

The Water and Power Employees' Retirement Plan of the City of Los Angeles

**Actuarial Valuation and Review as of
July 1, 2018**



This report has been prepared at the request of the Board of Administration to assist in administering the Plan. This valuation report may not otherwise be copied or reproduced in any form without the consent of the Board of Administration and may only be provided to other parties in its entirety, unless expressly authorized by Segal. The measurements shown in this actuarial valuation may not be applicable for other purposes.

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September 13, 2018

*Board of Administration
The Water and Power Employees' Retirement Plan of the City of Los Angeles
111 North Hope Street, Room 357
Los Angeles, California 90012*

Dear Board Members:

We are pleased to submit this Actuarial Valuation and Review as of July 1, 2018. It summarizes the actuarial data used in the valuation, establishes the funding requirements for fiscal 2018-2019 and analyzes the preceding year's experience.

This report was prepared in accordance with generally accepted actuarial principles and practices at the request of the Board to assist in administering the Retirement Plan. The census information and financial information on which our calculations were based was prepared by the Retirement Office. That assistance is gratefully acknowledged.

The measurements shown in this actuarial valuation may not be applicable for other purposes. 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; increases or decreases expected as part of the natural operation of the methodology used for these measurements (such as the end of an amortization period); and changes in plan provisions or applicable law.

The actuarial calculations were completed under the supervision of John Monroe, ASA, MAAA, Enrolled Actuary. We are members of the American Academy of Actuaries and we meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinion herein. To the best of our knowledge, the information supplied in the actuarial valuation is complete and accurate. Further, in our opinion, the assumptions as approved by the Board are reasonably related to the experience of and the expectations for the Plan.

We look forward to reviewing this report at your next meeting and to answering any questions.

Sincerely,

SEGAL CONSULTING

By:

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TJH/bqb

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SECTION 1: Valuation Summary for The Water and Power Employees' Retirement Plan of the City of Los Angeles

Purpose and Scope

This report has been prepared by Segal Consulting to present a valuation of The Water and Power Employees' Retirement Plan of the City of Los Angeles as of July 1, 2018. The valuation was performed to determine whether the assets and contributions are sufficient to provide the prescribed benefits. The contribution requirements presented in this report are based on:

- The benefit provisions of the Pension Plan, as administered by the Board;
- The characteristics of covered active members, inactive vested members, and retired members and beneficiaries as of March 31, 2018, provided by the Retirement Office;
- The assets of the Plan as of June 30, 2018, provided by the Retirement Office;
- Economic assumptions regarding future salary increases and investment earnings adopted by the Retirement Board for the July 1, 2018 valuation; and
- Other actuarial assumptions, regarding employee terminations, retirement, death, etc. adopted by the Retirement Board for the July 1, 2018 valuation.

In preparing this valuation, we have employed generally accepted actuarial methods and assumptions to evaluate the Plan's assets, liabilities and future contribution requirements. Our calculations are based upon member data and financial information provided to us by the Retirement Office. This information has not been audited by us, but it has been reviewed and found to be reasonably consistent, both internally and with prior years' information.

Ref: Pg. 30

The contribution requirements are determined as a percentage of payroll. The employer rates provide for both normal cost and a contribution to amortize any unfunded or overfunded actuarial accrued liabilities. In 2004, the Board elected to amortize the remaining balance of the Plan's Unfunded Actuarial Accrued Liability (UAAL) through July 1, 2004 over a decreasing 15-year period. Any change in the UAAL that arises at each valuation after July 1, 2004 is amortized over its own separate declining 15-year period.

Ref: Pgs. 31-32

Note that a graphical projection of the UAAL amortization bases and payments has been included as a new Exhibit I.

SECTION 1: Valuation Summary for The Water and Power Employees' Retirement Plan of the City of Los Angeles

Significant Issues in Valuation Year

The following key findings were the result of this actuarial valuation:

Ref: Pgs. 15, 56

- The results of this valuation reflect changes in Plan provisions that were adopted by the Board. The interest crediting rate on employee, Additional Annuity and Department matching contributions was decreased from 7.50% to 7.25% per annum, consistent with the rate used in the actuarial valuation. The interest rate and mortality table used to calculate the Money Purchase Annuity and certain other optional benefit amounts were changed to 7.25% per annum and a unisex version of mortality tables consistent with those used in the valuation. The vesting requirement for Tier 2 members was amended to include a reduction in the minimum vesting requirement for Tier 2 members to 5 years. These Plan provision changes decreased the aggregate required employer contribution rate (all tiers combined) by 0.72% of compensation.

Ref: Pgs. 29, 30

- The Actuarial Accrued Liability exceeds the Actuarial Value of Assets, resulting in an Unfunded Actuarial Accrued Liability (UAAL) of \$1.18 billion, which is a decrease from \$1.52 billion in the previous valuation. The Board's funding policy determines the Department's required contribution as the normal cost increased or offset by a UAAL amortization charge or credit. Under this funding policy, the Plan's UAAL is amortized over various 15-year periods, each beginning with the year that each portion or base of the UAAL was first identified and amortized.

Ref: Pgs. 12-14, 15, 29

- The aggregate required contribution rate decreased from 44.62% to 40.15% of pay for the 2018-2019 plan year; those contributions are estimated to be \$431.0 million. This includes amortization of the components of the Plan's UAAL over 15-year fixed periods. Under the Plan's funding policy, the required contribution rate continues to be larger than the mandatory 110% matching of the employee contribution for Tier 1.

Ref: Pgs. 8-10, 15, 29

- The market value of assets earned a return of 8.8% for the July 1, 2017 to June 30, 2018 plan year. The Actuarial Value of Assets earned a return of 8.2% for the July 1, 2017 to June 30, 2018 plan year due to the deferral of most of the current year investment gain and the recognition of prior investment gains and losses. This resulted in an actuarial gain of \$106.0 million when measured against the assumed rate of return of 7.25% for 2017-2018. This actuarial investment gain decreased the aggregate required contribution by 1.06% of compensation.

Ref: Pgs. 15, 29

- The salaries for continuing actives increased on average by 7.5% from the amounts in effect on March 31, 2017 to the amounts in effect on March 31, 2018. Since this increase is more than the average assumed rate of approximately 5.1%, the plan experienced an actuarial loss from individual salary experience. This loss amounted to \$87.1 million for the current year, which increased the aggregate required contribution by 0.87% of compensation. There was also a gain from cost-of-living adjustments (COLAs) for retirees and beneficiaries less than assumed which amounted to \$72.8 million, decreasing the aggregate required contribution rate by 0.73% of compensation.

SECTION 1: Valuation Summary for The Water and Power Employees' Retirement Plan of the City of Los Angeles

Ref: Pgs. 5, 6

- The total unrecognized return (i.e., the difference between the market value of assets and the “smoothed” actuarial value of assets) changed by \$77 million during the plan year from a \$67 million unrecognized gain in 2017 to a \$144 million unrecognized gain in 2018. This investment gain will be recognized in the determination of the actuarial value of assets over the next few years. This means that, if the Plan earns the assumed rate of investment return of 7.25% per year (net of expenses) on a **market value** basis, then the deferred gains will be recognized over the next few years as shown in the footnote in Chart 7.
- The unrecognized investment gains of \$144 million represent about 1.2% of the market value of assets. Unless offset by future investment losses or other unfavorable experience, the future recognition of the \$144 million in past market gains is expected to have an impact on the Plan’s future funded ratio and aggregate required contributions. This potential impact may be illustrated as follows:

- If the deferred gains were recognized immediately in the actuarial value assets, the funded percentage would increase from 91.1% to 92.2%.

For comparison purposes, if all deferred gains in the July 1, 2017 valuation had been recognized immediately in the July 1, 2017 valuation, the funded percentage would have increased from 88.0% to 88.5%.

- If the deferred gains were recognized immediately in the actuarial value of assets, the aggregate required contribution would decrease from 40.2% of covered payroll to 38.7% of covered payroll.

For comparison purposes, if all the deferred gains in the July 1, 2017 valuation had been recognized immediately in the July 1, 2017 valuation, the aggregate employer contribution rate would have decreased from 44.6% of covered payroll to 43.9% of covered payroll.

Ref: Pg. 37

- This year, the balance in the General Reserve increased from \$2.1 billion as of June 30, 2017 to \$2.4 billion as of June 30, 2018. This reserve tracks changes in the book value of assets and any gains and losses are recorded directly to the General Reserve. Consistent with prior valuations, this year we have been instructed to include all but \$122.8 million of the end of year General Reserve as valuation assets. The \$122.8 million amount is 1% of the end of year market value of assets.
- The actuarial valuation report as of July 1, 2018 is based on financial information as of that date. Changes in the value of assets subsequent to that date, to the extent that they exist, are not reflected. Declines in asset values will increase the actuarial cost of the plan, while increases will decrease the actuarial cost of the plan.

SECTION 1: Valuation Summary for The Water and Power Employees' Retirement Plan of the City of Los Angeles

Summary of Key Valuation Results

	2018		2017	
Required Contributions for plan year beginning July 1⁽¹⁾:	Rate	Estimated Annual Amount	Rate	Estimated Annual Amount
Tier 1 & Tier 2 Combined (aggregate)	40.15%	\$430,997,257	44.62%	\$442,590,213
Tier 1	42.73%	\$348,393,606	46.61%	\$376,106,036
Tier 2	31.99%	\$82,603,651	35.96%	\$66,484,177
Funding elements for plan year beginning July 1:		2018		2017
Total Normal cost (beginning of year)		\$243,262,953		\$228,621,066
Market value of assets (MVA)		12,277,085,263		11,313,899,335
Actuarial value of assets (AVA)		12,009,999,030		11,133,708,386
Actuarial accrued liability (AAL)		13,187,542,730		12,657,101,266
Unfunded/(overfunded) actuarial accrued liability on AVA basis		1,177,543,700		1,523,392,880
Unfunded/(overfunded) actuarial accrued liability on MVA basis		910,457,467		1,343,201,932
Funded ratio on AVA basic (AVA/AAL)		91.07%		87.96%
Funded ratio on MVA basic (MVA/AAL)		93.10%		89.39%
Demographic data for plan year beginning July 1:				
Number of retired members and beneficiaries ⁽²⁾		9,165		9,272
Number of vested former members ⁽³⁾		1,728		1,648
Number of active members		10,114		9,806
Projected total compensation		\$1,073,554,607		\$991,814,994
Projected average compensation		\$106,145		\$101,144

⁽¹⁾ Required contributions are assumed to be paid at the middle of every year.

⁽²⁾ Reflects 161 assignee records for Options B and C now combined with the benefit for the corresponding retired members. Last year, these assignee records were separate from the corresponding retired member records.

⁽³⁾ Includes terminated members due a refund of employee contributions and members receiving Permanent Total Disability (PTD) benefits.

SECTION 1: Valuation Summary for The Water and Power Employees' Retirement Plan of the City of Los Angeles

Important Information about Actuarial Valuations

An actuarial valuation is a budgeting tool with respect to the financing of future projected obligations of a pension plan. It is an estimated forecast – the actual long-term cost of the plan will be determined by the actual benefits and expenses paid and the actual investment experience of the plan.

In order to prepare an actuarial valuation, Segal Consulting (“Segal”) relies on a number of input items. These include:

- **Plan of benefits** Plan provisions define the rules that will be used to determine benefit payments, and those rules, or the interpretation of them, may change over time. It is important to keep Segal informed with respect to plan provisions and administrative procedures, and to review the plan description in this report to confirm that Segal has correctly interpreted the plan of benefits.
- **Participant data** An actuarial valuation for a plan is based on data provided to the actuary by the Retirement Office. Segal does not audit such data for completeness or accuracy, other than reviewing it for obvious inconsistencies compared to prior data and other information that appears unreasonable. It is important for Segal to receive the best possible data and to be informed about any known incomplete or inaccurate data.
- **Assets** This valuation is based on the market value of assets as of the valuation date, as provided by the Retirement Office.
- **Actuarial assumptions** In preparing an actuarial valuation, Segal projects the benefits to be paid to existing plan participants for the rest of their lives and the lives of their beneficiaries. This projection requires actuarial assumptions as to the probability of death, disability, withdrawal, and retirement of each participant for each year. In addition, the benefits projected to be paid for each of those events in each future year reflect actuarial assumptions as to salary increases and cost-of-living adjustments. The projected benefits are then discounted to a present value, based on the assumed rate of return that is expected to be achieved on the plan’s assets. There is a reasonable range for each assumption used in the projection and the results may vary materially based on which assumptions are selected. It is important for any user of an actuarial valuation to understand this concept. Actuarial assumptions are periodically reviewed to ensure that future valuations reflect emerging plan experience. While future changes in actuarial assumptions may have a significant impact on the reported results, that does not mean that the previous assumptions were unreasonable.

The user of Segal’s actuarial valuation (or other actuarial calculations) should keep the following in mind:

- The valuation is prepared at the request of the WPERP. Segal is not responsible for the use or misuse of its report, particularly by any other party.
- An actuarial valuation is a measurement of the plan’s assets and liabilities at a specific date. Accordingly, except where otherwise noted, Segal did not perform an analysis of the potential range of future financial measures. The actual long-term

SECTION 1: Valuation Summary for The Water and Power Employees' Retirement Plan of the City of Los Angeles

cost of the plan will be determined by the actual benefits and expenses paid and the actual investment experience of the plan.

