with 76% (16/21) dead in 1–5 days. The indoxacarb application eliminated 68% (19/28) of the fire ant colonies in 14 days with 46% (13/28) dead by day 4. For the control mounds combined over both trials, 36% (10/28) of the mounds were inactive at 14 DAT. These studies were conducted during the summer in north central Florida in unusually dry and wet conditions (Table 5, Fig. 2). Further testing of the non-repellent insecticide applications to individual fire ant mounds should be conducted on irrigated landscapes in the desert climate of the Coachella Valley.

References Cited.

Lofgren, C. S., and D. F. Williams. 1982. Avermectin $B_{1}a$: Highly potent inhibitor of reproduction by queens of the red imported fire ant (Hymenoptera: Formicidae). Journal of Economic Entomology 75(5): 798-803.

Table 3. [**Trial 1**] Comparisons of the average (n=5) sum of the population indices (PIs) **per cluster of mounds** among treatments and the number of mounds that were treated and the number of mounds assigned final post-treatment PIs. Trial was conducted in Gainesville (Alachua Co.), Florida under hot and dry conditions.

Treatment	Avg. sum of pretreat. PIs (std. error)[1]	Avg. sum of final PIs (std error)[2]	No. treated mounds	No. mounds assigned final PIs[3]	Percentage active mounds on day 14[4]
control	14.4 (±2.2) a	16.4 (±4.3) a	9	11	82% (9/11)
dinotefuran	18.0 (±1.5) a	0 (±0) b	11	11	0% (0/11)
indoxacarb	25.8 (±7.6) a	4.8 (±3.2) b	10	14	50% (7/14)

Averages followed by the same letter within a column are not significantly different (P>0.05) by analyses of variance and Ryan-Einot-Gabriel-Welsch multiple range test on logarithmic or angular transformed data. Non-transformed averages are presented.
[1] PIs were assigned 2 days pretreatment. Two mounds assigned to the control group were identified pre-treatment but not given a PI rating.
[2] Final PI ratings were recorded after 5 consecutive days with inactivity or 14 days following treatment, whichever occurred first.
[3] Satellite mounds (i.e., mounds that moved or split) appeared over the course of the study resulting in a greater number of mounds assigned final PIs than the number of treated mounds.
[4] # mounds with PIs ≥1 / # mounds assigned final PIs ≥0.

Table 4. [**Trial 2**] Comparisons of the average (n=5) sum of the population indices (PIs) **per cluster of mounds** among treatments and the number of mounds that were treated and the number of mounds assigned final post-treatment PIs. Trial was conducted in Gainesville (Alachua Co.), Florida under conditions of afternoon thundershowers and a tropical storm.

Treatment	Avg. sum of pretreat. PIs (std. error)[1]	Avg. sum of final PIs (std error)[2]	No. treated mounds	No. mounds assigned final PIs[3]	Percentage active mounds on day 14[4]
control	20.2 (±2.2) a	28.6 (±3.9) a	7	17	53% (9/17)
dinotefuran	28.2 (±7.9) a	11.6 (±4.2) b	10	16	19% (3/16)
indoxacarb	26.4 (±6.7) a	4.6 (±3.9) b	10	14	14% (2/14)

Averages followed by the same letter within a column are not significantly different (P>0.05) by analyses of variance and Ryan-Einot-Gabriel-Welsch multiple range test on logarithmic or angular transformed data. Non-transformed averages are presented.
[1] PIs were assigned 2 days pretreatment. Two mounds assigned to the control group were identified pre-treatment but not given a PI rating.
[2] Final PI ratings were recorded after 3 consecutive days with inactivity or 14 days following treatment, whichever occurred first.
[3] Satellite mounds (i.e., mounds that moved or split) appeared over the course of the study resulting in a greater number of mounds assigned final PIs than the number of treated mounds.
[4] # mounds with PIs ≥1 / # mounds assigned final PIs ≥0.

Table 5. Daily minimum and maximum temperatures for Trials (Reps) 1 and 2 over the 14-day study duration. Average daily temperature calculated over entire 14-day period with total cumulative rainfall.

Rep	Dates	Min. Temp °C (°F)	Max. Temp °C (°F)	Average Temp °C (°F)	Total Rainfall (in)
1	05-24 to 06-07-24	13.14 (55.65)	36.23 (97.21)	25.65 (78.18)	1.13
2	07-24 to 08-07-24	20.97 (69.75)	36.62 (97.92)	26.38 (79.49)	15.11

