



**UNION SANITARY DISTRICT BOARD MEETING/  
UNION SANITARY DISTRICT FINANCING AUTHORITY  
AGENDA**

**Monday, October 11, 2021  
Regular Meeting - 4:00 P.M.**

**Union Sanitary District  
Administration Building  
5072 Benson Road  
Union City, CA 94587**

**Directors**  
Manny Fernandez  
Tom Handley  
Pat Kite  
Anjali Lathi  
Jennifer Toy

**Officers**  
Paul R. Eldredge  
*General Manager/  
District Engineer*

Karen W. Murphy  
*Attorney*

**CORONAVIRUS (COVID-19) ADVISORY NOTICE**

This meeting will be held pursuant to Government Code Section 54953 (as amended by AB 361), which authorizes teleconferenced meetings under the Brown Act during a proclaimed state of emergency. The Governor of California proclaimed a State of Emergency related to COVID-19 on March 4, 2020. Consistent with Government Code Section 54953, this meeting will not be physically open to the public and all Board Members will be teleconferencing into the meeting. **To maximize public safety while still maintaining transparency and public access, members of the public can observe the meeting by following the steps listed below, and may provide public comment by sending comments to the Board Clerk by email at [assistanttogm@unionsanitary.ca.gov](mailto:assistanttogm@unionsanitary.ca.gov) before or during the meeting or via voicemail by calling 510-477-7599 before 3:00 p.m. on the date of the meeting.** Comments will then be read into the record, with a maximum allowance of 3 minutes per individual comment, subject to the Board President's discretion. All comments should be a maximum of 500 words, which corresponds to approximately 3 minutes of speaking time. If a comment is received after the agenda item is heard but before the close of the meeting, the comment will still be included as a part of the record of the meeting but will not be read into the record.

Any member of the public who needs accommodations should email or call the Board Clerk, [assistanttogm@unionsanitary.ca.gov](mailto:assistanttogm@unionsanitary.ca.gov) or 510-477-7503, who will use their best efforts to provide reasonable accommodations to provide as much accessibility as possible while also maintaining public safety in accordance with the Union Sanitary District procedure for resolving reasonable accommodation requests.

To listen to this Regular Board Meeting:

Call: 1-888-788-0099 or 1-877-853-5247

Meeting ID: 819 1360 4477 #

Participant ID: #

Click the Zoom link below to watch and listen:  
<https://us02web.zoom.us/j/81913604477>

|             |  |
|-------------|--|
|             | 1. Call to Order.  |
|             | 2. <del>Salute to the Flag.</del> (This item has been suspended due to the COVID-19 pandemic.)   |
|             | 3. Roll Call.  |
| Motion      | 4. Approve Minutes of the Union Sanitary District Board Meeting of September 27, 2021.   |
|             | 5. Written Communications.   |
|             | 6. Public Comment.<br>Public Comment is limited to three minutes per individual, with a maximum of 30 minutes per subject. If the comment relates to an agenda item, the speaker should address the Board at the time the item is considered. Speaker cards will be available in the Boardroom and are requested to be completed prior to the start of the meeting.  |
| Motion      | 7. Authorize the General Manager to Execute an Agreement and Task Order No. 1 with Hazen and Sawyer for the Thermal Dryer Feasibility Study <i>(to be reviewed by the Engineering and Information Technology Committee)</i> .  |
| Direction   | 8. Review PFM Asset Management LLC Performance and Provide Direction Regarding Approval of Continuation of Services with Portfolio Expansion <i>(to be reviewed by the Budget &amp; Finance Committee)</i> .   |
| Direction   | 9. Receive Presentation of CalPERS Actuarial Valuation as of June 30, 2020, with Projected Future Contributions and Provide Direction on Timing of Future Reports <i>(to be reviewed by the Budget &amp; Finance Committee)</i> .  |
| Information | 10. Computer and Student Loan Annual Update <i>(to be reviewed by the Budget &amp; Finance Committee)</i> .  |
| Information | 11. COVID-19 Update.   |
| Information | 12. Check Register.  |
| Information | 13. Committee Meeting Reports. <i>(No Board action is taken at Committee meetings):</i> <ol style="list-style-type: none"> <li>Budget &amp; Finance Committee – Wednesday, October 6, 2021, at 10:30 a.m. <ul style="list-style-type: none"> <li>Director Lathi and Director Toy</li> </ul> </li> <li>Engineering and Information Technology Committee – Friday, October 8, 2021, at 10:00 a.m. <ul style="list-style-type: none"> <li>Director Kite and Director Fernandez</li> </ul> </li> <li>Legal/Community Affairs Committee – will not meet.</li> <li>Legislative Committee – will not meet.</li> <li>Personnel Committee – will not meet.</li> </ol> |
| Information | 14. General Manager’s Report. <i>(Information on recent issues of interest to the Board)</i> .   |
|             | 15. Other Business:  |

- a. Comments and questions. *Directors can share information relating to District business and are welcome to request information from staff.*
  - b. Scheduling matters for future consideration.
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- 16. Adjournment – The Board will adjourn to the next Regular Board Meeting to be held virtually on Monday, October 25, 2021, at 4:00 p.m.
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The facilities at the District Offices are wheelchair accessible. Any attendee requiring special accommodations at the meeting should contact the General Manager's office at (510) 477-7503 at least 24 hours in advance of the meeting.



**BUDGET & FINANCE COMMITTEE MEETING**  
Committee Members: Director Lathi and Director Toy

**Directors**  
Manny Fernandez  
Tom Handley  
Pat Kite  
Anjali Lathi  
Jennifer Toy

**AGENDA**  
**Wednesday, October 6, 2021**  
**10:30 A.M.**

**Alvarado Conference Room**  
**5072 Benson Road**  
**Union City, CA 94587**

**Officers**  
Paul R. Eldredge  
*General Manager/  
District Engineer*

Karen W. Murphy  
*Attorney*

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1. Call to Order

2. Roll Call

3. Public Comment

Public Comment is limited to three minutes per individual, with a maximum of 30 minutes per subject. If the comment relates to an agenda item, the speaker should address the Board at the time the item is considered. Speaker cards will be available and are requested to be completed prior to the start of the meeting.

4. Items to be reviewed for the Regular Board meeting of October 11, 2021:

- Review PFM Asset Management LLC Performance and Consider Approval of Continuation of Services with Portfolio Expansion
- CalPERS Actuarial Valuation as of June 30, 2021, with Projected Future Contributions
- Computer and Student Loan Annual Update

5. Adjournment

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| Items reviewed at committee meetings will be included in the agenda packet for the upcoming Board meeting. No action will be taken at committee meetings. |
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**ENGINEERING AND INFORMATION TECHNOLOGY  
COMMITTEE MEETING**

Committee Members: Director Kite and Director Fernandez

**AGENDA**

**Friday, October 8, 2021  
10:00 A.M.**

**Alvarado Conference Room  
5072 Benson Road  
Union City, CA 94587**

**Directors**

Manny Fernandez  
Tom Handley  
Pat Kite  
Anjali Lathi  
Jennifer Toy

**Officers**

Paul R. Eldredge  
*General Manager/  
District Engineer*

Karen W. Murphy  
*Attorney*

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1. Call to Order

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2. Roll Call

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3. Public Comment

Public Comment is limited to three minutes per individual, with a maximum of 30 minutes per subject. If the comment relates to an agenda item, the speaker should address the Board at the time the item is considered. Speaker cards will be available and are requested to be completed prior to the start of the meeting.

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4. Items to be reviewed for the Regular Board meeting of October 11, 2021:

- Authorize the General Manager to Execute an Agreement and Task Order No. 1 with Hazen and Sawyer for the Thermal Dryer Feasibility Study
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5. Adjournment

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|--|
| Items reviewed at committee meetings will be included in the agenda packet for the upcoming Board meeting.<br>No action will be taken at committee meetings. |
|--|

The facilities at the District Offices are wheelchair accessible. Any attendee requiring special accommodations at the meeting should contact the General Manager's office at (510) 477-7503 at least 24 hours in advance of the meeting.

**MINUTES OF THE MEETING OF THE  
BOARD OF DIRECTORS OF  
UNION SANITARY DISTRICT/UNION SANITARY DISTRICT FINANCING  
AUTHORITY  
September 27, 2021**

**Consistent with Executive Orders No. N-08-21 from the Executive Department of the State of California, and Alameda County Health Officer Order No. 21-01a, the Monday, September 27, 2021, Regular Board Meeting was not physically open to the public and all Board Members teleconferenced into the meeting. To maximize public safety while still maintaining transparency and public access, members of the public were able to observe the Board Meeting and provide public comment by sending comments to the Board Clerk.**

**CALL TO ORDER**

President Kite called the meeting to order at 4:00 p.m. The regular meeting time was modified due to the COVID-19 emergency.

**SALUTE TO THE FLAG**

**ROLL CALL**

PRESENT: Pat Kite, President  
Anjali Lathi, Vice President  
Manny Fernandez, Secretary  
Jennifer Toy, Director  
Tom Handley, Director

STAFF: Paul Eldredge, General Manager/District Engineer  
Karen Murphy, District Counsel  
Mark Carlson, Business Services Manager/CFO  
Sami Ghossain, Technical Services Manager  
Armando Lopez, Treatment and Disposal Services Manager  
James Schofield, Collection Services Manager  
Robert Simonich, Fabrication, Maintenance, and Construction Manager  
Ric Pipkin, Enhanced Treatment and Site Upgrade Program Manager  
Shawn Nesgis, Collection Services Coach  
Jose Rodrigues, Collection Services Coach  
Marcus Lee, Treatment and Disposal Services Coach  
Curtis Bosick, Enhanced Treatment and Site Upgrade Program Coordinator  
Regina McEvoy, Executive Assistant to the General Manager/Board Clerk

**APPROVE MINUTES OF THE UNION SANITARY DISTRICT BOARD MEETING OF  
SEPTEMBER 13, 2021**

It was moved by Vice President Lathi, seconded by Director Handley, to Approve the Minutes of the Board Meeting of September 13, 2021. Motion carried with the following vote:

AYES: Fernandez, Handley, Kite, Lathi, Toy  
NOES: None  
ABSTAIN: None  
ABSENT: None

**APPROVE MINUTES OF THE UNION SANITARY DISTRICT SPECIAL BOARD MEETING OF SEPTEMBER 15, 2021**

It was moved by Secretary Fernandez, seconded by Director Toy, to Approve the Minutes of the Special Board Meeting of September 15, 2021. Motion carried with the following vote:

AYES: Fernandez, Handley, Kite, Lathi, Toy  
NOES: None  
ABSTAIN: None  
ABSENT: None

**AUGUST 2021 MONTHLY OPERATIONS REPORT**

This item was reviewed by the Budget & Finance and Legal/Community Affairs Committees. General Manager Eldredge provided an overview of the Odor Report and Work Group Reports, and Business Services Manager Carlson reviewed the financial reports included in the Board meeting packet.

**WRITTEN COMMUNICATIONS**

There were no written communications.

**PUBLIC COMMENT**

There was no public comment.

**DESIGNATE AND APPOINT TWO BOARD REPRESENTATIVES TO AD HOC SUBCOMMITTEE ON GENERAL MANAGER CONTRACT NEGOTIATIONS**

District Counsel Murphy stated the Fourth Amended and Restated Employment Agreement between Union Sanitary District and Paul R. Eldredge to serve as General Manager and District Engineer, approved October 12, 2020, provides the Board will review the General Manager's compensation annually. This item requests the Board designate two Board members to serve as the Board's representatives for contract review and compensation negotiations with the General Manager, the Board considers this action annually prior to the General Manager's performance evaluation. Staff recommended the Board designate and appoint two representatives to an ad hoc subcommittee on the General Manager's contract negotiations.

It was moved by Director Toy, seconded by Director Handley, to Appoint President Kite and Secretary Fernandez to the Ad Hoc Subcommittee on General Manager Contract Negotiations. Motion carried with the following vote:

AYES: Fernandez, Handley, Kite, Lathi, Toy  
NOES: None

ABSTAIN: None  
ABSENT: None

**CONSIDER A RESOLUTION TO ACCEPT A SANITARY SEWER EASEMENT FOR TRACT 8391 – CENTERVILLE PIONEER, LOCATED ON BONDE WAY NEAR POST STREET, IN THE CITY OF FREMONT**

This item was reviewed by the Legal/Community Affairs Committee. Technical Services Manager Ghossain stated Centerville Presbyterian Church will construct a residential development on the west side of Bonde Way between Post Street and Fremont Boulevard, in the City of Fremont. Sanitary sewer service for the development will be provided by new sewer mains in the development's roadways that discharge to an existing sewer main in Bonde Way. The roadways within Tract 8391 do not meet the City of Fremont's street dimensions and structure setback requirements for public streets and have been designated as private. Centerville Presbyterian Church constructed the new sewer mains with the private roadways and granted the District a sanitary sewer easement that provides for access and maintenance of the new sewer mains. Staff recommended the Board consider a resolution to accept a sanitary sewer easement for Tract 8391 – Centerville Pioneer, located on Bonde Way near Post Street, in the City of Fremont.

It was moved by Director Handley, seconded by Vice President Lathi, to Adopt Resolution No. 2935 Accepting Sanitary Sewer Easements for Tract 8391 – Centerville Pioneer, Located at Bonde Way Near Post Street, in the City of Fremont, California. Motion carried with the following vote:

AYES: Fernandez, Handley, Kite, Lathi, Toy  
NOES: None  
ABSTAIN: None  
ABSENT: None

**CONSIDER A RESOLUTION TO ADOPT A REVISED ADDENDUM TO THE MITIGATED NEGATIVE DECLARATION FOR THE STANDBY POWER GENERATION SYSTEM UPGRADE PROJECT AND APPROVE MODIFICATIONS TO THE STANDBY POWER GENERATION SYSTEM UPGRADE PROJECT AS SET FORTH IN THE REVISED ADDENDUM TO THE MITIGATED NEGATIVE DECLARATION**

This item was reviewed by the Engineering and Information Technology Committee. Technical Services Manager Ghossain stated the Revised Addendum to the Initial Study/Mitigated Negative Declaration (IS/MND) addressed changes in the site plan, further reductions in the construction footprint, and refinements in the Mitigation Monitoring and Reporting Plan (MMRP). These changes would not result in any new significant impacts not previously disclosed in the circulated IS/MND and Addendum, nor result in a substantial increase in the magnitude of any significant environmental impact previously identified; therefore, a revised Addendum to the adopted IS/MND will be sufficient to meet the requirements of CEQA. The Revised Addendum to the IS/MND was circulated through the California State Clearinghouse for a 15-day review and staff received no comments during the review period. Following adoption of the Revised Addendum to the IS/MND for the Project, staff will file the Notice of Determination with the Governor's Office of Planning and Research and the Alameda County Clerk. Staff

recommended the Board consider a resolution to adopt a Revised Addendum to IS/MND and MMRP for the Standby Power Generation System Upgrade Project and approve modifications to the Project as set forth in the Revised Addendum to the Mitigated Negative Declaration.

It was moved by Secretary Fernandez, seconded by Director Toy, to Adopt Resolution No. 2936 Adopting a Revised Addendum to the Mitigated Negative Declaration and Mitigation Monitoring and Reporting Plan for the Standby Power Generation System Upgrade Project and Approve Modifications to the Standby Power Generation System Upgrade Project as Set Forth in the Revised Addendum to the Mitigated Negative Declaration. Motion carried with the following vote:

AYES: Fernandez, Handley, Kite, Lathi, Toy  
NOES: None  
ABSTAIN: None  
ABSENT: None

**RECEIVE INFORMATION AND PROVIDE DIRECTION REGARDING NEW LEGISLATION, AB 361, ALLOWING TELECONFERENCED MEETINGS IN EMERGENCIES AND APPROACH TO FUTURE MEETINGS**

District Counsel Murphy stated AB 361 was signed into law by the Governor on September 16, 2021, and went into effect immediately. AB 361 amends the Brown Act to allow local legislative bodies to continue using teleconferencing and virtual meeting technology after the September 30, 2021, expiration of the current Brown Act exemptions when there is a “proclaimed state of emergency” by the Governor. Though adopted in the context of the pandemic, AB 361 will allow for virtual meetings during other proclaimed emergencies, such as earthquakes or wildfires, where physical attendance may present a risk. Staff recommended the Board provide direction regarding AB 361 and approach to future Board meetings.

The Board directed staff to continue with virtual Board meetings and ensure the District takes all necessary actions to be in compliance with AB 361.

**INFORMATION ITEMS:**

**Status of Priority 1 Capital Improvement Program Projects**

This item was reviewed by the Engineering and Information Technology Committee. Technical Services Manager Ghossain stated the Board approved the Capital Improvement Program (CIP) budget of \$42.68 million for design and construction of 27 CIP projects in June 2020. The Projects were ranked Priority 1, 2, or 3 based upon criteria prepared by staff and approved by the Executive Team. There were 17 projects ranked as Priority 1 for Fiscal Year 2021. The status of Priority 1 CIP Projects is reviewed by the Executive Team at the end of each quarter and a copy of the status report was included in the Board meeting packet.

**Fourth Quarterly Report on the Capital Improvement Program for FY21**

This item was reviewed by the Engineering and Information Technology Committee. Technical Services Manager Ghossain stated fourth quarter expenditures for Fiscal Year 2021 were presented in graphs included in the Board meeting packet. The graphs

depicted actual expenditures versus approved budget for Capacity Fund 900, the Renewal and Replacement Fund 800, and for both funds combined. Total CIP expenditures up to June 30, 2021, were under projections for the fourth quarter by approximately \$8.92 million. Projects that had significant variances from projected expenditures were presented in a table included in the Board meeting packet.

### **COVID-19 Update**

General Manager Eldredge provided an update regarding COVID-19 impacts on District operations and coordination efforts.

### **Check Register**

Staff responded to Boardmember questions regarding the check register.

### **COMMITTEE MEETING REPORTS:**

The Budget & Finance, Legal/Community Affairs, and Engineering and Information Technology Committees met.

### **GENERAL MANAGER'S REPORT:**

- The General Manager's Evaluation Closed Session will be held virtually Tuesday, October 5, 2021, at 4:00 p.m.

### **OTHER BUSINESS:**

There was no other business.

### **ADJOURNMENT:**

The meeting was adjourned at 4:49 p.m. to a Board Closed Session to be held virtually on Tuesday, October 5, 2021, at 4:00 p.m.

SUBMITTED:

ATTEST:

\_\_\_\_\_  
REGINA McEVOY  
BOARD CLERK

\_\_\_\_\_  
MANNY FERNANDEZ  
SECRETARY

APPROVED:

\_\_\_\_\_  
PAT KITE  
PRESIDENT

Adopted this 11<sup>th</sup> day of October 2021

**Directors**

Manny Fernandez  
Tom Handley  
Pat Kite  
Anjali Lathi  
Jennifer Toy

**Officers**

Paul R. Eldredge  
*General Manager/  
District Engineer*

Karen W. Murphy  
*Attorney*

**OCTOBER 11, 2021  
BOARD OF DIRECTORS MEETING  
AGENDA ITEM # 7**

**TITLE:** **Authorize the General Manager to Execute an Agreement and Task Order No. 1 with Hazen and Sawyer for the Thermal Dryer Feasibility Study (*This is a Motion Item*)**

**SUBMITTED:** Paul R. Eldredge, General Manager/District Engineer  
Sami E. Ghossain, Technical Services Work Group Manager  
Raymond Chau, CIP Team Coach  
Somporn Boonsalat, Associate Engineer  
Blake Ehlers, Assistant Engineer

**Recommendation**

Staff recommends the Board authorize the General Manager to execute an agreement and Task Order No. 1 with Hazen and Sawyer (Hazen) in the amount of \$127,570 for the Thermal Dryer Feasibility Study (Study).

**Discussion**

The purpose of Task Order No. 1 is to authorize Hazen to conduct a study of the District's current infrastructure and determine the feasibility of adding a new thermal dryer process to the current biosolids treatment process at the Alvarado Wastewater Treatment Plant (WWTP). The study will review up to five types of dryers, which will take the District's existing "Class B" biosolids composed of approximately 24% solids and generate "Class A" biosolids which could be up to 90% solids. The best thermal drying system will be recommended for the WWTP based on system complexity, current and future considerations, staff training requirements, serviceability, site footprint, life cycle cost effectiveness, "Class A" biosolid marketability, and any other criteria as identified by staff and Hazen during the Study.

Hazen's scope of services and fee for Task Order No. 1 are summarized below:

| <b>Task No.</b> | <b>Task Description Fee</b>  | <b>Fee</b>       |
|-----------------|--|------------------|
| 1               | Kick-off Meeting   | \$3,600          |
| 2               | Gather and Review Background Information                             | \$11,460         |
| 3               | Evaluation of Thermal Drying Technologies                            | \$37,420         |
| 4               | Evaluate Compatibility of Recommended Technology with Existing Plant | \$22,470         |
| 5               | Recommended Drying Technology  | \$17,360         |
| 6               | Feasibility Report   | \$21,440         |
| 7               | Project Management   | \$8,960          |
| 8               | Quality Assurance/Quality Control                                    | \$4,860          |
|                 | <b>Task Order No-to-Exceed Fee</b>                                   | <b>\$127,570</b> |

Staff believes the proposed fee is reasonable based on the level of effort required to evaluate multiple thermal dryer systems, review the WWTP's infrastructure to support the equipment, conduct multiple workshops with staff, provide life cycle costs of the alternative thermal dryer systems, and develop a final recommendation.

Staff anticipates Hazen will complete the Study by summer 2022.

### **Background**

Biosolids are divided into "Class A" and "Class B" designations based on treatment methods. Requirements for meeting "Class A" and "Class B" biosolids are determined by the federal regulation, Title 40 of the Code of Federal Regulations, Part 503 – Standards for the Use or Disposal of Sewage Sludge (40 CFR Part 503). The different classes have specified treatment requirements for pollutants, pathogens, and vector attraction reduction, as well as general requirements and management practices. The 40 CFR Part 503 treatment processes for "Class A" biosolids eliminate pathogens, including viruses. Generally, pathogens may exist when requirements are met under 40 CFR Part 503 for "Class B" biosolids, for which the EPA has land application restrictions that allow time for pathogen degradation for harvesting crops and turf, for grazing of animals, and public contact.

The District uses anaerobic digestion followed by dewatering via centrifuges for volume reduction to produce biosolids for beneficial reuse as defined by 40 CFR Part 503. The biosolids from the WWTP are either directly land applied or composted by others prior to land application. The treatment levels achieved in the WWTP's anaerobic digestion process designates the treated biosolids as "Class B" biosolids.

In 2018, the District completed a Solids System Capacity Assessment Study, which evaluated alternative technologies for “Class A” biosolids production. The technologies evaluated included the following:

- Class A Screw Press
- High Temperature Thermal Hydrolysis
- Lystek’s Low Temperature Thermal Hydrolysis
- Pasteurization
- Thermal Drying
- Temperature Phased Anaerobic Digestion
- Composting

Pasteurization and low temperature thermal drying were recommended for detailed evaluation when there is a need to consider producing “Class A” biosolids. The final report concluded that thermal drying, although more costly and requiring more equipment and a larger footprint, was the more proven technology with more operating experience from other wastewater agencies.

Due to the limited land application sites, local restrictions, and rising costs to dispose of “Class B” biosolids, staff believes it would be prudent to conduct the Study now to determine whether producing “Class A” biosolids at the WWTP is feasible and cost effective.

Figure 1 shows the locations of the seven primary digesters, the Centrifuge Building, and the limited available footprint in the biosolids treatment areas in the west side of the WWTP.

#### **Previous Board Action**

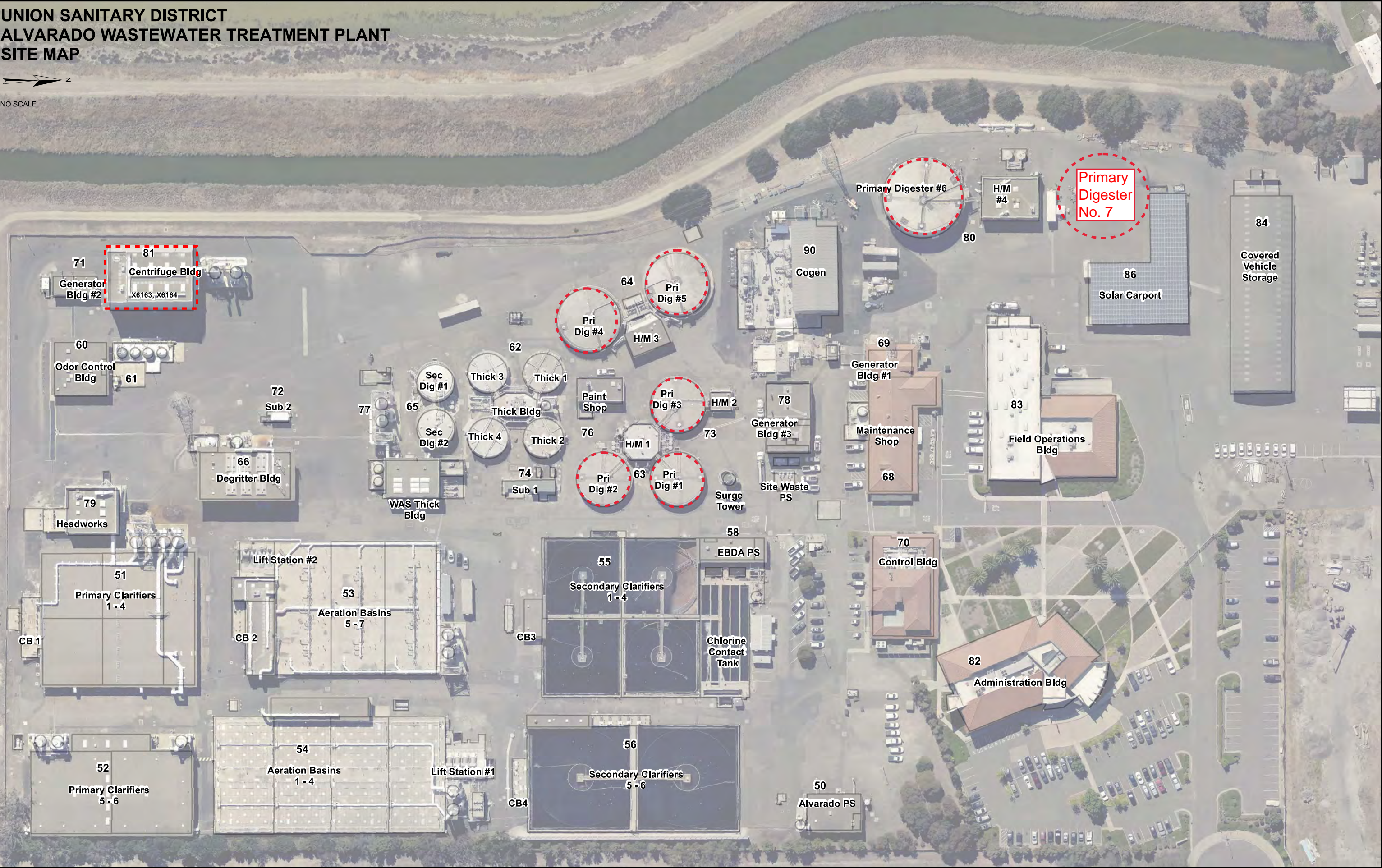
None.

PRE/SEG/RC/SB/BE/mb

Attachment: Figure 1 – Site Map  
Agreement  
Task Order No. 1

FIGURE 1

UNION SANITARY DISTRICT  
ALVARADO WASTEWATER TREATMENT PLANT  
SITE MAP



**THERMAL DRYER FEASIBILITY STUDY**  
**AGREEMENT**  
**BETWEEN**  
**UNION SANITARY DISTRICT**  
**AND**  
**HAZEN AND SAWYER**  
**FOR**  
**PROFESSIONAL SERVICES**

THIS IS AN AGREEMENT MADE AS OF \_\_\_\_\_, BETWEEN UNION SANITARY DISTRICT (hereinafter referred to as District), and HAZEN AND SAWYER (hereinafter referred to as Engineer).

WITNESSETH:

WHEREAS, District intends to conduct a Thermal Dryer Feasibility Study (hereinafter referred to as Study), and,

WHEREAS, District requires certain professional services in connection with the Study (hereinafter referred as Services); and

WHEREAS, Engineer is qualified and prepared to provide such Services;

NOW, THEREFORE, in consideration of the promises contained herein, the parties agree as follows:

**ARTICLE 1 - SERVICES TO BE PERFORMED BY ENGINEER**

- 1.1 Specific Services and the associated scope of services, payment, schedule, and personnel will be defined in specific Task Order as mutually agreed by District and Engineer.
- 1.2 All Task Orders will by reference incorporate the terms and conditions of this Agreement, and become formal amendments hereto.

**ARTICLE 2 - COMPENSATION**

- 2.1 Compensation for consulting services performed under this Agreement shall include:

- (1) Direct labor costs, multiplied by an agreed upon fixed factor (the Multiplier), to compensate for fringe benefits, indirect costs, and profit.
- (2) Non-labor direct study charge not included in the fixed factor and acceptable, without any markup.
- (3) Subconsultant costs, with a maximum markup of 5%.

Definitions are as follows:

- (a) Direct labor is salaries and wages paid to personnel for time directly chargeable to the study. Direct labor does not include the cost of Engineer's statutory and customary benefits, such as sick leave, holidays, vacations, and medical and retirement benefits nor the cost of the time of executive and administrative personnel and others whose time is not identifiable to the study.
- (b) Fringe benefits include Engineer's statutory and customary benefits, such as sick leave, holidays, vacations, medical and retirement benefits, incentive pay, tuition, and other costs classified as employee benefits.
- (c) Indirect costs are allocations of costs that are not directly chargeable to a specific engagement and are commonly referred to as Engineer's overhead. Indirect costs include provisions for such things as clerical support, office space, light and heat, insurance, statutory and customary employee benefits, and the time of executive and administrative personnel and others whose time is not identifiable to the Study or to any other study. Under no circumstances can the same labor costs be charged as direct labor and also appear at the same time as indirect costs, and vice versa.
- (d) The Multiplier is a multiplicative factor which is applied to direct labor costs, and compensates Engineer for fringe benefits and indirect costs (overhead) and profit.
- (e) Other non-labor direct study charges shall be included in the overhead and these charges include typical expenses as cost of transportation and subsistence, printing and reproduction, computer time and programming costs, identifiable supplies, outside consultant's charges, subcontracts, and charges by reviewing authorities."

Alternatively, the District and the Engineer may agree to utilize the fully-encumbered hourly rates and fees for Services performed by the

Engineer. These hourly rates and fees shall be based on the Engineer's rate schedule published at the time this Agreement or Task Order is executed and shall be attached to each applicable Task Order.

- 2.2 Reimbursement for mileage shall not exceed the prevailing Internal Revenue Service's standard mileage rate.
- 2.3 A *Cost Ceiling* will be established for each Task Order which is based upon estimated labor-hours and cost estimates. Costs as described above, comprising direct labor, overhead cost, and other direct costs, shall be payable up to a Cost Ceiling as specified in the Task Order. A *Maximum Fee Ceiling*, or *Task Order Firm Ceiling*, will also be established for each Task Order which includes the Cost Ceiling plus the Professional Fee.
- 2.4 Engineer shall invoice District monthly for the actual costs incurred, and a pro-rated portion of the Professional Fee for work performed during the previous month. If the Maximum Fee Ceiling is reached, the Engineer will complete the agreed-upon work for the Maximum Fee Ceiling. With District staff approval, labor hours may be reallocated within the tasks without renegotiation in such a manner so as not to exceed the Maximum Fee Ceiling.
- 2.5 The Engineer shall provide the District with a review of the budget amounts when 75 percent of the Cost Ceiling for any task has been expended. Engineer may request a revision in the Cost Ceiling for performance of this Agreement, and will relate the rationale for the revision to the specific basis of estimate as defined in the Scope of Services. Such notification will be submitted to the District at the earliest possible date. The authorized Cost Ceiling shall not be exceeded without written approval of the District.
- 2.6 The Professional Fee will not be changed except in the case of a written amendment to the Agreement which alters the Scope of Services. District and Engineer agree to negotiate an increase or decrease in Cost Ceiling and Professional Fee for any change in Scope of Services required at any time during the term of this Agreement. Engineer will not commence work on the altered Scope of Services until authorized by District.
- 2.7 Direct labor rates are subject to revision to coincide with Engineer's normal salary review schedule. Adjustments in direct labor rates shall not affect the firm ceiling without prior written authorization of the District.
- 2.8 District shall pay Engineer in accordance with each Task Order for Services.

- 2.9 Engineer shall submit monthly statements for Services rendered. District will make prompt monthly payments in response to Engineer's monthly statements.

### ARTICLE 3 - PERIOD OF SERVICE

- 3.1 Engineer's services will be performed and the specified services rendered and deliverables submitted within the time period or by the date stipulated in each Task Order.
- 3.2 Engineer's services under this Agreement will be considered complete when the services are rendered and/or final deliverable is submitted and accepted by District.
- 3.3 If any time period within or date by which any of the Engineer's services are to be completed is exceeded through no fault of Engineer, all rates, measures and amounts of compensation and the time for completion of performance shall be subject to equitable adjustment.

### ARTICLE 4 - DISTRICT'S RESPONSIBILITIES

District will do the following in a timely manner so as not to delay the services of Engineer.

- 4.1 Provide all criteria and full information as to District's requirements for the services assignment and designate in writing a person with authority to act on District's behalf on all matters concerning the Engineer's services.
- 4.2 Furnish to Engineer all existing studies, reports and other available data pertinent to the Engineer's services, obtain or authorize Engineer to obtain or provide additional reports and data as required, and furnish to Engineer services of others required for the performance of Engineer's services hereunder, and Engineer shall be entitled to use and rely upon all such information and services provided by District or others in performing Engineer's services under this Agreement.
- 4.3 Arrange for access to and make all provisions for Engineer to enter upon public and private property as required for Engineer to perform services hereunder.
- 4.4 Perform such other functions as are indicated in each Task Order related to duties of District.

- 4.5 Bear all costs incident to compliance with the requirements of this Section.

#### ARTICLE 5 - STANDARD OF CARE

- 5.1 Engineer shall exercise the same degree of care, skill, and diligence in the performance of the Services as is ordinarily provided by a professional Engineer under similar circumstance and Engineer shall, at no cost to District, re-perform services which fail to satisfy the foregoing standard of care.

#### ARTICLE 6 - OPINIONS OF COST AND SCHEDULE

- 6.1 Since Engineer has no control over the cost of labor, materials, equipment or services furnished by others, or over contractors', subcontractors' , or vendors' methods of determining prices, or over competitive bidding or market conditions or economic conditions, Engineer's cost estimate and economic analysis shall be made on the basis of qualification and experience as a professional engineer.
- 6.2 Since Engineer has no control over the resources provided by others to meet contract schedules, Engineer's forecast schedules shall be made on the basis of qualification and experience as a professional Engineer.
- 6.3 Engineer cannot and does not guarantee that proposals, bids or actual study costs will not vary from his cost estimates or that actual schedules will not vary from his forecast schedules.

#### ARTICLE 7 - SUBCONTRACTING

- 7.1 No subcontract shall be awarded by Engineer until prior written approval is obtained from the District.

#### ARTICLE 8 - ENGINEER-ASSIGNED PERSONNEL

- 8.1 Engineer shall designate in writing an individual to have immediate responsibility for the performance of the services and for all matters relating to performance under this Agreement. Key personnel to be assigned by Engineer will be stipulated in each Task Order. Substitution of any assigned person shall require the prior written approval of the District, which shall not be unreasonably withheld. If the District

determines that a proposed substitution is not responsible or qualified to perform the services then, at the request of the District, Engineer shall substitute a qualified and responsible person.

## ARTICLE 9 - OWNERSHIP OF DOCUMENTS

- 9.1 All work products, drawings, data, reports, files, estimate and other such information and materials (except proprietary computer programs, including source codes purchased or developed with Engineer monies) as may be accumulated by Engineer to complete services under this Agreement shall be owned by the District.
- 9.2 Engineer shall retain custody of all study data and documents other than deliverables specified in each Task Order, but shall make access thereto available to the District at all reasonable times the District may request. District may make and retain copies for information and reference.
- 9.3 All deliverables and other information prepared by Engineer pursuant to this Agreement are instruments of service in respect to this study. They are not intended or represented to be suitable for reuse by District or others on extensions of this Study or on any other study. Any reuse without written verification or adaptation by Engineer for the specific purpose intended will be at District's sole risk and without liability or legal exposure to Engineer; and District shall indemnify and hold harmless Engineer against all claims, damages, losses, and expenses including attorney's fees arising out of or resulting from such reuse. Any such verification or adaptation will entitle Engineer to further compensation at rates to be agreed upon by District and Engineer.

## ARTICLE 10 - RECORDS OF LABOR AND COSTS

- 10.1 Engineer shall maintain for all Task Orders, records of all labor and costs used in claims for compensation under this Agreement. Records shall mean a contemporaneous record of time for personnel; a methodology and calculation of the Multiplier for fringe benefits and indirect costs; and invoices, time sheets, or other factors used as a basis for determining other non-labor Study charges. These records must be made available to the District upon reasonable notice of no more than 48 hours during the period of the performance of this Agreement.
- 10.2 After delivery of Services (completion of Task Orders) under this Agreement, the Engineer's records of all costs used in claims for compensation under this Agreement shall be available to District's accountants and auditors for inspection and verification. These records

will be maintained by Engineer and made reasonably accessible to the District for a period of three (3) years after completion of Task Orders under this Agreement.

- 10.3 Engineer agrees to cooperate and provide any and all information concerning the Study costs which are a factor in determining compensation under this Agreement as requested by the District or any public agency which has any part in providing financing for, or authority over, the Services which are provided under the Agreement.
- 10.4 Failure to provide documentation or substantiation of all Study costs used as a factor in compensation paid under Article 2 hereof will be grounds for District to refuse payment of any statement submitted by the Engineer and for a back charge for any District funds, including interest from payment; or grant, matching, or other funds from agencies assisting District in financing the Services specified in this Agreement.

#### ARTICLE 11 - INSURANCE

Engineer shall provide and maintain at all times during the performance of the Agreement the following insurances:

- 11.1 Workers' Compensation and Employer's Liability Insurance for protection of Engineer's employees as required by law and as will protect Engineer from loss or damage because of personal injuries, including death to any of his employees.
- 11.2 Comprehensive Automobile Liability Insurance. Engineer agrees to carry a Comprehensive Automobile Liability Policy providing bodily injury liability. This policy shall protect Engineer against all liability arising out of the use of owned or leased automobiles both passenger and commercial. Automobiles, trucks, and other vehicles and equipment (owned, not owned, or hired, licensed or unlicensed for road use) shall be covered under this policy. Limits of liability for Comprehensive Automobile Liability Insurance shall not be less than \$1,000,000 Combined Single Limit.
- 11.3 Comprehensive General Liability Insurance as will protect Engineer and District from any and all claims for damages or personal injuries, including death, which may be suffered by persons, or for damages to or destruction to the property of others, which may arise from the Engineer's operations under this Agreement, which insurance shall name the District as additional insured. Said insurance shall provide a minimum of \$1,000,000 Combined Single Limit coverage for personal injury, bodily injury, and property damage for each occurrence and

aggregate. Such insurance will insure Engineer and District from any and all claims arising from the following:

1. Personal injury;
2. Bodily injury;
3. Property damage;
4. Broad form property damage;
5. Independent contractors;
6. Blanket contractual liability.

- 11.4 Engineer shall maintain a policy of professional liability insurance, protecting it against claims arising out of negligent acts, errors, or omissions of Engineer pursuant to this Agreement, in an amount of not less than \$1,000,000. The said policy shall cover the indemnity provisions under this Agreement.
- 11.5 Engineer agrees to maintain such insurance at Engineer's expense in full force and effect in a company or companies satisfactory to the District. All coverage shall remain in effect until completion of the Study.
- 11.6 Engineer will furnish the District with certificates of insurance and endorsements issued by Engineer's insurance carrier and countersigned by an authorized agent or representative of the insurance company. The certificates shall show that the insurance will not be cancelled without at least thirty (30) days' prior written notice to the District. The certificates for liability insurance will show that liability assumed under this Agreement is included. The endorsements will show the District as an additional insured on Engineer's insurance policies for the coverage required in Article 11 for services performed under this Agreement, except for workers' compensation and professional liability insurance.
- 11.7 Waiver of Subrogation: Engineer hereby agrees to waive subrogation which any insurer of Engineer may acquire from Engineer by virtue of the payment of any loss. Engineer agrees to obtain any endorsement that may be necessary to effect this waiver of subrogation.

The Workers' Compensation policy shall be endorsed with a waiver of subrogation in favor of the District for all work performed by the Engineer, its employees, agents and subconsultants.

