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

## Governmental Accounting Standards Board Statement 67 (GAS 67) Actuarial Valuation

As of June 30, 2022



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September 23, 2022

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

Dear Board Members:

We are pleased to submit this Governmental Accounting Standards (GAS) 67 Actuarial Valuation as of June 30, 2022. It contains various information that will need to be disclosed in order to comply with GAS 67.

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 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; and changes in plan provisions or applicable law.

The actuarial calculations were completed under the supervision of Eva Yum, FSA, 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 expectations for the Plan.

We look forward to reviewing this report with you and to answering any questions.

Sincerely,

Segal

| | |
|---|---|
| Paul Angelo, FSA, MAAA, FCA, EA<br>Senior Vice President and Actuary | Eva Yum, FSA, MAAA, EA<br>Vice President and Actuary |

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# Section 1: Actuarial Valuation Summary

## Purpose and basis

This report has been prepared by Segal to present certain disclosure information required by Governmental Accounting Standards Board Statement 67 (GAS 67) as of June 30, 2022. This valuation is based on:

- The benefit provisions of the Retirement Plan, as administered by the Board;
- The characteristics of covered active members, inactive vested members, and retired members and beneficiaries as of March 31, 2022, provided by the Retirement Office;
- The assets of the Plan as of June 30, 2022, provided by the Retirement Office;
- Economic assumptions regarding future salary increases and investment earnings adopted by the Board for the July 1, 2022 valuation; and
- Other actuarial assumptions, regarding employee terminations, retirement, death, etc. adopted by the Board for the July 1, 2022 valuation.

## General observations on GAS 67 actuarial valuation

1. The Governmental Accounting Standards Board (GASB) rules only define pension liability and expense for financial reporting purposes, and do not apply to contribution amounts for pension funding purposes. Employers and plans should develop and adopt funding policies under current practices.
2. When measuring pension liability GASB uses the same actuarial cost method (Entry Age method) and the same type of discount rate (expected return on assets) as WPERP uses for funding. This means that the Total Pension Liability (TPL) measure for financial reporting shown in this report is determined on the same basis as WPERP's Actuarial Accrued Liability (AAL) measure for funding. We note that the same is generally true for the Normal Cost component of the annual plan cost for funding and financial reporting.
3. The Net Pension Liability (NPL) is equal to the difference between the TPL and the Plan Fiduciary Net Position. The Plan Fiduciary Net Position is equal to the market value of assets and therefore, the NPL measure is very similar to an Unfunded Actuarial Accrued Liability (UAAL) calculated on a market value basis. The NPL reflects all investment gains and losses as of the measurement date.

## Highlights of the valuation

1. The NPLs measured as of June 30, 2022 and June 30, 2021 have been determined from the actuarial valuations as of July 1, 2022 and July 1, 2021, respectively.
2. The June 30, 2022 measurement date results reflect changes in the economic and demographic assumptions as recommended by Segal and adopted by the Board for the July 1, 2022 valuation. These changes were documented in our Actuarial Experience Study dated May 20, 2022.
3. The NPL increased from $(1,658.6) million as of June 30, 2021 to $616.2 million as of June 30, 2022 primarily due to unfavorable investment return during the year ending June 30, 2022 (-5.37% return which was lower than the assumed return of 7.00%), and changes in actuarial assumptions. Changes in these values during the last two fiscal years ending June 30, 2022 and June 30, 2021 can be found in *Section 2, Schedule of Changes in Net Pension Liability* on page 16.
4. The discount rates used to determine the TPL and NPL as of June 30, 2022 and 2021 were 6.50% and 7.00%, respectively, following the same assumptions used by the Plan in the pension funding valuations as of July 1, 2022 and July 1, 2021. Details on the derivation of the discount rate as of June 30, 2022 can be found in *Section 3, Appendix A*. Various other information that is required to be disclosed can be found throughout *Section 2*.
5. It is important to note that this actuarial valuation is based on plan assets as of June 30, 2022. Due to the COVID-19 pandemic, market conditions have changed significantly since the onset of the Public Health Emergency. The Plan's funded status does not reflect short-term fluctuations of the market, but rather is based on the market values on the last day of the Plan Year. Moreover, this actuarial valuation is based on Plan data as of March 31, 2022 (adjusted to June 30, 2022 by adding 3 months of age, service and interest on contribution balance, and increasing benefit by the assumed July 1 COLA for members in pay status) and it does not include any possible short-term or long-term impacts on mortality of the covered population that may emerge after March 31, 2022. While it is impossible to determine how the pandemic will affect market conditions and other demographic experience of the Plan in future valuations, Segal is available to prepare projections of potential outcomes upon request.