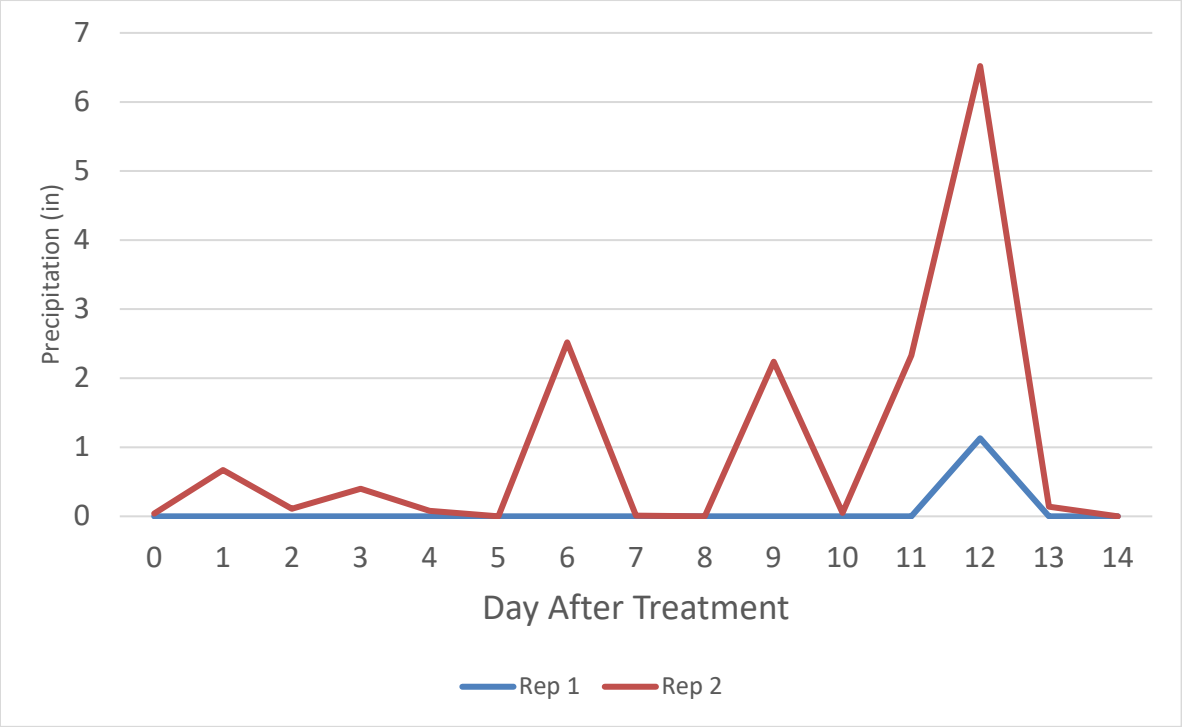

Fig. 2. Daily rainfall for Trials 1 and 2 (Rep 1 and Rep 2). The 6.5 inches of rainfall on day 12 in Rep 2 was due to tropical storm Debbie.

	Coachella Valley Mosquito and Vector Control District **Staff Report**	**February 11, 2025**

Agenda Item: Informational Item

Mosquito and Vector Control Association of California (MVCAC) Annual Conference, January 26-29, 2025, Oakland, CA

Report:

The annual meeting of the Mosquito and Vector Control Association of California (MVCAC) is an opportunity for District trustees and employees to meet with leading mosquito researchers and professionals from across the state. The Association held the meeting in Oakland, CA. Attendees heard presentations on mosquitoes in cybersecurity; generative AI; security concerns using unmanned aerial systems (drones); releasing sterilized mosquitoes; and several presentations on the continued local transmission of dengue in southern California. The meeting ended with the Board Meeting of MVCAC, where several District employees participated as part of their committee responsibilities.

District employees who participated are listed below. Congratulations to Biologist **Alex Echenberg** for winning the poster competition!

Symposium organizer – Jeremy Wittie, Administrative and Managerial Topics

Talks:
Kim Hung: Generating Tableau reports with VectorSurv data
Jennifer A. Henke: Evaluation of larviciding as an *Aedes* control strategy

Posters
Eric Ortiz: At the larval stage – Identifying and processing samples
Iver Romero: UAS product characterization
Marisa Kelling: Why calibrate? Ensuring accuracy in mosquito control
Michael Chylik: Control efforts in agriculture areas in the Coachella Valley
Jeff Rushing: Optimizing urban mosquito work: A mapping system for efficient mosquito source management in the Coachella Valley

Alex Echenberg: Evaluating a drone application of VectoBac FG+ in a duck club pond – **Poster winner!**

Alex with the lead poster judge

ATTENDEES:

Jeremy Wittie, General Manager
Jennifer Henke, Laboratory Manager
Crystal Moreno, Human Resources Manager
Robert Gaona, Public Information Manager
Edward Prendez, Information Technology Manager
Greg Alvarado, Operations Manager
Rick Ortiz, UAS Coordinator
Kim Hung, Vector Ecologist
Gabriela Perezchica-Harvey, Vector Ecologist
Jeff Rushing, Field Supervisor
Fernando Gutierrez, Community Liaison
Hugo Arcos, Community Liaison
Alex Echenberg, Biologist
Marissa Kelling, Lead Vector Control Technician
Michael Chylik, Vector Control Technician II
Iver Romero, UAS Operator
Eric Ortiz, Laboratory Technician

	Coachella Valley Mosquito and Vector Control District **Staff Report**	**February 11, 2025**

Agenda Item: Informational Item

Government Finance Officers Association Budget Academy, January 6 to 9, 2025, Garden Grove, CA

Report:

The GFOA Budget Academy is an immersion training course that focuses on skills and techniques critical to public sector budget analyst. Using a combination of exercises, discussions, and lectures, the course provided an overview of the budget development process, including best practices and techniques required in effective budgeting. This course covered essential elements of public sector budgeting such as goal setting, program development, revenue and expense analysis, position budgeting, capital budgeting, and more.