## ARTICLE 12 - LIABILITY AND INDEMNIFICATION

- 12.1 Having considered the risks and potential liabilities that may exist during the performance of the Services, and in consideration of the promises included herein, District and Engineer agree to allocate such liabilities in accordance with this Article 12. Words and phrases used in this Article shall be interpreted in accordance with customary insurance industry usage and practice.
- 12.2 Engineer shall indemnify and save harmless the District and all of their agents, officers, and employees from and against all claims, demands, or causes of action of every name or nature to the extent caused by the negligent error, omission, or act of Engineer, its agents, servants, or employees in the performance of its services under this Agreement. In no event shall Engineer's costs to defend the District exceed the Engineer's proportionate percentage of negligence or fault, based upon a final judicial determination, except that if one or more defendants in an action are unable to pay its share of defense costs due to bankruptcy or dissolution, Engineer shall meet and confer with the other defendant parties regarding defense costs.
- 12.3 In the event an action for damages is filed in which negligence is alleged on the part of District and Engineer, Engineer agrees to defend District. In the event District accepts Engineer's defense, District agrees to indemnify and reimburse Engineer on a pro rata basis for all expenses of defense and any judgment or amount paid by Engineer in resolution of such claim. Such pro rata share shall be based upon a final judicial determination of proportionate negligence or, in the absence of such determination, by mutual agreement.
- 12.4 Engineer shall indemnify District against legal liability for damages arising out of claims by Engineer's employees. District shall indemnify Engineer against legal liability for damages arising out of claims by District's employees.
- 12.5 Indemnity provisions will be incorporated into all Study contractual arrangements entered into by District and will protect District and Engineer to the same extent.
- 12.6 Upon completion of all services, obligations and duties provided for in the Agreement, or in the event of termination of this Agreement for any reason, the terms and conditions of this Article shall survive.
- 12.7 To the maximum extent permitted by law, Engineer's liability for District's damage will not exceed the aggregate compensation received by Engineer under this Agreement or the maximum amount of professional

liability insurance available at the time of any settlement or judgment, which ever is greater.

#### ARTICLE 13 - INDEPENDENT CONTRACTOR

Engineer undertakes performance of the Services as an independent contractor and shall be wholly responsible for the methods of performance. District will have no right to supervise the methods used, but District will have the right to observe such performance. Engineer shall work closely with District in performing Services under this Agreement.

#### ARTICLE 14 - COMPLIANCE WITH LAWS

In performance of the Services, Engineer will comply with applicable regulatory requirements including federal, state, and local laws, rules, regulations, orders, codes, criteria and standards. Engineer shall procure the permits, certificates, and licenses necessary to allow Engineer to perform the Services. Engineer shall not be responsible for procuring permits, certificates, and licenses required for any construction unless such responsibilities are specifically assigned to Engineer in Task Order.

#### ARTICLE 15 - NONDISCLOSURE OF PROPRIETARY INFORMATION

Engineer shall consider all information provided by District and all drawings, reports, studies, design calculations, specifications, and other documents resulting from the Engineer's performance of the Services to be proprietary unless such information is available from public sources. Engineer shall not publish or disclose proprietary information for any purpose other than the performance of the Services without the prior written authorization of District or in response to legal process.

#### ARTICLE 16 - TERMINATION OF CONTRACT

- 16.1 The obligation to continue Services under this Agreement may be terminated by either party upon seven days written notice in the event of substantial failure by the other party to perform in accordance with the terms hereof through no fault of the terminating party.
- 16.2 District shall have the right to terminate this Agreement or suspend performance thereof for District's convenience upon written notice to Engineer, and Engineer shall terminate or suspend performance of Services on a schedule acceptable to District. In the event of termination or suspension for District's convenience, District will pay Engineer for all

services performed and costs incurred including termination or suspension expenses. Upon restart of a suspended study, equitable adjustment shall be made to Engineer's compensation.

#### ARTICLE 17 - UNCONTROLLABLE FORCES

- 17.1 Neither District nor Engineer shall be considered to be in default of this Agreement if delays in or failure of performance shall be due to uncontrollable forces, the effect of which, by the exercise of reasonable diligence, the nonperforming party could not avoid. The term "uncontrollable forces" shall mean any event which results in the prevention or delay of performance by a party of its obligations under this Agreement and which is beyond the control of the nonperforming party. It includes, but is not limited to, fire, flood, earthquake, storms, lightening, epidemic, war, riot, civil disturbance, sabotage, inability to procure permits, licenses, or authorizations from any state, local, or federal agency or person for any of the supplies, materials, accesses, or services required to be provided by either District or Engineer under this Agreement, strikes, work slowdowns or other labor disturbances, and judicial restraint.
- 17.2 Neither party shall, however, be excused from performance if nonperformance is due to uncontrollable forces which are removable or remediable, and which the nonperforming party could have, with the exercise of reasonable diligence, removed or remedied with reasonable dispatch. The provisions of this Article shall not be interpreted or construed to require Engineer or District to prevent, settle, or otherwise avoid a strike, work slowdown, or other labor action. The nonperforming party shall, within a reasonable time of being prevented or delayed from performance by an uncontrollable force, give written notice to the other party describing the circumstances and uncontrollable forces preventing continued performance of the obligations of this Agreement. The Engineer will be allowed reasonable negotiated extension of time or adjustments for District initiated temporary stoppage of services.

#### ARTICLE 18 - MISCELLANEOUS

- 18.1 A waiver by either District or Engineer of any breach of this Agreement shall not be binding upon the waiving party unless such waiver is in writing. In the event of a written waiver, such a waiver shall not affect the waiving party's rights with respect to any other or further breach.
- 18.2 The invalidity, illegality, or unenforceability of any provision of this Agreement, or the occurrence of any event rendering any portion or

provision of this Agreement void, shall in no way effect the validity or enforceability of any other portion or provision of the Agreement. Any void provision shall be deemed severed from the Agreement and the balance of the Agreement shall be construed and enforced as if the Agreement did not contain the particular portion or provision held to be void.

#### ARTICLE 19 - INTEGRATION AND MODIFICATION

- 19.1 This Agreement (consisting of pages 1 to ##), together with all Task Orders executed by the undersigned, is adopted by District and Engineer as a complete and exclusive statement of the terms of the Agreement between District and Engineer. This Agreement supersedes all prior agreements, contracts, proposals, representations, negotiations, letters, or other communications between the District and Engineer pertaining to the Services, whether written or oral.
- 19.2 The Agreement may not be modified unless such modifications are evidenced in writing signed by both District and Engineer.

#### ARTICLE 20 - SUCCESSORS AND ASSIGNS

- 20.1 District and Engineer each binds itself and its directors, officers, partners, successors, executors, administrators, assigns and legal representatives to the other party to this Agreement and to the partners, successors, executors, administrators, assigns, and legal representatives of such other party, in respect to all covenants, agreements, and obligations of this Agreement.
- 20.2 Neither District nor Engineer shall assign, sublet, or transfer any rights under or interest in (including, but without limitation, monies that may become due or monies that are due) this Agreement without the written consent of the other, except to the extent that the effect of this limitation may be restricted by law. Unless specifically stated to the contrary in any written consent to an assignment, no assignment will release or discharge the assignor from any duty or responsibility under this Agreement. Nothing contained in this paragraph shall prevent Engineer from employing such independent engineers, associates, and subcontractors as he may deem appropriate to assist him/her in the performance of the Services hereunder and in accordance with Article 7.
- 20.3 Nothing herein shall be construed to give any rights or benefits to anyone other than District and Engineer.

## ARTICLE 21 – INFORMATION SYSTEM SECURITY

When the District determines this article is applicable, the Engineer shall obtain written approval from the District representative prior to accessing District internal systems through real-time computer connections. Upon approval, the Engineer will use only in-bound connections to accomplish a legitimate business need and a previously defined and approved task. As a condition of approval, the Engineer shall:

- a) Be running a current operating system supported by the District with up-to-date security patches applied as defined in the District COE/Non-COE document.
- b) Have anti-virus software installed on his/her personal computer with up-to-date virus signatures.
- c) Have personal firewall software installed and enabled on their computer.
- d) Understand and sign the District's Electronic Equipment Use Policy, number 2160.

The District reserves the right to audit the security measures in effect on Engineer's connected systems without prior notice. The District also reserves the right to terminate network connections immediately with all Engineer's systems not meeting the above requirements.

## ARTICLE 22 – EMPLOYEE BACKGROUND CHECK

Engineer, at no additional expense to the District, shall conduct a background check for each of its employees, as well as for the employees of its subconsultants (collectively "Consultant Employees") who will have access to District's computer systems, either through on-site or remote access, or whose contract work requires an extended presence on the District's premises. The minimum background check process for any District consultant shall include, but not be limited to

- 1. California residents: Criminal Records (County and State Criminal Felony and Misdemeanor
- 2. Out of State residents: Federal criminal search of the National Criminal Database,

The background check shall be conducted and the results submitted to the District prior to initial access by Consultant Employees. If at any time, it is discovered that a Consultant Employee has a criminal record that includes a felony or misdemeanor, the Engineer is required to inform the District immediately and the District will assess the circumstances surrounding the conviction, time frame, nature, gravity, and relevancy of the conviction to the job duties, to determine

whether the Consultant Employee will be placed or remain on a District assignment. The District may withhold consent at its sole discretion. The District may also conduct its own criminal background check of the Consultant Employees. Failure of the Engineer to comply with the terms of this paragraph may result in the termination of its contract with the District.

#### ARTICLE 23 - EXCEPTIONS

No exceptions.

IN WITNESS THEREOF, the parties hereto have made and executed this Agreement as of the day and year first above written.

DISTRICT

ENGINEER

Union Sanitary District

Hazen and Sawyer

By: \_\_\_\_\_  
Paul R. Eldredge, P.E.  
General Manager/District Engineer

By: \_\_\_\_\_  
Marc Solomon, PE, BCCE, D.WRE  
Vice President

Date: \_\_\_\_\_

Date: \_\_\_\_\_

# **THERMAL DRYER FEASIBILITY STUDY**

TASK ORDER NO. 1

to

AGREEMENT

BETWEEN

UNION SANITARY DISTRICT

AND

HAZEN AND SAWYER

FOR

PROFESSIONAL SERVICES

Dated \_\_\_\_\_

## **1. PURPOSE**

The objective of this Task Order is to review and assess the District's current infrastructure and determine the feasibility of adding a new thermal dryer technology to the current treatment process at the WWTP.

## **2. PROJECT COORDINATION**

All work related to this task order shall be coordinated through the District's Project Manager, Somporn Boonsalat.

## **3. SCOPE OF SERVICES**

The task numbers in this Scope of Services are associated with the cost presented in Exhibit A and the schedule outlined in section 8.

This section describes the Hazen's (Engineer's) Scope of Services to conduct a study to evaluate thermal drying technologies, determine the infrastructure requirements and constraints of the WWTP, and prepare a report summarizing the

study findings and the life cycle costs to implement the project. The findings from this feasibility study will assist the District in planning for a potential project to address the challenges of biosolids management. Engineer's Scope of Services includes the following tasks:

### **Task 1 – Kick-off Meeting**

**1.1 Kick-Off Meeting** - Working with the District's Project Manager, Engineer shall coordinate and schedule the project kick-off meeting to confirm the scope and objectives of the project and communicate the project plan, proposed thermal drying technologies for evaluation, proposed schedule, and request for information. Two weeks prior to the meeting, Engineer shall submit a data request for information, project plan, project schedule, and a meeting agenda for the District's review. Engineer shall conduct the meeting and prepare meeting minutes within 5 working days following the meeting.

### **Task 2 – Gather and Review Background Information**

**2.1. Data Gathering** – Engineer shall review available information and prepare a data request for missing information.

**2.2. Data Review** – Engineer shall review the received background materials including operational data, drawings, reports, and other pertinent information provided by the District.

**2.3. Criteria Development** – Engineer shall review and develop the criteria that will be utilized for the evaluations and recommendations. The selected criteria will be weighted based on the District's input. Engineer shall facilitate a workshop with the District to finalize the evaluation criteria.

**2.4. Data Review Workshop** – Engineer shall conduct a workshop to summarize and discuss the findings and establish basis of equipment performance and sizing criteria.

### **Task 3 – Evaluation of Thermal Drying Technologies**

**3.1. Market Assessment** – Engineer's subconsultant, Material Matters, shall conduct an end-use market assessment. This task will define categories of opportunities to be considered for the market survey for Class A/EQ dried product in the region and shall identify specific beneficial use and disposal options within approximately 50 air-miles of the District's service area for each

dried product and conduct up to 30 phone surveys with potential customers from the market(s) identified.

**3.2. Technology Evaluation** –With the District’s input, Engineer shall evaluate a maximum of five types of thermal drying technologies, including dryers that run on electric power, and dryers that facilitate the pyrolysis process. Engineer shall evaluate the advantages and disadvantages of each type of equipment, operation and maintenance requirements and complexities, required staff skill set, and scalability for future expansion. Engineer shall life cycle costs for each alternative and compare to existing system that incorporates a Class 5 construction cost estimate and the District’s annual O&M costs.

**3.3. Multi-Level Decision Making Tool** – Engineer shall develop and use their Multi-Level Decision Making Tool (HazenConverge) to evaluate different drying technologies.

**3.4. Alternatives Evaluation Workshop** – Engineer shall conduct a workshop to review the alternatives evaluation findings and select up to three recommended technologies for Task 4 analysis.

#### **Task 4 – Evaluate Compatibility of Recommended Technology with Existing Plant**

**4.1. Identify Location** - Engineer shall review potential locations for a new thermal drying facility and assess whether the new drying system and ancillaries can be placed inside an existing building.

**4.2. Evaluate Utility Requirements** - Engineer shall evaluate the energy balance and utility (power, water, drain, etc.) requirements, and determine whether there is sufficient excess cogeneration heat or additional energy/heat is needed for the new process.

**4.3. Utility Requirements Workshop** – Engineer shall conduct a workshop to review alternative locations and get input from the District.

#### **Task 5 – Recommended Drying Technology**

**5.1. Recommended Technology** – Engineer shall present the assessment process and recommend the best thermal dryer system/location for the District.

**5.2. Costs** – Engineer shall provide life cycle costs for the recommended technology/equipment taking into consideration any future regulations regarding land application.

- 5.3. Recommended Technology Workshop** – Engineer shall conduct a workshop to present and review the details of the selected technology and cost estimates.

## **Task 6 – Preparation of Feasibility Report**

- 6.1 Prepare Draft Feasibility Report** – Engineer shall prepare a draft feasibility report to include an executive summary, introduction and project background, project purpose, the results from the alternatives evaluation, recommended technology, and life cycle costs for the selected technology. Engineer shall provide electronic copies in Word and PDF format for the District's review. The draft report will be submitted one week prior to the Draft Feasibility Report Workshop. Comments received from the District on the draft document shall be incorporated into the final document.

- 6.2. Draft Feasibility Report Workshop** – Engineer shall conduct a workshop to present the draft feasibility report and receive verbal comments from the District.

- 6.3. Prepare Final Feasibility Report** – Engineer shall document all comments received from District on the draft document and incorporate comments as appropriate into the final document. Engineer shall submit electronic copies in both Word and PDF formats of the final report to the District.

## **Task 7 – Project Management**

- 7.1 Project Management** – Engineer shall prepare monthly invoices and reports which shall include a summary of what was completed during the month and a budget summary of what was spent and what is remaining.

- 7.2 Project Meetings** – Working with the District's Project Manager, Engineer shall coordinate and schedule bi-monthly project progress meetings. Assume twelve meetings (up to 30 minutes) will be required. The purpose of these meetings will be to review the project schedule, budget, and action items with the District.

- 7.3 Site Visits (2)** – Working with District Staff, Engineer shall coordinate site visits for the Engineer's team. Assume two site visits will be needed to confirm existing site conditions and dimensions and to evaluate existing infrastructure.

## **Task 8 – Quality Assurance / Quality Control (QA/QC)**

**8.1 Quality Assurance / Quality Control (QA/QC)** - Engineer shall focus on QA/QC throughout the project, and each project deliverable undergoes a quality assurance review by a senior engineer in the specialty in question prior to being submitted to the District for review. Following the District's review, comments received from the District will be logged and prior to submitting final documents to the District, the QA/QC reviewer shall verify that all comments received from the District have been addressed and incorporated into the final documents.

## **4. DELIVERABLES**

### **Task 1 – Kick-off Meeting**

*Task 1 Deliverables:*

- *Kick-off meeting agenda, presentation slides and meeting minutes (PDF).*

### **Task 2 – Background Information**

*Task 2 Deliverable:*

- *Data Review and Criteria Development Workshop agenda, presentation slides and meeting minutes (PDF).*

### **Task 3 – Evaluation of Thermal Drying Technologies**

*Task 3 Deliverable:*

- *Alternatives Evaluation Workshop agenda, presentation slides and meeting minutes (PDF).*

### **Task 4 – Evaluate Compatibility of Recommended Technology with Existing Plant**

*Task 4 Deliverable:*

- *Utility Requirements Workshop agenda, presentation slides and meeting minutes (PDF).*

### **Task 5 – Recommended Drying Technology**

*Task 5 Deliverables:*

- *Recommended Technology Workshop agenda, presentation slides and meeting minutes (PDF).*
- *Layout of the selected technology (PDF).*

- *Detailed cost estimate of the selected technology (PDF).*

## **Task 6 – Preparation of Feasibility Report**

### *Task 6 Deliverables:*

- *Draft Feasibility Report Workshop agenda, presentation, and meeting minutes (PDF).*
- *A draft and final feasibility report (Word, PDF).*

## **Task 7 – Project Management**

### *Task 7 Deliverables:*

- *Project Management Plan (PDF).*
- *Monthly Reports (PDF).*
- *Monthly Invoices (PDF).*

## **Task 8 – Quality Assurance / Quality Control (QA/QC)**

### *Task 8 Deliverable:*

- *Log of comments and responses to District comments on the draft feasibility report (PDF).*

5. NOT USED

6. NOT USED

7. PAYMENT TO THE ENGINEER

Payment to the Engineer shall be as called for in Article 2 of the Agreement. The Multiplier for this work shall be 3.15, the profit shall be 10 percent, and the not-to-exceed amount shall be \$127,570.00. A summary of the anticipated distribution of cost and manpower between tasks is shown in Exhibit A.

The following table summarizes the previously-executed and proposed task orders and amendments under the Agreement:

| <b>Task Order /<br/>Amendment</b>                        | <b>Not to<br/>Exceed<br/>Amount</b> | <b>Board<br/>Authorization<br/>Required?</b> | <b>District Staff<br/>Approval</b> |
|--|-------------------------------------|--|------------------------------------|
| Task Order No. 1 –<br>Thermal Dryer<br>Feasibility Study | \$127,570.00                        | Yes  | Paul Eldredge                      |
| <b>Total</b>   | <b>\$127,570.00</b>                 |  |                                    |

8. TIME OF COMPLETION

All work defined in this Task Order shall be completed by July 2022 and subject to the conditions of Article 3 of this Agreement. A summary of the anticipated schedule of work is shown below.

| <b>Est. Date</b> | <b>Activity</b>   |
|------------------|---|
| October 2021     | Notice to proceed   |
| January 2022     | Complete Review of Background Information and Conduct Workshop          |
| March 2022       | Complete Evaluation of Thermal Drying Technologies and Conduct Workshop |
| April 2022       | Recommend Drying Technology and Conduct Workshop                        |
| May 2022         | Complete Assessment of Recommended Technology and Conduct Workshop      |
| June 2022        | Complete Draft Feasibility Report and Conduct Workshop                  |
| July 2022        | Complete Final Feasibility Report                                       |

9. KEY PERSONNEL

Engineering personnel assigned to this Task Order No. 1 are as follows:

| <u>Role</u>              | <u>Key Person to be Assigned</u> |
|--------------------------|----------------------------------|
| Principal-in-Charge      | Marc Solomon, PE, BCCE, D.WRE    |
| Project Manager          | Allan Briggs, PE                 |
| QA/QC                    | Michael Bullard, PE              |
| Technical Advisor        | Mohammed Abu-Orf, PhD            |
| Biosolids Technical Lead | Derya Dursun Balci, PhD, PE      |
| Process Engineer         | Justing Irving, PE               |
| Cost Estimating          | Chris Portner, PE                |
| Electrical               | Jack Yao, PE                     |
| Market Analysis          | Lisa Challenger                  |

Key personnel shall not be changed except in accordance with Article 8 of the Agreement.

IN WITNESS WHEREOF, the parties hereto have made and executed this Task Order No. 1 as of \_\_\_\_\_ and therewith incorporate it as part of the Agreement.

DISTRICT

ENGINEER

Union Sanitary District

Hazen and Sawyer

By: \_\_\_\_\_  
Paul R. Eldredge, P.E.  
General Manager/District Engineer

By: \_\_\_\_\_  
Marc Solomon, PE, BCCE, D.WRE  
Vice President

Date: \_\_\_\_\_

Date: \_\_\_\_\_

EXHIBIT A  
Thermal Dryer Feasibility Study



| Project Role   | Project Director    | Project Manager | QA/QC Manager   | Technical Lead   | Biosolids Technical Lead | Process       | Engineering Support | Cost Estimate | Electrical       | Engineering Support | Admin         | CAD Designer      | Hanzen & Sawyer ODCs    | Material Matters | Material Matters ODCs | Sub Total  |
|--|---------------------|-----------------|-----------------|------------------|--------------------------|---------------|---------------------|---------------|------------------|---------------------|---------------|-------------------|-------------------------|------------------|-----------------------|------------|
| Name   | Marc Solomon        | Allan Briggs    | Michael Bullard | Mohammed Abu-orf | Derya Dursun Balci       | Justin Irving | Hersy Enriquez      | Chris Portner | Jack Yao         | Kaithin McGovern    | America Avila | David Schlossberg |                         |                  |                       |            |
| Base Classification  | Principal-in-Charge | Project Manager | QA/QC Manager   | Vice President   | Associate                | Associate     | Principal Engineer  | Associate     | Senior Associate | Assistant Engineer  | Admin         | CAD Designer      | Travel and Reproduction |                  |                       |            |
| Billing Rate   | \$320               | \$270           | \$280           | \$320            | \$230                    | \$220         | \$180               | \$220         | \$280            | \$140               | \$150         | \$130             |                         |                  |                       |            |
| Task 1 - Kick off meeting  | 1                   | 2               | 1               | 2                | 2                        | 2             | 2                   | 0             | 0                | 4                   | 0             | 0                 |                         |                  |                       | \$ 3,600   |
| Task 2 - Gather and Review Background Information  | 0                   | 2               | 0               | 0                | 8                        | 8             | 4                   | 0             | 4                | 32                  | 0             | 0                 | \$ 1,000                |                  |                       | \$ 11,460  |
| Task 3 - Evaluation of Thermal Drying Technologies   | 0                   | 0               | 4               | 8                | 20                       | 0             | 20                  | 16            | 0                | 48                  | 0             | 0                 |                         | \$ 15,000        | \$ 300                | \$ 37,420  |
| Task 4 - Evaluate Compatibility of Recommended Technology with Existing Plant  | 1                   | 1               | 2               | 4                | 20                       | 8             | 12                  | 0             | 8                | 48                  | 0             | 12                | \$ 1,000                |                  |                       | \$ 22,470  |
| Task 5 - Recommended Drying Technology   | 0                   | 0               | 4               | 4                | 12                       | 0             | 12                  | 8             | 4                | 40                  | 0             | 12                |                         |                  |                       | \$ 17,360  |
| Task 6 - Preparation of Feasibility Report   | 1                   | 2               | 4               | 4                | 24                       | 8             | 8                   | 0             | 4                | 40                  | 8             | 8                 | \$ 500                  |                  |                       | \$ 21,440  |
| Task 7 - Project Management  | 2                   | 24              | 0               | 0                | 8                        | 0             | 0                   | 0             | 0                | 0                   | 0             | 0                 |                         |                  |                       | \$ 8,960   |
| Task 8 - Quality Assurance/Quality Control (QA/QC)   | 2                   | 2               | 4               | 8                | 0                        | 0             | 0                   | 0             | 0                | 0                   | 0             | 0                 |                         |                  |                       | \$ 4,860   |
| Labor Hours Sub Total  | 7                   | 33              | 19              | 30               | 94                       | 26            | 58                  | 24            | 20               | 212                 | 8             | 32                |                         |                  |                       |            |
| Grand Total  |                     |                 |                 |                  |                          |               |                     |               |                  |                     |               |                   |                         |                  |                       | \$ 127,570 |
| Notes:<br>1 ODCs for H&S Labor refers to travel and reproduction costs.<br>2 ODCs for SubConsultant labor is based on a 5% mark up.<br>3 Mileage will be charged at 2020 Federal Rate for mileage. |                     |                 |                 |                  |                          |               |                     |               |                  |                     |               |                   |                         |                  |                       |            |

**Directors**

Manny Fernandez  
Tom Handley  
Pat Kite  
Anjali Lathi  
Jennifer Toy

**Officers**

Paul R. Eldredge  
*General Manager/  
District Engineer*

Karen W. Murphy  
*Attorney*

**OCTOBER 11, 2021  
BOARD OF DIRECTORS MEETING  
AGENDA ITEM #8**

**TITLE:** Review PFM Asset Management LLC Performance and Provide Direction Regarding Approval of Continuation of Services With Portfolio Expansion (This is a direction item)

**SUBMITTED:** Paul R. Eldredge, General Manager/District Engineer  
Mark Carlson, CFO, Work Group Manager

**Recommendation**

Receive information from staff regarding PFM asset Management, CAMP and LAIF accounts and provide direction accordingly.

**Discussion**

PFM Asset Management LLC has managed a portion of the District's assets since March 2019. The District thought it was prudent to evaluate PFM's performance over a period of time before deciding if them managing additional assets was warranted. Over the last two and a half years, their performance has been \$3.5 million dollars and 2.84%.

The District also utilizes the Local Agency Investment Pool (LAIF) and The California Asset Management Program (CAMP) accounts to manage other assets. The balance of these accounts is nearing the maximum amount and the current performance of LAIF and CAMP (currently 22 and 5 basis points respectively) have caused staff to evaluate if these assets could be better served if managed by PFM.

Staff conducted a recent cash flow analysis and determined the range of assets that could be transferred was between \$5 million to \$50 million. The amount invested with any of the accounts will fluctuate over the next 5 to 10 years as the District funds the projects these assets have been allocated for. District staff will ensure that any additional funds transferred to PFM will meet all of the liquidity and cash flow requirements necessary to support the operational and capital needs of the District.

**Background**

In October 2018, the Board approved a Portfolio Management Services Contract with PFM Assets Management LLC. This contract was a result of an RFP the District issued for portfolio management services. The strategy behind the RFP was to maximize investment returns to the extent practicable, while maintaining compliance with all policy, legal and regulatory requirements for government agency investments. PFM offers the District a tenured and dedicated team with both investment and associated financial advisory capabilities. PFM has over 38 years of public sector experience and has been managing assets in California since 1989.

**Previous Board Action**

October 18, 2018 - Consider Approval of Portfolio Management Services Contract – Item was approved by the Board.

**Attachment**

none



**Directors**  
Manny Fernandez  
Tom Handley  
Pat Kite  
Anjali Lathi  
Jennifer Toy

**Officers**  
Paul R. Eldredge  
*General Manager/  
District Engineer*

Karen W. Murphy  
*Attorney*

**OCTOBER 11, 2021  
BOARD OF DIRECTORS MEETING  
AGENDA ITEM # 9**

**TITLE:** Receive Presentation of CalPERS Actuarial Valuation as of June 30, 2020, with Projected Future Contributions, and Provide Direction on Timing of Future Reports. *(This is an Direction Item)*

**SUBMITTED:** Paul R. Eldredge, General Manager/District Engineer  
Mark Carlson, Business Services Work Group Manager/CFO

**Recommendation**

Receive updated information regarding the Districts pension plan and provide direction on the timing of future reports.

**Discussion**

Attached Reports

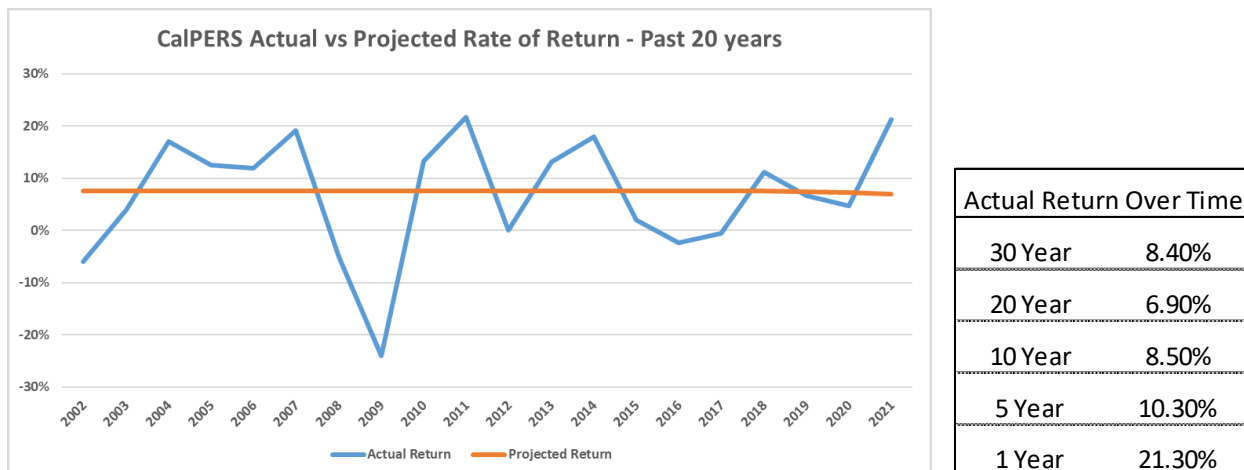
Each year the District receives a pension valuation from the California Public Employees' Retirement System (CalPERS) regarding the status of its pension plan. The valuation is attached to this report and described below:

Actuarial Valuation as of June 30, 2020 for the Miscellaneous Plan – This report contains the results of the June 30, 2020 actuarial valuation of the District's miscellaneous pension plan along with information regarding rates and projections that can be utilized for both short and long term planning as it relates to pension expenses for the District. The report is provided by CalPERS and is dated July 2021.

CalPERS Status

CalPERS most recent numbers, for 06/30/2021, states that they manage more than \$469 billion in pension assets for its 2 plus million members. Funding for the plan comes from three sources: 13% from employee contributions, 29% from employer contributions, and 58% from investment earnings. CalPERS model assumes an average investment return of 7% over time, although that

will be dropping to 6.8% in FY 23/24. The following graph shows the actual performance against the projected performance from 2002 through 2021:



This above graph illustrates the volatility in the funds' performance over the last 20 years. Each year that the performance falls below the expected rate of return, additional revenues are required to fund the deficit. The only other sources of funding are from employers and employees. Also shown above is the 21.3% return on investments for pension assets during the most recent year ending June 30, 2021.

#### District Status

The Districts pension payments consist of three components. The first two are paid by the District and combined represents the Districts annual pension obligation. The third is paid by the employee. These items are defined as follows:

- Employers Normal Cost (NC) represents the annual cost of service for active employees. It is shown as a percentage of payroll and is paid monthly through the year. As payroll increases, the Districts NC (in dollars) increases accordingly.
- Employers Unfunded Accrued Liability (UAL) is an annual fixed payment that represents the amortized dollar amount needed to fund:
  - Past earned benefits that were not sufficiently funded at the time earned
  - Changes in the mortality tables for retirees living longer
  - Reduction in the assumed earnings rate
  - Other smoothing methods to soften rate impacts
- Employee Contributions are a negotiated direct reduction from the employees earned pay and is expressed as a percent.

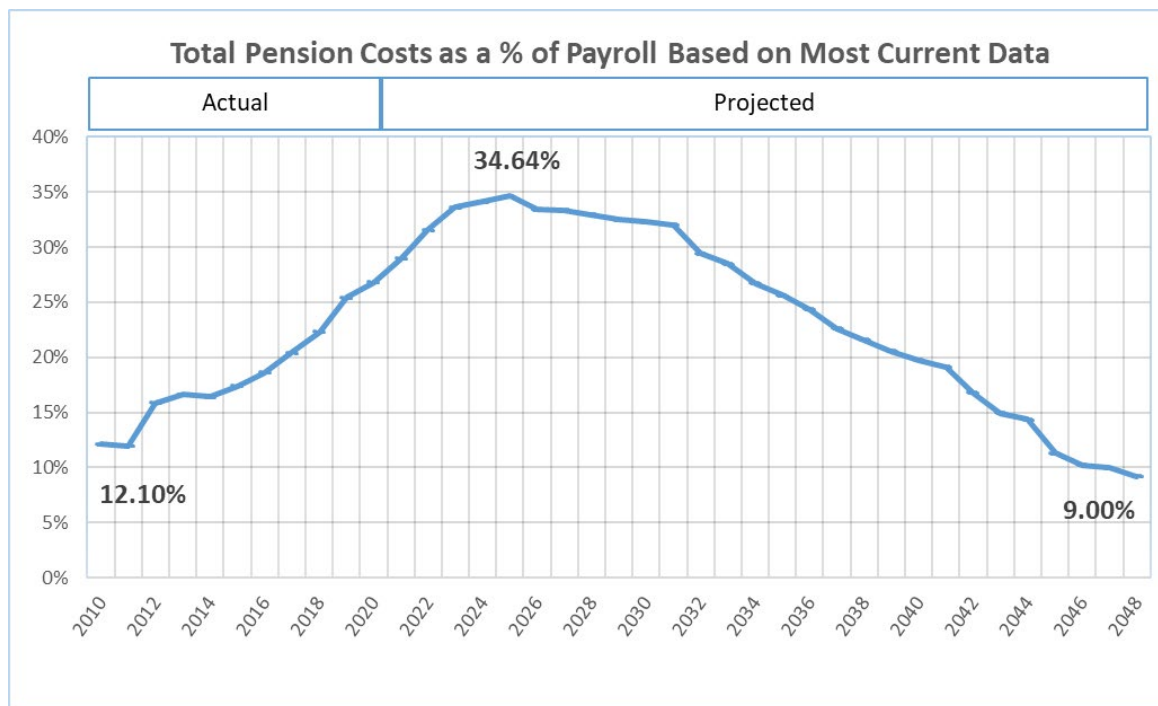
The chart below shows the above three items expressed as a percentage and in dollars for FY's 21/22 through 27/28.

| Union Sanitary District Projected Future Pension Contributions |              |              |              |              |              |              |              |              |
|--|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
|  | Actual       | Projected    |              |              |              |              |              | Change       |
| Fiscal Year  | 2021-22      | 2022-23      | 2023-24      | 2024-25      | 2025-26      | 2026-27      | 2027-28      | FY 22 to 28  |
| Employer Normal Cost % of Payroll                              | 10.400%      | 10.200%      | 10.000%      | 9.800%       | 9.600%       | 9.400%       | 9.200%       | -11.54%      |
| Employer Normal Cost   | \$ 2,074,302 | \$ 2,105,616 | \$ 2,136,581 | \$ 2,167,134 | \$ 2,197,209 | \$ 2,226,734 | \$ 2,255,634 | \$ 181,332   |
|  |              |              |              |              |              |              |              |              |
| UAL Employer % of Payroll                                      | 21.495%      | 23.398%      | 24.118%      | 24.842%      | 23.787%      | 23.970%      | 23.729%      | 10.39%       |
| UAL Employer   | \$ 4,287,313 | \$ 4,830,090 | \$ 5,152,913 | \$ 5,493,510 | \$ 5,444,191 | \$ 5,678,053 | \$ 5,817,769 | \$ 1,530,456 |
|  |              |              |              |              |              |              |              |              |
| Total Employer Paid % of Payroll                               | 31.895%      | 33.598%      | 34.118%      | 34.642%      | 33.387%      | 33.370%      | 32.929%      | 3.24%        |
| Total Employer Paid (1)  | \$ 6,361,615 | \$ 6,935,706 | \$ 7,289,494 | \$ 7,660,644 | \$ 7,641,400 | \$ 7,904,787 | \$ 8,073,403 | \$ 1,711,788 |
|  |              |              |              |              |              |              |              |              |
| Employee % of Payroll  | 8.000%       | 8.000%       | 8.000%       | 8.000%       | 8.000%       | 8.000%       | 8.000%       | 0.00%        |
| Employee   | \$ 1,595,617 | \$ 1,651,464 | \$ 1,709,265 | \$ 1,769,089 | \$ 1,831,007 | \$ 1,895,093 | \$ 1,961,421 | \$ 365,804   |
|  |              |              |              |              |              |              |              |              |
| Estimated Wages (2)  | \$19,945,214 | \$20,643,296 | \$21,365,812 | \$22,113,615 | \$22,887,592 | \$23,688,658 | \$24,517,761 | \$ 4,572,547 |

(1) FY 21/22 Based on Adopted Budget. FY 22/23 - 27/28 based on CalPERS calculations.

(2) CALPERS uses a 2.75% year-over-year increase in wages assumption. For purposes of this table, staff used the internally estimated wages for the first year and a 3.5% YOY increase thereafter.

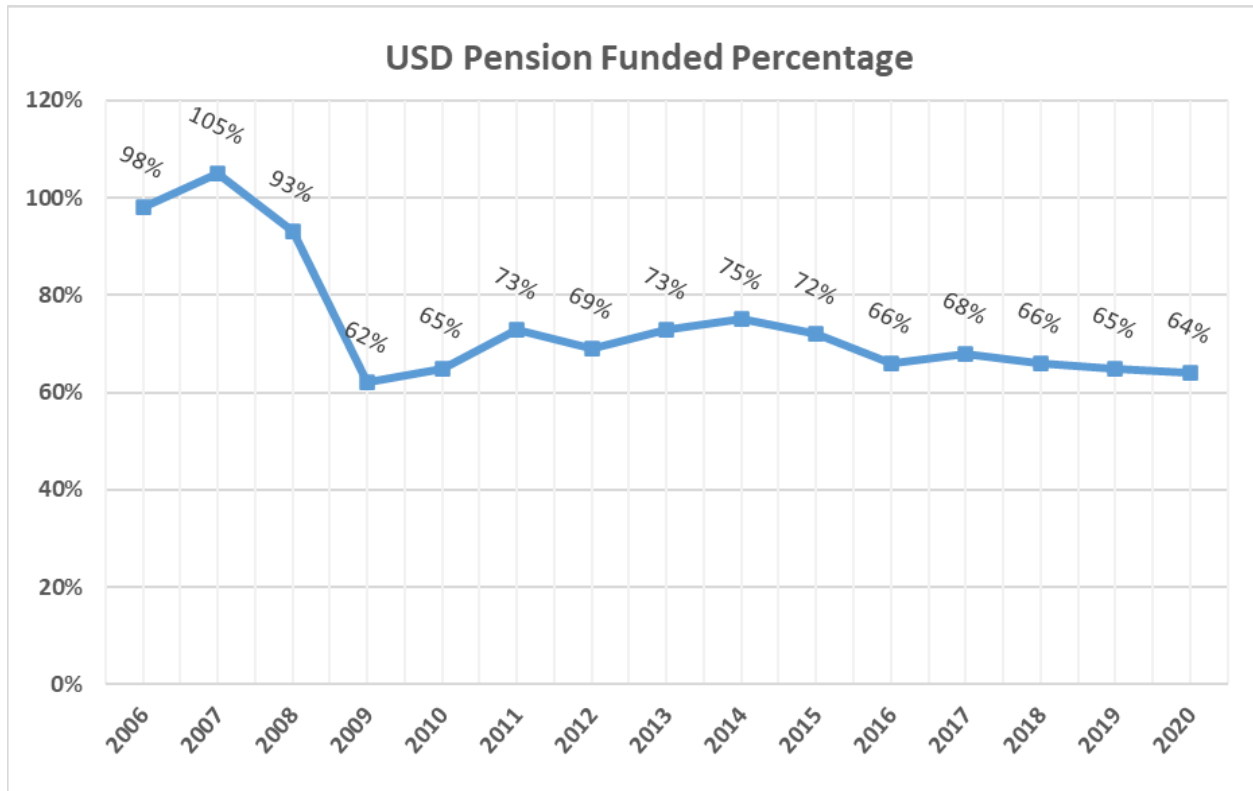
The Districts combined pension costs (NC + UAL) as a percent of payroll have increased from FY 09/10 when it was 12.10%. It is projected to peak at 34.64% in FY 24/25 and then decrease over time as the UAL is paid off at which time the rate drops to match the projected NC of 9.00% in FY 47/48. The chart below shows the change over time:



### Plan Funded Status

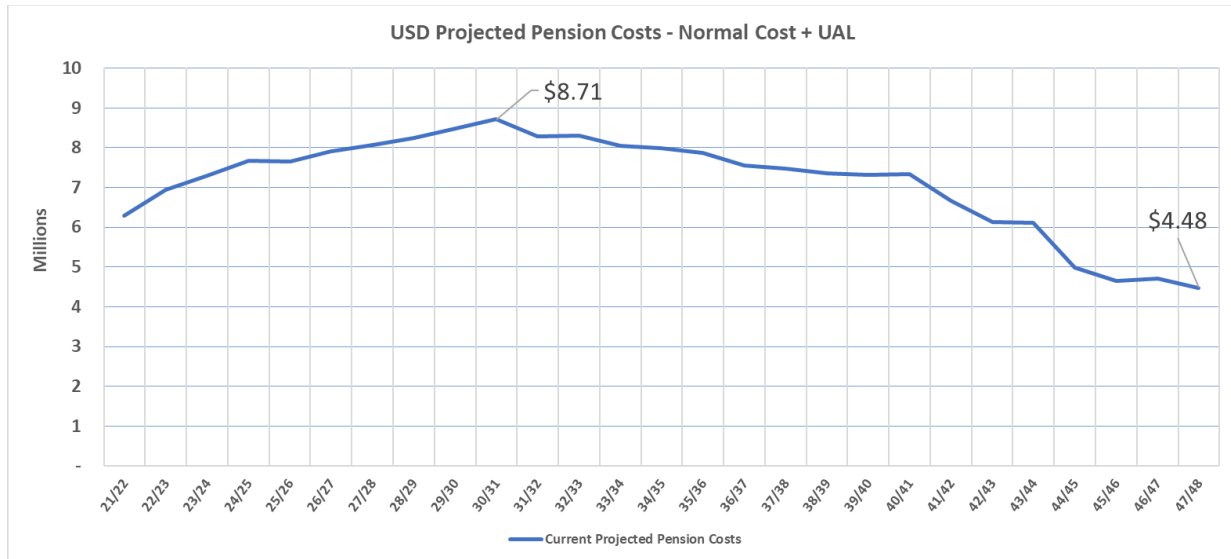
At 06/30/2020, CalPERS latest valuation data shows the USD pension plan had a total pension liability of \$165.5 million and total plan assets of \$106.3 million dollars leaving a difference, or UAL, of \$59.2 million. This equates to a funded status of 64%. These numbers do not reflect the

most current CalPERS earnings of 21.3% in FY 20/21. Internal estimates, considering those earnings, would increase the funded status of the USD pension plan to approximately 72%. The chart below shows the funded status of the District's pension plan since 2006.