- If WPERP is aware of any event or trend that was not considered in this valuation that may materially change the results of the valuation, Segal should be advised, so that we can evaluate it.
- Segal does not provide investment, legal, accounting, or tax advice. Segal's valuation is based on our understanding of applicable guidance in these areas and of the plan's provisions, but they may be subject to alternative interpretations. The WPERP should look to their other advisors for expertise in these areas.

As Segal Consulting has no discretionary authority with respect to the management or assets of WPERP, it is not a fiduciary in its capacity as actuaries and consultants with respect to WPERP.

SECTION 2: Valuation Results for The Water and Power Employees' Retirement Plan of the City of Los Angeles

A. MEMBER DATA

The Actuarial Valuation and Review considers the number and demographic characteristics of covered members, including active members, vested terminated members, retired members and beneficiaries.

This section presents a summary of significant statistical data on these member groups.

More detailed information for this valuation year and the preceding valuation can be found in Section 3, Exhibits A, B, and C.

A historical perspective of how the member population has changed over the past ten valuations can be seen in this chart.

CHART 1
Member Population: 2009 – 2018

Year Ended June 30	Active Members	Vested Terminated Members*	Retired Members and Beneficiaries**	Ratio of Non-Actives to Actives
2009	8,868	1,742	8,505	1.16
2010	9,295	1,739	8,468	1.10
2011	9,203	1,694	8,496	1.11
2012	8,962	1,648	8,510	1.13
2013	8,913	1,555	8,642	1.14
2014	8,960	1,484	8,739	1.14
2015	9,205	1,528	8,843	1.13
2016	9,348	1,612	9,265	1.16
2017	9,806	1,648	9,272	1.11
2018	10,114	1,728	9,165	1.08

* Includes terminated members due a refund of employee contributions and members receiving PTD benefits.

** In 2018, 161 assignee records for Options B and C were combined with the benefit for the corresponding retired members. Before that, these assignee records were separate from the corresponding retired member records.

SECTION 2: Valuation Results for The Water and Power Employees' Retirement Plan of the City of Los Angeles

Active Members

Plan costs are affected by the age, years of service and compensation of active members. In this year's valuation, there were 10,114 active members with an average age of 47.5, average years of service of 15.1 years and average compensation of \$106,145. The 9,806 active members in the prior valuation had an average age of 47.9, average service of 15.7 years and average compensation of \$101,144.

Inactive Members

In this year's valuation, there were 1,728 members with a vested right to a deferred or immediate vested benefit, or entitled to a return of their employee contributions, versus 1,648 in the prior valuation.

These graphs show a distribution of active members by age and by years of service.

CHART 2
Distribution of Active Members by Age as of July 1, 2018

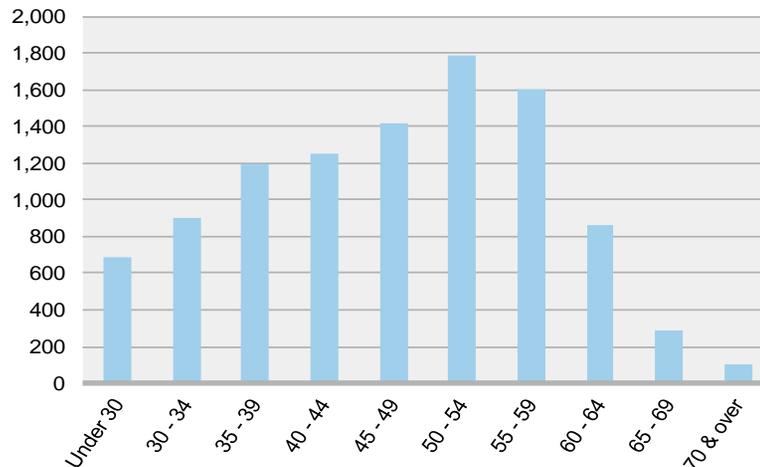
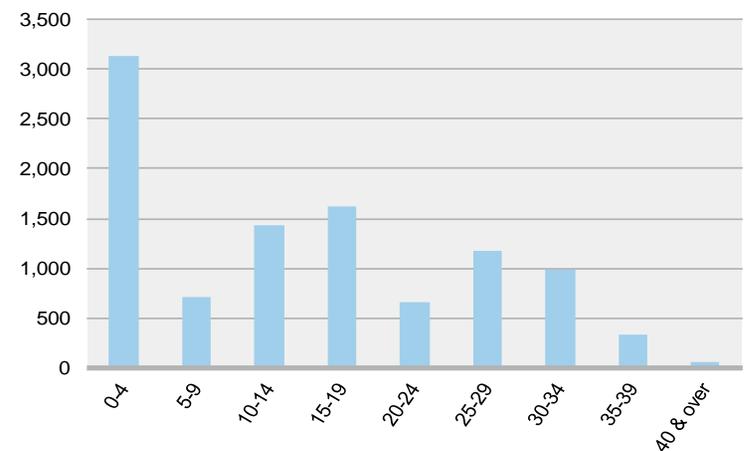


CHART 3
Distribution of Active Members by Years of Service as of July 1, 2018



SECTION 2: Valuation Results for The Water and Power Employees' Retirement Plan of the City of Los Angeles

Retired Members and Beneficiaries

As of July 1, 2018, 7,199 retired members and 1,966 beneficiaries were receiving total monthly benefits of \$48,126,356. For comparison, in the previous valuation, there were 7,113 retired members and 2,159 beneficiaries receiving monthly benefits of \$46,099,528.

This year, 161 assignee records for Options B and C were combined with the benefit for the corresponding retired members. Last year, these assignee records were separate from the corresponding retired member records.

CHART 4
Distribution of Retired Members and Beneficiaries by Type and by Monthly Amount as of July 1, 2018

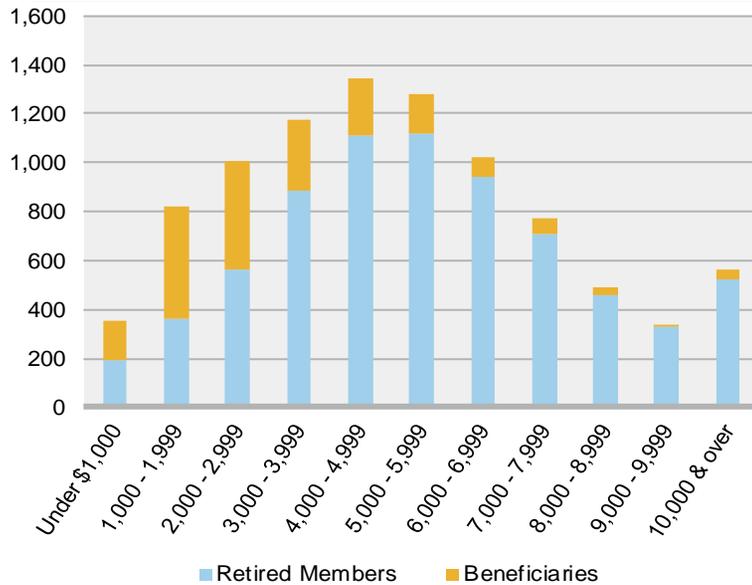
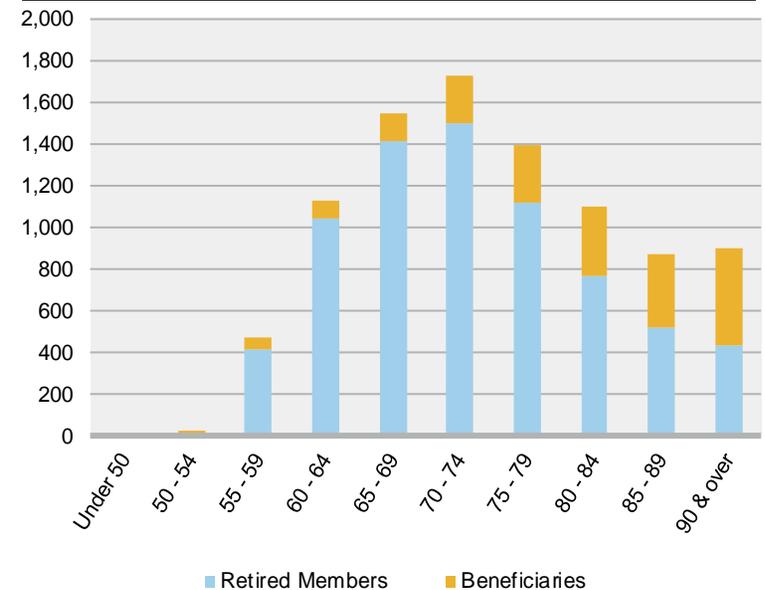


CHART 5
Distribution of Retired Members and Beneficiaries by Type and by Age as of July 1, 2018



These graphs show a distribution of the current retired members and beneficiaries based on their monthly amount and age.

SECTION 2: Valuation Results for The Water and Power Employees' Retirement Plan of the City of Los Angeles

B. FINANCIAL INFORMATION

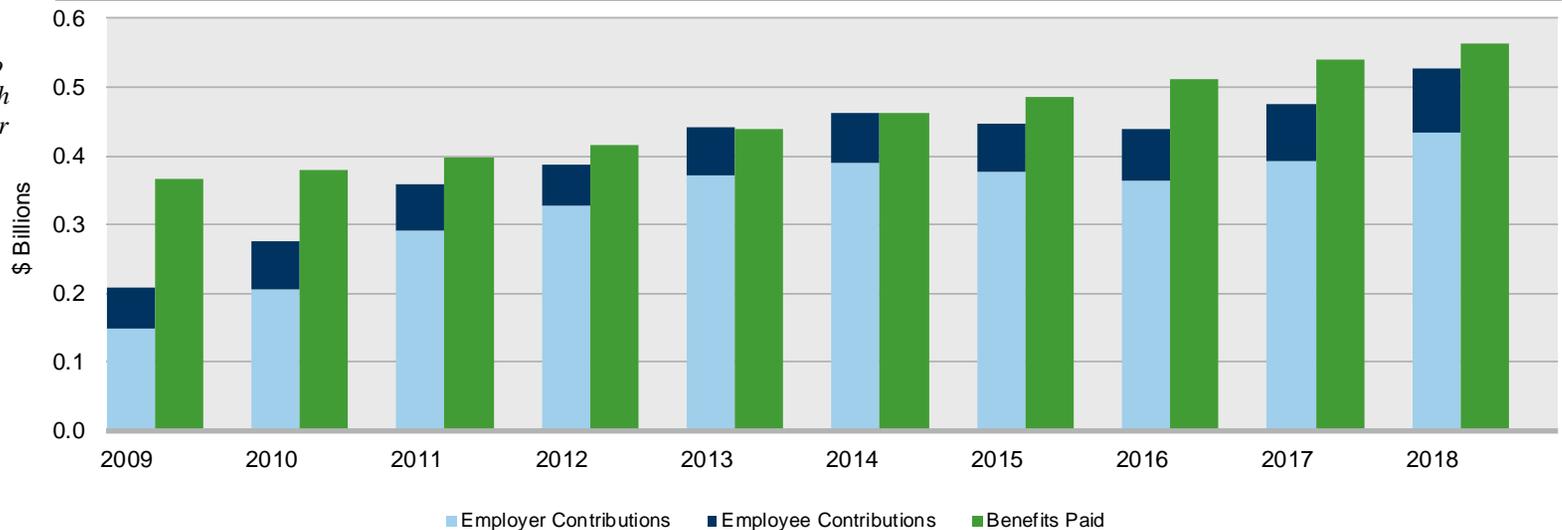
Retirement plan funding anticipates that, over the long term, both contributions (net of administrative expenses starting in 2015) and net investment earnings (less investment fees) will be needed to cover benefit payments. Retirement plan assets change as a result of the net impact of these income and expense components.

Additional financial information, including a summary of these transactions for the valuation year, is presented in Section 3, Exhibits D, E and F.

The chart depicts two components of changes in the actuarial value of assets due to contributions over the last ten years. The first bar represents increases in assets due to contributions during each year while the second bar details the decreases due to benefit payments.

CHART 6

Comparison of Contributions with Benefits for Years Ended June 30, 2009 – 2018



SECTION 2: Valuation Results for The Water and Power Employees' Retirement Plan of the City of Los Angeles

It is desirable to have level and predictable plan costs from one year to the next. For this reason, the Board has approved an asset valuation method that gradually adjusts to market value. Under this valuation method, the full value of market fluctuations is not recognized in a single year and, as a result, the asset value and the plan costs are more stable.

The amount of the adjustment to recognize market value is treated as income, which may be positive or negative.

Realized and unrealized gains and losses are treated equally and, therefore, the sale of assets has no immediate effect on the actuarial value.

Please note that as instructed by Plan staff, we have included all but \$122.8 million (1% of the end of year market value of assets) in the General Reserve as valuation assets.

The chart shows the determination of the actuarial value of assets as of the valuation date.