ATTENDEES:
David I'Anson

	Coachella Valley Mosquito and Vector Control District **Staff Report**	**February 11, 2025**

Agenda Item: Informational Item

Approval for Biologist to attend the Pacific Branch of the Entomological Society of America Annual Conference, March 30-April 2, 2025 in an amount not to exceed $2000.00 from fund #7600.01.400.027, Professional Development **— Jennifer A. Henke, M.S., BCE, Laboratory Manager**

BACKGROUND:

The Annual Meeting of the Pacific Branch of the Entomological Society of America will be held in Salt Lake City, Utah from March 30-April 2, 2025. The meeting will consist of presentations and exhibits that illustrate and highlight the latest science, technology, and products used to conduct research and control of insects in agriculture and mosquito control. The meeting also provides ample opportunities to network with professionals, researchers, and educators from the western United States.

Biologist Jacob Tarango was scheduled to attend the Annual Conference of the Entomological Society of America in Phoenix, Arizona in November 2024. Unfortunately, a conflict arose and he was not able to attend. The Laboratory Department has funds budgeted. In addition to attending the meeting, *Laboratory Manager Jennifer Henke* and *Jacob* will schedule time to visit and tour the Salt Lake City Mosquito Abatement District.

STAFF RECOMMENDATION:
Approve funding for the Biologist to attend the Pacific Branch of the Entomological Society of America Annual Conference, March 30-April 2, 2025 in Salt Lake City, Utah.

Strategic Business Plan Alignment:
Goal 2 Strong culture supports the Board and Staff Team that grows in skill, teamwork, and experience

Strategic Response – 2.1 Create a staff culture and a safe working environment to promote effective communication, collaboration, creativity, and employee satisfaction.

	Coachella Valley Mosquito and Vector Control District **Staff Report**	**February 11, 2025**

Agenda Item: Consent Calendar
Approval to purchase two Guardian 190-G4 VF Ultra Low-Volume (ULV) Sprayer, in an amount not to exceed $50,000 from Capital Replacement Budget Fund #8415.14.300.000 – **Edward Prendez, Information Technology Manager**

Background:
This request is for the purchase of two (2) Guardian 190-G4 VF Ultra Low-Volume (ULV) Sprayers, including Monitor Flex for data capture and a portable storage case. These units will serve as the primary ULV foggers for truck-mounted applications. As a result, Fleet Services will reassign two older London Foggers (models from 2004 and 2005) to backup status. This update will bring the total number of ULV foggers in operation to seven.

The California Air Resources Board (CARB) has mandated the retirement of small off-road engines (SORE) producing 19 kilowatts (25 horsepower) or less unless the engine was manufactured before 2024. Since the London Foggers were produced before this cutoff, they will be retained as backup units.

The Guardian 190-G4 VF Sprayers being purchased were also manufactured before 2024, ensuring compliance with current regulations. These sprayers enhance operational efficiency by reaching diverse mosquito breeding areas, including residential and open agricultural sources across the Coachella Valley reducing risk of mosquito-borne disease to the public.

The Budget for FY2024-25 was passed authorizing the purchase of new control equipment.

Item	QTY	Price	Cost
Guardian 190-G4	2	$14,499.00	$28,998.00
Monitor Flex	2	$4,000.00	$8,000.00
Portable Case	2	$329.00	$658.00
Labor	2	$75.00	$150.00
Tax		8.75%	$3,308.03
Total			$41,114.03

Staff Recommendation:
To approve the purchase two Guardian 190-G4 VF Ultra Low-Volume (ULV) Sprayer, in an amount not to exceed $50,000 from Capital Replacement Budget Fund #8415.01.300.000

Fiscal Impact:			
FY2024-25 Budget GL # 8415.14.300.000	Current Available Funds	Proposed Expense Fiscal Year 2024/25	Remaining Available Funds
$50,800.00	**$319,160.77**	**$41,114.03**	**$278,046.74**

NEW BUSINESS

	Coachella Valley Mosquito and Vector Control District **Staff Report**	**February 11, 2025**

Agenda Item: New Business

Approval of Participation in the Southern Region Mutual Assistance Agreement. **— Jeremy Wittie, MS, CSDM, General Manager**

Background:

The District is responsible for protecting public health through effective mosquito and vector management in the Coachella Valley, However, emergencies such as vector-borne disease outbreaks or natural disasters can overwhelm local resources, requiring external assistance to protect the health and safety of the community.

The Southern Region Mutual Assistance Agreement is a formal arrangement among mosquito and vector control agencies in Southern California to provide mutual aid during emergencies. Participating in this agreement enhances the District's ability to respond effectively during public health crises by:

1. Allowing the District to request personnel, equipment, and other resources when needed.
2. Enabling the District to provide assistance to other agencies when feasible.
3. Ensuring a coordinated regional response to emergencies.