#### Future Annual Pension Costs

The chart below shows the projected annual pension costs (normal cost + UAL) from CalPERS most recent data through FY 47/48. That data does not yet include the positive impact of the 21.3% earnings from FY 20/21 or future impacts of the District's 115 Pension Trust. We anticipate receiving that data from CalPERS in the spring of next year. Internal estimates are that the positive impacts of the FY 20/21 earnings alone, may reduce the District's UAL by as much as \$15 million dollars.



### Timing of Pension Information to the Board

This information has historically been presented to the Board in the April of each year. For the past two years the data has been presented in October. After reviewing the timing of the valuation reports, staff is recommending that this report switch back to April to coincide with the CalPERS GASB 68 valuation report and the annual budget process. Also at that time, staff would present the status of the 115 Pension Trust and its impact on future pension costs.

### **Background**

This report is submitted annually to the Board to provide information on the status of the CalPERS pension plan provided to its employees.

### **Previous Board Action**

None

### **Attachments**

Actuarial Valuation as of June 30, 2020 for the Miscellaneous Plan



## California Public Employees' Retirement System

### Actuarial Office

400 Q Street, Sacramento, CA 95811 | Phone: (916) 795-3000 | Fax: (916) 795-2744

888 CalPERS (or 888-225-7377) | TTY: (877) 249-7442 | [www.calpers.ca.gov](http://www.calpers.ca.gov)

July 2021

### Miscellaneous Plan of the Union Sanitary District (CalPERS ID: 6011550262) Annual Valuation Report as of June 30, 2020

Dear Employer,

Attached to this letter, you will find the June 30, 2020 actuarial valuation report of your CalPERS pension plan. **Provided in this report is the determination of the minimum required employer contributions for fiscal year 2022-23.** In addition, the report also contains important information regarding the current financial status of the plan as well as projections and risk measures to aid in planning for the future.

Actuarial valuations are based on assumptions regarding future plan experience including investment return and payroll growth, eligibility for the types of benefits provided, and longevity among retirees. The CalPERS Board of Administration adopts these assumptions after considering the advice of CalPERS actuarial and investment teams and other professionals. Each actuarial valuation reflects all prior differences between actual and assumed experience and adjusts the contribution requirements as needed. This valuation is based on an investment return assumption of 7.0%, which was adopted by the board in December 2016. Other assumptions used in this report are those recommended in the CalPERS Experience Study and Review of Actuarial Assumptions report from December 2017.

#### Required Contributions

The table below shows the minimum required employer contributions and the Employee PEPR Rate for fiscal year 2022-23 along with an estimate of the required contribution for fiscal year 2023-24. Employee contributions other than cost sharing (whether paid by the employer or the employee) are in addition to the results shown below. **The required employer contributions in this report do not reflect any cost sharing arrangement you may have with your employees.**

| Fiscal Year              | Employer Normal Cost Rate | Employer Amortization of Unfunded Accrued Liability | Employee PEPR Rate |
|--------------------------|---------------------------|---|--------------------|
| 2022-23                  | 10.20%                    | \$4,830,090   | 6.25%              |
| <i>Projected Results</i> |                           |   |                    |
| 2023-24                  | 10.0%                     | \$5,153,000   | TBD                |

The actual investment return for fiscal year 2020-21 was not known at the time this report was prepared. The projections above assume the investment return for that year would be 7.0%. **To the extent the actual investment return for fiscal year 2020-21 differs from 7.0%, the actual contribution requirements for fiscal year 2023-24 will differ from those shown above.** For additional details regarding the assumptions and methods used for these projections please refer to the "Projected Employer Contributions" in the "Highlights and Executive Summary" section. This section also contains projected required contributions through fiscal year 2027-28.

#### Changes from Previous Year's Valuations

There are no significant changes in actuarial assumptions or policies in your 2020 actuarial valuation. Your annual valuation report is an important tool for monitoring the health of your CalPERS pension Plan. Your report contains useful information about future required contributions and ways to control your plan's funding progress.

In addition to your annual actuarial report, my office has developed tools for employers to plan, project and protect the retirement benefits of your employees. Pension Outlook is a tool to help plan and budget pension costs into the future with easy to understand results and charts.

You will be able to view the projected funded status and required employer contributions for pension plans in different potential scenarios for up to 30 years into the future — which will make budgeting more predictable. While

Pension Outlook cannot predict the future, it can provide valuable planning information based on a variety of future scenarios that you select.

Pension Outlook can help you answer specific questions about your plans, including:

- When is my plan's funded status expected to increase?
- What happens to my required contributions in a down market?
- How does the discount rate assumption affect my contributions?
- What is the impact of making an additional discretionary payment to my plan?

To get started, visit our Pension Outlook page at [www.calpers.ca.gov/page/employers/actuarial-resources/pension-outlook-overview](http://www.calpers.ca.gov/page/employers/actuarial-resources/pension-outlook-overview) and take the steps to register online.

CalPERS will be completing an Asset Liability Management (ALM) review process in November 2021 that will review the capital market assumptions and the strategic asset allocation and ascertain whether a change in the discount rate and other economic assumptions is warranted. In addition, the Actuarial Office will be completing its Experience Study to review the demographic experience within the pension system and make recommendations to modify future assumptions where appropriate. Any assumption change stemming from these studies will be reflected in the June 30, 2021 actuarial valuation.

Furthermore, this valuation does not reflect any impacts from the COVID-19 pandemic on your pension plan. The impact of COVID-19 on retirement plans is not yet known and CalPERS actuaries will continue to monitor the effects and, where necessary, make future adjustments to actuarial assumptions.

Further descriptions of general changes are included in the "Highlights and Executive Summary" section and in Appendix A, "Actuarial Methods and Assumptions." The effects of the changes on the required contributions are included in the "Reconciliation of Required Employer Contributions" section.

## Questions

We understand that you might have questions about these results, and your assigned CalPERS actuary whose signature is on the valuation report is available to discuss. If you have other questions, you may call the Customer Contact Center at (888)-CalPERS or (888-225-7377).

Sincerely,



SCOTT TERANDO, ASA, EA, MAAA, FCA, CFA  
Chief Actuary, CalPERS



**Actuarial Valuation  
as of June 30, 2020**

**for the  
Miscellaneous Plan  
of the  
Union Sanitary District**

**(CalPERS ID: 6011550262)**

**(Rate Plan ID: 984)**

**Required Contributions  
for Fiscal Year  
July 1, 2022 – June 30, 2023**

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## Actuarial Certification

To the best of our knowledge, this report is complete and accurate and contains sufficient information to disclose, fully and fairly, the funded condition of the Miscellaneous Plan of the Union Sanitary District. This valuation is based on the member and financial data as of June 30, 2020 provided by the various CalPERS databases and the benefits under this plan with CalPERS as of the date this report was produced. It is our opinion that the valuation has been performed in accordance with generally accepted actuarial principles, in accordance with standards of practice prescribed by the Actuarial Standards Board, and that the assumptions and methods are internally consistent and reasonable for this plan, as prescribed by the CalPERS Board of Administration according to provisions set forth in the California Public Employees' Retirement Law.

The undersigned is an actuary who satisfies the Qualification Standards for Actuaries Issuing Statements of Actuarial Opinion in the United States with regard to pensions.



EDDIE W. LEE, ASA, EA, FCA, MAAA  
Senior Pension Actuary, CalPERS

## **Highlights and Executive Summary**

- **Introduction**
- **Purpose of the Report**
- **Required Contributions**
- **Additional Discretionary Employer Contributions**
- **Plan's Funded Status**
- **Projected Employer Contributions**
- **Cost**
- **Changes Since the Prior Year's Valuation**
- **Subsequent Events**

## Introduction

This report presents the results of the June 30, 2020 actuarial valuation of the Miscellaneous Plan of the Union Sanitary District of the California Public Employees' Retirement System (CalPERS). This actuarial valuation sets the minimum required employer contributions for fiscal year 2022-23.

## Purpose of the Report

The actuarial valuation was prepared by the CalPERS Actuarial Office using data as of June 30, 2020. The purpose of the report is to:

- Set forth the assets and accrued liabilities of this plan as of June 30, 2020;
- Determine the minimum required employer contributions for the fiscal year July 1, 2022 through June 30, 2023;
- Provide actuarial information as of June 30, 2020 to the CalPERS Board of Administration and other interested parties.

The pension funding information presented in this report should not be used in financial reports subject to Governmental Accounting Standards Board (GASB) Statement No. 68 for an Agent Employer Defined Benefit Pension Plan. A separate accounting valuation report for such purposes is available from CalPERS and details for ordering are available on the CalPERS website ([calpers.ca.gov](http://calpers.ca.gov)).

The measurements shown in this actuarial valuation may not be applicable for other purposes. The employer should contact their actuary before disseminating any portion of this report for any reason that is not explicitly described above.

Future actuarial measurements may differ significantly from the current measurements presented in this report due to such factors as the following: plan experience differing from that anticipated by the economic or demographic assumptions; changes in economic or demographic assumptions; changes in actuarial policies; and changes in plan provisions or applicable law.

### Assessment and Disclosure of Risk

This report includes the following risk disclosures consistent with the recommendations of Actuarial Standards of Practice No. 51 and recommended by the California Actuarial Advisory Panel (CAAP) in the Model Disclosure Elements document:

- A "Scenario Test," projecting future results under different investment income returns.
- A "Sensitivity Analysis," showing the impact on current valuation results using alternative discount rates of 6.0% and 8.0%.
- A "Sensitivity Analysis," showing the impact on current valuation results assuming rates of mortality are 10% lower or 10% higher than our current mortality assumptions adopted in 2017.
- Plan maturity measures indicating how sensitive a plan may be to the risks noted above.

## Required Contributions

|  | Fiscal Year    |
|--|----------------|
| <b>Required Employer Contribution</b>  | <b>2022-23</b> |
| Employer Normal Cost Rate  | 10.20%         |
| <i>Plus, Either</i>  |                |
| 1) Monthly Employer Dollar UAL Payment   | \$402,508      |
| <i>Or</i>  |                |
| 2) Annual UAL Prepayment Option*   | \$4,669,424    |
| <b>Required PEPRAs Member Contribution Rate</b>  | <b>6.25%</b>   |
| <p>The total minimum required employer contribution is the <b>sum</b> of the Plan's Employer Normal Cost Rate (expressed as a percentage of payroll) and the Employer Unfunded Accrued Liability (UAL) Contribution Amount (billed monthly in dollars).</p> <p>* Only the UAL portion of the employer contribution can be prepaid (<b>which must be received in full no later than July 31</b>). Any prepayment totaling over \$5 million requires a 72-hour notice email to <a href="mailto:FCSD_public_agency_wires@calpers.ca.gov">FCSD_public_agency_wires@calpers.ca.gov</a>. Plan Normal Cost contributions will be made as part of the payroll reporting process. If there is contractual cost sharing or other change, this amount will change.</p> <p>In accordance with Sections 20537 and 20572 of the Public Employees' Retirement Law, if a contracting agency fails to remit the required contributions when due, interest and penalties may apply.</p> <p>For additional detail regarding the determination of the required contribution for PEPRAs members, see "PEPRAs Member Contribution Rates" in the "Liabilities and Contributions" section. Required member contributions for Classic members can be found in Appendix B.</p> |                |

|  | Fiscal Year<br>2021-22 | Fiscal Year<br>2022-23 |
|--|------------------------|------------------------|
| <b>Normal Cost Contribution as a Percentage of Payroll</b>         |                        |                        |
| Total Normal Cost  | 18.07%                 | 17.80%                 |
| Employee Contribution <sup>1</sup>                                 | 7.67%                  | 7.60%                  |
| Employer Normal Cost <sup>2</sup>                                  | 10.40%                 | 10.20%                 |
| Projected Annual Payroll for Contribution Year                     | \$18,400,827           | \$19,710,596           |
| <b>Estimated Employer Contributions Based On Projected Payroll</b> |                        |                        |
| Total Normal Cost  | \$3,325,029            | \$3,508,486            |
| Employee Contribution <sup>1</sup>                                 | 1,411,343              | 1,498,005              |
| Employer Normal Cost <sup>2</sup>                                  | 1,913,686              | 2,010,481              |
| Unfunded Liability Contribution                                    | 4,287,313              | 4,830,090              |
| % of Projected Payroll (illustrative only)                         | 23.30%                 | 24.51%                 |
| Estimated Total Employer Contribution                              | \$6,200,999            | \$6,840,571            |
| % of Projected Payroll (illustrative only)                         | 33.70%                 | 34.71%                 |

<sup>1</sup> For classic members, this is the percentage specified in the Public Employees' Retirement Law, net of any reduction from the use of a modified formula or other factors. For PEPRAs members, the member contribution rate is based on 50% of the normal cost. A development of PEPRAs member contribution rates can be found in the "Liabilities and Contributions" section. Employee cost sharing is not shown in this report.

<sup>2</sup> The Employer Normal Cost is a blended rate for all benefit groups in the plan. For a breakout of normal cost by benefit group, see "Normal Cost by Benefit Group" in the "Liabilities and Contributions" section.

## Additional Discretionary Employer Contributions

The minimum required employer contribution towards the Unfunded Accrued Liability (UAL) for this rate plan for the 2022-23 fiscal year is \$4,830,090. CalPERS allows employers to make additional discretionary payments (ADPs) at any time and in any amount. These optional payments serve to reduce the UAL and future required contributions and can result in significant long-term savings. Employers can also use ADPs to stabilize annual contributions as a fixed dollar amount, percent of payroll or percent of revenue.

Provided below are select ADP options for consideration. Making such an ADP during fiscal year 2022-23 does not require an ADP be made in any future year, nor does it change the remaining amortization period of any portion of unfunded liability. For information on permanent changes to amortization periods, see the "Amortization Schedule and Alternatives" section of the report.

If you are considering making an ADP, please contact your actuary for additional information.

### Minimum Required Employer Contribution for Fiscal Year 2022-23

| Estimated Normal Cost | Minimum UAL Payment | ADP | Total UAL Contribution | Estimated Total Contribution |
|-----------------------|---------------------|-----|------------------------|------------------------------|
| \$2,010,481           | \$4,830,090         | \$0 | \$4,830,090            | \$6,840,571                  |

### Alternative Fiscal Year 2022-23 Employer Contributions for Greater UAL Reduction

| Funding Target | Estimated Normal Cost | Minimum UAL Payment | ADP <sup>1</sup> | Total UAL Contribution | Estimated Total Contribution |
|----------------|-----------------------|---------------------|------------------|------------------------|------------------------------|
| 20 years       | \$2,010,481           | \$4,830,090         | \$581,056        | \$5,411,146            | \$7,421,627                  |
| 15 years       | \$2,010,481           | \$4,830,090         | \$1,463,970      | \$6,294,060            | \$8,304,541                  |
| 10 years       | \$2,010,481           | \$4,830,090         | \$3,331,808      | \$8,161,898            | \$10,172,379                 |
| 5 years        | \$2,010,481           | \$4,830,090         | \$9,151,129      | \$13,981,219           | \$15,991,700                 |

<sup>1</sup> The ADP amounts are assumed to be made in the middle of the fiscal year. A payment made earlier or later in the fiscal year would have to be less or more than the amount shown to have the same effect on the UAL amortization.

Note that the calculations above are based on the projected Unfunded Accrued Liability as of June 30, 2022 as determined in the June 30, 2020 actuarial valuation. New unfunded liabilities can emerge in future years due to assumption or method changes, changes in plan provisions and actuarial experience different than assumed. Making an ADP illustrated above for the indicated number of years will not result in a plan that is exactly 100% funded in the indicated number of years. Valuation results will vary from one year to the next and can diverge significantly from projections over a period of several years.

## Plan's Funded Status

|   | June 30, 2019 | June 30, 2020 |
|---|---------------|---------------|
| 1. Present Value of Projected Benefits          | \$184,471,189 | \$191,832,235 |
| 2. Entry Age Accrued Liability                  | 159,124,986   | 165,485,189   |
| 3. Market Value of Assets (MVA)                 | 103,764,050   | 106,304,227   |
| 4. Unfunded Accrued Liability (UAL) [(2) – (3)] | \$55,360,936  | \$59,180,962  |
| 5. Funded Ratio [(3) / (2)]                     | 65.2%         | 64.2%         |

This measure of funded status is an assessment of the need for future employer contributions based on the actuarial cost method used to fund the plan. The UAL is the present value of future employer contributions for service that has already been earned and is in addition to future normal cost contributions for active members. For a measure of funded status that is appropriate for assessing the sufficiency of plan assets to cover estimated termination liabilities, please see "Hypothetical Termination Liability" in the "Risk Analysis" section.

## Projected Employer Contributions

The table below shows the required and projected employer contributions (before cost sharing) for the next six fiscal years. The projection assumes that all actuarial assumptions will be realized and that no further changes to assumptions, contributions, benefits, or funding will occur during the projection period. Actual contribution rates during this projection period could be significantly higher or lower than the projection shown below. The projected normal cost percentages in the projections below reflect that the normal cost will continue to decline over time as new employees are hired into PEPPRA or other lower cost benefit tiers.

|                                 | Required Contribution | Projected Future Employer Contributions<br>(Assumes 7.00% Return for Fiscal Year 2020-21) |                     |                     |                     |                     |
|---------------------------------|-----------------------|---|---------------------|---------------------|---------------------|---------------------|
| Fiscal Year                     | 2022-23               | 2023-24   | 2024-25             | 2025-26             | 2026-27             | 2027-28             |
| Normal Cost %                   | 10.20%                | 10.0%   | 9.8%                | 9.6%                | 9.4%                | 9.2%                |
| UAL Payment                     | \$4,830,090           | \$5,153,000   | \$5,494,000         | \$5,444,000         | \$5,678,000         | \$5,818,000         |
| <i>Total as a % of Payroll*</i> | <i>34.71%</i>         | <i>35.4%</i>  | <i>36.2%</i>        | <i>35.0%</i>        | <i>35.2%</i>        | <i>35.0%</i>        |
| <i>Projected Payroll</i>        | <i>\$19,710,596</i>   | <i>\$20,252,637</i>   | <i>\$20,809,585</i> | <i>\$21,381,849</i> | <i>\$21,969,849</i> | <i>\$22,574,020</i> |

\*Illustrative only and based on the projected payroll shown.

For some sources of UAL, the change in UAL is amortized using a 5-year ramp up. For more information, please see "Amortization of the Unfunded Actuarial Accrued Liability" under "Actuarial Methods" in Appendix A. This method phases in the impact of the change in UAL over a 5-year period in order to reduce employer cost volatility from year to year. As a result of this methodology, dramatic changes in the required employer contributions in any one year are less likely. However, required contributions can change gradually and significantly over the next five years. In years when there is a large increase in UAL, the relatively small amortization payments during the ramp up period could result in a funded ratio that is projected to decrease initially while the contribution impact of the increase in the UAL is phased in.

For projected contributions under alternate investment return scenarios, please see the "Future Investment Return Scenarios" in the "Risk Analysis" section.

Our online pension plan modeling and projection tool, Pension Outlook, is available in the Employers section of the CalPERS website. Pension Outlook is a tool to help plan and budget pension costs into the future with results and charts that are easy to understand.

## Cost

### Actuarial Determination of Pension Plan Cost

Contributions to fund the pension plan are comprised of two components:

- Normal Cost, expressed as a percentage of total active payroll
- Amortization of the Unfunded Accrued Liability (UAL), expressed as a dollar amount

For fiscal years prior to 2017-18, the Amortization of UAL component was expressed as percentage of total active payroll. Starting with fiscal year 2017-18, the Amortization of UAL component is expressed as a dollar amount and invoiced on a monthly basis. There is an option to prepay this amount during July of each fiscal year.

The Normal Cost component is expressed as a percentage of active payroll with employer and employee contributions payable as part of the regular payroll reporting process.

The determination of both components requires complex actuarial calculations. The calculations are based on a set of actuarial assumptions which can be divided into two categories:

- Demographic assumptions (e.g., mortality rates, retirement rates, employment termination rates, disability rates)
- Economic assumptions (e.g., future investment earnings, inflation, salary growth rates)

These assumptions reflect CalPERS' best estimate of future experience of the plan and are long term in nature. We recognize that all assumptions will not be realized in any given year. For example, the investment earnings at CalPERS have averaged 5.5% over the 20 years ending June 30, 2020, yet individual fiscal year returns have ranged from -23.6% to +20.7%. In addition, CalPERS reviews all actuarial assumptions by conducting in-depth experience studies every four years, with the most recent experience study completed in 2017.

## Changes Since the Prior Year's Valuation

### Benefits

The standard actuarial practice at CalPERS is to recognize mandated legislative benefit changes in the first annual valuation following the effective date of the legislation. Voluntary benefit changes by plan amendment are generally included in the first valuation that is prepared after the amendment becomes effective, even if the valuation date is prior to the effective date of the amendment.

This valuation generally reflects plan changes by amendments effective before the date of the report. Please refer to the "Plan's Major Benefit Options" and Appendix B for a summary of the plan provisions used in this valuation. The effect of any mandated benefit changes or plan amendments on the unfunded liability is shown in the "(Gain)/Loss Analysis" and the effect on the employer contribution is shown in the "Reconciliation of Required Employer Contributions." It should be noted that no change in liability or contribution is shown for any plan changes which were already included in the prior year's valuation.

### Actuarial Methods and Assumptions

There are no significant changes to the actuarial methods or assumptions for the 2020 actuarial valuation.

## Subsequent Events

The contribution requirements determined in this actuarial valuation report are based on demographic and financial information as of June 30, 2020. Changes in the value of assets subsequent to that date are not reflected. Investment returns below the assumed rate of return will increase future required contributions while investment returns above the assumed rate of return will decrease future required contributions.

CalPERS will be completing an Asset Liability Management (ALM) review process in November 2021 that will review the capital market assumptions and the strategic asset allocation and ascertain whether a change in the discount rate and other economic assumptions is warranted. In addition, the Actuarial Office will be completing its Experience Study to review the demographic experience within the pension system and make recommendations to modify future assumptions where appropriate.

Furthermore, this valuation does not reflect any impacts from the COVID-19 pandemic on your pension plan. The impact of COVID-19 on retirement plans is not yet known and CalPERS actuaries will continue to monitor the effects and, where necessary, make future adjustments to actuarial assumptions.

The projected employer contributions on Page 6 are calculated under the assumption that the discount rate remains at 7.0% going forward and that the realized rate of return on assets for fiscal year 2020-21 is 7.0%.

This actuarial valuation report reflects statutory changes, regulatory changes and CalPERS Board actions through January 2021. Any subsequent changes or actions are not reflected.

## **Assets**

- **Reconciliation of the Market Value of Assets**
- **Asset Allocation**
- **CalPERS History of Investment Returns**

## Reconciliation of the Market Value of Assets

|  |                     |
|--|---------------------|
| 1. Market Value of Assets as of 6/30/19 including Receivables  | \$103,764,050       |
| 2. Change in Receivables for Service Buybacks                  | (41,939)            |
| 3. Employer Contributions                                      | 4,859,547           |
| 4. Employee Contributions                                      | 1,381,569           |
| 5. Benefit Payments to Retirees and Beneficiaries              | (8,273,355)         |
| 6. Refunds   | (117,937)           |
| 7. Transfers   | 0                   |
| 8. Service Credit Purchase (SCP) Payments and Interest         | 65,559              |
| 9. Administrative Expenses                                     | (80,133)            |
| 10. Miscellaneous Adjustments                                  | 0                   |
| 11. Investment Return (Net of Investment Expenses)             | 4,746,865           |
| 12. Market Value of Assets as of 6/30/20 including Receivables | <hr/> \$106,304,227 |

## Asset Allocation

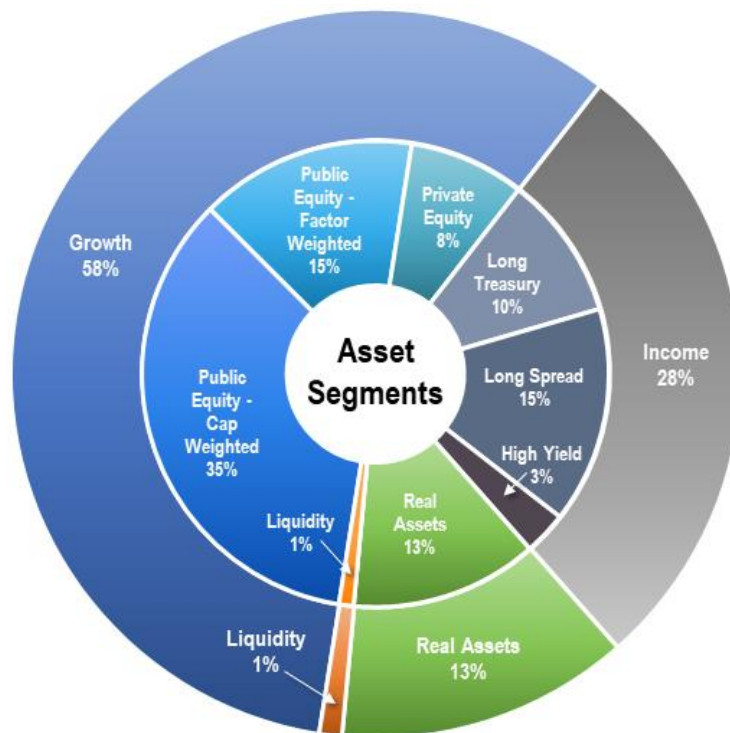
CalPERS adheres to an Asset Allocation Strategy which establishes asset class allocation policy targets and ranges and manages those asset class allocations within their policy ranges. CalPERS Investment Belief No. 6 recognizes that strategic asset allocation is the dominant determinant of portfolio risk and return. On December 19, 2017, the CalPERS Board of Administration adopted changes to the current asset allocation as shown in the Policy Target Allocation below expressed as a percentage of total assets.

The asset allocation shown below reflect the allocation of the Public Employees' Retirement Fund (PERF) in its entirety as of June 30, 2020. The assets for Union Sanitary District Miscellaneous Plan are part of the PERF and are invested accordingly.

| Asset Class                | Actual Allocation | Policy Target Allocation |
|----------------------------|-------------------|--------------------------|
| Public Equity              | 53.0%             | 50.0%                    |
| Private Equity             | 6.3%              | 8.0%                     |
| Global Fixed Income        | 28.3%             | 28.0%                    |
| Real Assets                | 11.3%             | 13.0%                    |
| Liquidity                  | 0.9%              | 1.0%                     |
| Inflation Sensitive Assets | 0.0%              | 0.0%                     |
| Trust Level <sup>1</sup>   | 0.2%              | 0.0%                     |
| <b>Total Fund</b>          | <b>100.0%</b>     | <b>100.0%</b>            |

<sup>1</sup> Trust Level includes Multi-Asset Class, Completion Overlay, Risk Mitigation, Absolute Return Strategies, Plan Level Transition and other Total Fund level portfolios.

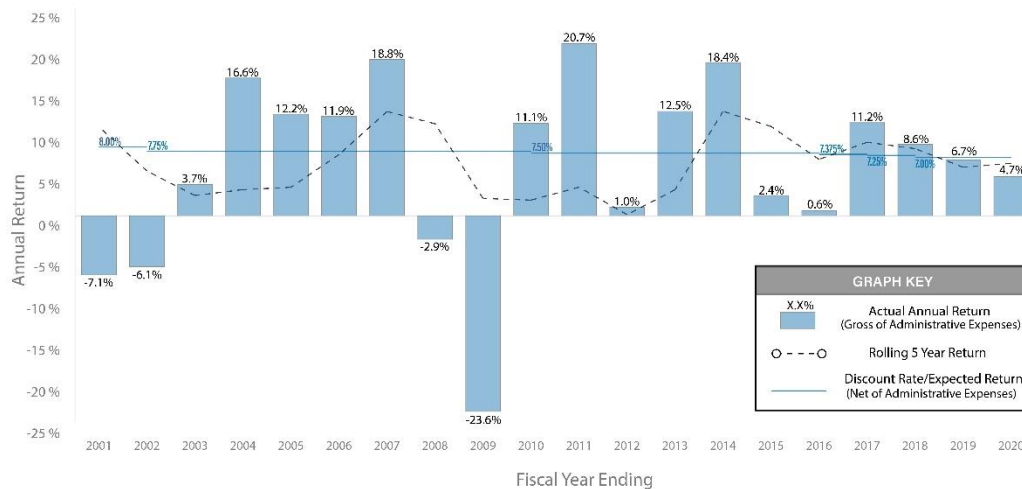
### Strategic Asset Allocation Policy Targets



## CalPERS History of Investment Returns

The following is a chart with the 20-year historical annual returns of the PERF for each fiscal year ending on June 30. Beginning in 2002, investment returns reported are net of investment expenses and gross of administrative expenses.

History of Investment Returns (2001 - 2020)



The table below shows annualized investment returns of the PERF for various time periods ending on June 30, 2020 (figures reported are net of investment expenses and gross of administrative expenses). These returns are the annual rates that if compounded over the indicated number of years would equate to the actual performance of the PERF. It should be recognized that in any given year the rate of return is volatile. The portfolio has an expected volatility of 11.4% per year based on the most recent Asset Liability Modeling study. The realized volatility is a measure of the risk of the portfolio expressed as the standard deviation of the fund's total monthly return distribution, expressed as an annual percentage. Due to their volatile nature, when looking at investment returns, it is more instructive to look at returns over longer time horizons.

| History of CalPERS Compound Annual Rates of Return and Volatilities |        |        |         |         |         |
|---|--------|--------|---------|---------|---------|
|   | 1 year | 5 year | 10 year | 20 year | 30 year |
| Compound Annual Return  | 4.7%   | 6.3%   | 8.5%    | 5.5%    | 8.0%    |
| Realized Volatility   | —      | 7.3%   | 7.1%    | 8.6%    | 8.6%    |

## **Liabilities and Contributions**

- **Development of Accrued and Unfunded Liabilities**
- **(Gain) / Loss Analysis 6/30/19 - 6/30/20**
- **Schedule of Amortization Bases**
- **Amortization Schedule and Alternatives**
- **Reconciliation of Required Employer Contributions**
- **Employer Contribution History**
- **Funding History**
- **Normal Cost by Benefit Group**
- **PEPRA Member Contribution Rates**

## Development of Accrued and Unfunded Liabilities

|  | June 30, 2019        | June 30, 2020        |
|--|----------------------|----------------------|
| 1. Present Value of Projected Benefits               |                      |                      |
| a) Active Members                                    | \$76,914,135         | \$81,443,282         |
| b) Transferred Members                               | 6,487,997            | 5,085,766            |
| c) Terminated Members                                | 663,367              | 1,143,988            |
| d) Members and Beneficiaries Receiving Payments      | 100,405,690          | 104,159,199          |
| e) Total   | <u>\$184,471,189</u> | <u>\$191,832,235</u> |
| 2. Present Value of Future Employer Normal Costs     | \$14,280,939         | \$14,725,429         |
| 3. Present Value of Future Employee Contributions    | \$11,065,264         | \$11,621,617         |
| 4. Entry Age Accrued Liability                       |                      |                      |
| a) Active Members [(1a) - (2) - (3)]                 | \$51,567,932         | \$55,096,236         |
| b) Transferred Members (1b)                          | 6,487,997            | 5,085,766            |
| c) Terminated Members (1c)                           | 663,367              | 1,143,988            |
| d) Members and Beneficiaries Receiving Payments (1d) | 100,405,690          | 104,159,199          |
| e) Total   | <u>\$159,124,986</u> | <u>\$165,485,189</u> |
| 5. Market Value of Assets (MVA)                      | \$103,764,050        | \$106,304,227        |
| 6. Unfunded Accrued Liability (UAL) [(4e) - (5)]     | \$55,360,936         | \$59,180,962         |
| 7. Funded Ratio [(5) / (4e)]                         | 65.2%                | 64.2%                |

## (Gain)/Loss Analysis 6/30/19 – 6/30/20

To calculate the cost requirements of the plan, assumptions are made about future events that affect the amount and timing of benefits to be paid and assets to be accumulated. Each year, actual experience is compared to the expected experience based on the actuarial assumptions. This results in actuarial gains or losses, as shown below.

### 1. Total (Gain)/Loss for the Year

|   |                   |
|---|-------------------|
| a) Unfunded Accrued Liability (UAL) as of 6/30/19                                 | \$55,360,936      |
| b) Expected Payment on the UAL during 2019-20                                     | 3,047,917         |
| c) Interest through 6/30/20 $[(.07 \times (1a) - ((1.07)^{1/2} - 1) \times (1b)]$ | 3,770,391         |
| d) Expected UAL before all other changes $[(1a) - (1b) + (1c)]$                   | 56,083,410        |
| e) Change due to plan changes   | 0                 |
| f) Change due to AL Significant Increase  | 0                 |
| g) Change due to assumption change  | 0                 |
| h) Change due to method change  | 0                 |
| i) Expected UAL after all other changes $[(1d) + (1e) + (1f) + (1g) + (1h)]$      | 56,083,410        |
| j) Actual UAL as of 6/30/20   | <u>59,180,962</u> |
| k) Total (Gain)/Loss for 2019-20 $[(1j) - (1i)]$                                  | \$3,097,552       |

### 2. Contribution (Gain)/Loss for the Year

|   |                  |
|---|------------------|
| a) Expected Contribution (Employer and Employee)        | \$6,244,753      |
| b) Interest on Expected Contributions                   | 214,870          |
| c) Actual Contributions                                 | 6,241,116        |
| d) Interest on Actual Contributions                     | 214,745          |
| e) Expected Contributions with Interest $[(2a) + (2b)]$ | 6,459,623        |
| f) Actual Contributions with Interest $[(2c) + (2d)]$   | <u>6,455,861</u> |
| g) Contribution (Gain)/Loss $[(2e) - (2f)]$             | \$3,762          |

### 3. Investment (Gain)/Loss for the Year

|   |                    |
|---|--------------------|
| a) Market Value of Assets as of 6/30/19   | \$103,764,050      |
| b) Prior Fiscal Year Receivables  | (288,173)          |
| c) Current Fiscal Year Receivables  | 246,235            |
| d) Contributions Received   | 6,241,116          |
| e) Benefits and Refunds Paid  | (8,391,292)        |
| f) Transfers, SCP Payments and Interest, and Miscellaneous Adjustments                        | 65,559             |
| g) Expected Return $[(.07 \times (3a + 3b) + ((1.07)^{1/2} - 1) \times ((3d) + (3e) + (3f))]$ | 7,171,584          |
| h) Expected Assets as of 6/30/20 $[(3a) + (3b) + (3c) + (3d) + (3e) + (3f) + (3g)]$           | 108,809,078        |
| i) Actual Market Value of Assets as of 6/30/20  | <u>106,304,227</u> |
| j) Investment (Gain)/Loss $[(3h) - (3i)]$   | \$2,504,851        |

### 4. Liability (Gain)/Loss for the Year

|   |             |
|---|-------------|
| a) Total (Gain)/Loss (1j)                       | \$3,097,552 |
| b) Contribution (Gain)/Loss (2g)                | 3,762       |
| c) Investment (Gain)/Loss (3j)                  | 2,504,851   |
| d) Liability (Gain)/Loss $[(4a) - (4b) - (4c)]$ | \$588,939   |

### 5. Non-Investment (Gain)/Loss for the Year

|   |                |
|---|----------------|
| a) Contribution (Gain)/Loss (2g)              | \$3,762        |
| b) Liability (Gain)/Loss (4d)                 | <u>588,939</u> |
| c) Non-Investment (Gain)/Loss $[(5a) + (5b)]$ | \$592,701      |

## Schedule of Amortization Bases

Below is the schedule of the plan's amortization bases. Note that there is a two-year lag between the valuation date and the start of the contribution fiscal year.

- The assets, liabilities, and funded status of the plan are measured as of the valuation date: June 30, 2020.
- The required employer contributions determined by the valuation are for the fiscal year beginning two years after the valuation date: fiscal year 2022-23.

This two-year lag is necessary due to the amount of time needed to extract and test the membership and financial data, and the need to provide public agencies with their required employer contribution well in advance of the start of the fiscal year.