CHART 7

Determination of Actuarial Value of Assets for Year Ended June 30, 2018

From	To	Total Actual Market Return (net)	Expected Market Return (net)	Investment* Gain (Loss)	Deferred Factor	Deferred** Return
7/2013	6/2014	\$1,406,480,292	\$643,809,077	\$762,671,215	0.0	\$0
7/2014	6/2015	416,474,352	726,771,065	-310,296,713	0.2	-62,059,343
7/2015	6/2016	82,810,914	753,804,054	-670,993,140	0.4	-268,397,256
7/2016	6/2017	1,281,254,293	729,713,941	551,540,352	0.6	330,924,211
7/2017	6/2018	998,777,227	818,967,517	179,809,710	0.8	<u>143,847,768</u>
1 Total Unrecognized Return***						144,315,380
2 Market value of assets, June 30, 2018						12,277,085,263
3 Gross actuarial value: (2) - (1)						12,132,769,883
4 Portion of General Reserve not included as valuation asset						122,770,853
5 Net actuarial value as of June 30, 2018: (3) - (4)						<u>12,009,999,030</u>
6 Net actuarial value as a percentage of market value: (5) / (2)						97.8%

* Total return minus expected return on a market value basis

** Recognition at 20% per year over 5 years

*** Deferred return as of June 30, 2018 recognized in each of the next 4 years:

(a) Amount recognized during 2018/2019 -\$49,987,959

(b) Amount recognized during 2019/2020 12,071,385

(c) Amount recognized during 2020/2021 146,270,012

(d) Amount recognized during 2021/2022 35,961,942

Subtotal \$144,315,380

SECTION 2: Valuation Results for The Water and Power Employees' Retirement Plan of the City of Los Angeles

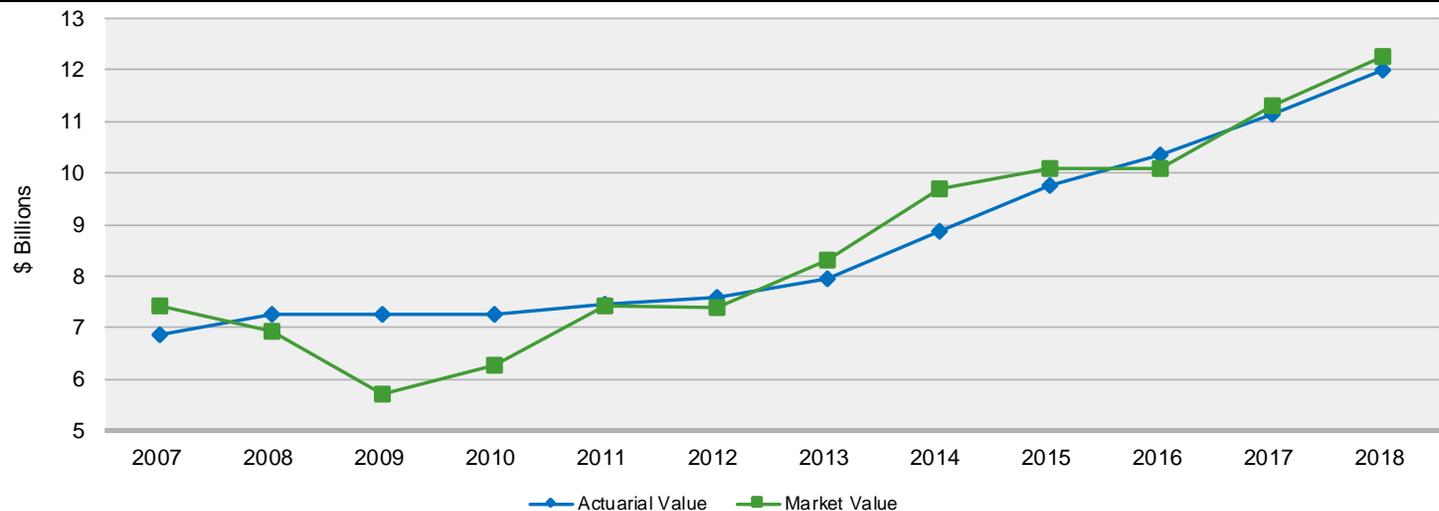
Both the actuarial value and market value of assets are representations of the WPERP's financial status. As investment gains and losses are gradually taken into account, the actuarial value of assets tracks the market value of assets. The actuarial asset value is significant because the WPERP's liabilities are compared to these assets to determine what portion, if any, remains unfunded. Amortization of the unfunded actuarial accrued liability is an important element in determining the contribution requirement.

Note that in the chart below, the actuarial value of assets are exclusive of a small portion of the General Reserve (and Reserve for Investment Gains and Losses prior to June 30, 2017) while that Reserve is included in the development of the Market Value of Assets.

This chart shows the change in the actuarial value of assets versus the market value over the years 2007-2018.

CHART 8

Actuarial Value of Assets vs. Market Value of Assets as of June 30, 2007 – 2018



SECTION 2: Valuation Results for The Water and Power Employees' Retirement Plan of the City of Los Angeles

C. ACTUARIAL EXPERIENCE

To calculate the required contribution, 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 measured against the assumptions. If overall experience is more favorable than anticipated (an actuarial gain), the contribution requirement will decrease from the previous year. On the other hand, the contribution requirement will increase if overall actuarial experience is less favorable than expected (an actuarial loss).

Taking account of experience gains or losses in one year without making a change in assumptions reflects the belief that the single year's experience was a short-term

development and that, over the long term, experience will return to the original assumptions. For contribution requirements to remain stable, assumptions should approximate experience.

If assumptions are changed, the contribution requirement is adjusted to take into account a change in experience anticipated for all future years.

The total gain is \$111.5 million, \$106.0 million in gains from investments, \$15.8 million in gains from contribution experience and \$10.3 million in losses from all other sources. The net experience variation from individual sources other than investments and contribution experience was 0.1% of the actuarial accrued liability. A discussion of the major components of the actuarial experience is on the following pages.

This chart provides a summary of the actuarial experience during the past year.

CHART 9
Actuarial Experience for Year Ended June 30, 2018

1. Net gain from investments*	\$105,978,270
2. Net gain from contribution experience	15,777,092
3. Net loss from other experience**	<u>-10,253,750</u>
4. Net experience gain: (1) + (2) + (3)	\$111,501,612

* Details in Chart 10

** See Section 3, Exhibit G. Does not include the effect of Plan or assumption changes, if any.

SECTION 2: Valuation Results for The Water and Power Employees' Retirement Plan of the City of Los Angeles

Investment Rate of Return

A major component of projected asset growth is the assumed rate of return. The assumed return should represent the expected long-term rate of return, based on the WPERP's investment policy. For valuation purposes, the assumed rate of return on the actuarial value of assets was 7.25% for the 2017-2018 plan year (based on the July 1, 2017 valuation). The actual rate of return on an actuarial basis for the 2017-2018 plan year was 8.20%.

Since the actual return on the actuarial value of assets for the year was more than the assumed return, the WPERP experienced an actuarial gain during the year ended June 30, 2018 with regard to its investments.

This chart shows the gain/(loss) due to investment experience.

CHART 10
Market and Actuarial Value Investment Experience for Year Ended June 30, 2018

	Market Value	Actuarial Value
1. Actual return	\$998,777,227	\$911,881,943
2. Average value of assets	11,296,103,686	11,115,912,737
3. Actual rate of return: (1) ÷ (2)	8.84%	8.20%
4. Assumed rate of return	7.25%	7.25%
5. Expected return: (2) x (4)	\$818,967,517	\$805,903,673
6. Actuarial gain/(loss): (1) – (5)	<u>\$179,809,710</u>	<u>\$105,978,270</u>

SECTION 2: Valuation Results for The Water and Power Employees' Retirement Plan of the City of Los Angeles

Because actuarial planning is long term, it is useful to see how the assumed investment rate of return has followed actual experience over time. The chart below shows the rate of return on an actuarial basis compared to the market value investment return for the last ten years, including five-year and ten-year averages.

CHART 11

Investment Return – Actuarial Value vs. Market Value: 2009 – 2018

Year Ended June 30	Net Interest and Dividend Income		Recognition of Capital Appreciation		Actuarial Value Investment Return		Market Value Investment Return	
	Amount	Percent	Amount	Percent	Amount	Percent	Amount	Percent
2009	\$178,210,091	2.49%	-\$15,044,818	-0.21%	\$163,165,273	2.28%	-\$1,062,966,407	-15.53%
2010	165,427,697	2.30	-61,931,590	-0.86	103,496,107	1.44	675,223,168	11.96
2011	189,663,213	2.63	76,943,548	1.06	266,606,761	3.69	1,197,629,301	19.18
2012	171,625,847	2.30	-28,332,250	-0.38	143,293,597	1.92	5,273,279	0.07
2013	173,531,364	2.29	211,568,037	2.79	385,099,401	5.08	922,455,661	12.48
2014	165,507,432	2.08	760,631,032	9.56	926,138,464	11.64	1,406,480,292	16.93
2015	156,994,160	1.77	755,549,754	8.53	912,543,914	10.30	416,474,352	4.30
2016	146,128,493	1.50	520,157,840	5.36	666,286,333	6.86	82,810,914	0.82
2017	177,862,393	1.72	676,239,873	6.56	854,102,266	8.28	1,281,254,293	12.73
2018	<u>187,896,485</u>	1.69	<u>723,985,458</u>	6.51	<u>911,881,943</u>	8.20	<u>998,777,227</u>	8.84
Total	\$1,712,847,175		\$3,619,766,884		\$5,332,614,059		\$5,923,412,080	
					Five-year average return	8.90%		8.46%
					Ten-year average return	6.31%		7.13%

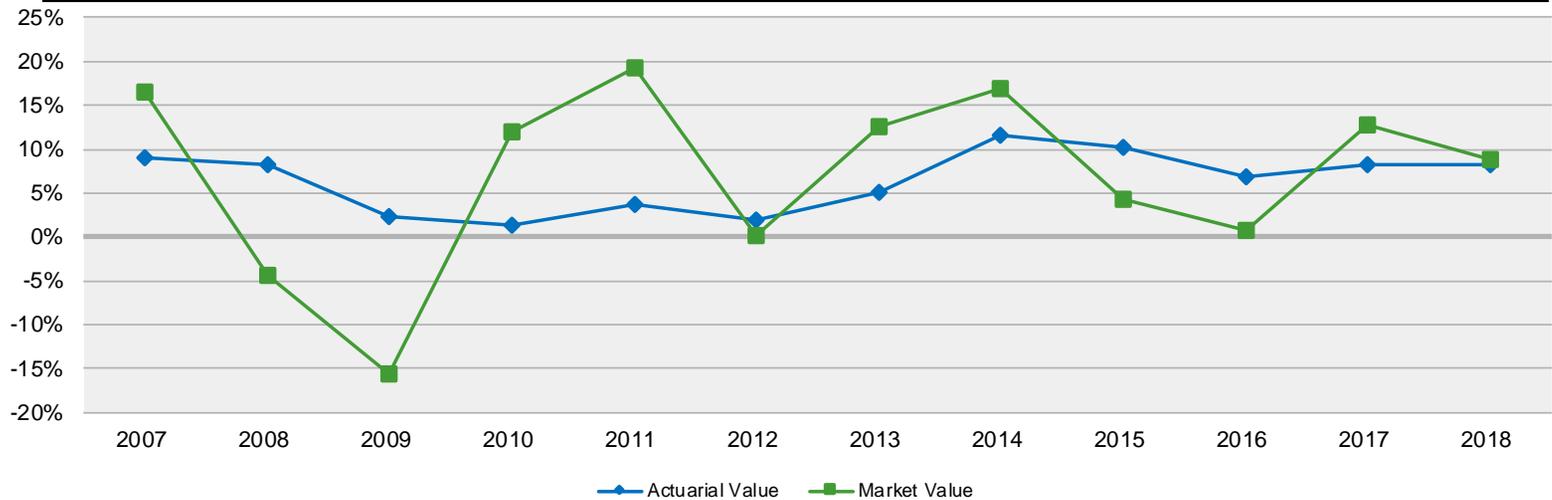
Note: Each year's yield is weighted by the average asset value in that year.

SECTION 2: Valuation Results for The Water and Power Employees' Retirement Plan of the City of Los Angeles

Subsection B described the actuarial asset valuation method that gradually takes into account fluctuations in the market value rate of return. The effect of this is to stabilize the actuarial rate of return, which contributes to leveling pension plan costs.

This chart illustrates how this leveling effect has actually worked over the years 2007 - 2018.

CHART 12
Market and Actuarial Rates of Return for Years Ended June 30, 2007 - 2018



SECTION 2: Valuation Results for The Water and Power Employees' Retirement Plan of the City of Los Angeles

Other Experience

There are other differences between the expected and the actual experience that appear when the new valuation is compared with the projections from the previous valuation. These include:

- the extent of turnover among the participants,
- retirement experience (earlier or later than expected),
- mortality (more or fewer deaths than expected),
- salary increases different than assumed, and
- COLA increases for retirees and beneficiaries different than assumed.

The net loss from this other experience for the year ended June 30, 2018 amounted to \$10,253,750, which is 0.1% of the actuarial accrued liability.

This loss is mainly the result of higher individual salary increases offset by lower COLA increases than expected. See Section 3, Exhibit G for a detailed development of the Unfunded Actuarial Accrued Liability.

SECTION 2: Valuation Results for The Water and Power Employees' Retirement Plan of the City of Los Angeles

D. REQUIRED CONTRIBUTION

The required Department contribution is made up of (a) the normal cost and (b) the amortization of the unfunded or overfunded actuarial accrued liability. For this year, an amortization base was created for the actuarial gain during the plan year ending June 30, 2018 and for the changes in Plan provisions. This produces a net total amortization charge of \$248,722,911.