Staff Recommendation:

Approve Resolution 2025-03

Exhibits:

- Southern Region Mutual Assistance Agreement

Resolution No. 2025-03

A RESOLUTION OF THE BOARD OF TRUSTEES OF THE COACHELLA VALLEY MOSQUITO AND VECTOR CONTROL DISTRICT APPROVING AND AUTHORIZING EXECUTION OF THE MUTUAL ASSISTANCE AGREEMENT FOR MOSQUITO AND VECTOR CONTROL SERVICES

WHEREAS, the Coachella Valley Mosquito and Vector Control District (the "District") is a political subdivision and a "local agency" of the State of California, created and operating under the authority and provisions of California Health and Safety Code Section 2000 et. seq., and is also a "local agency" within the meaning of Section 53600 of the California Government Code; and

WHEREAS, the Board of Trustees of the District is responsible for protecting public health and safety through the control of mosquitoes and other vectors in the Coachella valley; and

WHEREAS, emergency situations, such as vector-borne disease outbreaks, natural disasters, or other critical incidents, may arise that exceed the District's resources and capacity to respond effectively; and

WHEREAS, mutual assistance agreements foster regional collaboration and provide a framework for requesting and providing assistance among participating agencies during emergencies; and

WHEREAS, the Mutual Assistance Agreement for Mosquito and Vector Control Services ("Agreement") establishes a voluntary, cooperative relationship among mosquito and vector control districts and other agencies within the Southern California region to coordinate mutual assistance during emergencies. A copy of the Agreement is attached hereto as Exhibit "A" and incorporated herein by this reference; and

WHEREAS, the participation in the Agreement ensures that the District can both request and provide resources, personnel, and expertise to effectively manage public health emergencies, benefiting the community and neighboring regions; and

WHEREAS, the Board of Trustees recognizes the importance of collaboration, resource sharing, and mutual support to strengthen regional response capabilities and protect public health.

NOW, THEREFORE, BE IT RESOLVED by the Board of Trustees of the Coachella Valley Mosquito and Vector Control District that:

Section 1. Recitals.

The recitals set forth above are true and correct.

Section 2. Approval of and Authorization to Execute Agreement.

The Board of Trustees hereby approves the Mutual Assistance Agreement for Mosquito and Vector Control Services and authorizes the General Manager or his designee to execute sassistance Agreement.

Section 3. Effective Date.

This Resolution shall take effect upon its adoption.

Section 4. Certification.

The Clerk of the Board shall certify as to the adoption of this Resolution and shall cause the same to be processed in the manner required by law.

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PASSED, ADOPTED AND APPROVED, this 11th day of February 2025.

_____

John Peña, President
Board of Trustees

ATTEST:

_____

Megan Scarborough-Eckel, Clerk of the Board

APPROVED AS TO FORM:

_____

Lena D. Wade, General Counsel

REVIEWED:

_____

Jeremy Wittie, M.S., CSDM, General Manager

Exhibit “A”

Mutual Assistance Agreement for Mosquito and Vector Control Services
(attached)

MUTUAL ASSISTANCE AGREEMENT FOR MOSQUITO AND VECTOR CONTROL SERVICES

This Agreement is made and entered into by and between the mosquito and vector control agencies of Southern California that are signatory herein, on the ____day of _____2025.

RECITALS

WHEREAS, mosquitoes and other vectors, that do not recognize political boundaries, can transmit disease and cause discomfort to humans and other animals;

WHEREAS, the California Legislature has recognized the risks of vector-borne diseases and has provided broad powers in the Mosquito Abatement and Vector Control District Law (hereinafter "Law") set forth in California Health and Safety Code Section 2000 *et seq*.;

WHEREAS, the Law specifically provides the authority to enter into agreements with other public agencies to cooperate and take actions to carry out the purposes of the Law (§2044);

WHEREAS, there is a need to have a mutual assistance agreement between agencies to allow joint efforts, and

WHEREAS, the parties hereto desire to enter into this Agreement to cooperate and mutually assist each other when the need arises to control mosquitoes and other vectors and to thereby prevent the spread of vector-borne diseases and discomfort.

NOW, THEREFORE, the parties hereto do hereby agree as follows:

1. PURPOSE.

A. Purpose. The above recitals are adopted herein. A further purpose of this Agreement is to provide a framework for mutual assistance that can be readily utilized in time of need.

B. No separate legal entity created. The parties do not intend to create a separate legal entity but to approve a working protocol that can be implemented and executed by administrative staff.

C. Definitions.

i. **Qualifying Event**- a natural or human-caused event that causes concern with a public agency that is signatory to this Agreement that mosquitoes or other vectors may spread disease or discomfort beyond the area or capabilities that an agency can combat or abate using its own personnel and resources.

ii. **Authorized Official-** an officer or employee of a public agency that is signatory to this Agreement or their designee, who is authorized by the governing body of the public agency to request or offer assistance under this Agreement.

iii. **Requesting Agency**- the public agency requesting assistance under this Agreement.

iv. **Responding Agency**- the agency responding to a request for assistance under this Agreement.

v. **Period of Assistance**- the period during which a Responding Agency assists the Requesting Agency. It includes mobilization efforts, and coverage arrangements, portal-to-portal costs of equipment, personnel and supplies utilized in the response, as well as demobilization costs upon return to the Responding Agency.