## Summary of key valuation results

| Measurement Date | | June 30, 2022 | June 30, 2021 |
|---|---|---|---|
| Disclosure elements for fiscal year ending June 30: | • Service cost[1] | $277,243,581 | $275,365,595 |
| | • Total Pension Liability | 16,130,108,757 | 15,008,817,566 |
| | • Plan Fiduciary Net Position[2] | 15,513,924,394 | 16,667,463,956 |
| | • Net Pension Liability | 616,184,363 | (1,658,646,390) |
| Schedule of contributions for fiscal year ending June 30: | • Actuarially determined contributions[3] | $302,800,123 | $373,374,390 |
| | • Actual contributions | 318,873,759 | 378,990,511 |
| | • Contribution deficiency / (excess) | (16,073,636) | (5,616,121) |
| Demographic data for plan year ending June 30: | • Number of retired members and beneficiaries | 9,716 | 9,564 |
| | • Number of inactive vested members[4] | 1,735 | 1,708 |
| | • Number of active members | 10,799 | 10,605 |
| Key assumptions as of June 30: | • Investment rate of return | 6.50% | 7.00% |
| | • Inflation rate | 2.50% | 2.75% |
| | • Projected salary increases[5] | 4.25% to 10.00%, varying by service, including inflation | 4.50% to 10.25%, varying by service, including inflation |
| | • Cost of living adjustments | 2.75% for Tier 1 and 2.00% for Tier 2 | 2.75% for Tier 1 and 2.00% for Tier 2 |

1 The service cost is always based on the previous year's assumptions, meaning the June 30, 2022 and June 30, 2021 measurement values are based on the assumptions shown in the June 30, 2021 column as there had been no changes in the actuarial assumptions between the July 1, 2020 and July 1, 2021 valuations.

2 Based on preliminary unaudited financial statements as of June 30, 2022.

3 Based on actual covered payroll reported by the Retirement Office.

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

5 Includes inflation at 2.50% and 2.75% as of June 30, 2022 and 2021, respectively, plus real across-the-board salary increases of 0.50% plus merit and promotion increases.

## 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 a valuation, 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 (as well as the plan summary included in our funding valuation 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 measurement 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, termination, 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. |
| **Models** | Segal valuation results are based on proprietary actuarial modeling software. The actuarial valuation models generate a comprehensive set of liability and cost calculations that are presented to meet regulatory, legislative and client requirements. Our Actuarial Technology and Systems unit, comprised of both actuaries and programmers, is responsible for the initial development and maintenance of these models. The models have a modular structure that allows for a high degree of accuracy, flexibility and user control. The client team programs the assumptions and the plan provisions, validates the models, and reviews test lives and results, under the supervision of the responsible actuary. |

# Section 1: Actuarial Valuation Summary

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 Board to assist the Plan in preparing their financial reports. 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 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 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 or LADWP.

# Section 2: GAS 67 Information

## General information about the Pension Plan

**Plan Description**

*Plan administration.* The Water and Power Employees' Retirement Plan of the City of Los Angeles (WPERP) was established by the Los Angeles Department of Water and Power in 1938. WPERP is a single employer public employee retirement system whose main function is to provide retirement benefits to employees of the Los Angeles Department of Water and Power.

Under the provisions of the City Charter, the Board of Administration (the "Board") has the responsibility and authority to administer the Plan and to invest its assets. The Board members serve as trustees and must act in the exclusive interest of the Plan's members and beneficiaries. The Board has seven members: one member of the Board of Water and Power Commissioners, the General Manager, the Chief Accounting Employee, three employee members who are elected for three-year terms by active members of the Plan, and one retiree who is appointed by the Board of Water and Power Commissioners for a three-year term.

*Plan membership.* At June 30, 2022, pension plan membership consisted of the following:

| | |
|---|---|
| Retired members or beneficiaries currently receiving benefits | 9,716 |
| Vested terminated members entitled to, but not yet receiving benefits[1] | 1,735 |
| Active members | 10,799 |
| Total | 22,250 |

[1] Includes terminated members due a refund of member contributions and members receiving PTD benefits.