The Unfunded Accrued Liability (UAL) is used to determine the employer contribution and therefore must be rolled forward two years from the valuation date to the first day of the fiscal year for which the contribution is being determined. The UAL is rolled forward each year by subtracting the expected payment on the UAL for the fiscal year and adjusting for interest. The expected payment on the UAL for a fiscal year is equal to the Expected Employer Contribution for the fiscal year minus the Expected Normal Cost for the year. The Employer Contribution for the first fiscal year is determined by the actuarial valuation two years ago and the contribution for the second year is from the actuarial valuation one year ago. Additional discretionary payments are reflected in the Expected Payments column in the fiscal year they were made by the agency.

| Reason for Base     | Date Est. | Ramp Level 2022-23 | Ramp Shape | Escalation Rate | Amort. Period | Balance 6/30/20 | Expected Payment 2020-21 | Balance 6/30/21 | Expected Payment 2021-22 | Balance 6/30/22 | Minimum Required Payment 2022-23 |
|---------------------|-----------|--------------------|------------|-----------------|---------------|-----------------|--------------------------|-----------------|--------------------------|-----------------|----------------------------------|
| Assumption Change   | 6/30/03   | No Ramp            |            | 2.75%           | 3             | 1,021,686       | 228,839                  | 856,491         | 235,132                  | 673,223         | 241,598                          |
| Method Change       | 6/30/04   | No Ramp            |            | 2.75%           | 4             | (161,408)       | (30,721)                 | (140,929)       | (31,566)                 | (118,142)       | (32,433)                         |
| Assumption Change   | 6/30/09   | No Ramp            |            | 2.75%           | 9             | 4,355,253       | 497,464                  | 4,145,540       | 511,144                  | 3,906,996       | 525,200                          |
| Special (Gain)/Loss | 6/30/09   | No Ramp            |            | 2.75%           | 19            | 2,349,791       | 168,469                  | 2,340,011       | 173,102                  | 2,324,754       | 177,862                          |
| Special (Gain)/Loss | 6/30/10   | No Ramp            |            | 2.75%           | 20            | 1,426,766       | 99,353                   | 1,423,868       | 102,085                  | 1,417,941       | 104,892                          |
| Assumption Change   | 6/30/11   | No Ramp            |            | 2.75%           | 11            | 1,935,744       | 194,189                  | 1,870,375       | 199,530                  | 1,794,906       | 205,017                          |
| Special (Gain)/Loss | 6/30/11   | No Ramp            |            | 2.75%           | 21            | (863,213)       | (58,495)                 | (863,130)       | (60,104)                 | (861,377)       | (61,757)                         |
| Payment (Gain)/Loss | 6/30/12   | No Ramp            |            | 2.75%           | 22            | (35,966)        | (2,376)                  | (36,026)        | (2,441)                  | (36,023)        | (2,508)                          |
| (Gain)/Loss         | 6/30/12   | No Ramp            |            | 2.75%           | 22            | 6,016,958       | 397,485                  | 6,026,983       | 408,416                  | 6,026,403       | 419,648                          |
| (Gain)/Loss         | 6/30/13   | 100%               | Up/Down    | 2.75%           | 23            | 15,571,192      | 1,056,303                | 15,568,527      | 1,085,351                | 15,535,628      | 1,115,198                        |
| Assumption Change   | 6/30/14   | 100%               | Up/Down    | 2.75%           | 14            | 7,779,248       | 739,722                  | 7,558,621       | 760,065                  | 7,301,507       | 780,967                          |
| (Gain)/Loss         | 6/30/14   | 100%               | Up/Down    | 2.75%           | 24            | (9,210,805)     | (609,082)                | (9,225,522)     | (625,832)                | (9,223,943)     | (643,042)                        |
| (Gain)/Loss         | 6/30/15   | 100%               | Up/Down    | 2.75%           | 25            | 6,802,208       | 355,783                  | 6,910,338       | 456,959                  | 6,921,380       | 469,526                          |
| Assumption Change   | 6/30/16   | 100%               | Up/Down    | 2.75%           | 16            | 2,516,080       | 136,988                  | 2,550,504       | 187,673                  | 2,534,909       | 241,042                          |
| (Gain)/Loss         | 6/30/16   | 100%               | Up/Down    | 2.75%           | 26            | 8,989,394       | 353,271                  | 9,253,225       | 483,981                  | 9,400,317       | 621,614                          |
| Assumption Change   | 6/30/17   | 80%                | Up/Down    | 2.75%           | 17            | 2,079,141       | 75,817                   | 2,146,255       | 116,853                  | 2,175,619       | 160,088                          |
| (Gain)/Loss         | 6/30/17   | 80%                | Up/Down    | 2.75%           | 27            | (3,359,922)     | (89,312)                 | (3,502,731)     | (137,653)                | (3,605,533)     | (188,584)                        |
| Method Change       | 6/30/18   | 60%                | Up/Down    | 2.75%           | 18            | 1,232,667       | 22,983                   | 1,295,180       | 47,229                   | 1,336,989       | 72,792                           |
| Assumption Change   | 6/30/18   | 60%                | Up/Down    | 2.75%           | 18            | 4,744,184       | 88,454                   | 4,984,779       | 181,772                  | 5,145,687       | 280,156                          |
| (Gain)/Loss         | 6/30/18   | 60%                | Up/Down    | 2.75%           | 28            | 718,838         | 9,818                    | 759,001         | 20,176                   | 791,261         | 31,095                           |

## Schedule of Amortization Bases (continued)

| Reason for Base            | Date Est. | Ramp Level 2022-23 | Ramp Shape | Escalation Rate | Amort. Period | Balance 6/30/20   | Expected Payment 2020-21 | Balance 6/30/21   | Expected Payment 2021-22 | Balance 6/30/22   | Minimum Required Payment 2022-23 |
|----------------------------|-----------|--------------------|------------|-----------------|---------------|-------------------|--------------------------|-------------------|--------------------------|-------------------|----------------------------------|
| Non-Investment (Gain)/Loss | 6/30/19   | No Ramp            |            | 0.00%           | 19            | 1,677,443         | 0                        | 1,794,864         | 163,787                  | 1,751,082         | 163,787                          |
| Investment (Gain)/Loss     | 6/30/19   | 40%                | Up Only    | 0.00%           | 19            | 498,131           | 0                        | 533,000           | 11,654                   | 558,255           | 23,307                           |
| Non-Investment (Gain)/Loss | 6/30/20   | No Ramp            |            | 0.00%           | 20            | 592,701           | 0                        | 634,190           | 0                        | 678,583           | 61,923                           |
| Investment (Gain)/Loss     | 6/30/20   | 20%                | Up Only    | 0.00%           | 20            | 2,504,851         | 0                        | 2,680,191         | 0                        | 2,867,804         | 62,702                           |
| <b>Total</b>               |           |                    |            |                 |               | <b>59,180,962</b> | <b>3,634,952</b>         | <b>59,563,605</b> | <b>4,287,313</b>         | <b>59,298,226</b> | <b>4,830,090</b>                 |

## Amortization Schedule and Alternatives

The amortization schedule on the previous page shows the minimum contributions required according to the CalPERS amortization policy. Many agencies have expressed a desire for a more stable pattern of payments or have indicated interest in paying off the unfunded accrued liabilities more quickly than required. As such, we have provided alternative amortization schedules to help analyze the current amortization schedule and illustrate the potential savings of accelerating unfunded liability payments.

Shown on the following page are future year amortization payments based on 1) the current amortization schedule reflecting the individual bases and remaining periods shown on the previous page, and 2) alternative "fresh start" amortization schedules using two sample periods that would both result in interest savings relative to the current amortization schedule. To initiate a Fresh Start, please consult with your plan actuary.

The Current Amortization Schedule typically contains both positive and negative bases. Positive bases result from plan changes, assumption changes, method changes or plan experience that increase unfunded liability. Negative bases result from plan changes, assumption changes, method changes, or plan experience that decrease unfunded liability. The combination of positive and negative bases within an amortization schedule can result in unusual or problematic circumstances in future years, such as:

- When a negative payment would be required on a positive unfunded actuarial liability; or
- When the payment would completely amortize the total unfunded liability in a very short time period, and results in a large change in the employer contribution requirement.

In any year when one of the above scenarios occurs, the actuary will consider corrective action such as replacing the existing unfunded liability bases with a single "fresh start" base and amortizing it over a reasonable period.

The Current Amortization Schedule on the following page may appear to show that, based on the current amortization bases, one of the above scenarios will occur at some point in the future. It is impossible to know today whether such a scenario will in fact arise since there will be additional bases added to the amortization schedule in each future year. Should such a scenario arise in any future year, the actuary will take appropriate action based on guidelines in the CalPERS amortization policy.

## Amortization Schedule and Alternatives (continued)

| Date                     | <u>Current Amortization Schedule</u> |                    | <u>Alternative Schedules</u> |                    |                      |                   |
|--------------------------|--------------------------------------|--------------------|------------------------------|--------------------|----------------------|-------------------|
|                          | Balance                              | Payment            | 20 Year Amortization         |                    | 15 Year Amortization |                   |
|                          |                                      |                    | Balance                      | Payment            | Balance              | Payment           |
| 6/30/2022                | 59,298,226                           | 4,830,090          | 59,298,226                   | 5,411,146          | 59,298,226           | 6,294,060         |
| 6/30/2023                | 58,452,819                           | 5,152,913          | 57,851,769                   | 5,411,146          | 56,938,476           | 6,294,060         |
| 6/30/2024                | 57,214,300                           | 5,493,510          | 56,304,060                   | 5,411,146          | 54,413,543           | 6,294,060         |
| 6/30/2025                | 55,536,771                           | 5,444,191          | 54,648,011                   | 5,411,146          | 51,711,865           | 6,294,060         |
| 6/30/2026                | 53,792,831                           | 5,678,053          | 52,876,039                   | 5,411,146          | 48,821,069           | 6,294,060         |
| 6/30/2027                | 51,684,903                           | 5,817,769          | 50,980,029                   | 5,411,146          | 45,727,918           | 6,294,060         |
| 6/30/2028                | 49,284,902                           | 5,961,328          | 48,951,298                   | 5,411,146          | 42,418,246           | 6,294,061         |
| 6/30/2029                | 46,568,404                           | 6,108,834          | 46,780,556                   | 5,411,146          | 38,876,896           | 6,294,060         |
| 6/30/2030                | 43,509,163                           | 6,260,396          | 44,457,862                   | 5,411,146          | 35,087,652           | 6,294,060         |
| 6/30/2031                | 40,078,999                           | 5,745,683          | 41,972,579                   | 5,411,146          | 31,033,161           | 6,294,061         |
| 6/30/2032                | 36,941,149                           | 5,682,385          | 39,313,327                   | 5,411,146          | 26,694,855           | 6,294,060         |
| 6/30/2033                | 33,649,126                           | 5,335,408          | 36,467,927                   | 5,411,146          | 22,052,869           | 6,294,061         |
| 6/30/2034                | 30,485,575                           | 5,182,651          | 33,423,349                   | 5,411,147          | 17,085,943           | 6,294,061         |
| 6/30/2035                | 27,258,587                           | 4,960,959          | 30,165,649                   | 5,411,146          | 11,771,332           | 6,294,061         |
| 6/30/2036                | 24,035,030                           | 4,551,605          | 26,679,911                   | 5,411,146          | 6,084,698            | 6,294,061         |
| 6/30/2037                | 21,009,266                           | 4,351,072          | 22,950,172                   | 5,411,146          |                      |                   |
| 6/30/2038                | 17,979,131                           | 4,136,519          | 18,959,351                   | 5,411,147          |                      |                   |
| 6/30/2039                | 14,958,821                           | 3,983,781          | 14,689,172                   | 5,411,146          |                      |                   |
| 6/30/2040                | 11,885,085                           | 3,885,189          | 10,120,081                   | 5,411,147          |                      |                   |
| 6/30/2041                | 8,698,170                            | 3,082,280          | 5,231,153                    | 5,411,147          |                      |                   |
| 6/30/2042                | 6,118,707                            | 2,438,369          |                              |                    |                      |                   |
| 6/30/2043                | 4,024,749                            | 2,281,663          |                              |                    |                      |                   |
| 6/30/2044                | 1,946,311                            | 1,018,840          |                              |                    |                      |                   |
| 6/30/2045                | 1,028,655                            | 551,325            |                              |                    |                      |                   |
| 6/30/2046                | 530,366                              | 465,164            |                              |                    |                      |                   |
| 6/30/2047                | 86,322                               | 89,292             |                              |                    |                      |                   |
| 6/30/2048                |                                      |                    |                              |                    |                      |                   |
| 6/30/2049                |                                      |                    |                              |                    |                      |                   |
| 6/30/2050                |                                      |                    |                              |                    |                      |                   |
| 6/30/2051                |                                      |                    |                              |                    |                      |                   |
| <b>Total</b>             |                                      | <b>108,489,269</b> |                              | <b>108,222,924</b> |                      | <b>94,410,906</b> |
| <b>Interest Paid</b>     |                                      | <b>49,191,043</b>  |                              | <b>48,924,698</b>  |                      | <b>35,112,680</b> |
| <b>Estimated Savings</b> |                                      |                    |                              | <b>266,345</b>     |                      | <b>14,078,363</b> |

## Reconciliation of Required Employer Contributions

### Normal Cost (% of Payroll)

|   |         |
|---|---------|
| 1. For Period 7/1/21 – 6/30/22                              |         |
| a) Employer Normal Cost                                     | 10.40%  |
| b) Employee Contribution                                    | 7.67%   |
| c) Total Normal Cost  | 18.07%  |
| 2. Changes since the prior year annual valuation            |         |
| a) Effect of demographic experience                         | (0.27%) |
| b) Effect of plan changes                                   | 0.00%   |
| c) Effect of assumption changes                             | 0.00%   |
| d) Effect of method changes                                 | 0.00%   |
| e) Net effect of the changes above [sum of (a) through (d)] | (0.27%) |
| 3. For Period 7/1/22 – 6/30/23                              |         |
| a) Employer Normal Cost                                     | 10.20%  |
| b) Employee Contribution                                    | 7.60%   |
| c) Total Normal Cost  | 17.80%  |
| Employer Normal Cost Change [(3a) – (1a)]                   | (0.20%) |
| Employee Contribution Change [(3b) – (1b)]                  | (0.07%) |

### Unfunded Liability Contribution (\$)

|  |           |
|--|-----------|
| 1. For Period 7/1/21 – 6/30/22   | 4,287,313 |
| 2. Changes since the prior year annual valuation                                   |           |
| a) Effect of adjustments to prior year's amortization schedule                     | 0         |
| b) Effect of investment (gain)/loss during prior year <sup>1</sup>                 | 62,702    |
| c) Effect of non-investment (gain)/loss during prior year                          | 61,923    |
| d) Effect of plan changes  | 0         |
| e) Effect of AL Significant Increase   | 0         |
| f) Effect of assumption changes  | 0         |
| g) Changes to prior year amortization payments <sup>2</sup>                        | 418,152   |
| h) Effect of changes due to Fresh Start or immediate recognition of small balances | 0         |
| i) Effect of elimination of amortization base                                      | 0         |
| j) Effect of method change   | 0         |
| k) Net effect of the changes above [sum of (a) through (j)]                        | 542,777   |
| 3. For Period 7/1/22 – 6/30/23 [(1) + (2k)]  | 4,830,090 |

The amounts shown for the period 7/1/21 – 6/30/22 may be different if a prepayment of unfunded actuarial liability is made or a plan change became effective after the prior year's actuarial valuation was performed.

<sup>1</sup> The unfunded liability contribution for the investment (gain)/loss during the year prior to the valuation date is 20% of the "full" annual requirement due to the 5-year ramp. Increases to this amount that occur during the ramp period will be included in line g) in future years.

<sup>2</sup> Includes scheduled escalation in individual amortization base payments due to the 5-year ramp and payroll growth assumption used in the pre-2019 amortization policy.

## Employer Contribution History

The table below provides a recent history of the required employer contributions for the plan. The amounts are based on the actuarial valuation from two years prior and does not account for prepayments or benefit changes made during a fiscal year. Additional discretionary payments before July 1, 2018 or after June 30, 2020 are not included.

| Fiscal Year | Employer Normal Cost | Unfunded Rate | Unfunded Liability Payment (\$) | Additional Discretionary Payments |
|-------------|----------------------|---------------|---------------------------------|-----------------------------------|
| 2013 - 14   | 8.367%               | 8.032%        | N/A                             | N/A                               |
| 2014 - 15   | 8.389%               | 9.021%        | N/A                             | N/A                               |
| 2015 - 16   | 8.361%               | 10.197%       | N/A                             | N/A                               |
| 2016 - 17   | 8.608%               | 11.754%       | N/A                             | N/A                               |
| 2017 - 18   | 8.793%               | N/A           | 2,139,379                       | N/A                               |
| 2018 - 19   | 9.368%               | N/A           | 2,648,073                       | 0                                 |
| 2019 - 20   | 9.774%               | N/A           | 3,196,761                       | 0                                 |
| 2020 - 21   | 10.392%              | N/A           | 3,634,952                       |                                   |
| 2021 - 22   | 10.40%               | N/A           | 4,287,313                       |                                   |
| 2022 - 23   | 10.20%               | N/A           | 4,830,090                       |                                   |

## Funding History

The table below shows the recent history of actuarial accrued liability, market value of assets, unfunded accrued liability, funded ratio and annual covered payroll.

| Valuation Date | Accrued Liability (AL) | Market Value of Assets (MVA) | Unfunded Accrued Liability (UAL) | Funded Ratio | Annual Covered Payroll |
|----------------|------------------------|------------------------------|----------------------------------|--------------|------------------------|
| 6/30/2011      | \$94,015,409           | \$68,869,888                 | \$25,145,521                     | 73.3%        | \$12,767,707           |
| 6/30/2012      | 98,458,686             | 67,951,375                   | 30,507,311                       | 69.0%        | 13,063,048             |
| 6/30/2013      | 104,969,799            | 76,215,351                   | 28,754,448                       | 72.6%        | 13,595,469             |
| 6/30/2014      | 117,459,514            | 88,570,710                   | 28,888,804                       | 75.4%        | 13,841,577             |
| 6/30/2015      | 123,680,195            | 88,724,620                   | 34,955,575                       | 71.7%        | 14,495,883             |
| 6/30/2016      | 131,997,730            | 86,950,874                   | 45,046,856                       | 65.9%        | 15,154,419             |
| 6/30/2017      | 139,483,910            | 94,177,756                   | 45,306,154                       | 67.5%        | 15,112,393             |
| 6/30/2018      | 151,708,586            | 99,565,021                   | 52,143,565                       | 65.6%        | 16,167,849             |
| 6/30/2019      | 159,124,986            | 103,764,050                  | 55,360,936                       | 65.2%        | 16,962,578             |
| 6/30/2020      | 165,485,189            | 106,304,227                  | 59,180,962                       | 64.2%        | 18,169,972             |

## Normal Cost by Benefit Group

The table below displays the Total Normal Cost broken out by benefit group for fiscal year 2022-23. The Total Normal Cost is the annual cost of service accrual for the fiscal year for active employees and can be viewed as the long-term contribution rate for the benefits contracted. Generally, the normal cost for a benefit group subject to more generous benefit provisions will exceed the normal cost for a group with less generous benefits. However, based on the characteristics of the members (particularly when the number of actives is small), this may not be the case. Future measurements of the Total Normal Cost for each group may differ significantly from the current values due to such factors as: changes in the demographics of the group, changes in economic and demographic assumptions, changes in plan benefits or applicable law.

| <b>Rate Plan Identifier</b> | <b>Benefit Group Name</b> | <b>Total Normal Cost<br/>FY 2022-23</b> | <b>Number of<br/>Actives</b> | <b>Payroll on<br/>6/30/2020</b> |
|-----------------------------|---------------------------|---|------------------------------|---------------------------------|
| 984                         | Miscellaneous First Level | 19.19%                                  | 100                          | \$14,039,921                    |
| 26482                       | Miscellaneous PEPRA Level | 13.12%                                  | 40                           | \$4,130,051                     |
|                             | <b>Plan Total</b>         | <b>17.80%</b>                           | <b>140</b>                   | <b>\$18,169,972</b>             |

Note that if a Benefit Group above has multiple bargaining units, each of which has separately contracted for different benefits such as Employer Paid Member Contributions, then the Normal Cost split does not reflect those differences. Additionally, if a Second Level Benefit Group amended to the same benefit formula as a First Level Benefit Group, their Normal Costs may be dissimilar due to demographic or other population differences. If you have questions in these situations, please consult with your plan actuary.

## PEPRA Member Contribution Rates

The California Public Employees' Pension Reform Act of 2013 ("PEPRA") established new benefit formulas, final compensation period, and contribution requirements for "new" employees (generally those first hired into a CalPERS-covered position on or after January 1, 2013). In accordance with Government Code section 7522.30(b), "new members ... shall have an initial contribution rate of at least 50% of the normal cost rate." The normal cost for the plan is dependent on the benefit levels, actuarial assumptions and demographics of the plan, particularly members' entry age into the plan. Should the total normal cost of the plan change by more than 1% from the base total normal cost established for the plan, the new member rate shall be 50% of the new normal cost rounded to the nearest quarter percent.

The table below shows the determination of the PEPRA member contribution rates effective July 1, 2022, based on 50% of the Total Normal Cost for each respective plan as of the June 30, 2020 valuation.

| Rate Plan Identifier | Benefit Group Name        | Basis for Current Rate |             | Rates Effective July 1, 2022 |        |               |             |
|----------------------|---------------------------|------------------------|-------------|------------------------------|--------|---------------|-------------|
|                      |                           | Total Normal Cost      | Member Rate | Total Normal Cost            | Change | Change Needed | Member Rate |
| 26482                | Miscellaneous PEPRA Level | 12.500%                | 6.25%       | 12.96%                       | 0.460% | No            | 6.25%       |

For purposes of setting member rates, it is preferable to determine total normal cost using a large active population so that the rate remains relatively stable. While each CalPERS non-pooled plan has a sufficiently large active population for this purpose, the PEPRA active population by itself may not be sufficiently large. The total PEPRA normal cost will be determined based on the plan's PEPRA membership only if the number of members covered under the PEPRA formula meets either:

1. 50% of the active population, or
2. 25% of the active population and 100 or more PEPRA members

Until one of these conditions is met, the plan's total PEPRA normal cost will be determined using the entire active plan population (both PEPRA and Classic) based on the PEPRA benefit provisions. For this reason, the PEPRA member contribution rate determined in the table above may not equal 50% of the total normal cost of the PEPRA group shown on the "Normal Cost by Benefit Group" page.

## **Risk Analysis**

- **Future Investment Return Scenarios**
- **Discount Rate Sensitivity**
- **Mortality Rate Sensitivity**
- **Maturity Measures**
- **Maturity Measures History**
- **Hypothetical Termination Liability**

## Future Investment Return Scenarios

Analysis was performed to determine the effects of various future investment returns on required employer contributions. The projections below provide a range of results based on five investment return scenarios assumed to occur during the next four fiscal years (2020-21, 2021-22, 2022-23 and 2023-24). The projections also assume that all other actuarial assumptions will be realized and that no further changes to assumptions, contributions, benefits, or funding will occur.

For fiscal years 2020-21, 2021-22, 2022-23, and 2023-24 each scenario assumes an alternate fixed annual return. The fixed return assumptions for the five scenarios are 1.0%, 4.0%, 7.0%, 9.0% and 12.0%.

These alternate investment returns were chosen based on stochastic analysis of possible future investment returns over the four-year period ending June 30, 2024. Using the expected returns and volatility of the asset classes in which the funds are invested, we produced five thousand stochastic outcomes for this period based on the recently completed Asset Liability Management process. We then selected annual returns that approximate the 5<sup>th</sup>, 25<sup>th</sup>, 50<sup>th</sup>, 75<sup>th</sup>, and 95<sup>th</sup> percentiles for these outcomes. For example, of all the four-year outcomes generated in the stochastic analysis, approximately 25% had an average annual return of 4.0% or less.

Required contributions outside of this range are also possible. In particular, whereas it is unlikely that investment returns will average less than 1.0% or greater than 12.0% over a four-year period, the likelihood of a single investment return less than 1.0% or greater than 12.0% in any given year is much greater.

| Assumed Annual Return From<br>2020-21 through 2023-24 | Projected Employer Contributions |             |             |             |
|---|----------------------------------|-------------|-------------|-------------|
|   | 2023-24                          | 2024-25     | 2025-26     | 2026-27     |
| <b>1.0%</b>   |                                  |             |             |             |
| Normal Cost   | 10.0%                            | 9.8%        | 9.6%        | 9.4%        |
| UAL Contribution                                      | \$5,311,000                      | \$5,967,000 | \$6,392,000 | \$7,257,000 |
| <b>4.0%</b>   |                                  |             |             |             |
| Normal Cost   | 10.0%                            | 9.8%        | 9.6%        | 9.4%        |
| UAL Contribution                                      | \$5,232,000                      | \$5,733,000 | \$5,927,000 | \$6,492,000 |
| <b>7.0%</b>   |                                  |             |             |             |
| Normal Cost   | 10.0%                            | 9.8%        | 9.6%        | 9.4%        |
| UAL Contribution                                      | \$5,153,000                      | \$5,494,000 | \$5,444,000 | \$5,678,000 |
| <b>9.0%</b>   |                                  |             |             |             |
| Normal Cost   | 10.2%                            | 10.3%       | 10.4%       | 10.5%       |
| UAL Contribution                                      | \$5,105,000                      | \$5,367,000 | \$5,208,000 | \$5,293,000 |
| <b>12.0%</b>  |                                  |             |             |             |
| Normal Cost   | 10.2%                            | 10.3%       | 10.4%       | 10.5%       |
| UAL Contribution                                      | \$5,027,000                      | \$5,123,000 | \$4,699,000 | \$4,410,000 |

These projections reflect changes to the amortization policy effective with the June 30, 2019 valuation as well as the impact of the CalPERS risk mitigation policy (which reduces the discount rate when investment returns exceed specified trigger points). The projected normal cost percentages reflect that normal cost is anticipated to decline over time as new employees are hired into PEPPA or other lower-cost benefit tiers.

## Discount Rate Sensitivity

The discount rate assumption is calculated as the sum of the assumed real rate of return and the assumed annual price inflation, currently 4.50% and 2.50%, respectively. Changing either the price inflation assumption or the real rate of return assumption will change the discount rate. The sensitivity of the valuation results to the discount rate assumption depends on which component of the discount rate is changed. Shown below are various valuation results as of June 30, 2020 assuming alternate discount rates by changing the two components independently. Results are shown using the current discount rate of 7.0% as well as alternate discount rates of 6.0% and 8.0%. The rates of 6.0% and 8.0% were selected since they illustrate the impact of a 1.0% increase or decrease to the 7.0% assumption.

### Sensitivity to the Real Rate of Return Assumption

| As of June 30, 2020                         | 1% Lower Real Return Rate | Current Assumptions | 1% Higher Real Return Rate |
|---|---------------------------|---------------------|----------------------------|
| <b>Discount Rate</b>                        | <b>6.0%</b>               | <b>7.0%</b>         | <b>8.0%</b>                |
| Inflation                                   | 2.5%                      | 2.5%                | 2.5%                       |
| <b>Real Rate of Return</b>                  | <b>3.5%</b>               | <b>4.5%</b>         | <b>5.5%</b>                |
| a) Total Normal Cost                        | 22.26%                    | 17.80%              | 14.38%                     |
| b) Accrued Liability                        | \$186,307,580             | \$165,485,189       | \$148,117,042              |
| c) Market Value of Assets                   | \$106,304,227             | \$106,304,227       | \$106,304,227              |
| d) Unfunded Liability/(Surplus) [(b) - (c)] | \$80,003,353              | \$59,180,962        | \$41,812,815               |
| e) Funded Status                            | 57.1%                     | 64.2%               | 71.8%                      |

### Sensitivity to the Price Inflation Assumption

| As of June 30, 2020                         | 1% Lower Inflation Rate | Current Assumptions | 1% Higher Inflation Rate |
|---|-------------------------|---------------------|--------------------------|
| <b>Discount Rate</b>                        | <b>6.0%</b>             | <b>7.0%</b>         | <b>8.0%</b>              |
| <b>Inflation</b>                            | <b>1.5%</b>             | <b>2.5%</b>         | <b>3.5%</b>              |
| Real Rate of Return                         | 4.5%                    | 4.5%                | 4.5%                     |
| a) Total Normal Cost                        | 19.01%                  | 17.80%              | 16.37%                   |
| b) Accrued Liability                        | \$173,773,397           | \$165,485,189       | \$154,426,417            |
| c) Market Value of Assets                   | \$106,304,227           | \$106,304,227       | \$106,304,227            |
| d) Unfunded Liability/(Surplus) [(b) - (c)] | \$67,469,170            | \$59,180,962        | \$48,122,190             |
| e) Funded Status                            | 61.2%                   | 64.2%               | 68.8%                    |

## Mortality Rate Sensitivity

The following table looks at the change in the June 30, 2020 plan costs and funded status under two different longevity scenarios, namely assuming rates of mortality are 10% lower or 10% higher than our current mortality assumptions. This type of analysis highlights the impact on the plan of improving or worsening mortality over the long term.

| As of June 30, 2020                         | 10% Lower Mortality Rates | Current Assumptions | 10% Higher Mortality Rates |
|---|---------------------------|---------------------|----------------------------|
| a) Total Normal Cost                        | 18.12%                    | 17.80%              | 17.50%                     |
| b) Accrued Liability                        | \$169,050,606             | \$165,485,189       | \$162,201,465              |
| c) Market Value of Assets                   | \$106,304,227             | \$106,304,227       | \$106,304,227              |
| d) Unfunded Liability/(Surplus) [(b) - (c)] | \$62,746,379              | \$59,180,962        | \$55,897,238               |
| e) Funded Status                            | 62.9%                     | 64.2%               | 65.5%                      |

## Maturity Measures

As pension plans mature they become more sensitive to risks. Understanding plan maturity and how it affects the ability of a pension plan sponsor to tolerate risk is important in understanding how the plan is impacted by investment return volatility, other economic variables and changes in longevity or other demographic assumptions. One way to look at the maturity level of CalPERS and its plans is to look at the ratio of a plan's retiree liability to its total liability. A pension plan in its infancy will have a very low ratio of retiree liability to total liability. As the plan matures, the ratio increases. A mature plan will often have a ratio above 60%-65%.

| <b>Ratio of Retiree Accrued Liability to Total Accrued Liability</b> | <b>June 30, 2019</b> | <b>June 30, 2020</b> |
|--|----------------------|----------------------|
| 1. Retiree Accrued Liability   | 100,405,690          | 104,159,199          |
| 2. Total Accrued Liability   | 159,124,986          | 165,485,189          |
| 3. Ratio of Retiree AL to Total AL [(1) / (2)]                       | 63%                  | 63%                  |

Another measure of the maturity level of CalPERS and its plans is the ratio of actives to retirees, also called Support Ratio. A pension plan in its infancy will have a very high ratio of active to retired members. As the plan matures, and members retire, the ratio declines. A mature plan will often have a ratio near or below one. The average support ratio for CalPERS public agency plans is 1.25.

| <b>Support Ratio</b>         | <b>June 30, 2019</b> | <b>June 30, 2020</b> |
|------------------------------|----------------------|----------------------|
| 1. Number of Actives         | 137                  | 140                  |
| 2. Number of Retirees        | 193                  | 197                  |
| 3. Support Ratio [(1) / (2)] | 0.71                 | 0.71                 |

The actuarial calculations supplied in this communication are based on various assumptions about long-term demographic and economic behavior. Unless these assumptions (e.g., terminations, deaths, disabilities, retirements, salary growth, investment return) are exactly realized each year, there will be differences on a year-to-year basis. The year-to-year differences between actual experience and the assumptions are called actuarial gains and losses and serve to lower or raise required employer contributions from one year to the next. Therefore, employer contributions will inevitably fluctuate, especially due to the ups and downs of investment returns.

### Asset Volatility Ratio

Shown in the table below is the asset volatility ratio (AVR), which is the ratio of market value of assets to payroll. Plans that have a higher AVR experience more volatile employer contributions (as a percentage of payroll) due to investment return. For example, a plan with AVR of 8 may experience twice the contribution volatility due to investment return volatility than a plan with AVR of 4. It should be noted that this ratio is a measure of the current situation. It increases over time but generally tends to stabilize as a plan matures.

### Liability Volatility Ratio

Also shown in the table below is the liability volatility ratio (LVR), which is the ratio of accrued liability to payroll. Plans that have a higher LVR experience more volatile employer contributions (as a percentage of payroll) due to changes in liability. For example, a plan with LVR of 8 is expected to have twice the contribution volatility of a plan with LVR of 4 when there is a change in accrued liability, such as when there is a change in actuarial assumptions. It should be noted that this ratio indicates a longer-term potential for contribution volatility, since the AVR, described above, will tend to move closer to the LVR as the funded status approaches 100%.

## Maturity Measures (continued)

| Contribution Volatility                         | June 30, 2019 | June 30, 2020 |
|---|---------------|---------------|
| 1. Market Value of Assets without Receivables   | \$103,475,877 | \$106,057,993 |
| 2. Payroll                                      | 16,962,578    | 18,169,972    |
| 3. Asset Volatility Ratio (AVR) [(1) / (2)]     | 6.1           | 5.8           |
| 4. Accrued Liability                            | \$159,124,986 | \$165,485,189 |
| 5. Liability Volatility Ratio (LVR) [(4) / (2)] | 9.4           | 9.1           |

## Maturity Measures History

| Valuation Date | Ratio of<br>Retiree Accrued Liability<br>to<br>Total Accrued Liability | Support<br>Ratio | Asset<br>Volatility<br>Ratio | Liability<br>Volatility<br>Ratio |
|----------------|--|------------------|------------------------------|----------------------------------|
| 6/30/2017      | 62%  | 0.75             | 6.2                          | 9.2                              |
| 6/30/2018      | 61%  | 0.74             | 6.1                          | 9.4                              |
| 6/30/2019      | 63%  | 0.71             | 6.1                          | 9.4                              |
| 6/30/2020      | 63%  | 0.71             | 5.8                          | 9.1                              |

## Hypothetical Termination Liability

The hypothetical termination liability is an estimate of the financial position of the plan had the contract with CalPERS been terminated as of June 30, 2020. The plan liability on a termination basis is calculated differently from the plan's ongoing funding liability. For this hypothetical termination liability calculation, both compensation and service are frozen as of the valuation date and no future pay increases or service accruals are assumed. This measure of funded status is not appropriate for assessing the need for future employer contributions in the case of an ongoing plan, that is, for an employer that continues to provide CalPERS retirement benefits to active employees.

A more conservative investment policy and asset allocation strategy was adopted by the CalPERS Board for the Terminated Agency Pool. The Terminated Agency Pool has limited funding sources since no future employer contributions will be made. Therefore, expected benefit payments are secured by risk-free assets and benefit security for members is increased while limiting the funding risk. However, this asset allocation has a lower expected rate of return than the PERF and consequently, a lower discount rate assumption. The lower discount rate for the Terminated Agency Pool results in higher liabilities for terminated plans.

The effective termination discount rate will depend on actual market rates of return for risk-free securities on the date of termination. As market discount rates are variable the table below shows a range for the hypothetical termination liability based on the lowest and highest interest rates observed during an approximate 19-month period from 12 months before the valuation date to 7 months after.

| <b>Market<br/>Value of<br/>Assets (MVA)</b> | <b>Hypothetical<br/>Termination<br/>Liability<sup>1,2</sup><br/>at 0.75%</b> | <b>Funded<br/>Status</b> | <b>Unfunded<br/>Termination<br/>Liability<br/>at 0.75%</b> | <b>Hypothetical<br/>Termination<br/>Liability<sup>1,2</sup><br/>at 2.50%</b> | <b>Funded<br/>Status</b> | <b>Unfunded<br/>Termination<br/>Liability<br/>at 2.50%</b> |
|---|--|--------------------------|--|--|--------------------------|--|
| \$106,304,227                               | \$367,631,539  | 28.9%                    | \$261,327,312  | \$282,784,530  | 37.6%                    | \$176,480,303  |

<sup>1</sup> The hypothetical liabilities calculated above include a 5% contingency load in accordance with Board policy. Other actuarial assumptions can be found in Appendix A.

<sup>2</sup> The current discount rate assumption used for termination valuations is a weighted average of the 10-year and 30-year U.S. Treasury yields where the weights are based on matching asset and liability durations as of the termination date. The discount rates used in the table are based on 20-year Treasury bonds, rounded to the nearest quarter percentage point, which is a good proxy for most plans. The 20-year Treasury yield was 1.18% on June 30, 2020, and was 1.68% on January 31, 2021.

In order to terminate the plan, you must first contact our Retirement Services Contract Unit to initiate a Resolution of Intent to Terminate. The completed Resolution will allow the plan actuary to give you a preliminary termination valuation with a more up-to-date estimate of the plan liabilities. CalPERS advises you to consult with the plan actuary before beginning this process.

## **Plan's Major Benefit Provisions**

## Plan's Major Benefit Options

Shown below is a summary of the major optional benefits for which your agency has contracted. A description of principal standard and optional plan provisions is in Appendix B.

| Member Category                   | Benefit Group |           |       |            |       |       |  |
|-----------------------------------|---------------|-----------|-------|------------|-------|-------|--|
|                                   | Misc          | Misc      | Misc  | Misc       | Misc  | Misc  |  |
| <b>Demographics</b>               |               |           |       |            |       |       |  |
| Actives                           | No            | Yes       | No    | Yes        | No    | No    |  |
| Transfers/Separated               | Yes           | Yes       | No    | Yes        | No    | No    |  |
| Receiving                         | Yes           | Yes       | Yes   | No         | Yes   | Yes   |  |
| <b>Benefit Provision</b>          |               |           |       |            |       |       |  |
| Benefit Formula                   | 2% @ 55       | 2.5% @ 55 |       | 2% @ 62    |       |       |  |
| Social Security Coverage          | No            | No        |       | No         |       |       |  |
| Full/Modified                     | Full          | Full      |       | Full       |       |       |  |
| Employee Contribution Rate        |               | 8.00%     |       | 6.25%      |       |       |  |
| Final Average Compensation Period | One Year      | One Year  |       | Three Year |       |       |  |
| Sick Leave Credit                 | Yes           | Yes       |       | Yes        |       |       |  |
| Non-Industrial Disability         | Standard      | Standard  |       | Standard   |       |       |  |
| Industrial Disability             | No            | No        |       | No         |       |       |  |
| Pre-Retirement Death Benefits     |               |           |       |            |       |       |  |
| Optional Settlement 2             | No            | No        |       | No         |       |       |  |
| 1959 Survivor Benefit Level       | Level 4       | Level 4   |       | Level 4    |       |       |  |
| Special                           | No            | No        |       | No         |       |       |  |
| Alternate (firefighters)          | No            | No        |       | No         |       |       |  |
| Post-Retirement Death Benefits    |               |           |       |            |       |       |  |
| Lump Sum                          | \$500         | \$500     | \$500 | \$500      | \$500 | \$500 |  |
| Survivor Allowance (PRSA)         | No            | No        | No    | No         | No    | No    |  |
| COLA                              | 2%            | 2%        | 2%    | 2%         | 2%    | 2%    |  |

## **Appendices**

- **Appendix A – Actuarial Methods and Assumptions**
- **Appendix B – Principal Plan Provisions**
- **Appendix C – Participant Data**
- **Appendix D – Glossary of Actuarial Terms**

## **Appendix A**

### **Actuarial Methods and Assumptions**

- **Actuarial Data**
- **Actuarial Methods**
- **Actuarial Assumptions**
- **Miscellaneous**

## Actuarial Data

As stated in the Actuarial Certification, the data which serves as the basis of this valuation has been obtained from the various CalPERS databases. We have reviewed the valuation data and believe that it is reasonable and appropriate in aggregate. We are unaware of any potential data issues that would have a material effect on the results of this valuation, except that data does not always contain the latest salary information for former members now in reciprocal systems and does not recognize the potential for unusually large salary deviation in certain cases such as elected officials. Therefore, salary information in these cases may not be accurate. These situations are relatively infrequent, however, and generally do not have a material impact on the required employer contributions.

## Actuarial Methods

### Actuarial Cost Method

The actuarial cost method used is the Entry Age Actuarial Cost Method. Under this method, projected benefits are determined for all members and the associated liabilities are spread in a manner that produces level annual cost as a percentage of pay in each year from the member's entry age to their assumed retirement age on the valuation date. The cost allocated to the current fiscal year is called the normal cost.

The actuarial accrued liability for active members is then calculated as the portion of the total cost of the plan allocated to prior years. The actuarial accrued liability for members currently receiving benefits and for members entitled to deferred benefits is equal to the present value of the benefits expected to be paid. No normal costs are applicable for these participants.

CalPERS uses an in-house proprietary actuarial model for calculating pension plan costs. We believe this model is fit for its intended purpose and meets all applicable Actuarial Standards of Practice. Furthermore, the actuarial results of our model are independently confirmed periodically by outside auditing actuaries. The actuarial assumptions used are internally consistent and the generated results reasonable. A further refinement to the actuarial model will be the introduction of generational mortality in the June 30, 2021 actuarial valuation.

### Amortization of Unfunded Actuarial Accrued Liability

The excess of the total actuarial accrued liability over the market value of plan assets is called the unfunded actuarial accrued liability (UAL). Funding requirements are determined by adding the normal cost and a payment toward the UAL. The UAL payment is equal to the sum of individual amortization payments, each representing a different source of UAL for a given measurement period.

Amortization payments are determined according to the CalPERS amortization policy. The CalPERS Board adopted a new policy effective for the June 30, 2019 actuarial valuation. The new policy applies prospectively only; amortization bases (sources of UAL) established prior to the June 30, 2019 valuation will continue to be amortized according to the prior policy.

#### Prior Policy (Bases Established prior to June 30, 2019)

Amortization payments are determined as a level percentage of payroll whereby the payment increases each year at an escalation rate. Gains or losses are amortized over a fixed 30-year period with a 5-year ramp up at the beginning and a 5-year ramp down at the end of the amortization period. All changes in liability due to plan amendments (other than golden handshakes) are amortized over a 20-year period with no ramp. Changes in actuarial assumptions or changes in actuarial methodology are amortized over a 20-year period with a 5-year ramp up at the beginning and a 5-year ramp down at the end of the amortization period. Changes in unfunded accrued liability due to a Golden Handshake will be amortized over a period of five years. Bases established prior to June 30, 2013 may be amortized differently. A summary is provided in the following table:

| Driver              | Source      |                |                          |                |                  |
|---------------------|-------------|----------------|--------------------------|----------------|------------------|
|                     | (Gain)/Loss |                | Assumption/Method Change | Benefit Change | Golden Handshake |
|                     | Investment  | Non-investment |                          |                |                  |
| Amortization Period | 30 Years    | 30 Years       | 20 Years                 | 20 Years       | 5 Years          |
| Escalation Rate     |             |                |                          |                |                  |
| - Active Plans      | 2.75%       | 2.75%          | 2.75%                    | 2.75%          | 2.75%            |
| - Inactive Plans    | 0%          | 0%             | 0%                       | 0%             | 0%               |
| Ramp Up             | 5           | 5              | 5                        | 0              | 0                |
| Ramp Down           | 5           | 5              | 5                        | 0              | 0                |

The 5-year ramp up means that the payments in the first four years of the amortization period are 20%, 40%, 60% and 80% of the “full” payment which begins in year five. The 5-year ramp down means that the reverse is true in the final four years of the amortization period.