2. MUTUAL ASSISTANCE REQUEST AND RESPONSE.

A. Authorized Official. Each signatory agency shall designate an Authorized Official, and any alternates, and provide contact information to the signatory agencies.

B. Requests for Assistance. In the event of a Qualifying Event an Authorized Official of the Requesting Agency may request mutual assistance from another signatory agency to this Agreement. Requests for assistance shall be made to the Authorized Official(s) of the Responding Agency(ies).

C. Response to a Request for Assistance. After a Responding Agency receives a request for assistance, the Authorized Official of the Responding Agency shall inform, as soon as possible, the Requesting Agency whether it is willing to provide assistance.

D. Discretion of Responding Agency's Authorized Official. Execution of this Agreement does not create any duty to respond to a request for assistance.

3. RESPONDING AGENCY PERSONNEL AND RESOURCES.

A. Control.

i. Generally. Responding Agency personnel and resources shall remain under the direction and control of the Responding Agency. The Requesting Agency's Authorized Official shall coordinate response activities with the designated supervisor(s) of the Responding Agency.

ii. NIMS or SEMS/Incident Command System. In cases where CAL OES becomes involved in federal or state emergencies, the signatory parties may be required to use the Incident Command System (ICS) as prescribed by the State's Standard Emergency Management System (SEMS) or the National Emergency Management System (NEMS).

B. Communication. The Responding Agency personnel will utilize Responding Agency cell phones in order to facilitate communications. If the Responding Agency does not have the necessary communication devices, it will be the responsibility of the Requesting Agency to supply communication devices.

C. Status. Unless otherwise provided by law, the Responding Agency's officers and employees retain the same privileges, immunities, rights, duties, and benefits as provided in their respective jurisdictions.

D. License and Permits. To the extent permitted by law, Responding Agency personnel who hold licenses, certificates, or permits evidencing professional, mechanical, or other skills shall be allowed to carry out activities and tasks relevant and related to their respective credentials during the specified Period of Assistance. The Requesting Agency will report any pesticide usage by Responding Agency personnel in their monthly pesticide usage report.

E. Right to Withdraw. The Responding Agency's Authorized Official retains the right to withdraw some or all of its personnel and/or resources at any time. Notice of intention to withdraw must be communicated to the Requesting Agency's Authorized Official as soon as possible.

4. COST REIMBURSEMENT.

A. Categories of Cost. Unless otherwise mutually agreed in whole or in part, the Requesting Agency shall reimburse the Responding Agency for each of the following categories of costs incurred while providing assistance.

i. Personnel – Responding Agency personnel are to be paid for work completed during a specified Period of Assistance according to the terms provided in their employment contracts or other conditions of employment. The Responding Agency designated supervisor(s) must keep accurate records of work performed by personnel during the specified Period of Assistance. Requesting Agency reimbursement to the Responding Agency must consider all personnel costs, including regular rate of pay as defined by the Fair Labor Standards Act, costs for fringe benefits, and indirect costs (e.g., cellular data usage, meals, and travel). Expenses related to travel, hotel, and meals; the parties agree to utilize the United States General Services Administration (GSA) Per Diem Rate structure as established annually on October 1 of each year by the GSA. Current Per Diem rate is located at the following link: https://www.gsa.gov/travel/plan-book/per-diem-rates.

   Responding Agencies' staff labor shall be reimbursed at the fully burdened hourly rate for each classification providing assistance to the requestor agency at the time of request.

ii. The Requesting Agency will return borrowed equipment in good working order and repair any damages incurred during the Period of Assistance. If damaged beyond repair equipment will be replaced by the Requesting Agency at current market value.

iii. Materials and Supplies - The Requesting Agency must reimburse the Responding Agency in kind or at actual replacement cost, plus handling charges, for use of expendable or non-returnable supplies.

iv. Mileage Reimbursement- The Responding Agency will be reimbursed for mileage for all Responding Agency vehicles used during the period of

assistance. Mileage will be reimbursed per the IRS mileage rate and will be the vehicle total mileage starting from Responding Agency headquarters to the return to Responding Agency headquarters once the period of assistance is deemed complete.

B. Payment Period. The Responding Agency must provide an itemized bill to the Requesting Agency for all expenses it incurred as a result of providing assistance under this Agreement. The Responding Agency must send the itemized bill within 60 days after the period of assistance. The Requesting Agency must pay the bill in full on or before the 90th day following the billing date. Unpaid bills become delinquent upon the 91st day following the billing date, and, once delinquent, the bill accrues interest at the rate of prime, as reported by the Wall Street Journal, plus two percent (2%) per annum, unless both parties agree to an alternative repayment plan.

5. DISPUTES.

Any controversy or claim arising out of, or relating to, this Agreement, or the making, performance, or interpretation of it, including, but not limited to, alleged breach of the Agreement, shall be submitted to arbitration in Southern California, under the Arbitration Law of the State of California (California Code of Civil Procedure Section 1280 et seq.). Any court of competent jurisdiction may enter the judgment rendered by the arbitrators as final judgment that is binding on the parties. The arbitration shall be conducted in the county of the Responding Agency.