Under the current funding policy, the Department's required contribution rate decreased as a percentage of pay. This was mainly the result of the investment return on an actuarial value basis being higher than assumed, COLA increases for retirees and beneficiaries lower than assumed and the effects of the increases in total payroll on the UAAL amortization rate.

Chart 13 first shows the development of the required Department contribution for the total Plan. Similar information is then shown in Tier 1 and Tier 2 separately.

The chart compares this valuation's required contribution with the prior valuation.

CHART 13
Required Contribution

	Year Beginning July 1			
	2018		2017	
	Amount	% of Payroll	Amount	% of Payroll
<u>All Tiers Combined (Aggregate)</u>				
1. Total normal cost	\$243,262,953	22.66%	\$228,621,066	23.05%
2. Expected employee contributions	<u>-76,065,712</u>	<u>-7.09%</u>	<u>-67,969,734</u>	<u>-6.85%</u>
3. Employer normal cost: (1) + (2)	\$167,197,241	15.57%	\$160,651,332	16.20%
4. Actuarial accrued liability	13,187,542,730		12,657,101,266	
5. Actuarial value of assets	<u>12,009,999,030</u>		<u>11,133,708,386</u>	
6. Unfunded actuarial accrued liability: (4) - (5)	\$1,177,543,700		\$1,523,392,880	
7. Amortization of unfunded actuarial accrued liability	248,722,911	23.17%	266,456,232	26.87%
8. Total required contribution: (3) + (7), adjusted for timing*	<u>430,997,257</u>	<u>40.15%</u>	<u>442,590,213</u>	<u>44.62%</u>
9. Projected compensation	\$1,073,554,607		\$991,814,994	

* Required contributions are assumed to be paid at the middle of every year.

SECTION 2: Valuation Results for The Water and Power Employees' Retirement Plan of the City of Los Angeles

CHART 13 (continued)
Required Contribution

	Year Beginning July 1			
	2018		2017	
	Amount	% of Payroll	Amount	% of Payroll
Tier 1				
1. Total normal cost	\$197,704,487	24.25%	\$195,753,313	24.26%
2. Expected employee contributions	<u>-50,401,728</u>	<u>-6.18%</u>	<u>-49,594,298</u>	<u>-6.15%</u>
3. Employer normal cost: (1) + (2)	\$147,302,759	18.07%	\$146,159,015	18.11%
4. Actuarial accrued liability	13,056,939,158		12,585,121,789	
5. Amortization of unfunded actuarial accrued liability*	\$188,903,375	23.17%	\$216,790,115	26.87%
6. Total required contribution: (3) + (5), adjusted for timing**	<u>348,393,606</u>	<u>42.73%</u>	<u>376,106,036</u>	<u>46.61%</u>
7. Employer match (110% of (2)), adjusted for timing**	\$57,451,670	7.05%	\$56,531,300	7.01%
8. Greater of employer match (7) or total required contribution (6)	<u>\$348,393,606</u>	<u>42.73%</u>	<u>\$376,106,036</u>	<u>46.61%</u>
9. Projected compensation	\$815,357,490		\$806,945,610	

* The same UAAL contribution rate is charged to both Tier 1 and Tier 2.

** Required contributions are assumed to be paid at the middle of every year.

SECTION 2: Valuation Results for The Water and Power Employees' Retirement Plan of the City of Los Angeles

CHART 13 (continued)

Required Contribution

	Year Beginning July 1			
	2018		2017	
	Amount	% of Payroll	Amount	% of Payroll
<u>Tier 2</u>				
1. Total normal cost	\$45,558,466	17.64%	\$32,867,753	17.78%
2. Expected employee contributions	<u>-25,663,984</u>	<u>-9.94%</u>	<u>-18,375,436</u>	<u>-9.94%</u>
3. Employer normal cost: (1) + (2)	\$19,894,482	7.70%	\$14,492,317	7.84%
4. Actuarial accrued liability	130,603,572		71,979,477	
5. Amortization of unfunded actuarial accrued liability*	59,819,536	23.17%	49,666,117	26.87%
6. Total required contribution: (3) + (5), adjusted for timing**	<u>82,603,651</u>	<u>31.99%</u>	<u>66,484,177</u>	<u>35.96%</u>
7. Projected compensation	\$258,197,117		\$184,869,384	

* The same UAAL contribution rate is charged to both Tier 1 and Tier 2.

** Required contributions are assumed to be paid at the middle of every year.

SECTION 2: Valuation Results for The Water and Power Employees' Retirement Plan of the City of Los Angeles

The contribution requirements as of July 1, 2018 are based on all of the data described in the previous sections, the actuarial assumptions described in Section 4, and the Plan provisions adopted at the time of preparation of the Actuarial Valuation. They include all changes affecting future costs, adopted benefit changes, actuarial gains and losses and changes in the actuarial assumptions.

Reconciliation of Required Contribution

The chart below details the changes in the aggregate required contribution from the prior valuation to the current year's valuation.

The chart reconciles the contribution from the prior valuation to the amount determined in this valuation.

CHART 14

Reconciliation of Aggregate Required Contribution Rate from July 1, 2017 to July 1, 2018

Aggregate Required Contribution Rate as of July 1, 2017	44.62%
Effect of actual contributions more than expected contributions	-0.16%
Effect of investment gain	-1.06%
Effect of higher than expected individual salary increases	0.87%
Effect of lower than expected 2017 COLA increase for retirees and beneficiaries	-0.73%
Effect of changes in member demographics (including increase in Tier 2 membership) on Normal Cost	-0.52%
Effect of net other experience gains*	-0.03%
Effect of increase in total payroll on UAAL amortization rate	-2.12%
Effect of plan amendments	-0.72%
Total change	-4.47%
Aggregate Required Contribution Rate as of July 1, 2018	40.15%

* Includes effect of differences in actual versus expected experience including mortality, disability, withdrawal and retirement experience.

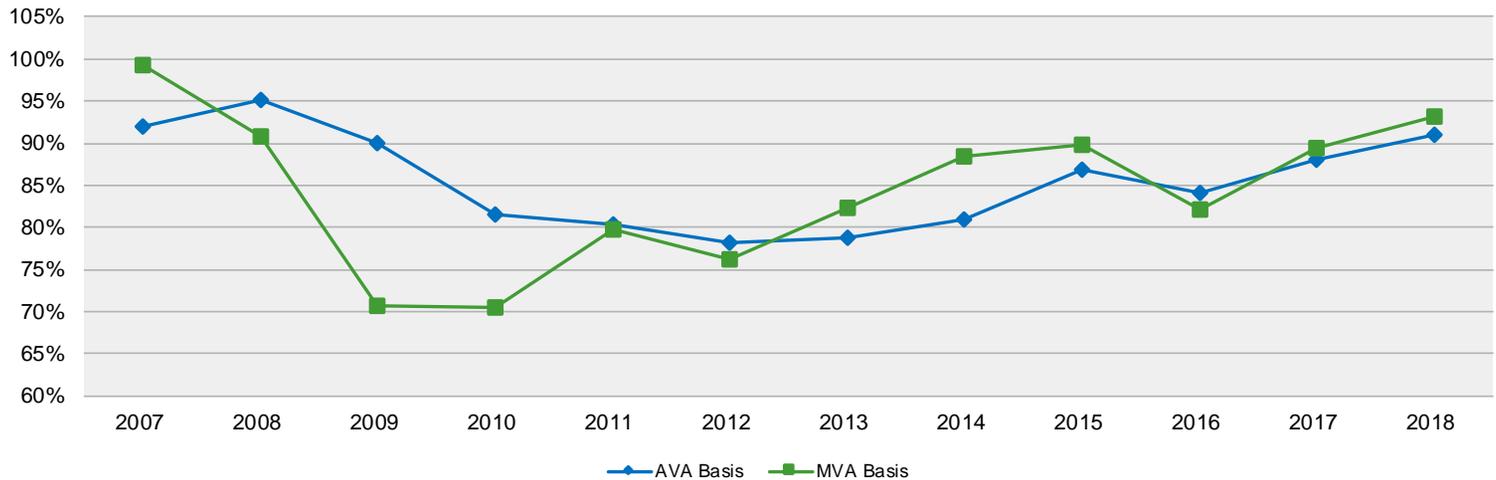
SECTION 2: Valuation Results for The Water and Power Employees' Retirement Plan of the City of Los Angeles

E. FUNDED RATIO

A commonly reported piece of information regarding the Plan's financial status is the funded ratio. These ratios compare the actuarial value of assets and market value of assets to the actuarial accrued liabilities of the Plan as calculated. High ratios indicate a well-funded plan with assets sufficient to cover the plan's actuarial accrued liabilities. Lower ratios may indicate recent changes to benefit structures, funding of the plan below actuarial requirements, poor asset performance, or a variety of other factors. The chart below depicts a history of the funded ratio for this plan. Chart 16 on the next page shows the Plan's schedule of funding progress for the last ten years.

The funded status measures shown in this valuation are appropriate for assessing the need for or amount of future contributions. However, they are not necessarily appropriate for assessing the sufficiency of Plan assets to cover the estimated cost of settling the Plan's benefit obligations. As the chart below shows, the measures are different depending on whether the valuation or market value of assets is used.

CHART 15
Funded Ratio for Plan Years Ending June 30, 2007 - 2018



SECTION 2: Valuation Results for The Water and Power Employees' Retirement Plan of the City of Los Angeles

CHART 16
Schedule of Funding Progress

Actuarial Valuation Date	Actuarial Value of Assets (a)	Actuarial Accrued Liability (AAL) (b)	Unfunded/ (Overfunded) AAL (UAAL) (b) - (a)	Funded Ratio (AVA basis) (a) / (b)	Covered Payroll (c)	UAAL as a Percentage of Covered Payroll [(b) - (a)] / (c)
07/01/2009	\$7,248,721,252	\$8,057,060,950	\$808,339,698	89.97%	\$805,137,795	100.40%
07/01/2010	7,244,429,689	8,893,618,433	1,649,188,744	81.46%	856,089,559	192.64%
07/01/2011	7,465,183,643	9,297,204,318	1,832,020,675	80.29%	870,203,423	210.53%
07/01/2012	7,573,885,754	9,692,602,852	2,118,717,098	78.14%	886,539,366	238.99%
07/01/2013	7,958,487,587	10,094,867,871	2,136,380,284	78.84%	900,254,454	237.31%
07/01/2014	8,877,594,529	10,975,550,617	2,097,956,088	80.89%	900,126,274	233.07%
07/01/2015	9,750,343,300	11,218,445,567	1,468,102,267	86.91%	920,781,074	159.44%
07/01/2016	10,344,355,801	12,289,229,001	1,944,873,200	84.17%	928,888,680	209.38%
07/01/2017	11,133,708,386	12,657,101,266	1,523,392,880	87.96%	991,814,994	153.60%
07/01/2018	12,009,999,030	13,187,542,730	1,177,543,700	91.07%	1,073,554,607	109.69%

SECTION 2: Valuation Results for The Water and Power Employees' Retirement Plan of the City of Los Angeles

F. VOLATILITY RATIOS

Retirement plans are subject to volatility in the level of required contributions. This volatility tends to increase as retirement plans become more mature.

The Asset Volatility Ratio (AVR), which is equal to the market value of assets divided by total payroll, provides an indication of the potential contribution volatility for any given level of investment volatility. A higher AVR indicates that the plan is subject to a greater level of contribution volatility. This is a current measure since it is based on the current level of assets.

For WPERP, the current AVR is about 11.4. This means that a 1% asset gain/(loss) (relative to the assumed investment return) translates to about 11.4% of one-year's payroll. Since WPERP amortizes actuarial gains and losses over a period of 15 years, there would be a 1.2% of payroll decrease/(increase) in the required contribution for each 1% asset gain/(loss).

The Liability Volatility Ratio (LVR), which is equal to the Actuarial Accrued Liability divided by payroll, provides an indication of the longer-term potential for contribution volatility for any given level of investment volatility. This is because, over an extended period of time, the plan's assets should track the plan's liabilities. For example, if a plan is 50% funded on a market value basis, the liability volatility ratio would be double the asset volatility ratio and the plan sponsor should expect contribution volatility to increase over time as the plan becomes better funded.

The LVR also indicates how volatile contributions will be in response to changes in the Actuarial Accrued Liability due to actual experience or to changes in actuarial assumptions.

For WPERP, the current LVR is about 12.3. This is about 8% higher than AVR. Therefore we would expect that contribution volatility will increase over the long-term.

This chart shows how the asset and liability volatility ratios have varied over time.

CHART 17
Volatility Ratios for Years Ended June 30, 2009 – 2018

Year Ended June 30	Asset Volatility Ratio	Liability Volatility Ratio
2009	7.1	10.0
2010	7.3	10.4
2011	8.5	10.7
2012	8.3	10.9
2013	9.2	11.2
2014	10.8	12.2
2015	11.0	12.2
2016	10.9	13.2
2017	11.4	12.8
2018	11.4	12.3

SECTION 3: Supplemental Information for The Water and Power Employees' Retirement Plan of the City of Los Angeles

EXHIBIT A

Table of Plan Coverage

i. Total

Category	Year Ended July 1		Change From Prior Year
	2018	2017	
Active members in valuation:			
Number	10,114	9,806	3.1%
Average age	47.5	47.9	-0.4
Average years of service	15.1	15.7	-0.6
Projected total compensation	\$1,073,554,608	\$991,814,994	8.2%
Projected average compensation	106,145	101,144	4.9%
Account balances	1,419,279,675	1,357,684,474	4.5%
Vested terminated members:*			
Number	1,728	1,648	4.9%
Average age	53.4	54.1	-0.7
Average account balances	\$61,701	\$61,621	0.1%
Retired members:			
Number in pay status	7,199	7,113	1.2%
Average age	72.9	72.9	0.0
Average monthly benefit	\$5,761	\$5,517	4.4%
Beneficiaries:			
Number in pay status**	1,966	2,159	-8.9%
Average age	80.7	79.6	1.1
Average monthly benefit	\$3,384	\$3,176	6.5%

* Includes terminated members due a refund of contributions and members receiving PTD benefits.