Current Policy (Bases Established on or after June 30, 2019)

Amortization payments are determined as a level dollar amount. Investment gains or losses are amortized over a fixed 20-year period with a 5-year ramp up at the beginning of the amortization period. Non-investment gains or losses are amortized over a fixed 20-year period with no ramps. All changes in liability due to plan amendments (other than golden handshakes) are amortized over a 20-year period with no ramps. Changes in actuarial assumptions or changes in actuarial methodology are amortized over a 20-year period with no ramps. Changes in unfunded accrued liability due to a Golden Handshake are amortized over a period of five years. A summary is provided in the table below:

|                     | Source      |                |                          |                |                  |
|---------------------|-------------|----------------|--------------------------|----------------|------------------|
|                     | (Gain)/Loss |                | Assumption/Method Change | Benefit Change | Golden Handshake |
|                     | Investment  | Non-investment |                          |                |                  |
| Amortization Period | 20 Years    | 20 Years       | 20 Years                 | 20 Years       | 5 Years          |
| Escalation Rate     | 0%          | 0%             | 0%                       | 0%             | 0%               |
| Ramp Up             | 5           | 0              | 0                        | 0              | 0                |
| Ramp Down           | 0           | 0              | 0                        | 0              | 0                |

Exceptions for Inconsistencies

An exception to the amortization rules above is used whenever their application results in inconsistencies. In these cases, a “fresh start” approach is used. This means that the current unfunded actuarial liability is projected and amortized over a set number of years. For example, a fresh start is needed in the following situations:

- When a negative payment would be required on a positive unfunded actuarial liability; or
- When the payment would completely amortize the total unfunded liability in a very short time period, and results in a large change in the employer contribution requirement.

It should be noted that the actuary may determine that a fresh start is necessary under other circumstances. In all cases of a fresh start, the period is set by the actuary at what is deemed appropriate; however, the period will not be greater than 20 years.

#### Exceptions for Plans in Surplus

If a surplus exists (i.e. the Market Value of Assets exceeds the plan's accrued liability) any prior amortization layers shall be considered fully amortized, and the surplus shall not be amortized.

In the event of any subsequent unfunded liability, a Fresh Start shall be used with an amortization period of 20 years or less.

#### Exceptions for Small Amounts

Where small unfunded liabilities are identified in annual valuations which result in small payment amounts, the actuary may shorten the remaining period for these bases.

- When the balance of a single amortization base has an absolute value less than \$250, the amortization period is reduced to one year.
- When the entire unfunded liability is a small amount the actuary may perform a Fresh Start and use an appropriate amortization period.

#### Exceptions for Inactive Plans

The following exceptions apply to plans classified as Inactive. These plans have no active members and no expectation to have active members in the future.

- Amortization of the unfunded liability is on a "level dollar" basis rather than a "level percent of pay" basis. For amortization layers, which utilize a ramp up and ramp down, the "ultimate" payment is constant.
- Actuarial judgment will be used to shorten amortization periods for Inactive plans with existing periods that are deemed too long given the duration of the liability. The specific demographics of the plan will be used to determine if shorter periods may be more appropriate.

#### Exceptions for Inactive Agencies

For a public agency with no active members in any CalPERS rate plan, the unfunded liability shall be amortized over a closed amortization period of no more than 15 years.

#### **Asset Valuation Method**

The Actuarial Value of Assets is set equal to the market value of assets. Asset values include accounts receivable.

#### **PEPRA Normal Cost Rate Methodology**

Per Government Code Section 7522.30(b), the "normal cost rate" shall mean the annual actuarially determined normal cost for the plan of retirement benefits provided to the new member and shall be established based on actuarial assumptions used to determine the liabilities and costs as part of the annual actuarial valuation. The plan of retirement benefits shall include any elements that would impact the actuarial determination of the normal cost, including, but not limited to, the retirement formula, eligibility and vesting criteria, ancillary benefit provisions, and any automatic cost-of-living adjustments as determined by the public retirement system.

For purposes of setting member rates, it is preferable to determine total normal cost using a large active population so that the rate remains relatively stable. While each CalPERS non-pooled plan has a sufficiently large active population for this purpose, the PEPRA active population by itself may not be sufficiently large. The total PEPRA normal cost will be determined based on the plan's PEPRA membership only if the number of members covered under the PEPRA formula meets either:

1. 50% of the active population, or
2. 25% of the active population and 100 or more PEPRA members

Until one of these conditions is met, the plan's total PEPRA normal cost will be determined using the entire active plan population (both PEPRA and Classic) based on the PEPRA benefit provisions.

## Actuarial Assumptions

In 2017, CalPERS completed its most recent asset liability management study incorporating actuarial assumptions and strategic asset allocation. In December 2017, the CalPERS Board of Administration adopted relatively modest changes to the asset allocation that reduced the expected volatility of returns. The adopted asset allocation was expected to have a long-term blended return that continued to support a discount rate assumption of 7.00%. The Board also approved several changes to the demographic assumptions that more closely aligned with actual experience.

On December 21, 2016, the CalPERS Board of Administration lowered the discount rate from 7.50% to 7.00% using a three-year phase-in beginning with the June 30, 2016 actuarial valuations. The minimum employer contributions for fiscal year 2022-23 determined in this valuation were calculated using a discount rate of 7.00%. The decision to reduce the discount rate was primarily based on reduced capital market assumptions provided by external investment consultants and CalPERS investment staff. The specific decision adopted by the Board reflected recommendations from CalPERS staff and additional input from employer and employee stakeholder groups. Based on the investment allocation adopted by the Board and capital market assumptions, the reduced discount rate schedule provides a more realistic assumption for the long-term investment return of the fund.

Notwithstanding the Board's decision to phase into a 7.00% discount rate, subsequent analysis of the expected investment return of CalPERS assets or changes to the investment allocation may result in a change to this discount rate schedule.

For more details and additional rationale for the selection of the actuarial assumptions, please refer to the CalPERS Experience Study and Review of Actuarial Assumptions report from December 2017 that can be found on the CalPERS website under: "Forms and Publications". Click on "View All" and search for Experience Study.

All actuarial assumptions (except the discount rates used for the hypothetical termination liability) represent an estimate of future experience rather than observations of the estimates inherent in market data.

### **Economic Assumptions**

#### **Discount Rate**

The prescribed discount rate assumption, adopted by the Board on December 21, 2016, is 7.00% compounded annually (net of investment and administrative expenses) as of June 30, 2020.

#### **Termination Liability Discount Rate**

The current discount rate assumption used for termination valuations is a weighted average of the 10-year and 30-year U.S. Treasury yields where the weights are based on matching asset and liability durations as of the termination date.

The hypothetical termination liabilities in this report are calculated using an observed range of market interest rates. This range is based on the lowest and highest 20-year Treasury bond observed during an approximate 19-month period from 12 months before the valuation date to 7 months after. The 20-year Treasury bond has a similar duration to most plan liabilities and serves as a good proxy for the termination discount rate. The 20-year Treasury yield was 1.18% on June 30, 2020.

### Salary Growth

Annual increases vary by category, entry age, and duration of service. A sample of assumed increases are shown below. Wage inflation assumption in the valuation year (2.75% for 2020) is added to these factors for total salary growth.

#### Public Agency Miscellaneous

| <u>Duration of Service</u> | <u>(Entry Age 20)</u> | <u>(Entry Age 30)</u> | <u>(Entry Age 40)</u> |
|----------------------------|-----------------------|-----------------------|-----------------------|
| 0                          | 0.0850                | 0.0775                | 0.0650                |
| 1                          | 0.0690                | 0.0635                | 0.0525                |
| 2                          | 0.0560                | 0.0510                | 0.0410                |
| 3                          | 0.0470                | 0.0425                | 0.0335                |
| 4                          | 0.0400                | 0.0355                | 0.0270                |
| 5                          | 0.0340                | 0.0295                | 0.0215                |
| 10                         | 0.0160                | 0.0135                | 0.0090                |
| 15                         | 0.0120                | 0.0100                | 0.0060                |
| 20                         | 0.0090                | 0.0075                | 0.0045                |
| 25                         | 0.0080                | 0.0065                | 0.0040                |
| 30                         | 0.0080                | 0.0065                | 0.0040                |

#### Public Agency Fire

| <u>Duration of Service</u> | <u>(Entry Age 20)</u> | <u>(Entry Age 30)</u> | <u>(Entry Age 40)</u> |
|----------------------------|-----------------------|-----------------------|-----------------------|
| 0                          | 0.1700                | 0.1700                | 0.1700                |
| 1                          | 0.1100                | 0.1100                | 0.1100                |
| 2                          | 0.0700                | 0.0700                | 0.0700                |
| 3                          | 0.0580                | 0.0580                | 0.0580                |
| 4                          | 0.0473                | 0.0473                | 0.0473                |
| 5                          | 0.0372                | 0.0372                | 0.0372                |
| 10                         | 0.0165                | 0.0165                | 0.0165                |
| 15                         | 0.0144                | 0.0144                | 0.0144                |
| 20                         | 0.0126                | 0.0126                | 0.0126                |
| 25                         | 0.0111                | 0.0111                | 0.0111                |
| 30                         | 0.0097                | 0.0097                | 0.0097                |

#### Public Agency Police

| <u>Duration of Service</u> | <u>(Entry Age 20)</u> | <u>(Entry Age 30)</u> | <u>(Entry Age 40)</u> |
|----------------------------|-----------------------|-----------------------|-----------------------|
| 0                          | 0.1027                | 0.1027                | 0.1027                |
| 1                          | 0.0803                | 0.0803                | 0.0803                |
| 2                          | 0.0628                | 0.0628                | 0.0628                |
| 3                          | 0.0491                | 0.0491                | 0.0491                |
| 4                          | 0.0384                | 0.0384                | 0.0384                |
| 5                          | 0.0300                | 0.0300                | 0.0300                |
| 10                         | 0.0145                | 0.0145                | 0.0145                |
| 15                         | 0.0150                | 0.0150                | 0.0150                |
| 20                         | 0.0155                | 0.0155                | 0.0155                |
| 25                         | 0.0160                | 0.0160                | 0.0160                |
| 30                         | 0.0165                | 0.0165                | 0.0165                |

**Salary Growth** (continued)

**Public Agency County Peace Officers**

| <u>Duration of Service</u> | <u>(Entry Age 20)</u> | <u>(Entry Age 30)</u> | <u>(Entry Age 40)</u> |
|----------------------------|-----------------------|-----------------------|-----------------------|
| 0                          | 0.1320                | 0.1320                | 0.1320                |
| 1                          | 0.0960                | 0.0960                | 0.0960                |
| 2                          | 0.0657                | 0.0657                | 0.0657                |
| 3                          | 0.0525                | 0.0525                | 0.0525                |
| 4                          | 0.0419                | 0.0419                | 0.0419                |
| 5                          | 0.0335                | 0.0335                | 0.0335                |
| 10                         | 0.0170                | 0.0170                | 0.0170                |
| 15                         | 0.0150                | 0.0150                | 0.0150                |
| 20                         | 0.0150                | 0.0150                | 0.0150                |
| 25                         | 0.0175                | 0.0175                | 0.0175                |
| 30                         | 0.0200                | 0.0200                | 0.0200                |

**Schools**

| <u>Duration of Service</u> | <u>(Entry Age 20)</u> | <u>(Entry Age 30)</u> | <u>(Entry Age 40)</u> |
|----------------------------|-----------------------|-----------------------|-----------------------|
| 0                          | 0.0428                | 0.0419                | 0.0380                |
| 1                          | 0.0428                | 0.0419                | 0.0380                |
| 2                          | 0.0428                | 0.0419                | 0.0380                |
| 3                          | 0.0354                | 0.0332                | 0.0280                |
| 4                          | 0.0305                | 0.0279                | 0.0224                |
| 5                          | 0.0262                | 0.0234                | 0.0180                |
| 10                         | 0.0171                | 0.0154                | 0.0112                |
| 15                         | 0.0152                | 0.0134                | 0.0098                |
| 20                         | 0.0135                | 0.0117                | 0.0086                |
| 25                         | 0.0120                | 0.0103                | 0.0076                |
| 30                         | 0.0087                | 0.0071                | 0.0048                |

- The Miscellaneous salary scale is used for Local Prosecutors.
- The Police salary scale is used for Other Safety, Local Sheriff, and School Police.

**Overall Payroll Growth**

2.75% compounded annually (used in projecting the payroll over which the unfunded liability is amortized). This assumption is used for all plans with active members.

**Inflation**

2.50% compounded annually.

**Non-valued Potential Additional Liabilities**

The potential liability loss for a cost-of-living increase exceeding the 2.50% inflation assumption and any potential liability loss from future member service purchases are not reflected in the valuation.

**Miscellaneous Loading Factors**

**Credit for Unused Sick Leave**

Total years of service is increased by 1% for those plans that have adopted the provision of providing Credit for Unused Sick Leave.

### **Conversion of Employer Paid Member Contributions (EPMC)**

Total years of service is increased by the Employee Contribution Rate for those plans with the provision providing for the Conversion of Employer Paid Member Contributions (EPMC) during the final compensation period.

### **Norris Decision (Best Factors)**

Employees hired prior to July 1, 1982 have projected benefit amounts increased in order to reflect the use of "Best Factors" in the calculation of optional benefit forms. This is due to a 1983 Supreme Court decision, known as the Norris decision, which required males and females to be treated equally in the determination of benefit amounts. Consequently, anyone already employed at that time is given the best possible conversion factor when optional benefits are determined. No loading is necessary for employees hired after July 1, 1982.

### **Termination Liability**

The termination liabilities include a 5% contingency load. This load is for unforeseen negative experience.

## **Demographic Assumptions**

### **Pre-Retirement Mortality**

Non-industrial death rates vary by age and gender. Industrial death rates vary by age. See sample rates in table below. The non-industrial death rates are used for all plans. The industrial death rates are used for safety plans (except for Local Prosecutor safety members where the corresponding miscellaneous plan does not have the Industrial Death Benefit).

| Age | <b>Non-Industrial Death<br/>(Not Job-Related)</b> |         | <b>Industrial Death<br/>(Job-Related)</b> |
|-----|---|---------|---|
|     | Male  | Female  | Male and Female                           |
| 20  | 0.00022   | 0.00007 | 0.00004                                   |
| 25  | 0.00029   | 0.00011 | 0.00006                                   |
| 30  | 0.00038   | 0.00015 | 0.00007                                   |
| 35  | 0.00049   | 0.00027 | 0.00009                                   |
| 40  | 0.00064   | 0.00037 | 0.00010                                   |
| 45  | 0.00080   | 0.00054 | 0.00012                                   |
| 50  | 0.00116   | 0.00079 | 0.00013                                   |
| 55  | 0.00172   | 0.00120 | 0.00015                                   |
| 60  | 0.00255   | 0.00166 | 0.00016                                   |
| 65  | 0.00363   | 0.00233 | 0.00018                                   |
| 70  | 0.00623   | 0.00388 | 0.00019                                   |
| 75  | 0.01057   | 0.00623 | 0.00021                                   |
| 80  | 0.01659   | 0.00939 | 0.00022                                   |

Miscellaneous plans usually have industrial death rates set to zero unless the agency has specifically contracted for industrial death benefits. If so, each non-industrial death rate shown above will be split into two components; 99% will become the non-industrial death rate and 1% will become the industrial death rate.

### Post-Retirement Mortality

Rates vary by age, type of retirement, and gender. See sample rates in table below. These rates are used for all plans.

| Age | Healthy Recipients |         | Non-Industrially Disabled<br>(Not Job-Related) |         | Industrially Disabled<br>(Job-Related) |         |
|-----|--------------------|---------|--|---------|--|---------|
|     | Male               | Female  | Male   | Female  | Male                                   | Female  |
| 50  | 0.00372            | 0.00346 | 0.01183  | 0.01083 | 0.00372                                | 0.00346 |
| 55  | 0.00437            | 0.00410 | 0.01613  | 0.01178 | 0.00437                                | 0.00410 |
| 60  | 0.00671            | 0.00476 | 0.02166  | 0.01404 | 0.00671                                | 0.00476 |
| 65  | 0.00928            | 0.00637 | 0.02733  | 0.01757 | 0.01113                                | 0.00765 |
| 70  | 0.01339            | 0.00926 | 0.03358  | 0.02183 | 0.01607                                | 0.01111 |
| 75  | 0.02316            | 0.01635 | 0.04277  | 0.02969 | 0.02779                                | 0.01962 |
| 80  | 0.03977            | 0.03007 | 0.06272  | 0.04641 | 0.04773                                | 0.03609 |
| 85  | 0.07122            | 0.05418 | 0.09793  | 0.07847 | 0.08547                                | 0.06501 |
| 90  | 0.13044            | 0.10089 | 0.14616  | 0.13220 | 0.14348                                | 0.11098 |
| 95  | 0.21658            | 0.17698 | 0.21658  | 0.21015 | 0.21658                                | 0.17698 |
| 100 | 0.32222            | 0.28151 | 0.32222  | 0.32226 | 0.32222                                | 0.28151 |
| 105 | 0.46691            | 0.43491 | 0.46691  | 0.43491 | 0.46691                                | 0.43491 |
| 110 | 1.00000            | 1.00000 | 1.00000  | 1.00000 | 1.00000                                | 1.00000 |

The post-retirement mortality rates above include 15 years of projected on-going mortality improvement using 90% of Scale MP 2016 published by the Society of Actuaries.

### Marital Status

For active members, a percentage who are married upon retirement is assumed according to member category as shown in the following table.

| Member Category             | Percent Married |
|-----------------------------|-----------------|
| Miscellaneous Member        | 70%             |
| Local Police                | 85%             |
| Local Fire                  | 90%             |
| Other Local Safety          | 70%             |
| School Police               | 85%             |
| Local County Peace Officers | 75%             |

### Age of Spouse

It is assumed that female spouses are 3 years younger than male spouses. This assumption is used for all plans.

### Terminated Members

It is assumed that terminated members refund immediately if non-vested. Terminated members who are vested are assumed to retire at age 59 for Miscellaneous members and age 54 for safety members.

### Termination with Refund

Rates vary by entry age and service for miscellaneous plans. Rates vary by service for safety plans.  
See sample rates in tables below.

#### Public Agency Miscellaneous

| Duration of Service | Entry Age 20 | Entry Age 25 | Entry Age 30 | Entry Age 35 | Entry Age 40 | Entry Age 45 |
|---------------------|--------------|--------------|--------------|--------------|--------------|--------------|
| 0                   | 0.1742       | 0.1674       | 0.1606       | 0.1537       | 0.1468       | 0.1400       |
| 1                   | 0.1545       | 0.1477       | 0.1409       | 0.1339       | 0.1271       | 0.1203       |
| 2                   | 0.1348       | 0.1280       | 0.1212       | 0.1142       | 0.1074       | 0.1006       |
| 3                   | 0.1151       | 0.1083       | 0.1015       | 0.0945       | 0.0877       | 0.0809       |
| 4                   | 0.0954       | 0.0886       | 0.0818       | 0.0748       | 0.0680       | 0.0612       |
| 5                   | 0.0212       | 0.0193       | 0.0174       | 0.0155       | 0.0136       | 0.0116       |
| 10                  | 0.0138       | 0.0121       | 0.0104       | 0.0088       | 0.0071       | 0.0055       |
| 15                  | 0.0060       | 0.0051       | 0.0042       | 0.0032       | 0.0023       | 0.0014       |
| 20                  | 0.0037       | 0.0029       | 0.0021       | 0.0013       | 0.0005       | 0.0001       |
| 25                  | 0.0017       | 0.0011       | 0.0005       | 0.0001       | 0.0001       | 0.0001       |
| 30                  | 0.0005       | 0.0001       | 0.0001       | 0.0001       | 0.0001       | 0.0001       |
| 35                  | 0.0001       | 0.0001       | 0.0001       | 0.0001       | 0.0001       | 0.0001       |

#### Public Agency Safety

| Duration of Service | Fire   | Police | County Peace Officer |
|---------------------|--------|--------|----------------------|
| 0                   | 0.1298 | 0.1013 | 0.1188               |
| 1                   | 0.0674 | 0.0636 | 0.0856               |
| 2                   | 0.0320 | 0.0271 | 0.0617               |
| 3                   | 0.0237 | 0.0258 | 0.0445               |
| 4                   | 0.0087 | 0.0245 | 0.0321               |
| 5                   | 0.0052 | 0.0086 | 0.0121               |
| 10                  | 0.0005 | 0.0053 | 0.0053               |
| 15                  | 0.0004 | 0.0027 | 0.0025               |
| 20                  | 0.0003 | 0.0017 | 0.0012               |
| 25                  | 0.0002 | 0.0012 | 0.0005               |
| 30                  | 0.0002 | 0.0009 | 0.0003               |
| 35                  | 0.0001 | 0.0009 | 0.0002               |

The police termination and refund rates are also used for Public Agency Local Prosecutors, Other Safety, Local Sheriff, and School Police.

#### Schools

| Duration of Service | Entry Age 20 | Entry Age 25 | Entry Age 30 | Entry Age 35 | Entry Age 40 | Entry Age 45 |
|---------------------|--------------|--------------|--------------|--------------|--------------|--------------|
| 0                   | 0.2107       | 0.2107       | 0.1827       | 0.1546       | 0.1375       | 0.1203       |
| 1                   | 0.1807       | 0.1807       | 0.1526       | 0.1246       | 0.1105       | 0.0963       |
| 2                   | 0.1526       | 0.1526       | 0.1259       | 0.0992       | 0.0878       | 0.0765       |
| 3                   | 0.1266       | 0.1266       | 0.1023       | 0.0780       | 0.0691       | 0.0603       |
| 4                   | 0.1026       | 0.1026       | 0.0815       | 0.0605       | 0.0537       | 0.0469       |
| 5                   | 0.0808       | 0.0808       | 0.0634       | 0.0461       | 0.0409       | 0.0358       |
| 10                  | 0.0202       | 0.0202       | 0.0157       | 0.0112       | 0.0087       | 0.0063       |
| 15                  | 0.0107       | 0.0107       | 0.0077       | 0.0048       | 0.0034       | 0.0021       |
| 20                  | 0.0056       | 0.0056       | 0.0037       | 0.0017       | 0.0016       | 0.0016       |
| 25                  | 0.0026       | 0.0026       | 0.0018       | 0.0009       | 0.0012       | 0.0015       |
| 30                  | 0.0013       | 0.0013       | 0.0011       | 0.0009       | 0.0012       | 0.0015       |
| 35                  | 0.0008       | 0.0008       | 0.0009       | 0.0009       | 0.0012       | 0.0015       |

### Termination with Vested Benefits

Rates vary by entry age and service for miscellaneous plans. Rates vary by service for safety plans.  
See sample rates in tables below.

#### Public Agency Miscellaneous

| Duration of Service | Entry Age 20 | Entry Age 25 | Entry Age 30 | Entry Age 35 | Entry Age 40 |
|---------------------|--------------|--------------|--------------|--------------|--------------|
| 5                   | 0.0422       | 0.0422       | 0.0393       | 0.0364       | 0.0344       |
| 10                  | 0.0278       | 0.0278       | 0.0271       | 0.0263       | 0.0215       |
| 15                  | 0.0192       | 0.0192       | 0.0174       | 0.0156       | 0.0120       |
| 20                  | 0.0139       | 0.0139       | 0.0109       | 0.0079       | 0.0047       |
| 25                  | 0.0083       | 0.0083       | 0.0048       | 0.0014       | 0.0007       |
| 30                  | 0.0015       | 0.0015       | 0.0007       | 0.0000       | 0.0000       |
| 35                  | 0.0000       | 0.0000       | 0.0000       | 0.0000       | 0.0000       |

#### Public Agency Safety

| Duration of Service | Fire   | Police | County Peace Officer |
|---------------------|--------|--------|----------------------|
| 5                   | 0.0094 | 0.0163 | 0.0187               |
| 10                  | 0.0064 | 0.0126 | 0.0134               |
| 15                  | 0.0048 | 0.0082 | 0.0092               |
| 20                  | 0.0038 | 0.0065 | 0.0064               |
| 25                  | 0.0026 | 0.0058 | 0.0042               |
| 30                  | 0.0014 | 0.0056 | 0.0022               |
| 35                  | 0.0000 | 0.0000 | 0.0000               |

- After termination with vested benefits, a miscellaneous member is assumed to retire at age 59 and a safety member at age 54.
- The Police termination with vested benefits rates are also used for Public Agency Local Prosecutors, Other Safety, Local Sheriff, and School Police.

#### Schools

| Duration of Service | Entry Age 20 | Entry Age 25 | Entry Age 30 | Entry Age 35 | Entry Age 40 |
|---------------------|--------------|--------------|--------------|--------------|--------------|
| 5                   | 0.0405       | 0.0405       | 0.0346       | 0.0288       | 0.0264       |
| 10                  | 0.0324       | 0.0324       | 0.0280       | 0.0235       | 0.0211       |
| 15                  | 0.0202       | 0.0202       | 0.0179       | 0.0155       | 0.0126       |
| 20                  | 0.0144       | 0.0144       | 0.0114       | 0.0083       | 0.0042       |
| 25                  | 0.0091       | 0.0091       | 0.0046       | 0.0000       | 0.0000       |
| 30                  | 0.0015       | 0.0015       | 0.0007       | 0.0000       | 0.0000       |
| 35                  | 0.0000       | 0.0000       | 0.0000       | 0.0000       | 0.0000       |

### Non-Industrial (Not Job-Related) Disability

Rates vary by age and gender for miscellaneous plans. Rates vary by age and category for safety plans.

| Age | Miscellaneous |        | Fire            | Police          | County Peace Officer | Schools |        |
|-----|---------------|--------|-----------------|-----------------|----------------------|---------|--------|
|     | Male          | Female | Male and Female | Male and Female | Male and Female      | Male    | Female |
| 20  | 0.0002        | 0.0001 | 0.0001          | 0.0001          | 0.0001               | 0.0001  | 0.0001 |
| 25  | 0.0002        | 0.0001 | 0.0001          | 0.0001          | 0.0001               | 0.0001  | 0.0001 |
| 30  | 0.0002        | 0.0002 | 0.0001          | 0.0002          | 0.0001               | 0.0001  | 0.0002 |
| 35  | 0.0004        | 0.0007 | 0.0001          | 0.0003          | 0.0004               | 0.0005  | 0.0004 |
| 40  | 0.0010        | 0.0014 | 0.0001          | 0.0004          | 0.0007               | 0.0012  | 0.0008 |
| 45  | 0.0015        | 0.0019 | 0.0002          | 0.0005          | 0.0013               | 0.0020  | 0.0017 |
| 50  | 0.0016        | 0.0020 | 0.0005          | 0.0008          | 0.0018               | 0.0026  | 0.0022 |
| 55  | 0.0016        | 0.0015 | 0.0007          | 0.0013          | 0.0010               | 0.0025  | 0.0018 |
| 60  | 0.0015        | 0.0011 | 0.0007          | 0.0020          | 0.0006               | 0.0022  | 0.0011 |

- The miscellaneous non-industrial disability rates are used for Local Prosecutors.
- The police non-industrial disability rates are also used for Other Safety, Local Sheriff, and School Police.

### Industrial (Job-Related) Disability

Rates vary by age and category.

| Age | Fire   | Police | County Peace Officer |
|-----|--------|--------|----------------------|
| 20  | 0.0001 | 0.0000 | 0.0004               |
| 25  | 0.0002 | 0.0017 | 0.0013               |
| 30  | 0.0006 | 0.0048 | 0.0025               |
| 35  | 0.0012 | 0.0079 | 0.0037               |
| 40  | 0.0023 | 0.0110 | 0.0051               |
| 45  | 0.0040 | 0.0141 | 0.0067               |
| 50  | 0.0208 | 0.0185 | 0.0092               |
| 55  | 0.0307 | 0.0479 | 0.0151               |
| 60  | 0.0438 | 0.0602 | 0.0174               |

- The police industrial disability rates are also used for Local Sheriff and Other Safety.
- 50% of the police industrial disability rates are used for School Police.
- 1% of the police industrial disability rates are used for Local Prosecutors.
- Normally, rates are zero for miscellaneous plans unless the agency has specifically contracted for industrial disability benefits. If so, each miscellaneous non-industrial disability rate will be split into two components: 50% will become the non-industrial disability rate and 50% will become the industrial disability rate.

### Service Retirement

Retirement rates vary by age, service, and formula, except for the safety  $\frac{1}{2}$  @ 55 and 2% @ 55 formulas, where retirement rates vary by age only.

#### Public Agency Miscellaneous 1.5% @ 65

| Age | Duration of Service |          |          |          |          |          |
|-----|---------------------|----------|----------|----------|----------|----------|
|     | 5 Years             | 10 Years | 15 Years | 20 Years | 25 Years | 30 Years |
| 50  | 0.008               | 0.011    | 0.013    | 0.015    | 0.017    | 0.019    |
| 51  | 0.007               | 0.010    | 0.012    | 0.013    | 0.015    | 0.017    |
| 52  | 0.010               | 0.014    | 0.017    | 0.019    | 0.021    | 0.024    |
| 53  | 0.008               | 0.012    | 0.015    | 0.017    | 0.019    | 0.022    |
| 54  | 0.012               | 0.016    | 0.019    | 0.022    | 0.025    | 0.028    |
| 55  | 0.018               | 0.025    | 0.031    | 0.035    | 0.038    | 0.043    |
| 56  | 0.015               | 0.021    | 0.025    | 0.029    | 0.032    | 0.036    |
| 57  | 0.020               | 0.028    | 0.033    | 0.038    | 0.043    | 0.048    |
| 58  | 0.024               | 0.033    | 0.040    | 0.046    | 0.052    | 0.058    |
| 59  | 0.028               | 0.039    | 0.048    | 0.054    | 0.060    | 0.067    |
| 60  | 0.049               | 0.069    | 0.083    | 0.094    | 0.105    | 0.118    |
| 61  | 0.062               | 0.087    | 0.106    | 0.120    | 0.133    | 0.150    |
| 62  | 0.104               | 0.146    | 0.177    | 0.200    | 0.223    | 0.251    |
| 63  | 0.099               | 0.139    | 0.169    | 0.191    | 0.213    | 0.239    |
| 64  | 0.097               | 0.136    | 0.165    | 0.186    | 0.209    | 0.233    |
| 65  | 0.140               | 0.197    | 0.240    | 0.271    | 0.302    | 0.339    |
| 66  | 0.092               | 0.130    | 0.157    | 0.177    | 0.198    | 0.222    |
| 67  | 0.129               | 0.181    | 0.220    | 0.249    | 0.277    | 0.311    |
| 68  | 0.092               | 0.129    | 0.156    | 0.177    | 0.197    | 0.221    |
| 69  | 0.092               | 0.130    | 0.158    | 0.178    | 0.199    | 0.224    |
| 70  | 0.103               | 0.144    | 0.175    | 0.198    | 0.221    | 0.248    |

#### Public Agency Miscellaneous 2% @ 60

| Age | Duration of Service |          |          |          |          |          |
|-----|---------------------|----------|----------|----------|----------|----------|
|     | 5 Years             | 10 Years | 15 Years | 20 Years | 25 Years | 30 Years |
| 50  | 0.020               | 0.020    | 0.020    | 0.020    | 0.020    | 0.150    |
| 51  | 0.006               | 0.019    | 0.027    | 0.031    | 0.035    | 0.038    |
| 52  | 0.011               | 0.024    | 0.031    | 0.034    | 0.037    | 0.040    |
| 53  | 0.010               | 0.015    | 0.021    | 0.027    | 0.033    | 0.040    |
| 54  | 0.025               | 0.025    | 0.029    | 0.035    | 0.041    | 0.048    |
| 55  | 0.019               | 0.026    | 0.033    | 0.092    | 0.136    | 0.146    |
| 56  | 0.030               | 0.034    | 0.038    | 0.060    | 0.093    | 0.127    |
| 57  | 0.030               | 0.046    | 0.061    | 0.076    | 0.090    | 0.104    |
| 58  | 0.040               | 0.044    | 0.059    | 0.080    | 0.101    | 0.122    |
| 59  | 0.024               | 0.044    | 0.063    | 0.083    | 0.103    | 0.122    |
| 60  | 0.070               | 0.074    | 0.089    | 0.113    | 0.137    | 0.161    |
| 61  | 0.080               | 0.086    | 0.093    | 0.118    | 0.156    | 0.195    |
| 62  | 0.100               | 0.117    | 0.133    | 0.190    | 0.273    | 0.357    |
| 63  | 0.140               | 0.157    | 0.173    | 0.208    | 0.255    | 0.301    |
| 64  | 0.140               | 0.153    | 0.165    | 0.196    | 0.239    | 0.283    |
| 65  | 0.140               | 0.178    | 0.215    | 0.264    | 0.321    | 0.377    |
| 66  | 0.140               | 0.178    | 0.215    | 0.264    | 0.321    | 0.377    |
| 67  | 0.140               | 0.178    | 0.215    | 0.264    | 0.321    | 0.377    |
| 68  | 0.112               | 0.142    | 0.172    | 0.211    | 0.257    | 0.302    |
| 69  | 0.112               | 0.142    | 0.172    | 0.211    | 0.257    | 0.302    |
| 70  | 0.140               | 0.178    | 0.215    | 0.264    | 0.321    | 0.377    |

**Service Retirement**

| <b>Public Agency Miscellaneous 2% @ 55</b> |                     |          |          |          |          |          |
|--|---------------------|----------|----------|----------|----------|----------|
| Age  | Duration of Service |          |          |          |          |          |
|  | 5 Years             | 10 Years | 15 Years | 20 Years | 25 Years | 30 Years |
| 50   | 0.008               | 0.013    | 0.018    | 0.021    | 0.022    | 0.033    |
| 51   | 0.009               | 0.016    | 0.020    | 0.023    | 0.026    | 0.036    |
| 52   | 0.015               | 0.018    | 0.020    | 0.021    | 0.025    | 0.030    |
| 53   | 0.016               | 0.020    | 0.024    | 0.028    | 0.031    | 0.035    |
| 54   | 0.018               | 0.022    | 0.026    | 0.030    | 0.034    | 0.038    |
| 55   | 0.040               | 0.040    | 0.056    | 0.093    | 0.109    | 0.154    |
| 56   | 0.034               | 0.050    | 0.066    | 0.092    | 0.107    | 0.138    |
| 57   | 0.042               | 0.048    | 0.058    | 0.082    | 0.096    | 0.127    |
| 58   | 0.046               | 0.054    | 0.062    | 0.090    | 0.106    | 0.131    |
| 59   | 0.045               | 0.055    | 0.066    | 0.097    | 0.115    | 0.144    |
| 60   | 0.058               | 0.075    | 0.093    | 0.126    | 0.143    | 0.169    |
| 61   | 0.065               | 0.088    | 0.111    | 0.146    | 0.163    | 0.189    |
| 62   | 0.136               | 0.118    | 0.148    | 0.190    | 0.213    | 0.247    |
| 63   | 0.130               | 0.133    | 0.174    | 0.212    | 0.249    | 0.285    |
| 64   | 0.113               | 0.129    | 0.165    | 0.196    | 0.223    | 0.249    |
| 65   | 0.145               | 0.173    | 0.201    | 0.233    | 0.266    | 0.289    |
| 66   | 0.170               | 0.199    | 0.229    | 0.258    | 0.284    | 0.306    |
| 67   | 0.250               | 0.204    | 0.233    | 0.250    | 0.257    | 0.287    |
| 68   | 0.227               | 0.175    | 0.193    | 0.215    | 0.240    | 0.262    |
| 69   | 0.200               | 0.180    | 0.180    | 0.198    | 0.228    | 0.246    |
| 70   | 0.150               | 0.171    | 0.192    | 0.239    | 0.304    | 0.330    |

| <b>Public Agency Miscellaneous 2.5% @ 55</b> |                     |          |          |          |          |          |
|--|---------------------|----------|----------|----------|----------|----------|
| Age  | Duration of Service |          |          |          |          |          |
|  | 5 Years             | 10 Years | 15 Years | 20 Years | 25 Years | 30 Years |
| 50   | 0.008               | 0.014    | 0.020    | 0.026    | 0.033    | 0.050    |
| 51   | 0.008               | 0.015    | 0.023    | 0.030    | 0.037    | 0.059    |
| 52   | 0.009               | 0.016    | 0.023    | 0.030    | 0.037    | 0.061    |
| 53   | 0.014               | 0.021    | 0.028    | 0.035    | 0.042    | 0.063    |
| 54   | 0.014               | 0.022    | 0.030    | 0.039    | 0.047    | 0.068    |
| 55   | 0.020               | 0.038    | 0.055    | 0.073    | 0.122    | 0.192    |
| 56   | 0.025               | 0.047    | 0.069    | 0.091    | 0.136    | 0.196    |
| 57   | 0.030               | 0.048    | 0.065    | 0.083    | 0.123    | 0.178    |
| 58   | 0.035               | 0.054    | 0.073    | 0.093    | 0.112    | 0.153    |
| 59   | 0.035               | 0.054    | 0.073    | 0.092    | 0.131    | 0.183    |
| 60   | 0.044               | 0.072    | 0.101    | 0.130    | 0.158    | 0.197    |
| 61   | 0.050               | 0.078    | 0.105    | 0.133    | 0.161    | 0.223    |
| 62   | 0.055               | 0.093    | 0.130    | 0.168    | 0.205    | 0.268    |
| 63   | 0.090               | 0.124    | 0.158    | 0.192    | 0.226    | 0.279    |
| 64   | 0.080               | 0.112    | 0.144    | 0.175    | 0.207    | 0.268    |
| 65   | 0.120               | 0.156    | 0.193    | 0.229    | 0.265    | 0.333    |
| 66   | 0.132               | 0.172    | 0.212    | 0.252    | 0.292    | 0.366    |
| 67   | 0.132               | 0.172    | 0.212    | 0.252    | 0.292    | 0.366    |
| 68   | 0.120               | 0.156    | 0.193    | 0.229    | 0.265    | 0.333    |
| 69   | 0.120               | 0.156    | 0.193    | 0.229    | 0.265    | 0.333    |
| 70   | 0.120               | 0.156    | 0.193    | 0.229    | 0.265    | 0.333    |

**Service Retirement**

**Public Agency Miscellaneous 2.7% @ 55**

| Age | Duration of Service |          |          |          |          |          |
|-----|---------------------|----------|----------|----------|----------|----------|
|     | 5 Years             | 10 Years | 15 Years | 20 Years | 25 Years | 30 Years |
| 50  | 0.003               | 0.010    | 0.016    | 0.034    | 0.033    | 0.045    |
| 51  | 0.009               | 0.016    | 0.023    | 0.042    | 0.038    | 0.047    |
| 52  | 0.015               | 0.019    | 0.024    | 0.040    | 0.036    | 0.046    |
| 53  | 0.012               | 0.020    | 0.028    | 0.047    | 0.046    | 0.060    |
| 54  | 0.020               | 0.027    | 0.035    | 0.054    | 0.056    | 0.073    |
| 55  | 0.033               | 0.055    | 0.078    | 0.113    | 0.156    | 0.234    |
| 56  | 0.039               | 0.067    | 0.095    | 0.135    | 0.169    | 0.227    |
| 57  | 0.050               | 0.067    | 0.084    | 0.113    | 0.142    | 0.198    |
| 58  | 0.043               | 0.066    | 0.089    | 0.124    | 0.151    | 0.201    |
| 59  | 0.050               | 0.070    | 0.090    | 0.122    | 0.158    | 0.224    |
| 60  | 0.060               | 0.086    | 0.112    | 0.150    | 0.182    | 0.238    |
| 61  | 0.071               | 0.094    | 0.117    | 0.153    | 0.184    | 0.241    |
| 62  | 0.091               | 0.122    | 0.152    | 0.194    | 0.226    | 0.279    |
| 63  | 0.143               | 0.161    | 0.179    | 0.209    | 0.222    | 0.250    |
| 64  | 0.116               | 0.147    | 0.178    | 0.221    | 0.254    | 0.308    |
| 65  | 0.140               | 0.174    | 0.208    | 0.254    | 0.306    | 0.389    |
| 66  | 0.170               | 0.209    | 0.247    | 0.298    | 0.310    | 0.324    |
| 67  | 0.170               | 0.199    | 0.228    | 0.269    | 0.296    | 0.342    |
| 68  | 0.150               | 0.181    | 0.212    | 0.255    | 0.287    | 0.339    |
| 69  | 0.150               | 0.181    | 0.212    | 0.255    | 0.287    | 0.339    |
| 70  | 0.150               | 0.181    | 0.212    | 0.243    | 0.291    | 0.350    |