6. INSURANCE AND INDEMNIFICATION.

Responding Agency and Requesting Agency are authorized self-insured or partially self-insured public entities for purposes of Professional Liability, General Liability, Automobile Liability and Worker's Compensation and warrant that through their respective programs of self-insurance and insurance, they have adequate coverage or resources to protect against liabilities arising out of performance of the terms, conditions or obligations of this Agreement.

Neither Responding Agency nor any officer, employee, agent, or volunteer of Responding Agency shall be responsible for any damage or liability arising out of, pertaining to, or relating to, any acts or omissions on the part of Requesting Agency or its contractors under or in connection with any work, authority or jurisdiction delegated to and performed by Requesting Agency or its contractors under this Agreement. It is also understood and agreed that, pursuant to Government Code section 895.4, Requesting Agency shall fully indemnify, defend (with counsel approved by Responding Agency) and hold Responding Agency and its officers, employees, agents, and volunteers harmless from any liability imposed for injury (as defined by Government Code section 810.8) arising out of, pertaining to, or relating to any acts or omissions on the part of Requesting Agency or its contractors under or in connection with any work, authority or jurisdiction delegated to and performed by Requesting Agency or its contractors under this Agreement.

In the event Responding Agency and/or Requesting Agency is found to be comparatively at fault for any claim, action, loss or damage which results from their respective obligations under this Agreement, Responding Agency and/or Requesting Agency shall indemnify the other to the extent of its comparative fault.

Requesting Agency and Responding Agency agree to waive all rights of subrogation against each other. Furthermore, if the Responding Agency or Requesting Agency attempts to seek recovery from the other for Workers' Compensation benefits paid to an employee, the Responding Agency or Requesting Agency agree that any alleged negligence of the employee shall not be construed against the employer of that employee.

7. NOTICE.

A party who becomes aware of a claim or suit that in any way, directly or indirectly, contingently or otherwise, affects or might affect the other party to this Agreement shall provide prompt and timely written notice to the party who may be affected by the suit or claim. Each party reserves the right to participate in the defense of such claims or suits as necessary to protect its own interests.

8. INSURANCE.

The signatory parties shall each maintain insurance coverage that covers activities that it may undertake by virtue of this Agreement. The scope of the insurance coverage must include, at a minimum, coverage for employee faulty treatment or abatement efforts and other negligent acts, errors, or omissions and coverage for meeting the indemnity condition provided in Paragraph 6.

9. WITHDRAWAL.

A party may withdraw from this Agreement by providing written notice of its intent to withdraw to all other parties. Withdrawal takes effect after the Authorized Official receives notice. The indemnification and workers compensation provision shall survive withdrawal.

10. MODIFICATION.

This Agreement may not be modified orally or in any manner other than by an agreement in writing signed by all parties by a person with authority to sign.

11. PROHIBITION ON THIRD PARTIES AND ASSIGNMENT OF RIGHTS/DUTIES.

This Agreement is for the sole benefit of the signatories below and no person or entity may have any rights under this Agreement as a third-party beneficiary. Assignments of benefits and delegations of duties created by this Agreement are prohibited and are without effect.

12. COUNTERPARTS.

This Agreement may be executed in two or more counterparts, each of which shall be deemed an original, and all of which shall constitute one and the same agreement.

13. EFFECTIVE DATE.

This Agreement shall become effective between the signatory parties upon two parties signing. The effective date of subsequent parties' agreements shall be the date of its respective signing.

IN WITNESS WHEREOF, the parties have executed this Agreement on the day and year first written above.

ANTELOPE VALLEY MOSQUITO AND VECTOR CONTROL DISTRICT

By: _____

Name/Title: _____

Date: _____

COACHELLA VALLEY MOSQUITO & VECTOR CONTROL DISTRICT

By: _____

Name/Title: _____

Date: _____

GREATER LOS ANGELES COUNTY VECTOR CONTROL DISTRICT

By: _____

Name/Title: _____

Date: _____

NORTHWEST MOSQUITO & VECTOR CONTROL DISTRICT

By: _____

Name/Title: _____

Date: _____

ORANGE COUNTY MOSQUITO & VECTOR CONTROL DISTRICT

By: _____

Name/Title: _____

Date: _____

RIVERSIDE COUNTY ENVIRONMENTAL HEALTH

By: _____

Name/Title: _____

Date: _____

SAN GABRIEL VALLEY MOSQUITO & VECTOR CONTROL DISTRICT

By: _____

Name/Title: _____

Date: _____

MOSQUITO AND VECTOR MANAGEMENT DISTRICT OF SANTA BARBARA COUNTY

By: _____

Name/Title: _____

Date: _____

WEST VALLEY MOSQUITO AND VECTOR CONTROL DISTRICT

By: _____

Name/Title: _____

Date: _____

LA COUNTY WEST VECTOR CONTROL DISTRICT

By: _____

Name/Title: _____

Date: _____

COMPTON CREEK VECTOR CONTROL DISTRICT

By: _____

Name/Title: _____

Date: _____

LONG BEACH DEPARTMENT OF PUBLIC HEALTH

By: _____

Name/Title: _____

Date: _____

	Coachella Valley Mosquito and Vector Control District **Staff Report**	**February 11, 2025**

Agenda Item: New Business

Approval to update authorized bank account signatories. **— David I'Anson, Administrative Finance Manager**

Background:

As part of routine financial oversight and security measures, the District periodically reviews and updates its authorized bank account signatories. Updates may be required due to changes in Board membership, staff transitions, or organizational restructuring. Ensuring that the correct indivials are authorzed to conduct banking transactions on behalf of the District is essential for maintaining operational efficiency and financial integrity.