** Reflects 161 assignee records for Options B and C now combined with the benefit for the corresponding retired members. Last year, these assignee records were separate from the corresponding retired member records.

SECTION 3: Supplemental Information for The Water and Power Employees' Retirement Plan of the City of Los Angeles

EXHIBIT A

Table of Plan Coverage

ii. Tier 1

Category	Year Ended July 1		Change From Prior Year
	2018	2017	
Active members in valuation:			
Number	7,196	7,543	-4.6%
Average age	51.2	50.6	0.6
Average years of service	20.4	19.9	0.5
Projected total compensation	\$815,357,490	\$806,945,610	1.0%
Projected average compensation	113,307	106,979	5.9%
Account balances	1,370,810,105	1,331,860,390	2.9%
Vested terminated members:*			
Number	1,407	1,445	-2.6%
Average age	55.7	55.6	0.1
Average account balances	\$74,285	\$69,586	6.8%
Retired members:			
Number in pay status	7,198	7,112	1.2%
Average age	72.9	72.9	0.0
Average monthly benefit	\$5,761	\$5,518	4.4%
Beneficiaries:			
Number in pay status**	1,965	2,159	-9.0%
Average age	80.7	79.6	1.1
Average monthly benefit	\$3,386	\$3,176	6.6%

* Includes terminated members due a refund of contributions and members receiving PTD benefits.

** Reflects 161 assignee records for Options B and C now combined with the benefit for the corresponding retired members. Last year, these assignee records were separate from the corresponding retired member records.

SECTION 3: Supplemental Information for The Water and Power Employees' Retirement Plan of the City of Los Angeles

EXHIBIT A

Table of Plan Coverage

iii. Tier 2

Category	Year Ended July 1		Change From Prior Year
	2018	2017	
Active members in valuation:			
Number	2,918	2,263	28.9%
Average age	38.6	38.8	-0.2
Average years of service	2.2	1.7	0.5
Projected total compensation	\$258,197,117	\$184,869,384	39.7%
Projected average compensation	88,484	81,692	8.3%
Account balances	48,469,570	25,824,084	87.7%
Vested terminated members:*			
Number	321	203	58.1%
Average age	43.2	43.7	-0.5
Average account balances	\$6,545	\$4,924	32.9%
Retired members:			
Number in pay status	1	1	0.0%
Average age	61.4	60.4	1.0
Average monthly benefit	\$2,149	\$2,137	0.6%
Beneficiaries:			
Number in pay status	1	0	N/A
Average age	91.7	N/A	N/A
Average monthly benefit	\$893	N/A	N/A

* Includes terminated members due a refund of contributions and members receiving PTD benefits.

SECTION 3: Supplemental Information for The Water and Power Employees' Retirement Plan of the City of Los Angeles

**EXHIBIT B
Members in Active Service as of July 1, 2018
By Age, Years of Service, and Average Compensation
i. Total**

Age	Years of Service									
	Total	0-4	5 - 9	10 - 14	15 - 19	20 - 24	25 - 29	30 - 34	35 - 39	40 & over
Under 25	137	136	1	--	--	--	--	--	--	--
	\$83,128	\$82,805	\$127,086	--	--	--	--	--	--	--
25 - 29	548	517	31	--	--	--	--	--	--	--
	92,632	91,106	118,083	--	--	--	--	--	--	--
30 - 34	906	656	147	102	1	--	--	--	--	--
	95,870	87,586	118,183	\$116,555	\$140,043	--	--	--	--	--
35 - 39	1,195	565	163	319	144	4	--	--	--	--
	103,901	88,753	116,341	117,120	120,082	\$99,825	--	--	--	--
40 - 44	1,256	459	110	288	332	66	1	--	--	--
	102,793	88,628	106,107	108,906	113,939	111,267	\$219,483	--	--	--
45 - 49	1,421	344	84	271	400	183	133	6	--	--
	104,313	87,949	102,440	103,519	106,001	114,478	129,763	\$118,035	--	--
50 - 54	1,792	259	73	185	299	170	468	332	6	--
	113,561	90,125	101,908	103,164	104,614	114,324	128,572	126,452	\$127,747	--
55 - 59	1,602	127	55	149	238	127	331	406	165	4
	114,654	98,927	103,986	99,823	104,835	105,808	113,965	126,704	135,094	\$169,071
60 - 64	867	61	32	78	136	71	171	183	109	26
	109,722	89,788	97,425	96,932	99,832	104,253	115,736	118,374	122,834	121,252
65 - 69	292	9	14	27	53	29	56	50	34	20
	104,930	88,398	100,860	94,556	99,259	100,640	110,038	109,104	109,900	117,291
70 & over	98	3	1	9	13	10	20	10	15	17
	103,063	63,767	26,664	70,046	100,952	97,269	107,964	114,944	125,053	104,839
Total	10,114	3,136	711	1,428	1,616	660	1,180	987	329	67
	\$106,145	\$89,053	\$109,867	\$107,403	\$107,698	\$110,391	\$121,597	\$124,011	\$127,837	\$118,760

SECTION 3: Supplemental Information for The Water and Power Employees' Retirement Plan of the City of Los Angeles

EXHIBIT B

**Members in Active Service as of July 1, 2018
By Age, Years of Service, and Average Compensation
ii. Tier 1**

Age	Years of Service									
	Total	0-4	5 - 9	10 - 14	15 - 19	20 - 24	25 - 29	30 - 34	35 - 39	40 & over
Under 25	3	2	1	--	--	--	--	--	--	--
	\$93,860	\$77,248	\$127,086	--	--	--	--	--	--	--
25 - 29	77	46	31	--	--	--	--	--	--	--
	107,915	101,064	118,083	--	--	--	--	--	--	--
30 - 34	300	54	143	102	1	--	--	--	--	--
	115,741	106,187	118,598	\$116,555	\$140,043	--	--	--	--	--
35 - 39	660	35	159	318	144	4	--	--	--	--
	116,390	97,971	116,329	116,984	120,082	\$99,825	--	--	--	--
40 - 44	824	27	110	288	332	66	1	--	--	--
	110,485	96,737	106,107	108,906	113,939	111,267	\$219,483	--	--	--
45 - 49	1,096	24	80	270	400	183	133	6	--	--
	109,154	91,811	102,134	103,491	106,001	114,478	129,763	\$118,035	--	--
50 - 54	1,558	26	72	185	299	170	468	332	6	--
	117,112	92,758	101,789	103,164	104,614	114,324	128,572	126,452	\$127,747	--
55 - 59	1,486	12	55	148	238	127	331	406	165	4
	115,815	90,407	103,986	99,852	104,835	105,808	113,965	126,704	135,094	\$169,071
60 - 64	811	5	32	78	136	71	171	183	109	26
	111,036	79,526	97,425	96,932	99,832	104,253	115,736	118,374	122,834	121,252
65 - 69	285	2	14	27	53	29	56	50	34	20
	105,305	83,872	100,860	94,556	99,259	100,640	110,038	109,104	109,900	117,291
70 & over	96	1	1	9	13	10	20	10	15	17
	103,438	21,119	26,664	70,046	100,952	97,269	107,964	114,944	125,053	104,839
Total	7,196	234	698	1,425	1,616	660	1,180	987	329	67
	\$113,307	\$97,714	\$109,872	\$107,372	\$107,698	\$110,391	\$121,597	\$124,011	\$127,837	\$118,760

SECTION 3: Supplemental Information for The Water and Power Employees' Retirement Plan of the City of Los Angeles

EXHIBIT B

**Members in Active Service as of July 1, 2018
By Age, Years of Service, and Average Compensation
iii. Tier 2**

Age	Years of Service									
	Total	0-4	5 - 9	10 - 14	15 - 19	20 - 24	25 - 29	30 - 34	35 - 39	40 & over
Under 25	134	134	--	--	--	--	--	--	--	--
	\$82,888	\$82,888	--	--	--	--	--	--	--	--
25 - 29	471	471	--	--	--	--	--	--	--	--
	90,133	90,133	--	--	--	--	--	--	--	--
30 - 34	606	602	4	--	--	--	--	--	--	--
	86,033	85,918	\$103,365	--	--	--	--	--	--	--
35 - 39	535	530	4	1	--	--	--	--	--	--
	88,494	88,144	116,781	\$160,419	--	--	--	--	--	--
40 - 44	432	432	--	--	--	--	--	--	--	--
	88,121	88,121	--	--	--	--	--	--	--	--
45 - 49	325	320	4	1	--	--	--	--	--	--
	87,989	87,659	108,574	111,165	--	--	--	--	--	--
50 - 54	234	233	1	--	--	--	--	--	--	--
	89,919	89,831	110,436	--	--	--	--	--	--	--
55 - 59	116	115	--	1	--	--	--	--	--	--
	99,779	99,817	--	95,461	--	--	--	--	--	--
60 - 64	56	56	--	--	--	--	--	--	--	--
	90,704	90,704	--	--	--	--	--	--	--	--
65 - 69	7	7	--	--	--	--	--	--	--	--
	89,691	89,691	--	--	--	--	--	--	--	--
70 & over	2	2	--	--	--	--	--	--	--	--
	85,092	85,092	--	--	--	--	--	--	--	--
Total	2,918	2,902	13	3	--	--	--	--	--	--
	\$88,484	\$88,355	\$109,639	\$122,348	--	--	--	--	--	--

SECTION 3: Supplemental Information for The Water and Power Employees' Retirement Plan of the City of Los Angeles

EXHIBIT C

Reconciliation of Member Data

	Active Members	Vested Terminated Members*	Retired Members	Beneficiaries	Total
Number as of July 1, 2017	9,806	1,648	7,113	2,159	20,726
New members	778	N/A	N/A	N/A	778
Terminations – with vested rights	-148	148	N/A	N/A	0
Retirements	-304	-37	341	N/A	0
Died with beneficiary	-5	-2	-96	103	0
Died without beneficiary	-15	-19	-159	-151	-344
Rehire	20	-20	0	0	0
Data adjustments	-1	50**	0	-145***	-96
Contribution refunds	<u>-17</u>	<u>-40</u>	<u>N/A</u>	<u>N/A</u>	<u>-57</u>
Number as of July 1, 2018	10,114	1,728	7,199	1,966	21,007

* Includes terminated members due a refund of member contributions and members receiving PTD benefits.

** Terminated members due a refund of member contributions.

*** New beneficiaries from either death of retired members or divorce settlements. Also includes 161 assignee records for Options B and C that were combined with the benefit for the corresponding retired members. Last year, these assignee records were separate from the corresponding retired member records.

SECTION 3: Supplemental Information for The Water and Power Employees' Retirement Plan of the City of Los Angeles

EXHIBIT D

Summary Statement of Income and Expenses on an Actuarial Value Basis

	Year Ended June 30, 2018	Year Ended June 30, 2017
Net assets at actuarial value at the beginning of the year	\$11,133,708,386	\$10,344,355,801
Contribution income:		
Employer contributions	\$433,412,569	\$391,717,359
Employee contributions	93,659,240	83,239,105
Net administrative expense contributions	<u>549,417</u>	<u>655,190</u>
Net contribution income	527,621,226	475,611,654
Investment income:		
Interest, dividends and other income	\$225,612,064	\$209,368,663
Adjustment toward market value	723,985,458	676,239,873
Less investment fees	<u>-37,715,579</u>	<u>-31,506,270</u>
Net investment income	<u>911,881,943</u>	<u>854,102,266</u>
Total income available for benefits	\$1,439,503,169	\$1,329,713,920
Less benefit payments:		
Retirement benefits paid	-\$558,900,946	-\$535,914,984
Refund of members' contributions	<u>-4,311,579</u>	<u>-4,446,351</u>
Net benefit payments	-\$563,212,525	-\$540,361,335
Change in reserve for future benefits	\$876,290,644	\$789,352,585
Net assets at actuarial value at the end of the year	\$12,009,999,030	\$11,133,708,386

SECTION 3: Supplemental Information for The Water and Power Employees' Retirement Plan of the City of Los Angeles

EXHIBIT E

Summary Statement of Plan Assets

	Year Ended June 30, 2018	Year Ended June 30, 2017
Cash equivalents	\$8,066,188	\$8,810,904
Accounts receivable:		
Accrued investment income	\$32,914,444	\$31,270,415
Open investment trades and others	263,176,793	200,910,365
Department of Water and Power	<u>59,147,316</u>	<u>54,944,775</u>
Total accounts receivable	355,238,553	287,125,555
Investments:		
Fixed income	2,848,790,689	2,890,372,785
Equities	6,689,840,829	6,366,019,664
Other assets	<u>2,668,708,078</u>	<u>2,018,883,519</u>
Total investments at market value	<u>12,207,339,596</u>	<u>11,275,275,968</u>
Total assets	\$12,570,644,337	\$11,571,212,427
Less accounts payable	-\$293,559,074	-\$257,313,092
Net assets at market value	<u>\$12,277,085,263</u>	<u>\$11,313,899,335</u>
Net assets at actuarial value	<u>\$12,009,999,030</u>	<u>\$11,133,708,386</u>

SECTION 3: Supplemental Information for The Water and Power Employees' Retirement Plan of the City of Los Angeles

EXHIBIT F

Development of the Fund Through June 30, 2018

Year Ended June 30	Employer Contributions	Employee Contributions*	Other Contributions	Net Investment Return**	Benefit Payments	Actuarial Value of Assets at End of Year
2009	\$145,941,275	\$59,405,012	\$4,088,598	\$159,076,675	\$367,643,541	\$7,248,721,252
2010	201,034,807	71,246,053	4,463,141	99,032,966	380,068,530	7,244,429,689
2011	286,699,384	65,965,607	5,672,227	260,934,534	398,517,798	7,465,183,643
2012	321,688,919	60,105,653	5,428,297	137,856,300	416,386,058	7,573,885,754
2013	368,426,348	69,633,449	4,392,846	380,706,555	438,557,365	7,958,487,587
2014	384,265,892	72,299,526	4,872,432	921,266,032	463,596,940	8,877,594,529
2015	376,902,022	68,552,375	717,370	912,543,914	485,966,910	9,750,343,300
2016	362,359,894	75,068,523	791,047	666,286,333	510,493,296	10,344,355,801
2017	391,717,359	83,239,105	655,190	854,102,266	540,361,335	11,133,708,386
2018	433,412,569	93,659,240	549,417	911,881,943	563,212,525	12,009,999,030

* Includes member normal contributions, Additional Annuity program contributions, contributions due to open contracts for purchased service and member contributions transferred from LACERS.