**Public Agency Miscellaneous 3% @ 60**

| Age | Duration of Service |          |          |          |          |          |
|-----|---------------------|----------|----------|----------|----------|----------|
|     | 5 Years             | 10 Years | 15 Years | 20 Years | 25 Years | 30 Years |
| 50  | 0.013               | 0.019    | 0.026    | 0.042    | 0.038    | 0.064    |
| 51  | 0.035               | 0.037    | 0.039    | 0.052    | 0.047    | 0.062    |
| 52  | 0.023               | 0.030    | 0.038    | 0.055    | 0.051    | 0.056    |
| 53  | 0.025               | 0.032    | 0.040    | 0.057    | 0.056    | 0.066    |
| 54  | 0.035               | 0.042    | 0.050    | 0.067    | 0.066    | 0.076    |
| 55  | 0.040               | 0.052    | 0.064    | 0.085    | 0.095    | 0.120    |
| 56  | 0.043               | 0.056    | 0.070    | 0.094    | 0.102    | 0.150    |
| 57  | 0.045               | 0.060    | 0.074    | 0.099    | 0.109    | 0.131    |
| 58  | 0.053               | 0.056    | 0.059    | 0.099    | 0.126    | 0.185    |
| 59  | 0.050               | 0.068    | 0.085    | 0.113    | 0.144    | 0.202    |
| 60  | 0.089               | 0.106    | 0.123    | 0.180    | 0.226    | 0.316    |
| 61  | 0.100               | 0.117    | 0.133    | 0.212    | 0.230    | 0.298    |
| 62  | 0.130               | 0.155    | 0.180    | 0.248    | 0.282    | 0.335    |
| 63  | 0.120               | 0.163    | 0.206    | 0.270    | 0.268    | 0.352    |
| 64  | 0.150               | 0.150    | 0.150    | 0.215    | 0.277    | 0.300    |
| 65  | 0.200               | 0.242    | 0.283    | 0.330    | 0.300    | 0.342    |
| 66  | 0.220               | 0.264    | 0.308    | 0.352    | 0.379    | 0.394    |
| 67  | 0.250               | 0.279    | 0.309    | 0.338    | 0.371    | 0.406    |
| 68  | 0.170               | 0.196    | 0.223    | 0.249    | 0.290    | 0.340    |
| 69  | 0.220               | 0.261    | 0.302    | 0.344    | 0.378    | 0.408    |
| 70  | 0.220               | 0.255    | 0.291    | 0.326    | 0.358    | 0.388    |

**Service Retirement**

| <b>Public Agency Miscellaneous 2% @ 62</b> |                     |          |          |          |          |          |
|--|---------------------|----------|----------|----------|----------|----------|
| Age  | Duration of Service |          |          |          |          |          |
|  | 5 Years             | 10 Years | 15 Years | 20 Years | 25 Years | 30 Years |
| 50   | 0.000               | 0.000    | 0.000    | 0.000    | 0.000    | 0.000    |
| 51   | 0.000               | 0.000    | 0.000    | 0.000    | 0.000    | 0.000    |
| 52   | 0.005               | 0.008    | 0.012    | 0.015    | 0.019    | 0.031    |
| 53   | 0.007               | 0.011    | 0.014    | 0.018    | 0.021    | 0.032    |
| 54   | 0.007               | 0.011    | 0.015    | 0.019    | 0.023    | 0.034    |
| 55   | 0.010               | 0.019    | 0.028    | 0.036    | 0.061    | 0.096    |
| 56   | 0.014               | 0.026    | 0.038    | 0.050    | 0.075    | 0.108    |
| 57   | 0.018               | 0.029    | 0.039    | 0.050    | 0.074    | 0.107    |
| 58   | 0.023               | 0.035    | 0.048    | 0.060    | 0.073    | 0.099    |
| 59   | 0.025               | 0.038    | 0.051    | 0.065    | 0.092    | 0.128    |
| 60   | 0.031               | 0.051    | 0.071    | 0.091    | 0.111    | 0.138    |
| 61   | 0.038               | 0.058    | 0.079    | 0.100    | 0.121    | 0.167    |
| 62   | 0.044               | 0.074    | 0.104    | 0.134    | 0.164    | 0.214    |
| 63   | 0.077               | 0.105    | 0.134    | 0.163    | 0.192    | 0.237    |
| 64   | 0.072               | 0.101    | 0.129    | 0.158    | 0.187    | 0.242    |
| 65   | 0.108               | 0.141    | 0.173    | 0.206    | 0.239    | 0.300    |
| 66   | 0.132               | 0.172    | 0.212    | 0.252    | 0.292    | 0.366    |
| 67   | 0.132               | 0.172    | 0.212    | 0.252    | 0.292    | 0.366    |
| 68   | 0.120               | 0.156    | 0.193    | 0.229    | 0.265    | 0.333    |
| 69   | 0.120               | 0.156    | 0.193    | 0.229    | 0.265    | 0.333    |
| 70   | 0.120               | 0.156    | 0.193    | 0.229    | 0.265    | 0.333    |

**Service Retirement**

| <b>Public Agency Fire ½ @ 55 and 2% @ 55</b> |        |     |         |
|--|--------|-----|---------|
| Age  | Rate   | Age | Rate    |
| 50   | 0.0159 | 56  | 0.1108  |
| 51   | 0.0000 | 57  | 0.0000  |
| 52   | 0.0344 | 58  | 0.0950  |
| 53   | 0.0199 | 59  | 0.0441  |
| 54   | 0.0413 | 60  | 1.00000 |
| 55   | 0.0751 |     |         |

| <b>Public Agency Police ½ @ 55 and 2% @ 55</b> |        |     |        |
|--|--------|-----|--------|
| Age  | Rate   | Age | Rate   |
| 50   | 0.0255 | 56  | 0.0692 |
| 51   | 0.0000 | 57  | 0.0511 |
| 52   | 0.0164 | 58  | 0.0724 |
| 53   | 0.0272 | 59  | 0.0704 |
| 54   | 0.0095 | 60  | 0.3000 |
| 55   | 0.1667 |     |        |

### Service Retirement

| <b>Public Agency Police 2% @ 50</b> |                     |          |          |          |          |          |
|-------------------------------------|---------------------|----------|----------|----------|----------|----------|
| Age                                 | Duration of Service |          |          |          |          |          |
|                                     | 5 Years             | 10 Years | 15 Years | 20 Years | 25 Years | 30 Years |
| 50                                  | 0.050               | 0.050    | 0.050    | 0.050    | 0.050    | 0.100    |
| 51                                  | 0.040               | 0.040    | 0.040    | 0.040    | 0.058    | 0.094    |
| 52                                  | 0.040               | 0.040    | 0.040    | 0.040    | 0.061    | 0.087    |
| 53                                  | 0.040               | 0.040    | 0.040    | 0.040    | 0.082    | 0.123    |
| 54                                  | 0.040               | 0.040    | 0.040    | 0.046    | 0.098    | 0.158    |
| 55                                  | 0.072               | 0.072    | 0.072    | 0.096    | 0.141    | 0.255    |
| 56                                  | 0.066               | 0.066    | 0.066    | 0.088    | 0.129    | 0.228    |
| 57                                  | 0.060               | 0.060    | 0.060    | 0.080    | 0.118    | 0.213    |
| 58                                  | 0.080               | 0.080    | 0.080    | 0.088    | 0.138    | 0.228    |
| 59                                  | 0.080               | 0.080    | 0.080    | 0.092    | 0.140    | 0.228    |
| 60                                  | 0.150               | 0.150    | 0.150    | 0.150    | 0.150    | 0.228    |
| 61                                  | 0.144               | 0.144    | 0.144    | 0.144    | 0.144    | 0.170    |
| 62                                  | 0.150               | 0.150    | 0.150    | 0.150    | 0.150    | 0.213    |
| 63                                  | 0.150               | 0.150    | 0.150    | 0.150    | 0.150    | 0.213    |
| 64                                  | 0.150               | 0.150    | 0.150    | 0.150    | 0.150    | 0.319    |
| 65                                  | 1.000               | 1.000    | 1.000    | 1.000    | 1.000    | 1.000    |

- These rates also apply to County Peace officers, Local Prosecutors, Local Sheriff, School Police, and Other Safety.

### Service Retirement

| <b>Public Agency Fire 2% @ 50</b> |                     |          |          |          |          |          |
|-----------------------------------|---------------------|----------|----------|----------|----------|----------|
| Age                               | Duration of Service |          |          |          |          |          |
|                                   | 5 Years             | 10 Years | 15 Years | 20 Years | 25 Years | 30 Years |
| 50                                | 0.009               | 0.009    | 0.009    | 0.009    | 0.013    | 0.020    |
| 51                                | 0.013               | 0.013    | 0.013    | 0.013    | 0.020    | 0.029    |
| 52                                | 0.018               | 0.018    | 0.018    | 0.018    | 0.028    | 0.042    |
| 53                                | 0.052               | 0.052    | 0.052    | 0.052    | 0.079    | 0.119    |
| 54                                | 0.067               | 0.067    | 0.067    | 0.067    | 0.103    | 0.154    |
| 55                                | 0.089               | 0.089    | 0.089    | 0.089    | 0.136    | 0.204    |
| 56                                | 0.083               | 0.083    | 0.083    | 0.083    | 0.127    | 0.190    |
| 57                                | 0.082               | 0.082    | 0.082    | 0.082    | 0.126    | 0.189    |
| 58                                | 0.088               | 0.088    | 0.088    | 0.088    | 0.136    | 0.204    |
| 59                                | 0.074               | 0.074    | 0.074    | 0.074    | 0.113    | 0.170    |
| 60                                | 0.100               | 0.100    | 0.100    | 0.100    | 0.154    | 0.230    |
| 61                                | 0.072               | 0.072    | 0.072    | 0.072    | 0.110    | 0.165    |
| 62                                | 0.099               | 0.099    | 0.099    | 0.099    | 0.152    | 0.228    |
| 63                                | 0.114               | 0.114    | 0.114    | 0.114    | 0.175    | 0.262    |
| 64                                | 0.114               | 0.114    | 0.114    | 0.114    | 0.175    | 0.262    |
| 65                                | 1.000               | 1.000    | 1.000    | 1.000    | 1.000    | 1.000    |

**Service Retirement**

| <b>Public Agency Police 3% @ 55</b> |                     |          |          |          |          |          |
|-------------------------------------|---------------------|----------|----------|----------|----------|----------|
| Age                                 | Duration of Service |          |          |          |          |          |
|                                     | 5 Years             | 10 Years | 15 Years | 20 Years | 25 Years | 30 Years |
| 50                                  | 0.035               | 0.035    | 0.035    | 0.035    | 0.070    | 0.090    |
| 51                                  | 0.028               | 0.028    | 0.028    | 0.029    | 0.065    | 0.101    |
| 52                                  | 0.032               | 0.032    | 0.032    | 0.039    | 0.066    | 0.109    |
| 53                                  | 0.028               | 0.028    | 0.028    | 0.043    | 0.075    | 0.132    |
| 54                                  | 0.038               | 0.038    | 0.038    | 0.074    | 0.118    | 0.333    |
| 55                                  | 0.070               | 0.070    | 0.070    | 0.120    | 0.175    | 0.340    |
| 56                                  | 0.060               | 0.060    | 0.060    | 0.110    | 0.165    | 0.330    |
| 57                                  | 0.060               | 0.060    | 0.060    | 0.110    | 0.165    | 0.320    |
| 58                                  | 0.080               | 0.080    | 0.080    | 0.100    | 0.185    | 0.350    |
| 59                                  | 0.090               | 0.090    | 0.095    | 0.130    | 0.185    | 0.350    |
| 60                                  | 0.150               | 0.150    | 0.150    | 0.150    | 0.185    | 0.350    |
| 61                                  | 0.120               | 0.120    | 0.120    | 0.120    | 0.160    | 0.350    |
| 62                                  | 0.150               | 0.150    | 0.150    | 0.150    | 0.200    | 0.350    |
| 63                                  | 0.150               | 0.150    | 0.150    | 0.150    | 0.200    | 0.400    |
| 64                                  | 0.150               | 0.150    | 0.150    | 0.150    | 0.175    | 0.350    |
| 65                                  | 1.000               | 1.000    | 1.000    | 1.000    | 1.000    | 1.000    |

- These rates also apply to County Peace officers, Local Prosecutors, Local Sheriff, School Police, and Other Safety.

**Service Retirement**

| <b>Public Agency Fire 3% @ 55</b> |                     |          |          |          |          |          |
|-----------------------------------|---------------------|----------|----------|----------|----------|----------|
| Age                               | Duration of Service |          |          |          |          |          |
|                                   | 5 Years             | 10 Years | 15 Years | 20 Years | 25 Years | 30 Years |
| 50                                | 0.001               | 0.001    | 0.001    | 0.006    | 0.016    | 0.069    |
| 51                                | 0.002               | 0.002    | 0.002    | 0.006    | 0.018    | 0.071    |
| 52                                | 0.012               | 0.012    | 0.012    | 0.021    | 0.040    | 0.098    |
| 53                                | 0.032               | 0.032    | 0.032    | 0.049    | 0.085    | 0.149    |
| 54                                | 0.057               | 0.057    | 0.057    | 0.087    | 0.144    | 0.217    |
| 55                                | 0.073               | 0.073    | 0.073    | 0.109    | 0.179    | 0.259    |
| 56                                | 0.064               | 0.064    | 0.064    | 0.097    | 0.161    | 0.238    |
| 57                                | 0.063               | 0.063    | 0.063    | 0.095    | 0.157    | 0.233    |
| 58                                | 0.065               | 0.065    | 0.065    | 0.099    | 0.163    | 0.241    |
| 59                                | 0.088               | 0.088    | 0.088    | 0.131    | 0.213    | 0.299    |
| 60                                | 0.105               | 0.105    | 0.105    | 0.155    | 0.251    | 0.344    |
| 61                                | 0.118               | 0.118    | 0.118    | 0.175    | 0.282    | 0.380    |
| 62                                | 0.087               | 0.087    | 0.087    | 0.128    | 0.210    | 0.295    |
| 63                                | 0.067               | 0.067    | 0.067    | 0.100    | 0.165    | 0.243    |
| 64                                | 0.067               | 0.067    | 0.067    | 0.100    | 0.165    | 0.243    |
| 65                                | 1.000               | 1.000    | 1.000    | 1.000    | 1.000    | 1.000    |

### Service Retirement

| <b>Public Agency Police 3% @ 50</b> |                     |          |          |          |          |          |
|-------------------------------------|---------------------|----------|----------|----------|----------|----------|
| Age                                 | Duration of Service |          |          |          |          |          |
|                                     | 5 Years             | 10 Years | 15 Years | 20 Years | 25 Years | 30 Years |
| 50                                  | 0.050               | 0.050    | 0.050    | 0.100    | 0.155    | 0.400    |
| 51                                  | 0.040               | 0.040    | 0.040    | 0.090    | 0.140    | 0.380    |
| 52                                  | 0.040               | 0.040    | 0.040    | 0.070    | 0.115    | 0.350    |
| 53                                  | 0.040               | 0.040    | 0.040    | 0.080    | 0.135    | 0.350    |
| 54                                  | 0.040               | 0.040    | 0.040    | 0.090    | 0.145    | 0.350    |
| 55                                  | 0.070               | 0.070    | 0.070    | 0.120    | 0.175    | 0.340    |
| 56                                  | 0.060               | 0.060    | 0.060    | 0.110    | 0.165    | 0.330    |
| 57                                  | 0.060               | 0.060    | 0.060    | 0.110    | 0.165    | 0.320    |
| 58                                  | 0.080               | 0.080    | 0.080    | 0.100    | 0.185    | 0.350    |
| 59                                  | 0.090               | 0.090    | 0.095    | 0.130    | 0.185    | 0.350    |
| 60                                  | 0.150               | 0.150    | 0.150    | 0.150    | 0.185    | 0.350    |
| 61                                  | 0.120               | 0.120    | 0.120    | 0.120    | 0.160    | 0.350    |
| 62                                  | 0.150               | 0.150    | 0.150    | 0.150    | 0.200    | 0.350    |
| 63                                  | 0.150               | 0.150    | 0.150    | 0.150    | 0.200    | 0.400    |
| 64                                  | 0.150               | 0.150    | 0.150    | 0.150    | 0.175    | 0.350    |
| 65                                  | 1.000               | 1.000    | 1.000    | 1.000    | 1.000    | 1.000    |

- These rates also apply to County Peace officers, Local Prosecutors, Local Sheriff, School Police, and Other Safety.

### Service Retirement

| <b>Public Agency Fire 3% @ 50</b> |                     |          |          |          |          |          |
|-----------------------------------|---------------------|----------|----------|----------|----------|----------|
| Age                               | Duration of Service |          |          |          |          |          |
|                                   | 5 Years             | 10 Years | 15 Years | 20 Years | 25 Years | 30 Years |
| 50                                | 0.020               | 0.020    | 0.020    | 0.040    | 0.130    | 0.192    |
| 51                                | 0.008               | 0.008    | 0.008    | 0.023    | 0.107    | 0.164    |
| 52                                | 0.023               | 0.023    | 0.023    | 0.043    | 0.136    | 0.198    |
| 53                                | 0.023               | 0.023    | 0.023    | 0.043    | 0.135    | 0.198    |
| 54                                | 0.027               | 0.027    | 0.027    | 0.048    | 0.143    | 0.207    |
| 55                                | 0.043               | 0.043    | 0.043    | 0.070    | 0.174    | 0.244    |
| 56                                | 0.053               | 0.053    | 0.053    | 0.085    | 0.196    | 0.269    |
| 57                                | 0.054               | 0.054    | 0.054    | 0.086    | 0.197    | 0.271    |
| 58                                | 0.052               | 0.052    | 0.052    | 0.084    | 0.193    | 0.268    |
| 59                                | 0.075               | 0.075    | 0.075    | 0.116    | 0.239    | 0.321    |
| 60                                | 0.065               | 0.065    | 0.065    | 0.102    | 0.219    | 0.298    |
| 61                                | 0.076               | 0.076    | 0.076    | 0.117    | 0.241    | 0.324    |
| 62                                | 0.068               | 0.068    | 0.068    | 0.106    | 0.224    | 0.304    |
| 63                                | 0.027               | 0.027    | 0.027    | 0.049    | 0.143    | 0.208    |
| 64                                | 0.094               | 0.094    | 0.094    | 0.143    | 0.277    | 0.366    |
| 65                                | 1.000               | 1.000    | 1.000    | 1.000    | 1.000    | 1.000    |

### Service Retirement

| <b>Public Agency Police 2% @ 57</b> |                     |          |          |          |          |          |
|-------------------------------------|---------------------|----------|----------|----------|----------|----------|
| Age                                 | Duration of Service |          |          |          |          |          |
|                                     | 5 Years             | 10 Years | 15 Years | 20 Years | 25 Years | 30 Years |
| 50                                  | 0.040               | 0.040    | 0.040    | 0.040    | 0.040    | 0.080    |
| 51                                  | 0.028               | 0.028    | 0.028    | 0.028    | 0.040    | 0.066    |
| 52                                  | 0.028               | 0.028    | 0.028    | 0.028    | 0.043    | 0.061    |
| 53                                  | 0.028               | 0.028    | 0.028    | 0.028    | 0.057    | 0.086    |
| 54                                  | 0.028               | 0.028    | 0.028    | 0.032    | 0.069    | 0.110    |
| 55                                  | 0.050               | 0.050    | 0.050    | 0.067    | 0.099    | 0.179    |
| 56                                  | 0.046               | 0.046    | 0.046    | 0.062    | 0.090    | 0.160    |
| 57                                  | 0.054               | 0.054    | 0.054    | 0.072    | 0.106    | 0.191    |
| 58                                  | 0.060               | 0.060    | 0.060    | 0.066    | 0.103    | 0.171    |
| 59                                  | 0.060               | 0.060    | 0.060    | 0.069    | 0.105    | 0.171    |
| 60                                  | 0.113               | 0.113    | 0.113    | 0.113    | 0.113    | 0.171    |
| 61                                  | 0.108               | 0.108    | 0.108    | 0.108    | 0.108    | 0.128    |
| 62                                  | 0.113               | 0.113    | 0.113    | 0.113    | 0.113    | 0.159    |
| 63                                  | 0.113               | 0.113    | 0.113    | 0.113    | 0.113    | 0.159    |
| 64                                  | 0.113               | 0.113    | 0.113    | 0.113    | 0.113    | 0.239    |
| 65                                  | 1.000               | 1.000    | 1.000    | 1.000    | 1.000    | 1.000    |

- These rates also apply to County Peace officers, Local Prosecutors, Local Sheriff, School Police, and Other Safety.

### Service Retirement

| <b>Public Agency Fire 2% @ 57</b> |                     |          |          |          |          |          |
|-----------------------------------|---------------------|----------|----------|----------|----------|----------|
| Age                               | Duration of Service |          |          |          |          |          |
|                                   | 5 Years             | 10 Years | 15 Years | 20 Years | 25 Years | 30 Years |
| 50                                | 0.005               | 0.005    | 0.005    | 0.005    | 0.008    | 0.012    |
| 51                                | 0.006               | 0.006    | 0.006    | 0.006    | 0.009    | 0.013    |
| 52                                | 0.012               | 0.012    | 0.012    | 0.012    | 0.019    | 0.028    |
| 53                                | 0.033               | 0.033    | 0.033    | 0.033    | 0.050    | 0.075    |
| 54                                | 0.045               | 0.045    | 0.045    | 0.045    | 0.069    | 0.103    |
| 55                                | 0.061               | 0.061    | 0.061    | 0.061    | 0.094    | 0.140    |
| 56                                | 0.055               | 0.055    | 0.055    | 0.055    | 0.084    | 0.126    |
| 57                                | 0.081               | 0.081    | 0.081    | 0.081    | 0.125    | 0.187    |
| 58                                | 0.059               | 0.059    | 0.059    | 0.059    | 0.091    | 0.137    |
| 59                                | 0.055               | 0.055    | 0.055    | 0.055    | 0.084    | 0.126    |
| 60                                | 0.085               | 0.085    | 0.085    | 0.085    | 0.131    | 0.196    |
| 61                                | 0.085               | 0.085    | 0.085    | 0.085    | 0.131    | 0.196    |
| 62                                | 0.085               | 0.085    | 0.085    | 0.085    | 0.131    | 0.196    |
| 63                                | 0.085               | 0.085    | 0.085    | 0.085    | 0.131    | 0.196    |
| 64                                | 0.085               | 0.085    | 0.085    | 0.085    | 0.131    | 0.196    |
| 65                                | 1.000               | 1.000    | 1.000    | 1.000    | 1.000    | 1.000    |

### Service Retirement

| <b>Public Agency Police 2.5% @ 57</b> |                     |          |          |          |          |          |
|---------------------------------------|---------------------|----------|----------|----------|----------|----------|
| Age                                   | Duration of Service |          |          |          |          |          |
|                                       | 5 Years             | 10 Years | 15 Years | 20 Years | 25 Years | 30 Years |
| 50                                    | 0.050               | 0.050    | 0.050    | 0.050    | 0.050    | 0.100    |
| 51                                    | 0.038               | 0.038    | 0.038    | 0.038    | 0.055    | 0.089    |
| 52                                    | 0.038               | 0.038    | 0.038    | 0.038    | 0.058    | 0.082    |
| 53                                    | 0.036               | 0.036    | 0.036    | 0.036    | 0.073    | 0.111    |
| 54                                    | 0.036               | 0.036    | 0.036    | 0.041    | 0.088    | 0.142    |
| 55                                    | 0.061               | 0.061    | 0.061    | 0.082    | 0.120    | 0.217    |
| 56                                    | 0.056               | 0.056    | 0.056    | 0.075    | 0.110    | 0.194    |
| 57                                    | 0.060               | 0.060    | 0.060    | 0.080    | 0.118    | 0.213    |
| 58                                    | 0.072               | 0.072    | 0.072    | 0.079    | 0.124    | 0.205    |
| 59                                    | 0.072               | 0.072    | 0.072    | 0.083    | 0.126    | 0.205    |
| 60                                    | 0.135               | 0.135    | 0.135    | 0.135    | 0.135    | 0.205    |
| 61                                    | 0.130               | 0.130    | 0.130    | 0.130    | 0.130    | 0.153    |
| 62                                    | 0.135               | 0.135    | 0.135    | 0.135    | 0.135    | 0.191    |
| 63                                    | 0.135               | 0.135    | 0.135    | 0.135    | 0.135    | 0.191    |
| 64                                    | 0.135               | 0.135    | 0.135    | 0.135    | 0.135    | 0.287    |
| 65                                    | 1.000               | 1.000    | 1.000    | 1.000    | 1.000    | 1.000    |

- These rates also apply to County Peace officers, Local Prosecutors, Local Sheriff, School Police, and Other Safety.

### Service Retirement

| <b>Public Agency Fire 2.5% @ 57</b> |                     |          |          |          |          |          |
|-------------------------------------|---------------------|----------|----------|----------|----------|----------|
| Age                                 | Duration of Service |          |          |          |          |          |
|                                     | 5 Years             | 10 Years | 15 Years | 20 Years | 25 Years | 30 Years |
| 50                                  | 0.007               | 0.007    | 0.007    | 0.007    | 0.010    | 0.015    |
| 51                                  | 0.008               | 0.008    | 0.008    | 0.008    | 0.012    | 0.018    |
| 52                                  | 0.016               | 0.016    | 0.016    | 0.016    | 0.025    | 0.038    |
| 53                                  | 0.042               | 0.042    | 0.042    | 0.042    | 0.064    | 0.096    |
| 54                                  | 0.057               | 0.057    | 0.057    | 0.057    | 0.088    | 0.132    |
| 55                                  | 0.074               | 0.074    | 0.074    | 0.074    | 0.114    | 0.170    |
| 56                                  | 0.066               | 0.066    | 0.066    | 0.066    | 0.102    | 0.153    |
| 57                                  | 0.090               | 0.090    | 0.090    | 0.090    | 0.139    | 0.208    |
| 58                                  | 0.071               | 0.071    | 0.071    | 0.071    | 0.110    | 0.164    |
| 59                                  | 0.066               | 0.066    | 0.066    | 0.066    | 0.101    | 0.151    |
| 60                                  | 0.102               | 0.102    | 0.102    | 0.102    | 0.157    | 0.235    |
| 61                                  | 0.102               | 0.102    | 0.102    | 0.102    | 0.157    | 0.236    |
| 62                                  | 0.102               | 0.102    | 0.102    | 0.102    | 0.157    | 0.236    |
| 63                                  | 0.102               | 0.102    | 0.102    | 0.102    | 0.157    | 0.236    |
| 64                                  | 0.102               | 0.102    | 0.102    | 0.102    | 0.157    | 0.236    |
| 65                                  | 1.000               | 1.000    | 1.000    | 1.000    | 1.000    | 1.000    |

### Service Retirement

| <b>Public Agency Police 2.7% @ 57</b> |                     |          |          |          |          |          |
|---------------------------------------|---------------------|----------|----------|----------|----------|----------|
| Age                                   | Duration of Service |          |          |          |          |          |
|                                       | 5 Years             | 10 Years | 15 Years | 20 Years | 25 Years | 30 Years |
| 50                                    | 0.0500              | 0.0500   | 0.0500   | 0.0500   | 0.0500   | 0.1000   |
| 51                                    | 0.0400              | 0.0400   | 0.0400   | 0.0400   | 0.0575   | 0.0942   |
| 52                                    | 0.0380              | 0.0380   | 0.0380   | 0.0380   | 0.0580   | 0.0825   |
| 53                                    | 0.0380              | 0.0380   | 0.0380   | 0.0380   | 0.0774   | 0.1169   |
| 54                                    | 0.0380              | 0.0380   | 0.0380   | 0.0437   | 0.0931   | 0.1497   |
| 55                                    | 0.0684              | 0.0684   | 0.0684   | 0.0912   | 0.1340   | 0.2423   |
| 56                                    | 0.0627              | 0.0627   | 0.0627   | 0.0836   | 0.1228   | 0.2168   |
| 57                                    | 0.0600              | 0.0600   | 0.0600   | 0.0800   | 0.1175   | 0.2125   |
| 58                                    | 0.0800              | 0.0800   | 0.0800   | 0.0880   | 0.1375   | 0.2275   |
| 59                                    | 0.0800              | 0.0800   | 0.0800   | 0.0920   | 0.1400   | 0.2275   |
| 60                                    | 0.1500              | 0.1500   | 0.1500   | 0.1500   | 0.1500   | 0.2275   |
| 61                                    | 0.1440              | 0.1440   | 0.1440   | 0.1440   | 0.1440   | 0.1700   |
| 62                                    | 0.1500              | 0.1500   | 0.1500   | 0.1500   | 0.1500   | 0.2125   |
| 63                                    | 0.1500              | 0.1500   | 0.1500   | 0.1500   | 0.1500   | 0.2125   |
| 64                                    | 0.1500              | 0.1500   | 0.1500   | 0.1500   | 0.1500   | 0.3188   |
| 65                                    | 1.0000              | 1.0000   | 1.0000   | 1.0000   | 1.0000   | 1.0000   |

- These rates also apply to County Peace officers, Local Prosecutors, Local Sheriff, School Police, and Other Safety.

### Service Retirement

| <b>Public Agency Fire 2.7% @ 57</b> |                     |          |          |          |          |          |
|-------------------------------------|---------------------|----------|----------|----------|----------|----------|
| Age                                 | Duration of Service |          |          |          |          |          |
|                                     | 5 Years             | 10 Years | 15 Years | 20 Years | 25 Years | 30 Years |
| 50                                  | 0.0065              | 0.0065   | 0.0065   | 0.0065   | 0.0101   | 0.0151   |
| 51                                  | 0.0081              | 0.0081   | 0.0081   | 0.0081   | 0.0125   | 0.0187   |
| 52                                  | 0.0164              | 0.0164   | 0.0164   | 0.0164   | 0.0254   | 0.0380   |
| 53                                  | 0.0442              | 0.0442   | 0.0442   | 0.0442   | 0.0680   | 0.1018   |
| 54                                  | 0.0606              | 0.0606   | 0.0606   | 0.0606   | 0.0934   | 0.1397   |
| 55                                  | 0.0825              | 0.0825   | 0.0825   | 0.0825   | 0.1269   | 0.1900   |
| 56                                  | 0.0740              | 0.0740   | 0.0740   | 0.0740   | 0.1140   | 0.1706   |
| 57                                  | 0.0901              | 0.0901   | 0.0901   | 0.0901   | 0.1387   | 0.2077   |
| 58                                  | 0.0790              | 0.0790   | 0.0790   | 0.0790   | 0.1217   | 0.1821   |
| 59                                  | 0.0729              | 0.0729   | 0.0729   | 0.0729   | 0.1123   | 0.1681   |
| 60                                  | 0.1135              | 0.1135   | 0.1135   | 0.1135   | 0.1747   | 0.2615   |
| 61                                  | 0.1136              | 0.1136   | 0.1136   | 0.1136   | 0.1749   | 0.2618   |
| 62                                  | 0.1136              | 0.1136   | 0.1136   | 0.1136   | 0.1749   | 0.2618   |
| 63                                  | 0.1136              | 0.1136   | 0.1136   | 0.1136   | 0.1749   | 0.2618   |
| 64                                  | 0.1136              | 0.1136   | 0.1136   | 0.1136   | 0.1749   | 0.2618   |
| 65                                  | 1.0000              | 1.0000   | 1.0000   | 1.0000   | 1.0000   | 1.0000   |

## Service Retirement

| Schools 2% @ 55 |                     |          |          |          |          |          |
|-----------------|---------------------|----------|----------|----------|----------|----------|
| Age             | Duration of Service |          |          |          |          |          |
|                 | 5 Years             | 10 Years | 15 Years | 20 Years | 25 Years | 30 Years |
| 50              | 0.004               | 0.007    | 0.011    | 0.012    | 0.013    | 0.015    |
| 51              | 0.004               | 0.008    | 0.011    | 0.014    | 0.016    | 0.017    |
| 52              | 0.005               | 0.010    | 0.014    | 0.016    | 0.018    | 0.021    |
| 53              | 0.006               | 0.012    | 0.016    | 0.020    | 0.022    | 0.025    |
| 54              | 0.008               | 0.017    | 0.023    | 0.027    | 0.031    | 0.034    |
| 55              | 0.021               | 0.042    | 0.058    | 0.069    | 0.077    | 0.086    |
| 56              | 0.019               | 0.037    | 0.053    | 0.062    | 0.069    | 0.078    |
| 57              | 0.019               | 0.038    | 0.054    | 0.064    | 0.071    | 0.079    |
| 58              | 0.022               | 0.045    | 0.062    | 0.074    | 0.082    | 0.092    |
| 59              | 0.025               | 0.049    | 0.069    | 0.082    | 0.090    | 0.101    |
| 60              | 0.033               | 0.066    | 0.092    | 0.109    | 0.121    | 0.135    |
| 61              | 0.037               | 0.072    | 0.101    | 0.119    | 0.133    | 0.149    |
| 62              | 0.066               | 0.131    | 0.184    | 0.218    | 0.242    | 0.271    |
| 63              | 0.064               | 0.126    | 0.178    | 0.209    | 0.233    | 0.261    |
| 64              | 0.059               | 0.117    | 0.163    | 0.193    | 0.215    | 0.240    |
| 65              | 0.080               | 0.158    | 0.221    | 0.261    | 0.291    | 0.326    |
| 66              | 0.081               | 0.160    | 0.224    | 0.265    | 0.296    | 0.330    |
| 67              | 0.070               | 0.139    | 0.194    | 0.229    | 0.255    | 0.286    |
| 68              | 0.063               | 0.124    | 0.173    | 0.205    | 0.228    | 0.255    |
| 69              | 0.066               | 0.130    | 0.183    | 0.216    | 0.241    | 0.270    |
| 70              | 0.071               | 0.140    | 0.196    | 0.231    | 0.258    | 0.289    |

## Miscellaneous

### Internal Revenue Code Section 415

The limitations on benefits imposed by Internal Revenue Code Section 415 are taken into account in this valuation. Each year the impact of any changes in this limitation since the prior valuation is included and amortized as part of the actuarial gain or loss base. This results in lower contributions for those employers contributing to the Replacement Benefit Fund and protects CalPERS from prefunding expected benefits in excess of limits imposed by federal tax law. The Section 415(b) dollar limit for the 2020 calendar year is \$230,000.

### Internal Revenue Code Section 401(a)(17)

The limitations on compensation imposed by Internal Revenue Code Section 401(a)(17) are taken into account in this valuation. Each year, the impact of any changes in the compensation limitation since the prior valuation is included and amortized as part of the actuarial gain or loss base. The compensation limit for classic members for the 2020 calendar year is \$285,000.

## **Appendix B**

### **Principal Plan Provisions**

The following is a description of the principal plan provisions used in calculating costs and liabilities. We have indicated whether a plan provision is standard or optional. Standard benefits are applicable to all members while optional benefits vary among employers. Optional benefits that apply to a single period of time, such as Golden Handshakes, have not been included. Many of the statements in this summary are general in nature, and are intended to provide an easily understood summary of the Public Employees' Retirement Law. The law itself governs in all situations.

## Service Retirement

### Eligibility

A classic CalPERS member or PEPRSA Safety member becomes eligible for Service Retirement upon attainment of age 50 with at least 5 years of credited service (total service across all CalPERS employers, and with certain other retirement systems with which CalPERS has reciprocity agreements). For employees hired into a plan with the 1.5% at age 65 formula, eligibility for service retirement is age 55 with at least 5 years of service. PEPRSA miscellaneous members become eligible for service retirement upon attainment of age 52 with at least 5 years of service.

### Benefit

The service retirement benefit is a monthly allowance equal to the product of the *benefit factor*, *years of service*, and *final compensation*.

- The *benefit factor* depends on the benefit formula specified in your agency's contract. The table below shows the factors for each of the available formulas. Factors vary by the member's age at retirement. Listed are the factors for retirement at whole year ages:

### Miscellaneous Plan Formulas

| Retirement Age | 1.5% at 65 | 2% at 60 | 2% at 55 | 2.5% at 55 | 2.7% at 55 | 3% at 60 | PEPRSA 2% at 62 |
|----------------|------------|----------|----------|------------|------------|----------|-----------------|
| 50             | 0.5000%    | 1.092%   | 1.426%   | 2.000%     | 2.000%     | 2.000%   | N/A             |
| 51             | 0.5667%    | 1.156%   | 1.522%   | 2.100%     | 2.140%     | 2.100%   | N/A             |
| 52             | 0.6334%    | 1.224%   | 1.628%   | 2.200%     | 2.280%     | 2.200%   | 1.000%          |
| 53             | 0.7000%    | 1.296%   | 1.742%   | 2.300%     | 2.420%     | 2.300%   | 1.100%          |
| 54             | 0.7667%    | 1.376%   | 1.866%   | 2.400%     | 2.560%     | 2.400%   | 1.200%          |
| 55             | 0.8334%    | 1.460%   | 2.000%   | 2.500%     | 2.700%     | 2.500%   | 1.300%          |
| 56             | 0.9000%    | 1.552%   | 2.052%   | 2.500%     | 2.700%     | 2.600%   | 1.400%          |
| 57             | 0.9667%    | 1.650%   | 2.104%   | 2.500%     | 2.700%     | 2.700%   | 1.500%          |
| 58             | 1.0334%    | 1.758%   | 2.156%   | 2.500%     | 2.700%     | 2.800%   | 1.600%          |
| 59             | 1.1000%    | 1.874%   | 2.210%   | 2.500%     | 2.700%     | 2.900%   | 1.700%          |
| 60             | 1.1667%    | 2.000%   | 2.262%   | 2.500%     | 2.700%     | 3.000%   | 1.800%          |
| 61             | 1.2334%    | 2.134%   | 2.314%   | 2.500%     | 2.700%     | 3.000%   | 1.900%          |
| 62             | 1.3000%    | 2.272%   | 2.366%   | 2.500%     | 2.700%     | 3.000%   | 2.000%          |
| 63             | 1.3667%    | 2.418%   | 2.418%   | 2.500%     | 2.700%     | 3.000%   | 2.100%          |
| 64             | 1.4334%    | 2.418%   | 2.418%   | 2.500%     | 2.700%     | 3.000%   | 2.200%          |
| 65             | 1.5000%    | 2.418%   | 2.418%   | 2.500%     | 2.700%     | 3.000%   | 2.300%          |
| 66             | 1.5000%    | 2.418%   | 2.418%   | 2.500%     | 2.700%     | 3.000%   | 2.400%          |
| 67 & up        | 1.5000%    | 2.418%   | 2.418%   | 2.500%     | 2.700%     | 3.000%   | 2.500%          |

### **Safety Plan Formulas**

| <b>Retirement Age</b> | <b>½ at 55 *</b> | <b>2% at 55</b> | <b>2% at 50</b> | <b>3% at 55</b> | <b>3% at 50</b> |
|-----------------------|------------------|-----------------|-----------------|-----------------|-----------------|
| 50                    | 1.783%           | 1.426%          | 2.000%          | 2.400%          | 3.000%          |
| 51                    | 1.903%           | 1.522%          | 2.140%          | 2.520%          | 3.000%          |
| 52                    | 2.035%           | 1.628%          | 2.280%          | 2.640%          | 3.000%          |
| 53                    | 2.178%           | 1.742%          | 2.420%          | 2.760%          | 3.000%          |
| 54                    | 2.333%           | 1.866%          | 2.560%          | 2.880%          | 3.000%          |
| 55 & Up               | 2.500%           | 2.000%          | 2.700%          | 3.000%          | 3.000%          |

\* For this formula, the benefit factor also varies by entry age. The factors shown are for members with an entry age of 35 or greater. If entry age is less than 35, then the age 55 benefit factor is 50% divided by the difference between age 55 and entry age. The benefit factor for ages prior to age 55 is the same proportion of the age 55 benefit factor as in the above table.

### **PEPRA Safety Plan Formulas**

| <b>Retirement Age</b> | <b>2% at 57</b> | <b>2.5% at 57</b> | <b>2.7% at 57</b> |
|-----------------------|-----------------|-------------------|-------------------|
| 50                    | 1.426%          | 2.000%            | 2.000%            |
| 51                    | 1.508%          | 2.071%            | 2.100%            |
| 52                    | 1.590%          | 2.143%            | 2.200%            |
| 53                    | 1.672%          | 2.214%            | 2.300%            |
| 54                    | 1.754%          | 2.286%            | 2.400%            |
| 55                    | 1.836%          | 2.357%            | 2.500%            |
| 56                    | 1.918%          | 2.429%            | 2.600%            |
| 57 & Up               | 2.000%          | 2.500%            | 2.700%            |

- The *years of service* is the amount credited by CalPERS to a member while he or she is employed in this group (or for other periods that are recognized under the employer's contract with CalPERS). For a member who has earned service with multiple CalPERS employers, the benefit from each employer is calculated separately according to each employer's contract, and then added together for the total allowance. An agency may contract for an optional benefit where any unused sick leave accumulated at the time of retirement will be converted to credited service at a rate of 0.004 years of service for each day of sick leave.
- The *final compensation* is the monthly average of the member's highest 36 or 12 consecutive months' full-time equivalent monthly pay (no matter which CalPERS employer paid this compensation). The standard benefit is 36 months. Employers had the option of providing a final compensation equal to the highest 12 consecutive months for classic plans only. Final compensation must be defined by the highest 36 consecutive months' pay under the 1.5% at 65 formula. PEPRA members have a cap on the annual salary that can be used to calculate final compensation for all new members based on the Social Security contribution and benefit base. For employees that participate in Social Security this cap is \$126,291 for 2020 and for those employees that do not participate in Social Security the cap for 2020 is \$151,549. Adjustments to the caps are permitted annually based on changes to the CPI for all urban consumers.
- Employees must be covered by Social Security with the 1.5% at 65 formula. Social Security is optional for all other benefit formulas. For employees covered by Social Security, the modified formula is the standard benefit. Under this type of formula, the final compensation is offset by \$133.33 (or by one third if the final compensation is less than \$400). Employers may contract for the full benefit with Social Security that will eliminate the offset applicable to the final compensation. For employees not covered by Social Security, the full benefit is paid with no offsets.