The proposed updates to the authorized signatories reflect recent Board changes. The following actions are recommended:

1. **Addition of New Signatories:** The following individuals are recommended for authorization as signatories on the District's bank accounts:
    - Frank Figueroa, Treasurer: General Checking Account, Payroll Account
    - John Peña, President: Money Market Account
2. **Removal of Former Signatories:** The following individuals should be removed as authorized signatories:
    - Clive Weightman, Former Treasurer: General Checking, Payroll Account
    - Benjamin Guitron, Former President: Money Market Account
3. **Notification to Financial Institutions:** Upon Board approval, staff will coordinate with the District's financial institution to process the required documentation and signature cards to implement these changes.

Staff Recommendation:

Staff recommends that the Board approve Resolution 2025-04 which updates the list of authorized signatories for the District's bank accounts and authorize the necessary steps to implement these changes with the District's financial institutions.

Fiscal Impact:

- None

Attachments:

- Resolution 2025-04

Resolution No. 2025-04

A RESOLUTION OF THE BOARD OF TRUSTEES OF THE COACHELLA VALLEY MOSQUITO AND VECTOR CONTROL DISTRICT REGARDING THE UPDATING OF BANK ACCOUNT SIGNATORIES

WHEREAS, the Coachella Valley Mosquito and Vector Control District (the "District") is a political subdivision and a "local agency" of the State of California, created and operating under the authority and provisions of California Health and Safety Code Section 2000 et. seq., and is also a "local agency" within the meaning of Section 53600 of the California Government Code; and

WHEREAS, the Board of Trustees of the District ("Board") has determined that it is in the best interest of the District to update its banking arrangements with California Bank & Trust to reflect current leadership and ensure proper control over its financial accounts; and

WHEREAS, Clive Weightman, the former Treasurer of the Board, was previously designated as an authorized signatory on the District's General Checking Account and Payroll Account. Because former Trustee Weightman is no longer the Treasurer of the Board, the Board wishes to remove former Trustee Weightman as a signatory on the District's General Checking Account and Payroll Account; and

WHEREAS, the Board has elected Trustee Frank Figueroa as the current, successor Treasurer, and it is necessary to grant Trustee Figueroa the appropriate authority to act and serve as a signatory on behalf of the District with respect to the District's General Checking Account and Payroll Account; and

WHEREAS, Trustee Benjamin Guitron, in his capacity as Vice President of the Board, and Trustee John Pena, in his capacity as President of the Board, shall have the appropriate authority to act and serve as a signatories on behalf of the District with respect to the District's General Checking Account and Payroll Account; and

WHEREAS, Trustee Guitron, the former President of the Board, now serves as the Vice President of the Board. Trustee Guitron was previously designated as an authorized signatory on the District's Money Market Account in his former capacity as President of the Board. Because Trustee Guitron now serves as Vice President of the Board, the Board wishes to direct that District's Money Market Account acknowledge that Trustee Guitron, in his capacity as Vice President of the Board, continues to have the appropriate authority to act and serve as a signatories on behalf of the District with respect to the District's Money Market

Account; and

WHEREAS, Trustee Peña, has been duly elected and installed as the current President of the Board. the Board wishes to direct that District's Money Market Account acknowledge that Trustee Pena, in his capacity as President of the Board, shall have the appropriate authority to act and serve as a signatories on behalf of the District with respect to the District's Money Market Account.

NOW, THEREFORE, BE IT RESOLVED by the Board of Trustees of the Coachella Valley Mosquito and Vector Control District that:

Section 1. Recitals.

The recitals set forth above are true and correct.

Section 2. Approval of and Authorization to Execute Agreement.

The Board of Trustees hereby approves the updating of the bank account signatories:

A. District's General Checking Account and Payroll Account held by California Bank & Trust:

(1) Remove Clive Weightman as a signatory.

(2) The following Trustees shall have the appropriate authority to act and serve as a signatories on behalf of the District:

(a) Trustee Frank Figueroa;

(b) Trustee Benjamin Guitron, Vice President; and

(c) Trustee John Pena, President.

(3) All other signatories on file shall remain unchanged unless and until there is further action of the Board.

B. District's Money Market Account held by California Bank & Trust:

(1) The following Trustees shall have the appropriate authority to act and serve as a signatories on behalf of the District:

(a) Trustee Benjamin Guitron, Vice President; and

(b) Trustee John Pena, President.

(2) All other signatories on file shall remain unchanged unless and until there is further action of the Board.