** Net of investment fees and administrative expenses prior to 2015. Starting in 2015, administrative expenses are included as an offset to "other contributions".

SECTION 3: Supplemental Information for The Water and Power Employees' Retirement Plan of the City of Los Angeles

EXHIBIT G

Development of Unfunded Actuarial Accrued Liability for Year Ended June 30, 2018

1. Unfunded actuarial accrued liability at beginning of year		\$1,523,392,880
2. Normal cost at beginning of year		228,621,066
3. Total expected contributions (employer and employee)		-512,396,045
4. Interest		
(a) For whole year on (1) + (2)	\$127,021,010	
(b) For half year on (3)	<u>-18,574,357</u>	
(c) Total interest		<u>108,446,653</u>
5. Expected unfunded actuarial accrued liability		\$1,348,064,554
6. Changes due to:		
(a) Actual contributions higher than expected contributions	-15,777,092	
(b) Investment return higher than expected	-105,978,270	
(c) Higher than expected individual salary increases	87,077,475	
(d) Lower than expected 2017 COLA increases for retirees and beneficiaries	-72,849,688	
(e) Other experience gains	-3,974,037	
(f) Plan provisions changes	<u>-59,019,242</u>	
(g) Total changes		<u>-170,520,854</u>
7. Unfunded actuarial accrued liability at end of year		<u>\$1,177,543,700</u>

Note: The "Net loss from other experience" of \$10,253,750 shown in Section 2, Chart 9 is equal to the sum of items 6(c), 6(d) and 6(e).

SECTION 3: Supplemental Information for The Water and Power Employees' Retirement Plan of the City of Los Angeles

EXHIBIT H

Table of Amortization Bases

Type*	Date Established	Initial Years	Initial Amount	Annual Payment**	Years Remaining	Outstanding Balance
Combined Base	07/01/2004	15	\$170,392,797	\$18,164,605	1	18,164,605
Actuarial Loss	07/01/2005	15	267,915,003	28,476,510	2	55,028,034
Actuarial Loss	07/01/2006	15	183,420,211	19,439,626	3	54,465,407
Actuarial Loss	07/01/2007	15	47,238,833	4,992,598	4	18,035,140
Assumption Changes	07/01/2007	15	-18,102,738	-1,913,250	4	-6,911,376
Actuarial Gain	07/01/2008	15	-204,179,457	-21,520,961	5	-94,007,475
Actuarial Loss	07/01/2009	15	457,336,004	48,077,540	6	243,892,406
Plan Amendments	07/01/2009	15	2,239,982	235,479	6	1,194,561
Actuarial Loss	07/01/2010	15	626,174,290	65,658,959	7	376,224,123
Assumption Changes	07/01/2010	15	255,885,598	26,831,479	7	153,743,673
Actuarial Loss	07/01/2011	15	268,017,929	28,054,569	8	177,939,838
Plan Amendments	07/01/2011	15	-6,948,892	-727,370	8	-4,613,441
Actuarial Loss	07/01/2012	15	380,800,633	39,792,503	9	275,120,471
Actuarial Loss	07/01/2013	15	133,360,391	13,912,875	10	103,602,293
Actuarial Gain	07/01/2014	15	-434,196,395	-45,225,658	11	-359,233,214
Assumption Changes	07/01/2014	15	525,443,921	54,729,950	11	434,727,028
Actuarial Gain	07/01/2015	15	-341,001,627	-35,490,050	12	-298,335,766
Plan Amendments	07/01/2015	15	-144,007,904	-14,987,752	12	-125,989,745
Actuarial Gain	07/01/2016	15	-109,018,791	-11,337,411	13	-100,199,246
Assumption Changes	07/01/2016	15	722,927,661	75,180,871	13	664,443,309
Actuarial Gain	07/01/2017	15	-248,943,494	-25,888,882	14	-239,226,071
Actuarial Gain	07/01/2018	15	-111,501,612	-11,595,612	15	-111,501,612
Plan Amendments	07/01/2018	15	-59,019,242	<u>-6,137,707</u>	15	<u>-59,019,242</u>
Total				\$248,722,911		\$1,177,543,700

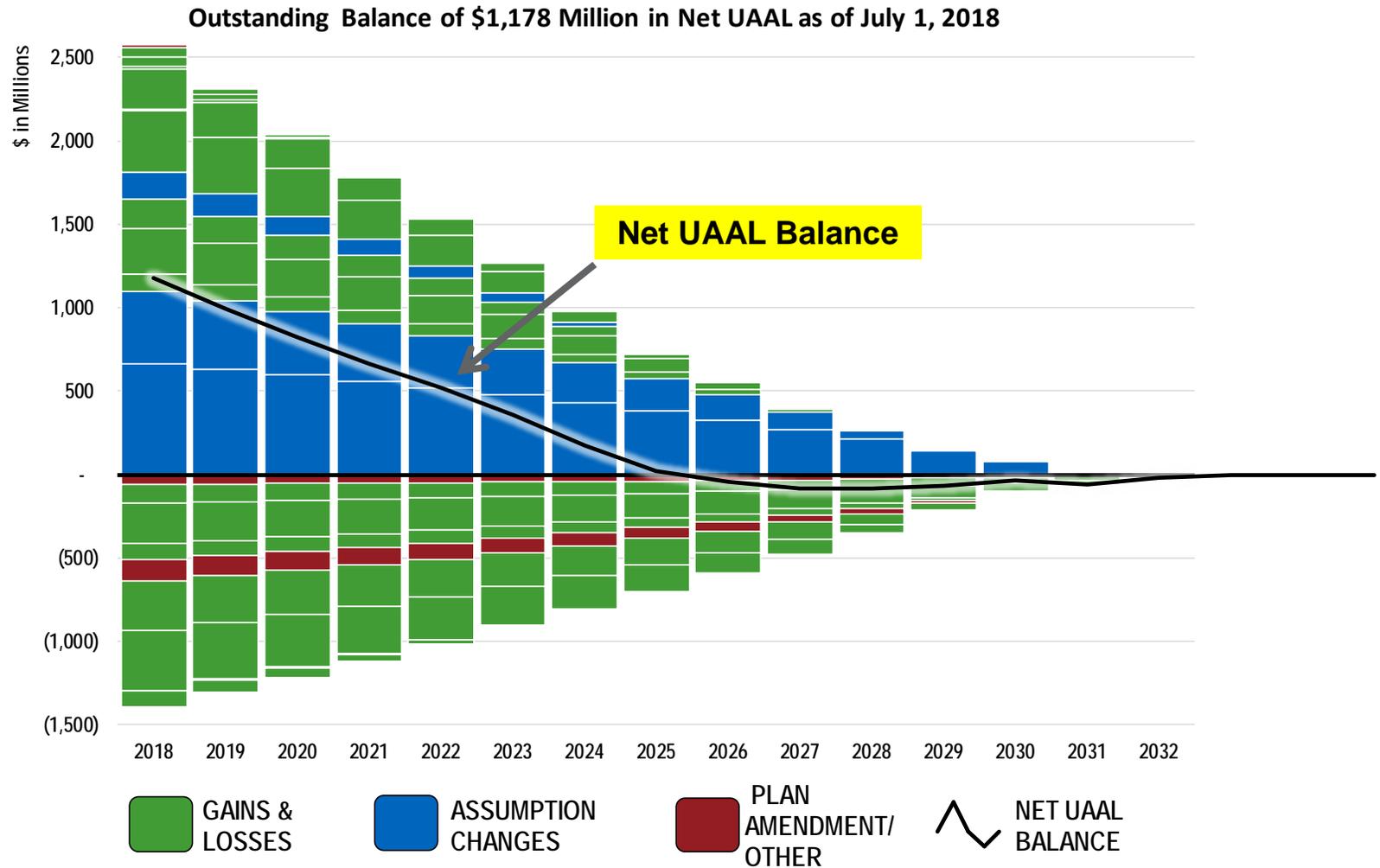
* The outstanding July 1, 2004 amortization bases were combined into a single amortization base and amortized over 15 years.

** Level dollar amount.

SECTION 3: Supplemental Information for The Water and Power Employees' Retirement Plan of the City of Los Angeles

EXHIBIT I

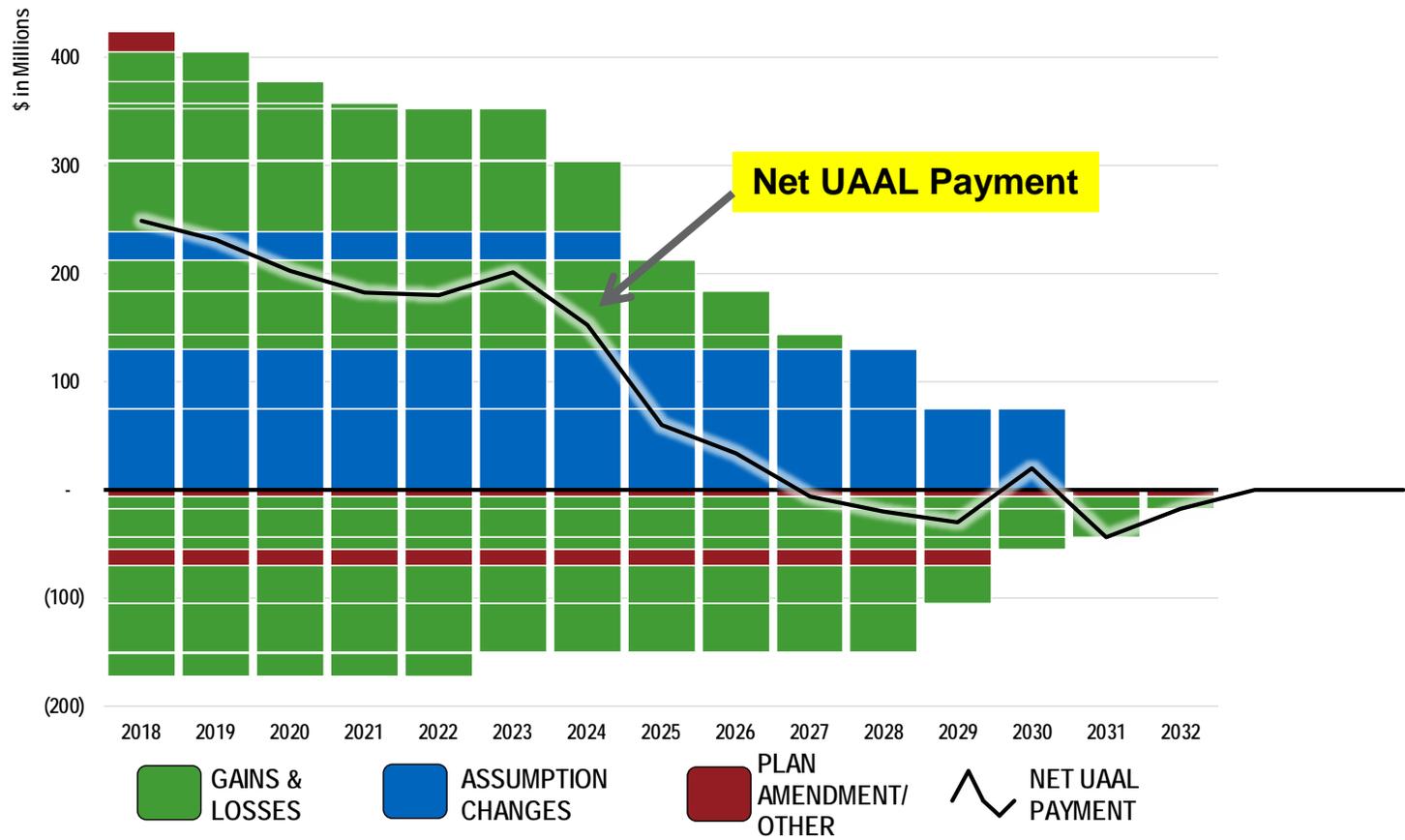
Projection of UAAL Outstanding Balances and Payments



SECTION 3: Supplemental Information for The Water and Power Employees' Retirement Plan of the City of Los Angeles

**EXHIBIT I (continued)
Projection of UAAL Outstanding Balances and Payments**

Annual Payments Required to Amortize \$1,178 Million in Net UAAL as of July 1, 2018



SECTION 3: Supplemental Information for The Water and Power Employees' Retirement Plan of the City of Los Angeles

EXHIBIT J

Section 415 Limitations

Section 415 of the Internal Revenue Code (IRC) specifies the maximum benefits that may be paid to an individual from a defined benefit plan and the maximum amounts that may be allocated each year to an individual's account in a defined contribution plan.