Auxiliary organizations of the CSUC system may elect reduced contribution rates, in which case the offset is \$317 if members are not covered by Social Security or \$513 if members are covered by Social Security.

- The miscellaneous and PEPRA safety service retirement benefit is not capped. The classic Safety service retirement benefit is capped at 90% of final compensation.

## Vested Deferred Retirement

### Eligibility for Deferred Status

A CalPERS member becomes eligible for a deferred vested retirement benefit when he or she leaves employment, keeps his or her contribution account balance on deposit with CalPERS, **and** has earned at least 5 years of credited service (total service across all CalPERS employers, and with certain other retirement systems with which CalPERS has reciprocity agreements).

### Eligibility to Start Receiving Benefits

The CalPERS classic members and PEPRA safety members become eligible to receive the deferred retirement benefit upon satisfying the eligibility requirements for deferred status and upon attainment of age 50 (55 for employees hired into a 1.5% @ 65 plan). PEPRA miscellaneous members become eligible to receive the deferred retirement benefit upon satisfying the eligibility requirements for deferred status and upon attainment of age 52.

### Benefit

The vested deferred retirement benefit is the same as the service retirement benefit, where the benefit factor is based on the member's age at allowance commencement. For members who have earned service with multiple CalPERS employers, the benefit from each employer is calculated separately according to each employer's contract, and then added together for the total allowance.

## Non-Industrial (Non-Job Related) Disability Retirement

### Eligibility

A CalPERS member is eligible for Non-Industrial Disability Retirement if he or she becomes *disabled* and has at least 5 years of credited service (total service across all CalPERS employers, and with certain other retirement systems with which CalPERS has reciprocity agreements). There is no special age requirement. *Disabled* means the member is unable to perform his or her job because of an illness or injury, which is expected to be permanent or to last indefinitely. The illness or injury does not have to be job related. A CalPERS member must be actively employed by any CalPERS employer at the time of disability in order to be eligible for this benefit.

### Standard Benefit

The standard Non-Industrial Disability Retirement benefit is a monthly allowance equal to 1.8% of final compensation, multiplied by *service*, which is determined as follows:

- *Service* is CalPERS credited service, for members with less than 10 years of service or greater than 18.518 years of service; or
- *Service* is CalPERS credited service plus the additional number of years that the member would have worked until age 60, for members with at least 10 years but not more than 18.518 years of service. The maximum benefit in this case is 33⅓% of final compensation.

### **Improved Benefit**

Employers have the option of providing the improved Non-Industrial Disability Retirement benefit. This benefit provides a monthly allowance equal to 30% of final compensation for the first 5 years of service, plus 1% for each additional year of service to a maximum of 50% of final compensation.

Members who are eligible for a larger service retirement benefit may choose to receive that benefit in lieu of a disability benefit. Members eligible to retire, and who have attained the normal retirement age determined by their service retirement benefit formula, will receive the same dollar amount for disability retirement as that payable for service retirement. For members who have earned service with multiple CalPERS employers, the benefit attributed to each employer is the total disability allowance multiplied by the ratio of service with a particular employer to the total CalPERS service.

## **Industrial (Job Related) Disability Retirement**

All safety members have this benefit. For miscellaneous members, employers have the option of providing this benefit. An employer may choose to provide the increased benefit option or the improved benefit option.

### **Eligibility**

An employee is eligible for Industrial Disability Retirement if he or she becomes disabled while working, where disabled means the member is unable to perform the duties of the job because of a work-related illness or injury, which is expected to be permanent or to last indefinitely. A CalPERS member who has left active employment within this group is not eligible for this benefit, except to the extent described below.

### **Standard Benefit**

The standard Industrial Disability Retirement benefit is a monthly allowance equal to 50% of final compensation.

### **Increased Benefit (75% of Final Compensation)**

The increased Industrial Disability Retirement benefit is a monthly allowance equal to 75 percent final compensation for total disability.

### **Improved Benefit (50% to 90% of Final Compensation)**

The improved Industrial Disability Retirement benefit is a monthly allowance equal to the Workman's Compensation Appeals Board permanent disability rate percentage (if 50% or greater, with a maximum of 90%) times the final compensation.

For a CalPERS member not actively employed in this group who became disabled while employed by some other CalPERS employer, the benefit is a return of accumulated member contributions with respect to employment in this group. With the standard or increased benefit, a member may also choose to receive the annuitization of the accumulated member contributions.

If a member is eligible for service retirement and if the service retirement benefit is more than the industrial disability retirement benefit, the member may choose to receive the larger benefit.

## **Post-Retirement Death Benefit**

### **Standard Lump Sum Payment**

Upon the death of a retiree, a one-time lump sum payment of \$500 will be made to the retiree's designated survivor(s), or to the retiree's estate.

### **Improved Lump Sum Payment**

Employers have the option of providing an improved lump sum death benefit of \$600, \$2,000, \$3,000, \$4,000 or \$5,000.

## **Form of Payment for Retirement Allowance**

### **Standard Form of Payment**

Generally, the retirement allowance is paid to the retiree in the form of an annuity for as long as he or she is alive. The retiree may choose to provide for a portion of his or her allowance to be paid to any designated beneficiary after the retiree's death. CalPERS provides for a variety of such benefit options, which the retiree pays for by taking a reduction in his or her retirement allowance. Such reduction takes into account the amount to be provided to the beneficiary and the probable duration of payments (based on the ages of the member and beneficiary) made subsequent to the member's death.

### **Improved Form of Payment (Post-Retirement Survivor Allowance)**

Employers have the option to contract for the post-retirement survivor allowance.

For retirement allowances with respect to service subject to the modified formula, 25% of the retirement allowance will automatically be continued to certain statutory beneficiaries upon the death of the retiree, without a reduction in the retiree's allowance. For retirement allowances with respect to service subject to the full or supplemental formula, 50% of the retirement allowance will automatically be continued to certain statutory beneficiaries upon the death of the retiree, without a reduction in the retiree's allowance. This additional benefit is referred to as post-retirement survivor allowance (PRSA) or simply as survivor continuance.

In other words, 25% or 50% of the allowance, the continuance portion, is paid to the retiree for as long as he or she is alive, and that same amount is continued to the retiree's spouse (or if no eligible spouse, to unmarried child(ren) until they attain age 18; or, if no eligible child(ren), to a qualifying dependent parent) for the rest of his or her lifetime. This benefit will not be discontinued in the event the spouse remarries.

The remaining 75% or 50% of the retirement allowance, which may be referred to as the option portion of the benefit, is paid to the retiree as an annuity for as long as he or she is alive. Or, the retiree may choose to provide for some of this option portion to be paid to any designated beneficiary after the retiree's death. Benefit options applicable to the option portion are the same as those offered with the standard form. The reduction is calculated in the same manner but is applied only to the option portion.

## Pre-Retirement Death Benefits

### Basic Death Benefit

This is a standard benefit.

#### Eligibility

An employee's beneficiary (or estate) may receive the basic death benefit if the member dies while actively employed. A CalPERS member must be actively employed with the CalPERS employer providing this benefit to be eligible for this benefit. A member's survivor who is eligible for any other pre-retirement death benefit may choose to receive that death benefit instead of this basic death benefit.

#### Benefit

The basic death benefit is a lump sum in the amount of the member's accumulated contributions, where interest is credited annually at the greater of 6% or the prevailing discount rate through the date of death, plus a lump sum in the amount of one month's salary for each completed year of current service, up to a maximum of six months' salary. For purposes of this benefit, one month's salary is defined as the member's average monthly full-time rate of compensation during the 12 months preceding death.

### 1957 Survivor Benefit

This is a standard benefit.

#### Eligibility

An employee's *eligible survivor(s)* may receive the 1957 Survivor benefit if the member dies while actively employed, has attained at least age 50 for classic and safety PEPPRA members and age 52 for miscellaneous PEPPRA members, and has at least 5 years of credited service (total service across all CalPERS employers and with certain other retirement systems with which CalPERS has reciprocity agreements). A CalPERS member must be actively employed with the CalPERS employer providing this benefit to be eligible for this benefit. An eligible survivor means the surviving spouse to whom the member was married at least one year before death or, if there is no eligible spouse, to the member's unmarried child(ren) under age 18. A member's survivor who is eligible for any other pre-retirement death benefit may choose to receive that death benefit instead of this 1957 Survivor benefit.

#### Benefit

The 1957 Survivor benefit is a monthly allowance equal to one-half of the unmodified service retirement benefit that the member would have been entitled to receive if the member had retired on the date of his or her death. If the benefit is payable to the spouse, the benefit is discontinued upon the death of the spouse. If the benefit is payable to dependent child(ren), the benefit will be discontinued upon death or attainment of age 18, unless the child(ren) is disabled. The total amount paid will be at least equal to the basic death benefit.

## Optional Settlement 2 Death Benefit

This is an optional benefit.

### Eligibility

An employee's *eligible survivor* may receive the Optional Settlement 2 Death benefit if the member dies while actively employed, has attained at least age 50 for classic and safety PEPPA members and age 52 for miscellaneous PEPPA members, and has at least 5 years of credited service (total service across all CalPERS employers and with certain other retirement systems with which CalPERS has reciprocity agreements). A CalPERS member who is no longer actively employed with **any** CalPERS employer is not eligible for this benefit. An *eligible survivor* means the surviving spouse to whom the member was married at least one year before death. A member's survivor who is eligible for any other pre-retirement death benefit may choose to receive that death benefit instead of this Optional Settlement 2 Death benefit.

### Benefit

The Optional Settlement 2 Death benefit is a monthly allowance equal to the service retirement benefit that the member would have received had the member retired on the date of his or her death and elected 100% to continue to the eligible survivor after the member's death. The allowance is payable as long as the surviving spouse lives, at which time it is continued to any unmarried child(ren) under age 18, if applicable. The total amount paid will be at least equal to the basic death benefit.

## Special Death Benefit

This is a standard benefit for safety members. An employer may elect to provide this benefit for miscellaneous members.

### Eligibility

An employee's *eligible survivor(s)* may receive the special death benefit if the member dies while actively employed and the death is job-related. A CalPERS member who is no longer actively employed with **any** CalPERS employer is not eligible for this benefit. An *eligible survivor* means the surviving spouse to whom the member was married prior to the onset of the injury or illness that resulted in death. If there is no eligible spouse, an eligible survivor means the member's unmarried child(ren) under age 22. An eligible survivor who chooses to receive this benefit will not receive any other death benefit.

### Benefit

The special death benefit is a monthly allowance equal to 50% of final compensation and will be increased whenever the compensation paid to active employees is increased but ceasing to increase when the member would have attained age 50. The allowance is payable to the surviving spouse until death at which time the allowance is continued to any unmarried child(ren) under age 22. There is a guarantee that the total amount paid will at least equal the basic death benefit.

If the member's death is the result of an accident or injury caused by external violence or physical force incurred in the performance of the member's duty, and there are *eligible* surviving child(ren) (*eligible* means unmarried child(ren) under age 22) in addition to an eligible spouse, then an **additional monthly allowance** is paid equal to the following:

- |                                   |                             |
|-----------------------------------|-----------------------------|
| • if 1 eligible child:            | 12.5% of final compensation |
| • if 2 eligible children:         | 20.0% of final compensation |
| • if 3 or more eligible children: | 25.0% of final compensation |

## Alternate Death Benefit for Local Fire Members

This is an optional benefit available only to local fire members.

### Eligibility

An employee's *eligible survivor(s)* may receive the alternate death benefit in lieu of the basic death benefit or the 1957 Survivor benefit if the member dies while actively employed and has at least 20 years of total CalPERS service. A CalPERS member who is no longer actively employed with **any** CalPERS employer is not eligible for this benefit. An *eligible survivor* means the surviving spouse to whom the member was married prior to the onset of the injury or illness that resulted in death. If there is no eligible spouse, an eligible survivor means the member's unmarried child(ren) under age 18.

### Benefit

The Alternate Death benefit is a monthly allowance equal to the service retirement benefit that the member would have received had the member retired on the date of his or her death and elected Optional Settlement 2. (A retiree who elects Optional Settlement 2 receives an allowance that has been reduced so that it will continue to be paid after his or her death to a surviving beneficiary.) If the member has not yet attained age 50, the benefit is equal to that which would be payable if the member had retired at age 50, based on service credited at the time of death. The allowance is payable as long as the surviving spouse lives, at which time it is continued to any unmarried child(ren) under age 18, if applicable. The total amount paid will be at least equal to the basic death benefit.

## Cost-of-Living Adjustments (COLA)

### Standard Benefit

Retirement and survivor allowances are adjusted each year in May for cost of living, beginning the second calendar year after the year of retirement. The standard cost-of-living adjustment (COLA) is 2%. Annual adjustments are calculated by first determining the lesser of 1) 2% compounded from the end of the year of retirement or 2) actual rate of inflation. The resulting increase is divided by the total increase provided in prior years. For any given year, the COLA adjustment may be less than 2% (when the rate of inflation is low), may be greater than the rate of inflation (when the rate of inflation is low after several years of high inflation) or may even be greater than 2% (when inflation is high after several years of low inflation).

### Improved Benefit

Employers have the option of providing a COLA of 3%, 4%, or 5%, determined in the same manner as described above for the standard 2% COLA. An improved COLA is not available with the 1.5% at 65 formula.

## Purchasing Power Protection Allowance (PPPA)

Retirement and survivor allowances are protected against inflation by PPPA. PPPA benefits are cost-of-living adjustments that are intended to maintain an individual's allowance at 80% of the initial allowance at retirement adjusted for inflation since retirement. The PPPA benefit will be coordinated with other cost-of-living adjustments provided under the plan.

## Employee Contributions

Each employee contributes toward his or her retirement based upon the retirement formula. The standard employee contribution is as described below.

- The percent contributed below the monthly compensation breakpoint is 0%.
- The monthly compensation breakpoint is \$0 for full and supplemental formula members and \$133.33 for employees covered by the modified formula.
- The percent contributed above the monthly compensation breakpoint depends upon the benefit formula, as shown in the table below.

| <b>Benefit Formula</b>    | <b>Percent Contributed above the Breakpoint</b> |
|---------------------------|---|
| Miscellaneous, 1.5% at 65 | 2%  |
| Miscellaneous, 2% at 60   | 7%  |
| Miscellaneous, 2% at 55   | 7%  |
| Miscellaneous, 2.5% at 55 | 8%  |
| Miscellaneous, 2.7% at 55 | 8%  |
| Miscellaneous, 3% at 60   | 8%  |
| Miscellaneous, 2% at 62   | 50% of the Total Normal Cost                    |
| Miscellaneous, 1.5% at 65 | 50% of the Total Normal Cost                    |
| Safety, 1/2 at 55         | Varies by entry age                             |
| Safety, 2% at 55          | 7%  |
| Safety, 2% at 50          | 9%  |
| Safety, 3% at 55          | 9%  |
| Safety, 3% at 50          | 9%  |
| Safety, 2% at 57          | 50% of the Total Normal Cost                    |
| Safety, 2.5% at 57        | 50% of the Total Normal Cost                    |
| Safety, 2.7% at 57        | 50% of the Total Normal Cost                    |

The employer may choose to “pick-up” these contributions for classic members (Employer Paid Member Contributions or EPMC). EPMC is prohibited for new PEPRA members.

An employer may also include Employee Cost Sharing in the contract, where employees agree to share the cost of the employer contribution. These contributions are paid in addition to the member contribution.

Auxiliary organizations of the CSU system may elect reduced contribution rates, in which case the offset is \$317 and the contribution rate is 6% if members are not covered by Social Security. If members are covered by Social Security, the offset is \$513 and the contribution rate is 5%.

## Refund of Employee Contributions

If the member’s service with the employer ends, and if the member does not satisfy the eligibility conditions for any of the retirement benefits above, the member may elect to receive a refund of his or her employee contributions, which are credited with 6% interest compounded annually.

## **1959 Survivor Benefit**

This is a pre-retirement death benefit available only to members not covered by Social Security. Any agency joining CalPERS subsequent to 1993 is required to provide this benefit if the members are not covered by Social Security. The benefit is optional for agencies joining CalPERS prior to 1994. Levels 1, 2 and 3 are now closed. Any new agency or any agency wishing to add this benefit or increase the current level may only choose the 4<sup>th</sup> or Indexed Level.

This benefit is not included in the results presented in this valuation. More information on this benefit is available on the CalPERS website.

## **Appendix C**

### **Participant Data**

- **Summary of Valuation Data**
- **Active Members**
- **Transferred and Terminated Members**
- **Retired Members and Beneficiaries**

## Summary of Valuation Data

|   | June 30, 2019 | June 30, 2020 |
|---|---------------|---------------|
| <b>1. Active Members</b>                          |               |               |
| a) Counts   | 137           | 140           |
| b) Average Attained Age                           | 45.69         | 45.72         |
| c) Average Entry Age to Rate Plan                 | 35.33         | 35.37         |
| d) Average Years of Credited Service              | 10.65         | 10.65         |
| e) Average Annual Covered Pay                     | \$123,814     | \$129,786     |
| f) Annual Covered Payroll                         | 16,962,578    | 18,169,972    |
| g) Projected Annual Payroll for Contribution Year | 18,400,827    | 19,710,596    |
| h) Present Value of Future Payroll                | 146,084,096   | 155,158,851   |
| <b>2. Transferred Members</b>                     |               |               |
| a) Counts   | 40            | 36            |
| b) Average Attained Age                           | 49.91         | 49.50         |
| c) Average Years of Credited Service              | 5.45          | 4.42          |
| d) Average Annual Covered Pay                     | \$103,743     | \$127,023     |
| <b>3. Terminated Members</b>                      |               |               |
| a) Counts   | 25            | 26            |
| b) Average Attained Age                           | 48.91         | 50.18         |
| c) Average Years of Credited Service              | 2.06          | 2.84          |
| d) Average Annual Covered Pay                     | \$64,286      | \$64,714      |
| <b>4. Retired Members and Beneficiaries</b>       |               |               |
| a) Counts   | 193           | 197           |
| b) Average Attained Age                           | 69.37         | 69.60         |
| c) Average Annual Benefits                        | \$41,581      | \$42,388      |
| <b>5. Active to Retired Ratio [(1a) / (4a)]</b>   | 0.71          | 0.71          |

Counts of members included in the valuation are counts of the records processed by the valuation. Multiple records may exist for those who have service in more than one valuation group. This does not result in double counting of liabilities.

Average Annual Benefits represents benefit amounts payable by this plan only. Some members may have service with another agency and would therefore have a larger total benefit than would be included as part of the average shown here.

## Active Members

Counts of members included in the valuation are counts of the records processed by the valuation. Multiple records may exist for those who have service in more than one valuation group. This does not result in double counting of liabilities.

### Distribution of Active Members by Age and Service

| Attained Age    | Years of Service at Valuation Date |           |           |           |          |           | Total      |
|-----------------|------------------------------------|-----------|-----------|-----------|----------|-----------|------------|
|                 | 0-4                                | 5-9       | 10-14     | 15-19     | 20-24    | 25+       |            |
| 15-24           | 1                                  | 0         | 0         | 0         | 0        | 0         | 1          |
| 25-29           | 8                                  | 1         | 0         | 0         | 0        | 0         | 9          |
| 30-34           | 9                                  | 4         | 0         | 0         | 0        | 0         | 13         |
| 35-39           | 12                                 | 9         | 1         | 1         | 0        | 0         | 23         |
| 40-44           | 5                                  | 6         | 7         | 6         | 0        | 0         | 24         |
| 45-49           | 6                                  | 2         | 5         | 1         | 1        | 1         | 16         |
| 50-54           | 2                                  | 8         | 8         | 4         | 2        | 3         | 27         |
| 55-59           | 2                                  | 1         | 2         | 2         | 3        | 3         | 13         |
| 60-64           | 2                                  | 1         | 1         | 2         | 2        | 3         | 11         |
| 65 and Over     | 0                                  | 1         | 0         | 0         | 0        | 2         | 3          |
| <b>All Ages</b> | <b>47</b>                          | <b>33</b> | <b>24</b> | <b>16</b> | <b>8</b> | <b>12</b> | <b>140</b> |

### Distribution of Average Annual Salaries by Age and Service

| Attained Age   | Years of Service at Valuation Date |                  |                  |                  |                  |                  | Average Salary   |
|----------------|------------------------------------|------------------|------------------|------------------|------------------|------------------|------------------|
|                | 0-4                                | 5-9              | 10-14            | 15-19            | 20-24            | 25+              |                  |
| 15-24          | \$99,861                           | \$0              | \$0              | \$0              | \$0              | \$0              | \$99,861         |
| 25-29          | 95,833                             | 123,012          | 0                | 0                | 0                | 0                | 98,853           |
| 30-34          | 97,748                             | 123,022          | 0                | 0                | 0                | 0                | 105,524          |
| 35-39          | 109,604                            | 132,418          | 103,693          | 147,050          | 0                | 0                | 119,903          |
| 40-44          | 106,417                            | 125,217          | 133,695          | 159,745          | 0                | 0                | 132,405          |
| 45-49          | 115,599                            | 219,814          | 139,363          | 129,106          | 156,746          | 247,563          | 147,716          |
| 50-54          | 159,181                            | 127,513          | 118,705          | 137,689          | 162,803          | 201,281          | 139,567          |
| 55-59          | 138,834                            | 181,810          | 128,912          | 127,397          | 169,480          | 160,489          | 150,923          |
| 60-64          | 141,811                            | 158,876          | 110,871          | 165,877          | 130,406          | 126,726          | 138,737          |
| 65 and Over    | 0                                  | 125,453          | 0                | 0                | 0                | 63,902           | 84,419           |
| <b>Average</b> | <b>\$109,933</b>                   | <b>\$135,880</b> | <b>\$127,280</b> | <b>\$148,245</b> | <b>\$156,450</b> | <b>\$153,405</b> | <b>\$129,786</b> |

## Transferred and Terminated Members

### Distribution of Transfers to Other CalPERS Plans by Age, Service, and average Salary

| Attained Age    | Years of Service at Valuation Date |           |          |          |          |          | Total     | Average Salary   |
|-----------------|------------------------------------|-----------|----------|----------|----------|----------|-----------|------------------|
|                 | 0-4                                | 5-9       | 10-14    | 15-19    | 20-24    | 25+      |           |                  |
| 15-24           | 0                                  | 0         | 0        | 0        | 0        | 0        | 0         | \$0              |
| 25-29           | 0                                  | 0         | 0        | 0        | 0        | 0        | 0         | 0                |
| 30-34           | 1                                  | 0         | 0        | 0        | 0        | 0        | 1         | 42,483           |
| 35-39           | 2                                  | 4         | 0        | 0        | 0        | 0        | 6         | 114,778          |
| 40-44           | 4                                  | 1         | 0        | 0        | 0        | 0        | 5         | 96,401           |
| 45-49           | 5                                  | 1         | 0        | 0        | 0        | 0        | 6         | 102,592          |
| 50-54           | 3                                  | 2         | 0        | 0        | 0        | 0        | 5         | 130,888          |
| 55-59           | 4                                  | 3         | 1        | 0        | 0        | 0        | 8         | 168,516          |
| 60-64           | 2                                  | 2         | 0        | 1        | 0        | 0        | 5         | 148,314          |
| 65 and Over     | 0                                  | 0         | 0        | 0        | 0        | 0        | 0         | 0                |
| <b>All Ages</b> | <b>21</b>                          | <b>13</b> | <b>1</b> | <b>1</b> | <b>0</b> | <b>0</b> | <b>36</b> | <b>\$127,023</b> |

### Distribution of Terminated Participants with Funds on Deposit by Age, Service, and average Salary

| Attained Age    | Years of Service at Valuation Date |          |          |          |          |          | Total     | Average Salary  |
|-----------------|------------------------------------|----------|----------|----------|----------|----------|-----------|-----------------|
|                 | 0-4                                | 5-9      | 10-14    | 15-19    | 20-24    | 25+      |           |                 |
| 15-24           | 0                                  | 0        | 0        | 0        | 0        | 0        | 0         | \$0             |
| 25-29           | 1                                  | 0        | 0        | 0        | 0        | 0        | 1         | 31,710          |
| 30-34           | 1                                  | 0        | 0        | 0        | 0        | 0        | 1         | 58,956          |
| 35-39           | 1                                  | 0        | 0        | 0        | 0        | 0        | 1         | 74,679          |
| 40-44           | 3                                  | 1        | 0        | 0        | 0        | 0        | 4         | 72,078          |
| 45-49           | 4                                  | 0        | 0        | 1        | 0        | 0        | 5         | 74,712          |
| 50-54           | 3                                  | 1        | 1        | 0        | 0        | 0        | 5         | 68,452          |
| 55-59           | 6                                  | 1        | 0        | 0        | 0        | 0        | 7         | 60,881          |
| 60-64           | 2                                  | 0        | 0        | 0        | 0        | 0        | 2         | 43,462          |
| 65 and Over     | 0                                  | 0        | 0        | 0        | 0        | 0        | 0         | 0               |
| <b>All Ages</b> | <b>21</b>                          | <b>3</b> | <b>1</b> | <b>1</b> | <b>0</b> | <b>0</b> | <b>26</b> | <b>\$64,714</b> |

## Retired Members and Beneficiaries

### Distribution of Retirees and Beneficiaries by Age and Retirement Type\*

| Attained Age    | Service Retirement | Non-Industrial Disability | Industrial Disability | Non-Industrial Death | Industrial Death | Death After Retirement | Total      |
|-----------------|--------------------|---------------------------|-----------------------|----------------------|------------------|------------------------|------------|
| Under 30        | 0                  | 0                         | 0                     | 0                    | 0                | 0                      | 0          |
| 30-34           | 0                  | 0                         | 0                     | 0                    | 0                | 0                      | 0          |
| 35-39           | 0                  | 0                         | 0                     | 0                    | 0                | 0                      | 0          |
| 40-44           | 0                  | 0                         | 0                     | 0                    | 0                | 0                      | 0          |
| 45-49           | 0                  | 0                         | 0                     | 0                    | 0                | 0                      | 0          |
| 50-54           | 2                  | 1                         | 0                     | 1                    | 0                | 0                      | 4          |
| 55-59           | 20                 | 0                         | 0                     | 0                    | 0                | 0                      | 20         |
| 60-64           | 34                 | 2                         | 0                     | 0                    | 0                | 3                      | 39         |
| 65-69           | 38                 | 1                         | 0                     | 1                    | 0                | 3                      | 43         |
| 70-74           | 40                 | 2                         | 0                     | 0                    | 0                | 1                      | 43         |
| 75-79           | 21                 | 0                         | 0                     | 0                    | 0                | 2                      | 23         |
| 80-84           | 11                 | 2                         | 0                     | 0                    | 0                | 3                      | 16         |
| 85 and Over     | 4                  | 2                         | 0                     | 0                    | 0                | 3                      | 9          |
| <b>All Ages</b> | <b>170</b>         | <b>10</b>                 | <b>0</b>              | <b>2</b>             | <b>0</b>         | <b>15</b>              | <b>197</b> |

### Distribution of Average Annual Disbursements to Retirees and Beneficiaries by Age and Retirement Type\*

| Attained Age    | Service Retirement | Non-Industrial Disability | Industrial Disability | Non-Industrial Death | Industrial Death | Death After Retirement | Average         |
|-----------------|--------------------|---------------------------|-----------------------|----------------------|------------------|------------------------|-----------------|
| Under 30        | \$0                | \$0                       | \$0                   | \$0                  | \$0              | \$0                    | \$0             |
| 30-34           | 0                  | 0                         | 0                     | 0                    | 0                | 0                      | 0               |
| 35-39           | 0                  | 0                         | 0                     | 0                    | 0                | 0                      | 0               |
| 40-44           | 0                  | 0                         | 0                     | 0                    | 0                | 0                      | 0               |
| 45-49           | 0                  | 0                         | 0                     | 0                    | 0                | 0                      | 0               |
| 50-54           | 4,195              | 23,950                    | 0                     | 383                  | 0                | 0                      | 8,181           |
| 55-59           | 58,193             | 0                         | 0                     | 0                    | 0                | 0                      | 58,193          |
| 60-64           | 38,217             | 18,258                    | 0                     | 0                    | 0                | 36,327                 | 37,048          |
| 65-69           | 37,479             | 28,761                    | 0                     | 3,518                | 0                | 39,455                 | 36,624          |
| 70-74           | 45,066             | 27,722                    | 0                     | 0                    | 0                | 132,397                | 46,290          |
| 75-79           | 55,867             | 0                         | 0                     | 0                    | 0                | 30,751                 | 53,683          |
| 80-84           | 42,988             | 15,470                    | 0                     | 0                    | 0                | 51,275                 | 41,102          |
| 85 and Over     | 34,164             | 11,493                    | 0                     | 0                    | 0                | 30,551                 | 27,921          |
| <b>All Ages</b> | <b>\$44,007</b>    | <b>\$19,860</b>           | <b>\$0</b>            | <b>\$1,950</b>       | <b>\$0</b>       | <b>\$44,448</b>        | <b>\$42,388</b> |

## Retired Members and Beneficiaries (continued)

### Distribution of Retirees and Beneficiaries by Years Retired and Retirement Type\*

| Years Retired    | Service Retirement | Non-Industrial Disability | Industrial Disability | Non-Industrial Death | Industrial Death | Death After Retirement | Total      |
|------------------|--------------------|---------------------------|-----------------------|----------------------|------------------|------------------------|------------|
| Under 5 Yrs      | 48                 | 0                         | 0                     | 2                    | 0                | 3                      | 53         |
| 5-9              | 44                 | 0                         | 0                     | 0                    | 0                | 6                      | 50         |
| 10-14            | 28                 | 1                         | 0                     | 0                    | 0                | 4                      | 33         |
| 15-19            | 31                 | 0                         | 0                     | 0                    | 0                | 0                      | 31         |
| 20-24            | 12                 | 4                         | 0                     | 0                    | 0                | 1                      | 17         |
| 25-29            | 4                  | 2                         | 0                     | 0                    | 0                | 1                      | 7          |
| 30 and Over      | 3                  | 3                         | 0                     | 0                    | 0                | 0                      | 6          |
| <b>All Years</b> | <b>170</b>         | <b>10</b>                 | <b>0</b>              | <b>2</b>             | <b>0</b>         | <b>15</b>              | <b>197</b> |

### Distribution of Average Annual Disbursements to Retirees and Beneficiaries by Years Retired and Retirement Type\*

| Years Retired    | Service Retirement | Non-Industrial Disability | Industrial Disability | Non-Industrial Death | Industrial Death | Death After Retirement | Average         |
|------------------|--------------------|---------------------------|-----------------------|----------------------|------------------|------------------------|-----------------|
| Under 5 Yrs      | \$50,232           | \$0                       | \$0                   | \$1,950              | \$0              | \$75,524               | \$49,842        |
| 5-9              | 43,582             | 0                         | 0                     | 0                    | 0                | 38,021                 | 42,914          |
| 10-14            | 42,684             | 23,950                    | 0                     | 0                    | 0                | 34,077                 | 41,073          |
| 15-19            | 41,378             | 0                         | 0                     | 0                    | 0                | 0                      | 41,378          |
| 20-24            | 36,769             | 21,364                    | 0                     | 0                    | 0                | 40,786                 | 33,380          |
| 25-29            | 36,546             | 28,729                    | 0                     | 0                    | 0                | 34,933                 | 34,082          |
| 30 and Over      | 29,061             | 10,577                    | 0                     | 0                    | 0                | 0                      | 19,819          |
| <b>All Years</b> | <b>\$44,007</b>    | <b>\$19,860</b>           | <b>\$0</b>            | <b>\$1,950</b>       | <b>\$0</b>       | <b>\$44,448</b>        | <b>\$42,388</b> |

\* Counts of members do not include alternate payees receiving benefits while the member is still working. Therefore, the total counts may not match information on C-1 of the report. Multiple records may exist for those who have service in more than one coverage group. This does not result in double counting of liabilities.

## **Appendix D**

### **Glossary of Actuarial Terms**

## Glossary of Actuarial Terms

### **Accrued Liability** (*also called Actuarial Accrued Liability or Entry Age Actuarial Accrued Liability*)

The total dollars needed as of the valuation date to fund all benefits earned in the past for *current* members.

### **Actuarial Assumptions**

Assumptions made about certain events that will affect pension costs. Assumptions generally can be broken down into two categories: demographic and economic. Demographic assumptions include such things as mortality, disability and retirement rates. Economic assumptions include discount rate, salary growth and inflation.

### **Actuarial Methods**

Procedures employed by actuaries to achieve certain funding goals of a pension plan. Actuarial methods include funding method, setting the length of time to fund the Accrued Liability and determining the Value of Assets.

### **Actuarial Valuation**

The determination as of a valuation date of the Normal Cost, Accrued Liability, and related actuarial present values for a pension plan. These valuations are performed annually or when an employer is contemplating a change to their plan provisions.

### **Amortization Bases**

Separate payment schedules for different portions of the Unfunded Liability. The total Unfunded Liability of a Risk Pool or non-pooled plan can be segregated by cause, creating "bases," and each such base will be separately amortized and paid for over a specific period of time. However, all bases are amortized using investment and payroll assumptions from the current valuation. This can be likened to a home having a first mortgage of 24 years remaining payments and a second mortgage that has 10 years remaining payments. Each base or each mortgage note has its own terms (payment period, principal, etc.).

Generally, in an actuarial valuation, the separate bases consist of changes in unfunded liability due to contract amendments, actuarial assumption changes, method changes, and/or gains and losses.

### **Amortization Period**

The number of years required to pay off an Amortization Base.

### **Classic Member (under PEPRA)**

A classic member is a member who joined CalPERS prior to January 1, 2013 and who is not defined as a new member under PEPRA. (See definition of New Member below.)

### **Discount Rate**

The assumed long-term rate of return on plan assets. This is the rate at which projected cash flows are discounted to the valuation date to determine Accrued Liability. This assumption is called "investment return" in earlier CalPERS reports and "actuarial interest rate" in Section 20014 of the California Public Employees' Retirement Law (PERL).

### **Entry Age**

The earliest age at which a plan member begins to accrue benefits under a defined benefit pension plan. In most cases, this is the age of the member on their date of hire.

### **Entry Age Actuarial Cost Method**

An actuarial cost method designed to fund a member's total plan benefit over the course of his or her career. This method is designed to yield a rate expressed as a level percentage of payroll.

(The assumed retirement age less the entry age is the amount of time required to fund a member's total benefit. Generally, the older a member on the date of hire, the greater the entry age normal cost. This is mainly because there is less time to earn investment income to fund the future benefits.)

**Fresh Start**

A Fresh Start is when multiple amortization bases are collapsed to one base and amortized together over a new funding period.

**Funded Status**

A measure of how well funded, or how "on track" a plan or risk pool is with respect to assets versus accrued liabilities. A ratio greater than 100% means the plan or risk pool has more assets than liabilities and a ratio less than 100% means liabilities are greater than assets.

**GASB 68**

Statement No. 68 of the Governmental Accounting Standards Board. The accounting standard governing a state or local governmental employer's accounting and financial reporting for pensions. GASB 68 replaces GASB 27 effective the first fiscal year beginning after June 15, 2014.

**New Member (under PEPPRA)**

A new member includes an individual who becomes a member of a public retirement system for the first time on or after January 1, 2013, and who was not a member of another public retirement system prior to that date, and who is not subject to reciprocity with another public retirement system.

**Normal Cost**

The annual cost of service accrual for the upcoming fiscal year for active employees. The normal cost should be viewed as the long-term contribution rate.

**Pension Actuary**

A business professional that is authorized by the Society of Actuaries and the American Academy of Actuaries to perform the calculations necessary to properly fund a pension plan.

**PEPPRA**

The California Public Employees' Pension Reform Act of 2013

**Present Value of Benefits (PVB)**

The total dollars needed as of the valuation date to fund all benefits earned in the past or expected to be earned in the future for *current* members.

**Unfunded Accrued Liability (UAL)**

When a plan or pool's value of assets is less than its Accrued Liability, the difference is the plan or pool's Unfunded Accrued Liability (or unfunded liability). If the unfunded liability is positive, the plan or pool will have to pay contributions exceeding the Normal Cost.



**Directors**  
Manny Fernandez  
Tom Handley  
Pat Kite  
Anjali Lathi  
Jennifer Toy

**Officers**  
Paul R. Eldredge  
*General Manager/  
District Engineer*

Karen W. Murphy  
*Attorney*

**OCTOBER 11, 2021  
BOARD OF DIRECTORS MEETING  
AGENDA ITEM # 10**

**TITLE:**               **Status Report on Computer Purchase and Student Loan Program (*This is an Information Item*)**

**SUBMITTED:**     Paul R. Eldredge, General Manager/District Engineer  
Mark Carlson, Business Services Work Group Manager/CFO

**Recommendation**  
Information only.

**Discussion**

Computer Purchase Loan Program

Since inception, employees have utilized the program 401 times to purchase computer related equipment totaling \$948,502 with an average purchase of \$2,365. The current terms of the program allow an employee to borrow a maximum of \$3,300 for up to 3 years and to repay the loan through payroll deductions. The program has a maximum District wide loan limit of \$50,000 (including student loan maximum of \$15,000).

As can be seen in the chart below, there are currently 23 outstanding loans for a total of \$29,430 with an average outstanding loan balance of \$1,280. During the year there were 11 new loans granted and 9 loans paid off.

| Employee Computer Loan Program |                  |           |
|--------------------------------|------------------|-----------|
|                                | Dollars          | Quantity  |
| Balance July 1, 2020           | \$ 26,738        | 21        |
| New Loans                      | 25,977           | 11        |
| Payments and Adjustments       | (23,285)         | (9)       |
| Balance June 30, 2021          | <u>\$ 29,430</u> | <u>23</u> |

### Student Loan Program

Research into the program has not identified any employees having taken advantage of the program since inception.

### **Background**

The Computer Purchase Loan Program was authorized by the Board of Directors in 1989 and provides an opportunity for employees to receive an interest free loan for the purchase of approved technology related equipment.

The Student Loan Program was created in 1995 and allows for a maximum annual interest free loan of up to \$3,000 for qualifying education expenses.

### **Previous Board Action**

None

**Directors**

Manny Fernandez  
Tom Handley  
Pat Kite  
Anjali Lathi  
Jennifer Toy

**Officers**

Paul R. Eldredge  
*General Manager/  
District Engineer*

Karen W. Murphy  
*Attorney*

**OCTOBER 11, 2021  
BOARD OF DIRECTORS MEETING  
AGENDA ITEM # 11**

**TITLE:** COVID-19 Update (*This is an Information Item*)

**SUBMITTED:** Paul R. Eldredge, General Manager/District Engineer

**Recommendation**

Information only.

**Discussion**

None.

**Background**

General Manager Eldredge will provide an update on the District's COVID-19 response and staffing levels.

**Previous Board Action**

None.