Section 3. Effective Date.

This Resolution shall take effect upon its adoption.

Section 4. Certification.

The Clerk of the Board shall certify as to the adoption of this Resolution and shall cause the same to be processed in the manner required by law.

[THE REMAINDER OF THIS PAGE INTENTIONALLY LEFT BLANK]

PASSED, ADOPTED AND APPROVED, this 11th day of February 2025.

_____

John Peña, President
Board of Trustees

ATTEST:

_____

Megan Scarborough-Eckel, Clerk of the Board

APPROVED AS TO FORM:

_____

Lena D. Wade, General Counsel

REVIEWED:

_____

Jeremy Wittie, M.S., CSDM, General Manager

BOARD REPORTS

Coachella Valley Mosquito and Vector Control District

Executive Committee Meeting

Minutes

TIME AND DATE: 1:00 p.m., Friday, January 31, 2025

LOCATION: 43420 Trader Place, Indio, CA 92201

TRUSTEES PRESENT:

PRESIDENT, John Peña	La Quinta
TREASURER, Dr. Frank Figueroa	Coachella
SECRETARY, Dr. Doug Kunz	Palm Springs

ABSENT:

VICE PRESIDENT, Benjamin Guitron	Indio

Members of the Public present:
No

OTHERS PRESENT:
Jeremy Wittie, MS, CSDM, General Manager
Megan Scarborough-Eckel, Clerk of the Board

1. **Call to Order**
   President Peña called the meeting to order at 1:09 p.m.

2. **Roll Call**
   Roll Call indicated that three (3) of the four (4) Committee members were present.

3. **Confirmation of Agenda**
   President Peña inquired if there were any agenda items to be shifted. Upon no objections by the Committee, the agenda was confirmed.

4. **Public Comments**
   Mr. Brad Anderson of Rancho Mirage submitted a written public comment.

5. **Review of February 11, 2025, Draft Board Meeting Agenda**

6. **Old Business**
   A. Discussion and/or update from ad hoc Building Committee Meeting regarding Energy Service Contract with Centrica Business Solutions. **— Jeremy Wittie, MS, CSDM, General Manager**

General Manager, Jeremy Wittie, gave a brief update regarding the continued Public Hearing for the Energy Services Contract with Centrica Business Solutions for the February Board Meeting.

   A. Discussion and/or update regarding the Strategic Plan with Pendoley Strategies + Communications. **— Jeremy Wittie, MS, CSDM, General Manager**

General Manager, Jeremy Wittie, gave a brief update regarding the strategic planning timeline.

7. **New Business**- None

8. **Trustee/staff comments**
   None

9. **Confirmation of next meeting**
   The next Executive Committee meeting is scheduled for Friday, February 28, 2025, at 1:00 p.m.

10. **Adjournment**
    President Peña adjourned the meeting at 1:25 p.m.

Megan Scarborough-Eckel

From: Brad Anderson [redacted]
Sent: Thursday, January 30, 2025 3:19 PM
To: Megan Scarborough-Eckel
Cc: Jeremy Wittie; District 4 Supervisor V. Manuel Perez; Assemblymember.Wallis@assembly.ca.gov
Subject: Public Comment, Agenda Item: 4.A of the CVMVCD Public meeting held on January 31, 2025 (1:PM)

January 30, 2025

Coachella Valley Mosquito and Vector Control District (CVMVCD)
43420 Trader Pl.
Indio, CA. 92201
Attention: Clerk of the Board

Re: Written letter to be entered in the Public record and made available for public Inspection for the January 31, 2025 (1:PM) CVMVCD Executive committee meeting - Agenda Item: 4.A (Non-Agenda Public comment)

Dear current CVMVCD appointees,

Please review the written statements listed below for consideration and potential Implementation.

It's been repeatedly demonstrated that the CVMVCD organization has been actively attempting to censor public testimony at the CVMVCD venue during and after precived open public meetings held under CVMVCD authority.

Please be reminded that CVMVCD administrators have been previously exposed allowing claimed vector activity (disease progression) to remain unabated by CVMVCD employees. It's also worth noting that CVMVCD administrators have puposely Imposed false narratives against prior CVMVCD employee(s) to potentially secure ongoing status quo operations of CVMVCD administrators/Board of Trustees.

Those previous mentioned status quo operations of the CVMVCD organization, could be described as communism style censorship of citizen verbalize discord in regards to CVMVCD operations that were voiced during CVMVCD precived open public meeting(s). Combined with the exposure of CVMVCD longterm misuse of pesticides (application/Storage and procurement) throughout Riverside County/Coachella Valley (Including locations outside of CVMVCD operational boundaries).

Please be advised that the continued mismanagement of CVMVCD operations poses an extreme danger to Coachella Valley residents and guests that enter the CVMVCD defined service boundaries. It remains clear (reasonable) that external organizations are needed to investigate the CVMVCD ongoing poor management and ever increasing risk to public safety (health) that CVMVCD administrators/board of trustees and current contacted legal counsel have conspired to maintain.

Sincerely,

Brad Anderson | [redacted]

Cc:

Assembly member 47 District
Riverside County Fourth Supervisory District