A qualified pension plan may not pay benefits in excess of the Section 415 limits. The ultimate penalty for non-compliance is disqualification: active participants could be taxed on their vested benefits and the IRS may seek to tax the income earned on the plan's assets.

In particular, Section 415(b) of the IRC limits the maximum annual benefit payable at the Normal Retirement Age to a dollar limit of \$160,000 indexed for inflation. That limit is \$220,000 for 2018. Normal Retirement Age for these purposes is age 62. These are the limits in simplified terms. They must be adjusted based on each participant's circumstances, for such things as age at retirement, form of benefits chosen and after tax contributions.

Benefits in excess of the limits may be paid through a qualified governmental excess plan that meets the requirements of Section 415(m).

Legal Counsel's review and interpretation of the law and regulations should be sought on any questions in this regard.

Contribution rates determined in this valuation have not been reduced for the Section 415 limitation. Actual limitations will result in gains when they occur.

SECTION 3: Supplemental Information for The Water and Power Employees' Retirement Plan of the City of Los Angeles

EXHIBIT K

Definitions of Pension Terms

The following list defines certain technical terms for the convenience of the reader:

Assumptions or Actuarial

Assumptions:

The estimates on which the cost of the Plan is calculated including:

- (a) Investment return — the rate of investment yield that the Plan will earn over the long-term future;
- (b) Mortality rates — the death rates of employees and pensioners; life expectancy is based on these rates;
- (c) Retirement rates — the rate or probability of retirement at a given age;
- (d) Withdrawal rates — the rates at which employees of various ages are expected to leave employment for reasons other than death, disability, or retirement.

Normal Cost:

The amount of contributions required to fund the benefit allocated to the current year of service.

Actuarial Accrued Liability

For Actives:

The value of all projected benefit payments for current members less the portion that will be paid by future normal costs.

Actuarial Accrued Liability

For Pensioners:

The single-sum value of lifetime benefits to existing pensioners. This sum takes account of life expectancies appropriate to the ages of the pensioners and the interest that the sum is expected to earn before it is entirely paid out in benefits.

Unfunded Actuarial Accrued

Liability:

The extent to which the actuarial accrued liability of the Plan exceeds the assets of the Plan.

SECTION 3: Supplemental Information for The Water and Power Employees' Retirement Plan of the City of Los Angeles

Amortization of the Unfunded Actuarial Accrued Liability:

Payments made over a period of years equal in value to the Plan's unfunded actuarial accrued liability.

Investment Return:

The rate of earnings of the Plan from its investments, including interest, dividends and capital gain and loss adjustments, computed as a percentage of the average value of the fund. For actuarial purposes, the investment return often reflects a smoothing of the capital gains and losses to avoid significant swings in the value of assets from one year to the next.

SECTION 3: Supplemental Information for The Water and Power Employees' Retirement Plan of the City of Los Angeles

EXHIBIT L

Actuarial Balance Sheet

An overview of the Plan's funding is given by an Actuarial Balance Sheet. In this approach, we first determine the amount and timing of all future payments that will be made by the Plan for current participants. We then discount these payments at the valuation interest rate to the date of the valuation, thereby determining their present value. We refer to this present value as the "liability" of the Plan.

Second, we determine how this liability will be met. These actuarial "assets" include the net amount of assets already accumulated by the Plan, the present value of future member contributions, the present value of future Department normal cost contributions, and the present value of future Department amortization payments or credits.

Actuarial Balance Sheet

Assets

	<u>July 1, 2018</u>	<u>July 1, 2017</u>
1. Total actuarial value of assets	\$12,009,999,030	\$11,133,708,386
2. Present value of future contribution by members	863,003,392	752,862,928
3. Present value of future Department contributions for		
(a) entry age normal cost	1,599,916,999	1,542,317,777
(b) unfunded actuarial accrued liability	<u>1,177,543,700</u>	<u>1,523,392,880</u>
4. Total current and future assets	\$15,650,463,121	\$14,952,281,971

Liabilities

	<u>July 1, 2018</u>	<u>July 1, 2017</u>
5. Present value of benefits for retirees and beneficiaries	\$7,324,080,162	\$6,995,706,647
6. Present value of benefits for terminated vested members	220,277,427	219,017,253
7. Present value of benefits for active members	<u>8,106,105,532</u>	<u>7,737,558,071</u>
8. Total liabilities	\$15,650,463,121	\$14,952,281,971

SECTION 3: Supplemental Information for The Water and Power Employees' Retirement Plan of the City of Los Angeles

EXHIBIT M

Reserves and Designated Balances

	<u>June 30, 2018</u>	<u>June 30, 2017</u>
1. Reserve for retirement allowance for retired members	\$7,409,140,493	\$6,942,830,729
2. Contribution accounts:		
(a) Members	1,667,598,977	1,592,237,219
(b) Department of Water and Power	(1,382,598,166)	(1,335,629,737)
3. General Reserve*	<u>2,388,641,092</u>	<u>2,118,011,960</u>
4. Total	\$10,082,782,396	\$9,317,450,171

* Out of the total General Reserve, \$122,770,853 and \$113,138,993 are not included as valuation assets as of June 30, 2018 and June 30, 2017, respectively.

SECTION 3: Supplemental Information for The Water and Power Employees' Retirement Plan of the City of Los Angeles

**EXHIBIT N
Adjusted Reserves**

Each year the Retirement Board adjusts its retired reserves to agree with the value calculated during the valuation. The following table presents the required transfers.

<u>Adjusted Reserves</u>	<u>June 30, 2018</u>	<u>June 30, 2017</u>
1. Retired reserve balance	\$7,409,140,493	\$6,942,830,729
2. Actuarially computed present value	7,324,080,162	6,995,706,647
3. Actuarial gain (loss): (1) – (2)	85,060,331	(52,875,918)
4. Transfer from (to) DWP contribution accounts to (from) retired reserves	(85,060,331)	52,875,918

SECTION 4: Reporting Information for The Water and Power Employees' Retirement Plan of the City of Los Angeles

EXHIBIT I

Summary of Actuarial Valuation Results

The valuation was made with respect to the following data supplied to us:

1. Retired members as of the valuation date (including 1,966 beneficiaries in pay status)	9,165
2. Members inactive during year ended June 30, 2018 with vested rights*	1,728
3. Members active during the year ended June 30, 2018	10,114

The actuarial factors as of the valuation date are as follows:

1. Normal cost	\$243,262,953
2. Present value of future benefits	15,650,463,121
3. Present value of future normal costs	2,462,920,391
4. Actuarial accrued liability	13,187,542,730
Retired members and beneficiaries	\$7,324,080,162
Inactive members with vested rights*	220,277,427
Active members	5,643,185,141
5. Actuarial value of assets (\$12,277,085,263 at market value as reported by Retirement Office)	12,009,999,030
6. Unfunded actuarial accrued liability	\$1,177,543,700

* Includes terminated members due a refund of member contributions and members receiving PTD benefits.

SECTION 4: Reporting Information for The Water and Power Employees' Retirement Plan of the City of Los Angeles

EXHIBIT I (continued)

Summary of Actuarial Valuation Results

The determination of the aggregate required contribution for all tiers combined is as follows:

	Dollar Amount	% of Payroll
1. Total normal cost	\$243,262,953	22.66%
2. Expected employee contributions	<u>-76,065,712</u>	<u>-7.09%</u>
3. Employer normal cost: (1) + (2)	\$167,197,241	15.57%
4. Amortization of unfunded actuarial accrued liability	<u>248,722,911</u>	<u>23.17%</u>
5. Total required contribution: (3) + (4), adjusted for timing*	<u>\$430,997,257</u>	<u>40.15%</u>
6. Projected compensation	\$1,073,554,607	

* Required contribution is assumed to be paid at the middle of every year.

SECTION 4: Reporting Information for The Water and Power Employees' Retirement Plan of the City of Los Angeles

EXHIBIT II

Actuarial Assumptions and Methods

Rationale for Assumptions:

The information and analysis used in selecting each assumption that has a significant effect on this actuarial valuation is shown in the July 1, 2012 through June 30, 2015 Actuarial Experience Study dated May 23, 2016. Unless otherwise noted, all actuarial assumptions and methods shown below apply to both Tier 1 and Tier 2 members.

Economic Assumptions:

Net Investment Return:

7.25%, net of investment expenses.

Consumer Price Index:

Increase of 3.00% per year; benefit increases due to CPI subject to 3.00% maximum for Tier 1 and 2.00% for Tier 2. The maximum COLA's are assumed to be paid for both Tier 1 and 2.

Employee Contribution, Additional Annuity and Matching Account Crediting Rate:

7.25%, based on Plan provisions

Administration Expenses:

Offset by additional employer contributions.

Increase in Internal Revenue Code Section 401(a)(17) Compensation Limit:

Increase of 3.00% per year from the valuation date.

SECTION 4: Reporting Information for The Water and Power Employees' Retirement Plan of the City of Los Angeles

Salary Increases:

Annual Rate of Compensation Increase

Inflation: 3.00% per year, plus “across the board” salary increases of 0.50% per year, plus the following merit and promotional increases.

<u>Years of Service</u>	<u>Increase</u>
Less than 1	6.50%
1	6.00%
2	5.50%
3	4.50%
4	3.00%
5	2.00%
6	1.50%
7	1.40%
8	1.30%
9	1.20%
10 & over	1.00%

The merit and promotional increases are added to the sum of the inflationary and “across the board” salary increases.

SECTION 4: Reporting Information for The Water and Power Employees' Retirement Plan of the City of Los Angeles

Demographic Assumptions:

Mortality Rates:

<i>Pre-retirement:</i>	Head count-weighted RP-2014 Employee Mortality Table times 80%, projected generationally with the two-dimensional MP-2015 projection scale.
<i>After Service Retirement:</i>	Head count-weighted RP-2014 Healthy Annuitant Mortality Table with no age adjustment for males and set back one year for females, projected generationally with the two-dimensional MP-2015 projection scale.
<i>After Disability Retirement:</i>	Head count-weighted RP-2014 Healthy Annuitant Mortality Table with no age adjustment for males and set back one year for females, projected generationally with the two-dimensional MP-2015 projection scale.

The RP-2014 mortality tables and adjustments as shown above reflect the mortality experience as of the measurement date. The generational projection is a provision for future mortality improvement.

SECTION 4: Reporting Information for The Water and Power Employees' Retirement Plan of the City of Los Angeles

**Termination Rates
Before Retirement:**

Rate (%)		
Male		
Age	Mortality*	Disability
25	.049	0.006
30	.048	0.012
35	.053	0.012
40	.064	0.018
45	.098	0.030
50	.167	0.054
55	.273	0.126
60	.452	0.240
65	.779	0.000
Female		
Age	Mortality*	Disability
25	.017	0.000
30	.022	0.006
35	.029	0.036
40	.039	0.072
45	.058	0.102
50	.100	0.138
55	.168	0.168
60	.241	0.000
65	.356	0.000

* 5% of pre-retirement deaths are assumed to be duty related, with the remaining being non-duty related. Note that generational projections beyond the base year (2014) are not reflected in the above mortality rates.