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|-----------|-----------|------|----------------|--------------------------------|--|--------------|--------------|
| 178734    | 9/30/2021 | 143  | 800526         | KIEWIT INFRASTRUCTURE WEST CO  | PRIMARY DIGESTER NO. 2 REHABILITATION                |              |              |
|           | 9/30/2021 | 143  | 800526.11      |                                | PRIMARY DIGESTER NO. 2 REHABILITATION                | \$148,853.08 | \$221,637.43 |
|           |           |      |                |                                |  | \$72,784.35  |              |
| 178718    | 9/30/2021 | 143  | 16469          | DW NICHOLSON CORP              | CALCIUM THIOSULFATE CHEMICAL TANK                    |              |              |
|           |           |      |                |                                |  | \$157,194.03 | \$157,194.03 |
| 178710    | 9/30/2021 | 143  | 13467          | CAROLLO ENGINEERS              | EMERGENCY OUTFALL, CATHODIC PROTECTION IMPROVEMENTS, |              |              |
|           | 9/30/2021 | 143  | 14409          |                                | PRIMARY DIGESTER NO. 7                               | \$56,429.82  | \$139,232.47 |
|           | 9/30/2021 | 143  | 14200          |                                | PLANT MISCELLANEOUS IMPROVEMENTS                     | \$62,555.15  |              |
|           |           |      |                |                                |  | \$20,247.50  |              |
| 178711    | 9/30/2021 | 143  | 800531.1       | CASEY CONSTRUCTION INC         | GRAVITY SEWER REHAB/REPLACEMENT                      |              |              |
|           |           |      |                |                                |  | \$115,976.00 | \$115,976.00 |
| 178756    | 9/30/2021 | 110  | 24261          | SYNAGRO WEST LLC               | AUG 2021 BIOSOLIDS DISPOSAL                          |              |              |
|           |           |      |                |                                |  | \$89,785.26  | \$89,785.26  |
| 178729    | 9/30/2021 |      | 30295020210929 | ICMA                           | PAYROLL CONTRIBUTIONS 09292021                       |              |              |
|           | 9/30/2021 |      | 70566320210929 |                                | PAYROLL CONTRIBUTIONS 09292021                       | \$54,834.77  | \$61,216.18  |
|           |           |      |                |                                |  | \$6,381.41   |              |
| 178745    | 9/30/2021 | 110  | 1574706        | POLYDYNE INC                   | 40,540 LBS CLARIFLOC C-6267                          |              |              |
|           |           |      |                |                                |  | \$49,257.65  | \$49,257.65  |
| 178695    | 9/23/2021 | 170  | 4274845        | WESTERN ENERGY SYSTEMS         | 12 CYLINDER HEADS                                    |              |              |
|           |           |      |                |                                |  | \$43,913.15  | \$43,913.15  |
| 178761    | 9/30/2021 | 143  | 20614          | V&A CONSULTING ENGINEERS       | PLANT MISCELLANEOUS IMPROVEMENTS                     |              |              |
|           |           |      |                |                                |  | \$27,562.29  | \$27,562.29  |
| 178682    | 9/23/2021 |      | 41887          | PREFERRED BENEFIT INSUR ADMINS | SEPTEMBER 2021 DELTA DENTAL STMT                     |              |              |
|           | 9/23/2021 |      | 41888          |                                | SEPTEMBER 2021 VSP STMT                              | \$11,968.75  | \$15,151.55  |
|           |           |      |                |                                |  | \$3,182.80   |              |

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| 178742    | 9/30/2021 | 110  | 3000018039  | OLIN CORPORATION               | 4544 GALS SODIUM HYPOCHLORITE            |             | \$14,924.90 |
|           | 9/30/2021 | 110  | 3000019035  |                                | 4780.343 GALS SODIUM HYPOCHLORITE        | \$3,542.87  |             |
|           | 9/30/2021 | 110  | 3000016437  |                                | 4900 GALS SODIUM HYPOCHLORITE            | \$3,727.14  |             |
|           | 9/30/2021 | 110  | 3000016186  |                                | 4918 GALS SODIUM HYPOCHLORITE            | \$3,820.43  |             |
|           |           |      |             |                                |  | \$3,834.46  |             |
| 178733    | 9/30/2021 | 110  | 9017725728  | KEMIRA WATER SOLUTIONS INC     | 46,460 LBS FERROUS CHLORIDE              |             | \$14,623.77 |
|           | 9/30/2021 | 110  | 9017725823  |                                | 47,540 LBS FERROUS CHLORIDE              | \$7,229.52  |             |
|           |           |      |             |                                |  | \$7,394.25  |             |
| 178709    | 9/30/2021 | 150  | 273344      | BURKE, WILLIAMS & SORENSON LLP | GENERAL LEGAL - JUL 2021                 |             | \$14,310.40 |
|           | 9/30/2021 | 150  | 272523      |                                | GENERAL PERSONNEL - JUL 2021             | \$7,987.20  |             |
|           | 9/30/2021 | 150  | 273347      |                                | FORCE MAIN RELOCATION - JUL 2021         | \$1,198.08  |             |
|           | 9/30/2021 | 150  | 272520      |                                | CONTRACT DISPUTE - JUL 2021              | \$665.60    |             |
|           | 9/30/2021 |      | 272522      |                                | EMPLOYMENT LEGAL - JUL 2021              | \$399.36    |             |
|           | 9/30/2021 |      |             |                                |  | \$665.60    |             |
|           | 9/30/2021 | 150  | 273348      |                                | ETSU - JUL 2021                          | \$965.12    |             |
|           | 9/30/2021 | 143  | 273345      |                                | CAPITAL IMPROVEMENT PROJECTS - JUL 2021  | \$2,030.08  |             |
|           | 9/30/2021 | 150  | 273349      |                                | STANDBY POWER PROJECT - JUL 2021         | \$399.36    |             |
| 178719    | 9/30/2021 | 143  | 265044      | ENGEO INCORPORATED             | ALAMEDA CREEK-FORCEMAIN CROSSING GEOTECH | \$12,072.50 | \$12,072.50 |
| 178679    | 9/23/2021 | 110  | 3000014737  | OLIN CORPORATION               | 4828 GALS SODIUM HYPOCHLORITE            |             | \$11,110.19 |
|           | 9/23/2021 | 110  | 3000015670  |                                | 4924 GALS SODIUM HYPOCHLORITE            | \$3,764.29  |             |
|           | 9/23/2021 | 110  | 3000013920  |                                | 4497.691 GALS SODIUM HYPOCHLORITE        | \$3,839.15  |             |
|           |           |      |             |                                |  | \$3,506.75  |             |
| 178668    | 9/23/2021 | 110  | 9017724651  | KEMIRA WATER SOLUTIONS INC     | 47,699.9 LBS FERROUS CHLORIDE            | \$7,421.71  | \$7,421.71  |

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| 178694    | 9/23/2021 | 121  | 48191            | WECO INDUSTRIES LLC           | CAMERA REPAIRS                            |             |            |
|           |           |      |                  |                               |   | \$7,230.71  | \$7,230.71 |
| 178765    | 9/30/2021 | 143  | 2046128          | WEST YOST ASSOCIATES          | GRAVITY SEWER REHAB/REPLACEMENT           |             |            |
|           |           |      |                  |                               |   | \$7,146.00  | \$7,146.00 |
| 178646    | 9/23/2021 | 170  | 4017274120210909 | ALAMEDA COUNTY WATER DISTRICT | SERV TO: 09/07/21 - FREMONT BLVD          |             |            |
|           |           |      |                  |                               |   | \$5,338.98  | \$6,285.73 |
|           | 9/23/2021 | 170  | 4017420220210908 |                               | SERV TO: 09/07/21 - FREMONT BLVD          |             |            |
|           |           |      |                  |                               |   | \$61.21     |            |
|           | 9/23/2021 | 170  | 4017275220210908 |                               | SERV TO: 09/07/21 - FREMONT BLVD          |             |            |
|           |           |      |                  |                               |   | \$885.54    |            |
| 178680    | 9/23/2021 | 170  | 096020210908     | PACIFIC GAS AND ELECTRIC      | SERV TO 08/31/21 CATHODIC PROJECT         |             |            |
|           |           |      |                  |                               |   | \$50.38     | \$4,661.13 |
|           | 9/23/2021 | 170  | 380420210908     |                               | SERV TO 08/31/21 CHERRY ST PS             |             |            |
|           |           |      |                  |                               |   | \$385.29    |            |
|           | 9/23/2021 | 170  | 666720210908     |                               | SERV TO 08/31/2021 PASEO PADRE PS         |             |            |
|           |           |      |                  |                               |   | \$443.32    |            |
|           | 9/23/2021 | 170  | 013720210913     |                               | SERV TO 09/06/21 BOYCE RD PS              |             |            |
|           |           |      |                  |                               |   | \$3,466.04  |            |
|           | 9/23/2021 | 170  | 140120210913     |                               | SERV TO 09/02/21 IRVINGTON PS             |             |            |
|           |           |      |                  |                               |   | \$23.82     |            |
|           | 9/23/2021 | 110  | 892820210908     |                               | SERV TO 08/31/2021 HAYWARD MARSH          |             |            |
|           |           |      |                  |                               |   | \$68.99     |            |
|           | 9/23/2021 | 170  | 898220210908     |                               | SERV TO 08/31/21 FREMONT PS               |             |            |
|           |           |      |                  |                               |   | \$223.29    |            |
| 178744    | 9/30/2021 | 130  | 82125999         | PFM ASSET MANAGEMENT LLC      | INVESTMENT MANAGEMENT / ADVISORY SERVICES |             |            |
|           |           |      |                  |                               |   | \$4,153.52  | \$4,153.52 |
| 178721    | 9/30/2021 | 170  | 247495           | FRANK A OLSEN COMPANY         | 2 DIGESTER VALVES                         |             |            |
|           |           |      |                  |                               |   | \$4,111.23  | \$4,111.23 |
| 178737    | 9/30/2021 | 113  | 2108G05          | MCCAMPBELL ANALYTICAL         | LAB SAMPLE ANALYSIS                       |             |            |
|           |           |      |                  |                               |   | \$1,682.00  | \$4,067.00 |
|           | 9/30/2021 | 113  | 2109142          |                               | LAB SAMPLE ANALYSIS                       |             |            |
|           |           |      |                  |                               |   | \$1,974.00  |            |
|           | 9/30/2021 | 113  | 2108G87          |                               | LAB SAMPLE ANALYSIS                       |             |            |
|           |           |      |                  |                               |   | \$411.00    |            |

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| 178671    | 9/23/2021 | 113  | 2108841     | MCCAMPBELL ANALYTICAL         | LAB SAMPLE ANALYSIS                       |             |            |
|           |           |      |             |                               |   | \$708.00    | \$3,806.00 |
|           | 9/23/2021 | 113  | 2108733     |                               | LAB SAMPLE ANALYSIS                       |             |            |
|           |           |      |             |                               |   | \$250.00    |            |
|           | 9/23/2021 | 113  | 2108736     |                               | LAB SAMPLE ANALYSIS                       |             |            |
|           |           |      |             |                               |   | \$711.00    |            |
|           | 9/23/2021 | 113  | 2108B47     |                               | LAB SAMPLE ANALYSIS                       |             |            |
|           |           |      |             |                               |   | \$164.00    |            |
|           | 9/23/2021 | 113  | 2108E39     |                               | LAB SAMPLE ANALYSIS                       |             |            |
|           |           |      |             |                               |   | \$1,612.00  |            |
|           | 9/23/2021 | 113  | 2108735     |                               | LAB SAMPLE ANALYSIS                       |             |            |
|           |           |      |             |                               |   | \$245.00    |            |
|           | 9/23/2021 | 113  | 2108E40     |                               | LAB SAMPLE ANALYSIS                       |             |            |
|           |           |      |             |                               |   | \$116.00    |            |
| 178749    | 9/30/2021 | 170  | 997         | PRIME MECHANICAL SERVICE INC  | SEMI ANNUAL MAINTENANCE - AUG 21          |             |            |
|           |           |      |             |                               |   | \$590.00    | \$3,506.25 |
|           | 9/30/2021 | 170  | 1004        |                               | MONTHLY MAINTENANCE - AUG 21              |             |            |
|           |           |      |             |                               |   | \$945.00    |            |
|           | 9/30/2021 | 122  | 984         |                               | SERVICE CALL                              |             |            |
|           |           |      |             |                               |   | \$1,971.25  |            |
| 178704    | 9/30/2021 | 122  | 23483       | BAYSCAPE LANDSCAPE MANAGEMENT | LANDSCAPE MAINTENANCE SERVICES - SEP 2021 |             |            |
|           |           |      |             |                               |   | \$3,310.00  | \$3,310.00 |
| 178663    | 9/23/2021 | 170  | 247469      | FRANK A OLSEN COMPANY         | 1 DIGESTER VALVE                          |             |            |
|           |           |      |             |                               |   | \$3,303.53  | \$3,303.53 |
| 178677    | 9/23/2021 |      | 10410       | CITY OF NEWARK                | REFUND # 39989                            |             |            |
|           |           |      |             |                               |   | \$3,300.00  | \$3,300.00 |
| 178681    | 9/23/2021 |      | 10514       | PACIFIC PLUMBING & SEWER SERV | REFUND # 39993                            |             |            |
|           |           |      |             |                               |   | \$3,300.00  | \$3,300.00 |

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| 178686    | 9/23/2021 |      | 733569749402 | STAPLES CONTRACT & COMMERCIAL  | JANITORIAL & BREAKROOM SUPPLIES | \$115.16    | \$2,787.89 |
|           | 9/23/2021 |      | 733642434201 |                                | JANITORIAL & BREAKROOM SUPPLIES | \$1,092.62  |            |
|           | 9/23/2021 |      | 733593580801 |                                | JANITORIAL & BREAKROOM SUPPLIES | \$872.09    |            |
|           | 9/23/2021 |      | 733642434202 |                                | JANITORIAL & BREAKROOM SUPPLIES | \$57.58     |            |
|           | 9/23/2021 |      | 733569749401 |                                | JANITORIAL & BREAKROOM SUPPLIES | \$241.94    |            |
|           | 9/23/2021 |      | 733791240801 |                                | JANITORIAL & BREAKROOM SUPPLIES | \$408.50    |            |
| 178752    | 9/30/2021 | 110  | 21090829     | S&S TRUCKING                   | GRIT HAULING 08/30/2021         | \$914.88    | \$2,742.80 |
|           | 9/30/2021 | 110  | 21090830     |                                | GRIT HAULING 09/03/2021         | \$1,015.74  |            |
|           | 9/30/2021 | 110  | 21083104     |                                | GRIT HAULING 08/25/2021         | \$812.18    |            |
| 178738    | 9/30/2021 | 170  | 65209810     | MCMASTER SUPPLY INC            | ASTD PARTS & MATERIALS          | \$202.97    | \$2,538.16 |
|           | 9/30/2021 |      | 65460530     |                                | ASTD PARTS & MATERIALS          | \$26.86     |            |
|           | 9/30/2021 |      | 65470990     |                                | ASTD PARTS & MATERIALS          | \$38.40     |            |
|           | 9/30/2021 | 143  | 65388102     |                                | ASTD PARTS & MATERIALS          | \$623.28    |            |
|           | 9/30/2021 | 122  | 65402737     |                                | ASTD PARTS & MATERIALS          | \$54.62     |            |
|           | 9/30/2021 |      | 64608515     |                                | ASTD PARTS & MATERIALS          | \$442.47    |            |
|           | 9/30/2021 |      | 65227202     |                                | ASTD PARTS & MATERIALS          | \$1,149.56  |            |
| 178659    | 9/23/2021 |      | 22991        | D.W. YOUNG CONSTRUCTION CO INC | REFUND # 39992                  | \$2,500.00  | \$2,500.00 |
| 178708    | 9/30/2021 |      | 30358        | BUCCANEER DEMOLITION INC       | REFUND # 41011                  | \$2,500.00  | \$2,500.00 |
| 178728    | 9/30/2021 |      | 20910        | HP COMMUNICATIONS INC          | REFUND # 41009                  | \$2,500.00  | \$2,500.00 |

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| 178766    | 9/30/2021 | 170  | 18430       | WESTERN MACHINE & FAB INC     | 3 RIDGED COUPLINGS                           |             |            |
|           |           |      |             |                               |  | \$2,491.88  | \$2,491.88 |
| 178691    | 9/23/2021 | 143  | 20602       | V&A CONSULTING ENGINEERS      | CATHODIC PROTECTION IMPROVEMENTS             |             |            |
|           |           |      |             |                               |  | \$2,478.00  | \$2,478.00 |
| 178676    | 9/23/2021 | 170  | 226162      | NAYLOR STEEL INC              | ASTD METAL, STEEL, STAINLESS & ALUMINUM      |             |            |
|           | 9/23/2021 | 170  | 226258      |                               | ASTD METAL, STEEL, STAINLESS & ALUMINUM      | \$379.70    | \$2,470.86 |
|           |           |      |             |                               |  | \$2,091.16  |            |
| 178653    | 9/23/2021 |      | 107773      | BRUCE BARTON PUMP SERVICE INC | 2 SUMP PUMPS                                 |             |            |
|           |           |      |             |                               |  | \$2,434.29  | \$2,434.29 |
| 178754    | 9/30/2021 | 150  | 47190       | SLOAN SAKAI YEUNG & WONG LLP  | SPECIAL COUNSEL SERVICES                     |             |            |
|           |           |      |             |                               |  | \$2,277.00  | \$2,277.00 |
| 178701    | 9/30/2021 | 170  | 362438      | AMETEK BROOKFIELD             | JEROME 631 CALIBRATION                       |             |            |
|           |           |      |             |                               |  | \$2,271.61  | \$2,271.61 |
| 178722    | 9/30/2021 | 122  | 9026451618  | GRAINGER INC                  | CREDIT: ASTD PARTS & MATERIALS               |             |            |
|           | 9/30/2021 |      | 9032698988  |                               | ASTD PARTS & MATERIALS                       | \$-6.10     | \$2,106.27 |
|           |           |      |             |                               |  | \$2,073.24  |            |
|           | 9/30/2021 | 122  | 9033956476  |                               | ASTD PARTS & MATERIALS                       |             |            |
|           |           |      |             |                               |  | \$39.13     |            |
| 178723    | 9/30/2021 | 170  | 12636719    | HACH COMPANY                  | 1 SENSOR                                     |             |            |
|           |           |      |             |                               |  | \$2,085.32  | \$2,085.32 |
| 178714    | 9/30/2021 |      | 129837959   | COLORADO WASHINGTON INC       | COMCAST OF CFIBER INTERNET BACKUP - SEP 2021 |             |            |
|           |           |      |             |                               |  | \$2,010.71  | \$2,010.71 |
| 178667    | 9/23/2021 | 141  | DW XK974    | IRON MOUNTAIN                 | OFF-SITE STORAGE AND SERVICE - SEP 2021      |             |            |
|           | 9/23/2021 | 141  | DXHL366     |                               | OFF-SITE STORAGE AND SERVICE - SEP 2021      | \$1,442.63  | \$1,981.15 |
|           |           |      |             |                               |  | \$538.52    |            |
| 178678    | 9/23/2021 | 173  | 8270        | OJO TECHNOLOGY INC            | LENEL SECURITY ACCESS PANEL CARD             |             |            |
|           |           |      |             |                               |  | \$1,887.40  | \$1,887.40 |

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| 178665    | 9/23/2021 | 111  | 9024786072     | GRAINGER INC                         | ASTD PARTS & MATERIALS                  |             |            |
|           |           |      |                |                                      |   | \$45.28     | \$1,870.06 |
|           | 9/23/2021 | 111  | 9026391178     |                                      | ASTD PARTS & MATERIALS                  |             |            |
|           |           |      |                |                                      |   | \$65.48     |            |
|           | 9/23/2021 |      | 9026451600     |                                      | ASTD PARTS & MATERIALS                  |             |            |
|           |           |      |                |                                      |   | \$1,638.19  |            |
|           | 9/23/2021 | 122  | 9025134074     |                                      | ASTD PARTS & MATERIALS                  |             |            |
|           |           |      |                |                                      |   | \$63.20     |            |
|           | 9/23/2021 | 170  | 9025520512     |                                      | ASTD PARTS & MATERIALS                  |             |            |
|           |           |      |                |                                      |   | \$57.91     |            |
| 178647    | 9/23/2021 | 121  | 14984          | AMERICAN DISCOUNT SECURITY           | 08/01/21 - 08/31/21 GUARD AT DISTRICT   |             |            |
|           |           |      |                |                                      |   | \$1,848.00  | \$1,848.00 |
| 178696    | 9/23/2021 | 143  | 5129           | WORKSMART AUTOMATION INC             | CALCIUM THIOSULFATE CHEMICAL TANK       |             |            |
|           |           |      |                |                                      |   | \$1,705.00  | \$1,705.00 |
| 178650    | 9/23/2021 | 173  | 2009250450B    | AVEPOINT PUBLIC SECTOR INC           | CLOUD MANAGEMENT FOR OFFICE 365         |             |            |
|           |           |      |                |                                      |   | \$1,680.00  | \$1,680.00 |
| 178656    | 9/23/2021 | 113  | 1602           | CHEMVAL CONSULTING INC               | LABORATORY INTERNAL AUDITING CONSULTING |             |            |
|           |           |      |                |                                      |   | \$1,550.00  | \$1,550.00 |
| 178688    | 9/23/2021 | 170  | 411643950      | TERMINIX COMMERCIAL                  | PEST CONTROL                            |             |            |
|           |           |      |                |                                      |   | \$240.00    | \$1,493.00 |
|           | 9/23/2021 | 170  | 411647523      |                                      | AUG PEST CONTROL                        |             |            |
|           |           |      |                |                                      |   | \$1,113.00  |            |
|           | 9/23/2021 | 170  | 411647522      |                                      | PEST CONTROL                            |             |            |
|           |           |      |                |                                      |   | \$140.00    |            |
| 178720    | 9/30/2021 | 150  | 2917           | ENS RESOURCES INC                    | PROFESSIONAL SERVICES                   |             |            |
|           |           |      |                |                                      |   | \$1,350.00  | \$1,350.00 |
| 178730    | 9/30/2021 |      | 10956920210929 | ICMA                                 | PAYROLL CONTRIBUTIONS 09292021          |             |            |
|           |           |      |                |                                      |   | \$1,280.70  | \$1,280.70 |
| 178692    | 9/23/2021 | 122  | 513061         | VALLEY OIL COMPANY                   | 1 DRUM DEF FLUID                        |             |            |
|           |           |      |                |                                      |   | \$1,230.43  | \$1,230.43 |
| 178669    | 9/23/2021 | 173  | 23430          | LOOKINGPOINT INC                     | ANNUAL LOOKINGPOINT SUPPORT AGREEMENT   |             |            |
|           |           |      |                |                                      |   | \$1,225.00  | \$1,225.00 |
| 178683    | 9/23/2021 | 120  | 0110036018380  | NESTLE WATERS NO. AMERICA READYREFRE | WATER SERVICE 08/07/21 - 09/06/21       |             |            |
|           |           |      |                |                                      |   | \$1,214.36  | \$1,214.36 |

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| 178652    | 9/23/2021 | 114  | 16381491    | BLAISDELL'S                    | ASTD OFFICE SUPPLIES                             |             |            |
|           | 9/23/2021 | 113  | 16395230    |                                | ASTD OFFICE SUPPLIES                             | \$697.16    | \$1,207.54 |
|           | 9/23/2021 | 120  | 16407160    |                                | ASTD OFFICE SUPPLIES                             | \$143.92    |            |
|           | 9/23/2021 | 144  | 16399830    |                                | ASTD OFFICE SUPPLIES                             | \$83.15     |            |
|           | 9/23/2021 | 144  | 16405610    |                                | ASTD OFFICE SUPPLIES                             | \$150.49    |            |
|           | 9/23/2021 | 130  | 16394990    |                                | ASTD OFFICE SUPPLIES                             | \$17.71     |            |
|           | 9/23/2021 | 144  | 16399831    |                                | ASTD OFFICE SUPPLIES                             | \$55.32     |            |
|           |           |      |             |                                |  | \$59.79     |            |
| 178658    | 9/23/2021 | 170  | 20210828    | COMMUNICATION & CONTROL INC    | UTILITY FEE/ANTENNA RENTAL                       | \$1,136.60  | \$1,136.60 |
| 178674    | 9/23/2021 | 114  | 2184829     | MOBILE MODULAR MANAGEMENT CORP | ETSU TEMPORARY OFFICE SPACE                      | \$1,080.81  | \$1,080.81 |
| 178703    | 9/30/2021 |      | 17011818    | AT&T                           | SERV: 08/10/21 - 09/09/21                        | \$1,007.32  | \$1,007.32 |
| 178716    | 9/30/2021 | 141  | 109A13      | DCM CONSULTING INC             | DUMBARTON TRANSIT-ORIENTED DEV & USD FORCE MAINS | \$900.00    | \$900.00   |
| 178645    | 9/23/2021 | 170  | 9982551768  | AIRGAS NCN                     | CYLINDER RENTAL                                  | \$879.44    | \$879.44   |
| 178712    | 9/30/2021 | 150  | 91489       | CITYLEAF INC                   | PLANT MAINTENANCE - SEPT 2021                    | \$435.79    | \$871.58   |
|           | 9/30/2021 | 150  | 91068       |                                | PLANT MAINTENANCE - AUG 2021                     | \$435.79    |            |
| 178660    | 9/23/2021 | 120  | 20210922    | ART DIOSDADO                   | TUITION REIMB: MAINT SUPER ASSOCIATION           | \$800.00    | \$800.00   |
| 178727    | 9/30/2021 |      | 604455578   | HILLYARD/SAN FRANCISCO         | ASST JANITORIAL SUPPLIES                         | \$754.52    | \$754.52   |
| 178685    | 9/23/2021 | 110  | 21083018    | S&S TRUCKING                   | GRIT HAULING 08/16/2021                          | \$747.60    | \$747.60   |
| 178649    | 9/23/2021 |      | 20210916    | SHAMSUL ARUOBI                 | THIRD PARTY CLAIM                                | \$741.74    | \$741.74   |

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| 178763    | 9/30/2021 | 113  | 8805895967   | VWR INTERNATIONAL LLC          | LAB SUPPLIES                     |             |           |
|           |           |      |              |                                |                                  | \$63.07     | \$730.63  |
|           | 9/30/2021 | 113  | 8806014826   |                                | LAB SUPPLIES                     |             |           |
|           |           |      |              |                                |                                  | \$85.41     |           |
|           | 9/30/2021 |      | 8805778793   |                                | CREDIT: LAB SUPPLIES             |             |           |
|           |           |      |              |                                |                                  | \$-263.48   |           |
|           | 9/30/2021 | 113  | 8805881458   |                                | LAB SUPPLIES                     |             |           |
|           |           |      |              |                                |                                  | \$209.80    |           |
|           | 9/30/2021 | 113  | 8805999064   |                                | LAB SUPPLIES                     |             |           |
|           |           |      |              |                                |                                  | \$545.93    |           |
|           | 9/30/2021 | 113  | 8806003414   |                                | LAB SUPPLIES                     |             |           |
|           |           |      |              |                                |                                  | \$89.90     |           |
| 178751    | 9/30/2021 | 170  | 276041       | ROCHESTER MIDLAND CORPORATION  | HOT WATER LOOP SERVICE           |             |           |
|           |           |      |              |                                |                                  | \$721.48    | \$721.48  |
| 178713    | 9/30/2021 | 132  | 211014687    | CLAREMONT BEHAVIORAL SERVICES  | OCT 2021 EAP PREMIUMS            |             |           |
|           |           |      |              |                                |                                  | \$667.00    | \$667.00  |
| 178648    | 9/23/2021 |      | 259000006761 | ARAMARK                        | UNIFORM LAUNDERING SERVICE       |             |           |
|           |           |      |              |                                |                                  | \$346.96    | \$657.24  |
|           | 9/23/2021 | 122  | 259000006703 |                                | ASTD DUST MOPS, WET MOPS & TERRY |             |           |
|           |           |      |              |                                |                                  | \$47.32     |           |
|           | 9/23/2021 |      | 259000006729 |                                | UNIFORM LAUNDERING & RUGS        |             |           |
|           |           |      |              |                                |                                  | \$262.96    |           |
| 178689    | 9/23/2021 |      | 25281081     | TRI DIM FILTER CORPORATION     | 210 FILTERS                      |             |           |
|           |           |      |              |                                |                                  | \$649.99    | \$649.99  |
| 178698    | 9/23/2021 |      | 5330         | ZELAYA DESIGNS                 | PUBLIC OUTREACH                  |             |           |
|           |           |      |              |                                |                                  | \$637.00    | \$637.00  |
| 178702    | 9/30/2021 |      | 259000010228 | ARAMARK                        | UNIFORM LAUNDERING SERVICE       |             |           |
|           |           |      |              |                                |                                  | \$347.91    | \$630.20  |
|           | 9/30/2021 |      | 259000010207 |                                | UNIFORM LAUNDERING & RUGS        |             |           |
|           |           |      |              |                                |                                  | \$282.29    |           |
| 178673    | 9/23/2021 | 170  | 210951       | METROMOBILE COMMUNICATIONS INC | RADIO SERVICE - SEP 2021         |             |           |
|           |           |      |              |                                |                                  | \$599.08    | \$599.08  |
| 178732    | 9/30/2021 | 170  | 590409       | INSTRUMART                     | 1 PH PROBE                       |             |           |
|           |           |      |              |                                |                                  | \$575.90    | \$575.90  |
| 178735    | 9/30/2021 |      | 29215        | KISHORE KONDRAGUNTA            | REFUND # 41015                   |             |           |
|           |           |      |              |                                |                                  | \$500.00    | \$500.00  |
| 178743    | 9/30/2021 |      | 30385        | PENINSULA HAULING & DEMOLITION | REFUND # 41013                   |             |           |
|           |           |      |              |                                |                                  | \$500.00    | \$500.00  |

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| 178759    | 9/30/2021 |      | 30365          | RB TRAVIS                      | REFUND # 40007                        |             |           |
|           |           |      |                |                                |                                       | \$500.00    | \$500.00  |
| 178717    | 9/30/2021 | 173  | 27324407       | DOCUSIGN INC                   | 2 DOCUSIGN LICENSES                   |             |           |
|           |           |      |                |                                |                                       | \$486.27    | \$486.27  |
| 178687    | 9/23/2021 |      | 303627         | STARLINE SUPPLY COMPANY        | 8 CS COMPOSTABLE UTENSILS             |             |           |
|           |           |      |                |                                |                                       | \$474.60    | \$474.60  |
| 178693    | 9/23/2021 |      | 8805868302     | VWR INTERNATIONAL LLC          | LAB SUPPLIES                          |             |           |
|           |           |      |                |                                |                                       | \$107.36    | \$464.87  |
|           | 9/23/2021 | 113  | 8805895968     |                                | LAB SUPPLIES                          |             |           |
|           |           |      |                |                                |                                       | \$140.35    |           |
|           | 9/23/2021 |      | 8805858089     |                                | LAB SUPPLIES                          |             |           |
|           |           |      |                |                                |                                       | \$217.16    |           |
| 178731    | 9/30/2021 |      | 10956820210929 | ICMA                           | PAYROLL CONTRIBUTIONS 09292021        |             |           |
|           |           |      |                |                                |                                       | \$461.52    | \$461.52  |
| 178758    | 9/30/2021 | 170  | 32251993       | TFORCE FREIGHT                 | FREIGHT CHARGES - CYLINDER HEADS      |             |           |
|           |           |      |                |                                |                                       | \$424.94    | \$424.94  |
| 178736    | 9/30/2021 | 122  | 2029           | MAKAI SOLUTIONS                | ANNUAL SAFETY LIFT INSPECTION         |             |           |
|           |           |      |                |                                |                                       | \$400.00    | \$400.00  |
| 178750    | 9/30/2021 | 170  | 436695         | RKI INSTRUMENTS INC            | 4 OXYGEN SENSORS                      |             |           |
|           |           |      |                |                                |                                       | \$398.70    | \$398.70  |
| 178672    | 9/23/2021 | 122  | 64442151       | MCMASTER SUPPLY INC            | ASTD PARTS & MATERIALS                |             |           |
|           |           |      |                |                                |                                       | \$60.85     | \$390.15  |
|           | 9/23/2021 |      | 64302448       |                                | ASTD PARTS & MATERIALS                |             |           |
|           |           |      |                |                                |                                       | \$329.30    |           |
| 178724    | 9/30/2021 | 170  | 3Q5082         | HARRINGTON INDUSTRIAL PLASTICS | ASTD PVC PARTS & MATERIALS            |             |           |
|           |           |      |                |                                |                                       | \$57.47     | \$385.90  |
|           | 9/30/2021 |      | 3Q4887         |                                | ASTD PVC PARTS & MATERIALS            |             |           |
|           |           |      |                |                                |                                       | \$328.43    |           |
| 178747    | 9/30/2021 |      | 169148         | PREFERRED ALLIANCE INC         | AUG 2021 SERVICE FEE                  |             |           |
|           |           |      |                |                                |                                       | \$383.57    | \$383.57  |
| 178662    | 9/23/2021 |      | 20210819       | AUSTIN FARSAI                  | TUITION REIMB - SUMMER 2021           |             |           |
|           |           |      |                |                                |                                       | \$379.08    | \$379.08  |
| 178746    | 9/30/2021 | 120  | 20210923       | TODD PORTEOUS                  | RETIREMENT GIFT - 25 YEARS OF SERVICE |             |           |
|           |           |      |                |                                |                                       | \$375.00    | \$375.00  |
| 178725    | 9/30/2021 | 170  | 37729          | HAYWARD PIPE AND SUPPLY        | ASTD PARTS & MATERIALS                |             |           |
|           |           |      |                |                                |                                       | \$369.53    | \$369.53  |
| 178715    | 9/30/2021 | 173  | 82097778       | CORELOGIC INFORMATION SOLUTION | METROSCAN ONLINE SERVICE              |             |           |
|           |           |      |                |                                |                                       | \$339.90    | \$339.90  |

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| 178739    | 9/30/2021 | 170  | 45685          | METROMOBILE COMMUNICATIONS INC | 3 MICROPHONES   |             |           |
|           |           |      |                |                                |   | \$322.33    | \$322.33  |
| 178757    | 9/30/2021 | 170  | 411834203      | TERMINIX COMMERCIAL            | PEST CONTROL  |             |           |
|           |           |      |                |                                |   | \$300.00    | \$300.00  |
| 178706    | 9/30/2021 | 110  | 16414630       | BLAISDELL'S                    | ASTD OFFICE SUPPLIES                                    |             |           |
|           |           |      |                |                                |   | \$115.17    | \$255.28  |
|           | 9/30/2021 | 111  | 16418580       |                                | ASTD OFFICE SUPPLIES                                    |             |           |
|           |           |      |                |                                |   | \$95.22     |           |
|           | 9/30/2021 | 141  | 16422830       |                                | ASTD OFFICE SUPPLIES                                    |             |           |
|           |           |      |                |                                |   | \$31.23     |           |
|           | 9/30/2021 | 141  | 16422831       |                                | ASTD OFFICE SUPPLIES                                    |             |           |
|           |           |      |                |                                |   | \$13.66     |           |
| 178661    | 9/23/2021 | 173  | 533437         | DLT SOLUTIONS, LLC             | AWS CLOUD STORAGE - JUL 2021                            |             |           |
|           |           |      |                |                                |   | \$253.87    | \$253.87  |
| 178664    | 9/23/2021 | 120  | 4089123904     | GLACIER ICE COMPANY INC        | 120 7-LB BAGS OF ICE                                    |             |           |
|           |           |      |                |                                |   | \$239.29    | \$239.29  |
| 178764    | 9/30/2021 |      | 8805794406     | VWR INTERNATIONAL LLC          | LAB SUPPLIES  |             |           |
|           |           |      |                |                                |   | \$212.36    | \$212.36  |
| 178651    | 9/23/2021 | 171  | 24791400       | BECK'S SHOES                   | SAFETY SHOES: P. CHAPARRO                               |             |           |
|           |           |      |                |                                |   | \$208.00    | \$208.00  |
| 178705    | 9/30/2021 | 113  | 24815200       | BECK'S SHOES                   | SAFETY SHOES: G. CALANOG                                |             |           |
|           |           |      |                |                                |   | \$208.00    | \$208.00  |
| 178684    | 9/23/2021 | 171  | 20210910025950 | RED WING BUS ADVANTAGE ACCT    | SAFETY SHOES: D. STRASBURG                              |             |           |
|           |           |      |                |                                |   | \$193.49    | \$193.49  |
| 178670    | 9/23/2021 | 170  | 771018216      | MATHESON TRI-GAS INC           | MONTHLY CYLINDER RENTAL - AUG 2021                      |             |           |
|           |           |      |                |                                |   | \$153.62    | \$153.62  |
| 178748    | 9/30/2021 | 111  | 275884         | PRESTIGE LENS LAB              | SAFETY GLASSES - SOTH                                   |             |           |
|           |           |      |                |                                |   | \$146.19    | \$146.19  |
| 178690    | 9/23/2021 | 122  | 144984         | TRI-SIGNAL INTEGRATION INC     | FIRE PROTECTION SERVICE - MONTHLY CHARGE MONITORING AGI |             |           |
|           |           |      |                |                                |   | \$133.34    | \$133.34  |
| 178697    | 9/23/2021 | 113  | 2108065        | ZALCO LABORATORIES INC         | LAB ANALYSIS  |             |           |
|           |           |      |                |                                |   | \$125.00    | \$125.00  |
| 178755    | 9/30/2021 |      | 303707         | STARLINE SUPPLY COMPANY        | 2 CS COMPOSTABLE UTENSILS                               |             |           |
|           |           |      |                |                                |   | \$122.38    | \$122.38  |
| 178753    | 9/30/2021 | 170  | 85340220210923 | SAN FRANCISCO WATER DEPT       | SERVICE 08/20/2021 - 09/21/21                           |             |           |
|           |           |      |                |                                |   | \$117.48    | \$117.48  |
| 178707    | 9/30/2021 | 136  | 20210927       | DENISE BLANCO                  | EXP REIMB: UPS SHIPPING COST                            |             |           |
|           |           |      |                |                                |   | \$100.24    | \$100.24  |

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| 178657    | 9/23/2021 | 123  | 47046       | CLARK'S HOME AND GARDEN INC    | 1.24 FILL SAND                  |             |           |
|           |           |      |             |                                |                                 | \$89.71     | \$89.71   |
| 178741    | 9/30/2021 |      | 24121366    | MOTION INDUSTRIES INC          | 4 BELTS                         |             |           |
|           |           |      |             |                                |                                 | \$84.20     | \$84.20   |
| 178726    | 9/30/2021 | 110  | 2221002     | HAYWARD WATER SYSTEM           | WATER SERV 07/12/21 - 09/12/21  |             |           |
|           |           |      |             |                                |                                 | \$79.81     | \$79.81   |
| 178654    | 9/23/2021 | 132  | 526541      | STATE OF CALIFORNIA            | 2 NEW HIRE FINGERPRINTS         |             |           |
|           |           |      |             |                                |                                 | \$64.00     | \$64.00   |
| 178700    | 9/30/2021 | 122  | 9117392362  | AIRGAS NCN                     | ASTD PARTS & MATERIALS          |             |           |
|           |           |      |             |                                |                                 | \$50.18     | \$50.18   |
| 178760    | 9/30/2021 | 136  | 98XW53361   | UPS - UNITED PARCEL SERVICE    | SHIPPING CHARGES W/E 09/04/21   |             |           |
|           |           |      |             |                                |                                 | \$49.42     | \$49.42   |
| 178699    | 9/30/2021 |      | 20210929    | 1ST UNITED CREDIT UNION        | PAYROLL CONTRIBUTIONS 09292021  |             |           |
|           |           |      |             |                                |                                 | \$46.00     | \$46.00   |
| 178740    | 9/30/2021 | 122  | 8050599     | MOTION & FLOW CONTROL PRODUCTS | ASTD PARTS & MATERIALS          |             |           |
|           |           |      |             |                                |                                 | \$43.18     | \$43.18   |
| 178762    | 9/30/2021 |      | 9887390857  | VERIZON WIRELESS               | WIRELESS SERV 08/02/21-09/01/21 |             |           |
|           |           |      |             |                                |                                 | \$21.16     | \$21.16   |
| 178655    | 9/23/2021 | 110  | 20210920    | PETE CHAPARRO                  | EXP REIMB: MILEAGE FOR CALL OUT |             |           |
|           |           |      |             |                                |                                 | \$14.78     | \$14.78   |
| 178666    | 9/23/2021 |      | 12623265    | HACH COMPANY                   | LABORATORY SUPPLIES             |             |           |
|           |           |      |             |                                |                                 | \$10.19     | \$10.19   |
| 178675    | 9/23/2021 | 122  | 8041645     | MOTION & FLOW CONTROL PRODUCTS | ASTD PARTS & MATERIALS          |             |           |
|           |           |      |             |                                |                                 | \$5.87      | \$5.87    |

**Invoices:**

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| <b>Credit Memos :</b>         | <b>2</b>   | <b>-269.58</b>      |
| <b>\$0 - \$1,000 :</b>        | <b>127</b> | <b>39,674.85</b>    |
| <b>\$1,000 - \$10,000 :</b>   | <b>60</b>  | <b>174,119.97</b>   |
| <b>\$10,000 - \$100,000 :</b> | <b>11</b>  | <b>501,411.19</b>   |
| <b>Over \$100,000 :</b>       | <b>3</b>   | <b>422,023.11</b>   |
| <b>Total:</b>                 | <b>203</b> | <b>1,136,959.54</b> |

**Checks:**

|                               |            |                     |
|-------------------------------|------------|---------------------|
| <b>\$0 - \$1,000 :</b>        | <b>61</b>  | <b>22,446.80</b>    |
| <b>\$1,000 - \$10,000 :</b>   | <b>46</b>  | <b>126,544.97</b>   |
| <b>\$10,000 - \$100,000 :</b> | <b>11</b>  | <b>353,927.84</b>   |
| <b>Over \$100,000 :</b>       | <b>4</b>   | <b>634,039.93</b>   |
| <b>Total:</b>                 | <b>122</b> | <b>1,136,959.54</b> |