SECTION 4: Reporting Information for The Water and Power Employees' Retirement Plan of the City of Los Angeles

Withdrawal Rates:

<u>Years of Service</u>	<u>Total Withdrawal*</u>
Less than 1	12.00%
1	6.00%
2	4.00%
3	2.50%
4	2.00%
5	2.00%
6	1.75%
7	1.50%
8	1.25%
9	1.00%
10 & over	0.75%

* *No withdrawal is assumed after a member is first eligible to retire. Ordinary withdrawal members are assumed to receive their account balance at termination. Vested termination members are assumed to receive a deferred retirement benefit. For Tier 1 members terminating with less than one year of service, and Tier 2 members terminating with less than 5 years of service, 100% are assumed to be ordinary withdrawals. For Tier 1 members terminating with at least one year of service but less than eleven years of service, 30% are assumed to be ordinary withdrawals with the remaining 70% being vested terminations. For Tier 1 members terminating with 11 or more years of service and Tier 2 members terminating with 5 or more years of service, 15% are assumed to be ordinary withdrawals, with the remaining 85% being vested terminations.*

SECTION 4: Reporting Information for The Water and Power Employees' Retirement Plan of the City of Los Angeles

Retirement Rates:

Age	Rate (%)			
	Tier 1		Tier 2	
	Under 30 Years of Service	30 or More Years of Service	Under 30 Years of Service	30 or More Years of Service
55	4.50%	25.00%	0.0%	25.0%
56	2.00	20.00	0.0	14.0
57	2.50	17.00	0.0	12.0
58	3.00	17.00	0.0	12.0
59	3.00	17.00	0.0	12.0
60	5.00	20.00	5.0	17.5
61	6.00	20.00	2.5	5.0
62	6.00	20.00	0.0	5.0
63	6.00	25.00	20.0	25.0
64	7.00	25.00	15.0	25.0
65	11.00	28.00	14.0	28.0
66	11.00	28.00	14.0	28.0
67	11.00	28.00	14.0	28.0
68	11.00	28.00	14.0	28.0
69	13.00	28.00	13.0	28.0
70	25.00	25.00	100.0	100.0
71	25.00	25.00	100.0	100.0
72	25.00	25.00	100.0	100.0
73	25.00	25.00	100.0	100.0
74	25.00	25.00	100.0	100.0
75	100.00	100.00	100.0	100.0

SECTION 4: Reporting Information for The Water and Power Employees' Retirement Plan of the City of Los Angeles

Benefit for Inactive Vested Members:	For Tier 1, inactive vested members are assumed to retire at age 60 with a Money Purchase Annuity. Tier 1 and Tier 2 members receiving Permanent Total Disability benefits are assumed to retire at the earlier of age 65 or age 55 with 30 years of service. For Tier 2, inactive vested members are assumed to retire at age 63.
Definition of Active Members:	First day of biweekly payroll following employment.
Unknown Data for Members:	Same as those exhibited by members with similar known characteristics. If not specified, members are assumed to be male.
Data Adjustments:	Data as of March 31 has been adjusted to June 30 by adding three months of age and, for active employees, three months of service. Contribution account balances were also increased by three months of interest. For members in pay status, we have increased their benefits by the assumed July 1 COLA.
Percent Married/Domestic Partner:	85% of male members and 60% of female members are assumed to have an eligible spouse or domestic partner at pre-retirement death or retirement. The assumption is also applied for current retirees retired before April 1, 2012 with Options Full, A, B, or C since they are missing this data. Spousal gender is assumed to be opposite that of the member.
Age of Spouse:	Females are 3 years younger than their spouses.
Future Benefit Accruals:	1.0 year of service per year.
Other Government Service:	Tier 1 members are assumed to purchase an additional 0.10 years of service per year. Tier 2 members are assumed to purchase an additional 0.03 years of service per year. These service purchases exclude those priced at full actuarial cost. The valuation reflects expected future member contributions that are associated with these assumed service purchases.
<u>Actuarial Methods:</u>	
Actuarial Value of Assets:	The market value of assets less unrecognized returns in each of the last five years. Unrecognized return is equal to the difference between the actual and expected returns on a market value basis and is recognized over a five-year period. As directed by the Retirement Office, the actuarial value of assets may be reduced by an amount classified as a non-valuation reserve.

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Actuarial Cost Method: Entry Age Actuarial Cost Method. Entry Age equals attained age less years of service. Normal Cost and Actuarial Accrued Liability are calculated on an individual basis and are based on costs allocated as a level percent of salary, with Normal Cost determined as if the current benefit accrual rate had always been in effect ("replacement life within each tier").

Amortization Policy: The July 1, 2004 Unfunded Actuarial Liability is amortized over a fifteen-year period commencing July 1, 2004. Any subsequent change in Surplus or Unfunded Actuarial Accrued Liability are amortized over separate fifteen-year periods. All amortization amounts are determined in equal dollar amounts over the amortization period. The Board may, by resolution, adopt a separate period of not more than thirty years to amortize the change in Surplus or Unfunded Actuarial Accrued Liability resulting from an unusual event, plan amendment or change in assumptions or methods.

Projected Compensation: Projected compensation for the year following the valuation date is calculated by annualizing the bi-weekly pay rate increased by the assumed rate of salary increase. For members with less than one year of service as of the valuation date, no salary increase assumption is applied to their annualized compensation.

Changes in Actuarial Assumptions and Methods:

Based on changes in Plan provisions that were adopted, the following assumptions have been changed. Previously, these assumptions were as follows:

Employee Contribution, Additional Annuity and Matching Account Crediting Rate:

7.50%, based on Plan provisions

Withdrawal Rates:

To determine the proportion of terminating members assumed to be ordinary withdrawals, the previous withdrawal assumptions used 15 years instead of 5 years for Tier 2:

For Tier 1 members terminating with less than one year of service, and Tier 2 members terminating with less than 15 years of service, 100% are assumed to be

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**Changes in Actuarial Assumptions
and Methods (continued):**

ordinary withdrawals. For Tier 1 members terminating with at least one year of service but less than eleven years of service, 30% are assumed to be ordinary withdrawals with the remaining 70% being vested terminations. For Tier 1 members terminating with 11 or more years of service and Tier 2 members terminating with 15 or more years of service, 15% are assumed to be ordinary withdrawals, with the remaining 85% being vested terminations.

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EXHIBIT III

Summary of Plan Provisions

This exhibit summarizes the major provisions of the Retirement Plan included in the valuation. It is not intended to be, nor should it be interpreted as, a complete statement of all plan provisions.

Plan Year: July 1 through June 30

Census Date: March 31

Membership:

Tier 1

All members hired before January 1, 2014. Utility Pre-Craft Trainee, Construction Electrical Helper, or Construction Electrical Mechanic hired before January 1, 2014 and continuously employed until eligible for membership become Tier 1 members upon membership.

Tier 2

All members hired on or after January 1, 2014.

Formula Retirement Benefit:

Tier 1

Age & Service Requirement

Age 60 with 5 years of Department service; or
Age 55 with 10 years of Department service in the last 12 years; or
Any age with 30 years of Department service; or
Receiving permanent total disability benefits from the Plan.

Note: To be eligible, the employee must have worked or been paid disability four of the last five years immediately preceding eligibility to retire, or while eligible to retire.

Monthly Amount

The greater of 2.1% of the Monthly Salary Base or \$9.50 per year of service. For those age 55 or older with 30 or more years of service the factor is 2.3% of the Monthly Salary Base. Benefits are limited to 100% of Monthly Salary Base.

Monthly Salary Base

Equivalent of monthly average salary of highest successive 26 biweekly payroll periods (one year).

Cost of Living Benefit

Based on CPI subject to a maximum of 3% per year.

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Tier 2

Age & Service Requirement

Age 60 with 5 years of continuous Department Service with the Plan immediately prior to reaching eligibility; or
Age 60 with 10 years of Qualifying Service; or
Any age with 30 years of Qualifying Service; or
Receiving permanent total disability benefits from the Plan.

Monthly Amount

1.5% x Monthly Salary Base x service credit at age 60 with 5 years of continuous Department Service (or 10 years of Qualifying Service).
2.0% x Monthly Salary Base x service credit at age 60 with 30 years of Qualifying Service; or
2.0% x Monthly Salary Base x service credit at age 55 with 30 years of Service Credit (Service Credit with the Department and with LACERS is combined for satisfying this requirement); or
2.0% x Monthly Salary Base x service credit at age 63 with 5 years of continuous Department Service (or 10 years of Qualifying Service); or
2.1% x Monthly Salary Base x service credit at age 63 with 30 years of Qualifying Service.

Monthly Salary Base

Benefits are limited to 80% of Monthly Salary Base.

Equivalent of monthly average salary of highest successive 78 biweekly payroll periods (three years).

Cost of Living Benefit

Based on CPI subject to a maximum of 2% per year.

Money Purchase Annuity:

Tier 1

A monthly lifetime benefit equal in value to the employee normal contribution account plus Department matching contribution (current service contribution) account at retirement date.

Tier 2

Same as Tier 1 (except no Department matching contribution).

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Minimum Benefit:

If the money purchase annuity amount exceeds the monthly amount of the formula retirement benefit and the retiree meets the eligibility requirements for the formula retirement benefit, the amount of the money purchase annuity is paid and the cost-of-living and death after retirement continuance features of the formula retirement benefit are also paid.

Early Retirement Reduction Factors:

Tier 1

The early retirement factor is determined by the attained age on the effective date of retirement. Every three months of attained age will affect the factor.

Attained Age at Actual Retirement	Exact Age	+3 Months	+6 Months	+9 Months
48	.7150	.7225	.7300	.7375
49	.7450	.7525	.7600	.7675
50	.7750	.7825	.7900	.7975
51	.8050	.8125	.8200	.8275
52	.8350	.8425	.8500	.8575
53	.8650	.8725	.8800	.8875
54	.8950	.9025	.9100	.9175
55	.9250	.92875	.9325	.93625
56	.9400	.94375	.9475	.95125
57	.9550	.95875	.9625	.96625
58	.9700	.97375	.9775	.98125
59	.9850	.98875	.9925	.99625
60 & Over	1.0000			

The factor is 1.0000 for those retiring at age 55 or later with at least 30 years of service.

Tier 2

Same as Tier 1. These are applied to the age 60 benefit for members (with 2.0% formula) who retire before age 60 with less than 30 years of service credit. Service Credit with the Department and with LACERS is combined for satisfying this requirement.

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Member Normal Contributions:

Tier 1

If an employee became a plan member after May 31, 1984, the member normal contribution rate is 6% of pay.

If an employee became a plan member before June 1, 1984 or transferred from CERS with an entry age contribution rate, sample rates by entry age are as follows:

<u>Entry Age</u>	<u>Rate</u>
20	2.601%
25	3.102%
30	3.611%
35	4.161%
40	4.742%
45	5.381%
50	6.042%
55	6.762%
59	7.332%

Tier 2

Normal contribution rate of 10% of pay.

Department Current Service Contributions:

Tier 1

The Department of Water and Power makes actuarially based contributions that are a minimum of 110% of employee contributions.

Tier 2

Same as Tier 1, except that the minimum contribution equal to 110% of employee contributions is not required.

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Disability:

Tier 1

Disability benefits are paid from the Disability Fund. However, if a member is receiving permanent and total disability benefits, the member may elect to retire. Other than a nominal amount, no service credit during disability is earned for the Formula benefit; however, credit is earned during disability toward the \$9.50 minimum formula.

Tier 2

Same as Tier 1 (except no \$9.50 minimum formula).

Deferred Retirement Benefit (Vested):

Tier 1

Age & Service Requirement

Age 60 with one year of continuous membership; or
Age 55 with 10 years of contributing membership in the 12 years prior to separation from service.

Amount

Value of employee normal contribution account plus Department matching contribution (called current service contribution) account at retirement date. Does not include cost-of-living and death after retirement continuance features of the formula retirement benefit.

Tier 2

Age & Service Requirement

Age 60 with 5 years of Service Credit with the Plan; or
Age 60 with 15 years of Service Credit (Plan and LACERS Service)

Monthly Amount

1.5% x Monthly Salary Base x service credit at age 60 with 5 years of Service Credit (or 15 years of Service Credit (Plan and LACERS)); or
2.0% x Monthly Salary Base x service credit at age 63 with 5 years of Service Credit (or 15 years of Service Credit (Plan and LACERS)).
Does not include cost-of-living and death after retirement continuance features of the formula retirement benefit.

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Death Before Retirement:

Tier 1 and Tier 2

Age and Service Requirement

None

Amount

Refund of member contributions with interest.

*Age, Service and Type of
Death Requirement*

Any death of a member who is eligible for service retirement, or attained 25 years of service, or age 55 with 10 years of service for Tier 1 only.

In lieu of the refund of member contributions with interest, the member's spouse or domestic partner may elect an immediate lifetime monthly allowance. The monthly allowance payable to the surviving spouse or domestic partner is the amount the spouse or domestic partner would have received had the member elected a full joint and survivor allowance.

*Age, Service and Type of
Death Requirement*

Duty death, but prior to service retirement eligibility or attainment of 25 years of service or age 55 with 10 years of service for Tier 1 only.

Amount

In lieu of the refund of member contributions with interest, the member's spouse or domestic partner may elect either:

- (a) A lifetime monthly allowance commencing when the member would have been eligible for a service retirement or attained 25 years of service; or
- (b) A lifetime monthly allowance calculated with up to five years added to the member's age or service. This option is only available if the member has attained age 50 or attained 20 years of service.

The monthly allowance payable is the amount the spouse or domestic partner would have received had the member elected a full joint and survivor allowance.

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Death After Retirement:

Tier 1 and Tier 2

50% of retiree's unmodified allowance continued to eligible spouse or domestic partner (reduced if difference in ages is greater than five years).

**Withdrawal of Contributions Benefit
(Ordinary Withdrawal):**

Tier 1 and Tier 2

Refund of employee contributions with interest.

**Post-retirement
Cost-of-Living Benefits:**

Tier 1

Future changes based on the Consumer Price Index to a maximum of 3% per year, excess "banked."

Tier 2

Future changes based on the Consumer Price Index to a maximum of 2% per year. Member may purchase additional 1% COLA protection at full actuarial cost.

Changes in Plan Provisions:

Certain technical amendments related to the administration of Tier 2 provisions were adopted. The vesting requirement for Tier 2 members was amended to include a reduction in the minimum vesting requirement for Tier 2 members to 5 years.

NOTE: *The summary of major Plan provisions is designed to outline principle Plan benefits as interpreted for purposes of the actuarial valuation. If the Retirement Office should find the Plan summary not in accordance with the actual provisions, the Retirement Office should alert the actuary so they can both be sure the proper provisions are valued.*

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