*Benefits provided.* WPERP provides service retirement, disability, death and survivor benefits to eligible employees. Most employees of the LADWP become members of WPERP effective on the first day of biweekly payroll following employment. Members employed prior to January 1, 2014 are designated as Tier 1 and those hired on or after January 1, 2014 are designated as Tier 2 (unless a specific exemption applies to employee providing a right to Tier 1 status).

Tier 1 members are eligible to retire once they attain the age of 60 with 5 or more years of Department service or at age 55 with 10 or more years of Department service acquired in the last 12 years prior to retirement. A Tier 1 member with 30 years of Department service is eligible to retire regardless of age. Tier 2 members are eligible to retire once they attain the age of 60 with 5 years of continuous Department service with the Plan immediately prior to reaching eligibility or age 60 with 10 or more years of Qualifying service or at any age with 30 years of Qualifying service. For both tiers, combined years of service between WPERP and LACERS is used to determine retirement eligibility and at least 5 years must be actual employment at DWP or City. The one exception is the age 60 with 5 years of continuous Department Service for Tier 2 where only service with DWP can be counted. For both tiers, members receiving Permanent Total Disability benefits may retire regardless of age. For Tier 1, to be eligible for a Formula Pension, 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.

The Formula Pension benefit the member will receive is based upon age at retirement, monthly average salary base and years of retirement service credit.

The Tier 1 Formula Pension is equal to 2.1% times years of service credit times monthly average salary base. In addition, members retiring after attaining age 55 with 30 years of service credit, receive an increase in the benefit factor from 2.1% to 2.3%. A reduced early retirement benefit is paid for those members attaining age 55 with 10 years of service or any age (under 55) with 30 years of service. The reduction is 1.5% for each year of retirement age between 60 and 55 and 3.0% for each year of retirement before age 55.

Under Tier 2, there are various benefit factors that apply as shown below:

- 1.5% at age 60 with 5 years of continuous Department Service (or 10 years of Qualifying Service)
- 2.0% at age 60 with 30 years of Qualifying Service
- 2.0% at age 55 with 30 years of Service Credit
- 2.0% at age 63 with 5 years of continuous Department Service (or 10 years of Qualifying Service)
- 2.1% at age 63 with 30 years of Qualifying Service

The reduced early retirement benefits for Tier 2 are the 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.

For Tier 1 members, the maximum monthly retirement allowance is 100% of monthly average salary base. For Tier 2 members, the maximum monthly retirement allowance is 80% of monthly average salary base.

Under Tier 1, pension benefits are calculated based on the highest average salary earned during a 12-month period. Under Tier 2, pension benefits are calculated based on the average salary earned during a 36-month period.

For both tiers, the member may elect the Full Allowance, or choose an optional retirement allowance. The Full Allowance provides the highest monthly benefit and up to a 50% continuance to an eligible surviving spouse or domestic partner. There are five optional retirement allowances the member may choose. Each of the optional retirement allowances requires a reduction in the Full Allowance in order to allow the member the ability to provide various benefits to a surviving spouse, domestic partner, or named beneficiary.

WPERP provides annual cost-of-living adjustments (COLAs) to retirees that are not considered vested retirement. The cost-of-living adjustments are made each July 1 based on the percentage change in the average of the Consumer Price Index for the Los Angeles-Long Beach-Anaheim--All Items For All Urban Consumers. It is capped at 3.0% for Tier 1 and 2.0% for Tier 2. Tier 2 members may purchase additional 1% COLA protection at full actuarial cost.

# Section 2: GAS 67 Information

The LADWP contributes to the retirement plan based upon actuarially determined contribution rates adopted by the Board of Administration. Employer contribution rates are adopted annually based upon recommendations received from WPERP's actuary after the completion of the annual actuarial valuation. The average employer contribution rate as of June 30, 2022 (based on the July 1, 2021 valuation) was 26.04% of compensation.

All members are required to make contributions to WPERP regardless of the retirement plan or tier in which they are included. The average member contribution rate as of June 30, 2022 (based on the July 1, 2021 valuation) was 7.85% of compensation. Most Tier 1 members contribute at 6% of compensation and all Tier 2 members contribute at 10% of compensation.

## Net Pension Liability

| Measurement Date | June 30, 2022 | June 30, 2021 |
|---|---|---|
| **Components of the Net Pension Liability** | | |
| Total Pension Liability | $16,130,108,757 | $15,008,817,566 |
| Plan Fiduciary Net Position | (15,513,924,394) | (16,667,463,956) |
| Net Pension Liability | $616,184,363 | $(1,658,646,390) |
| Plan Fiduciary Net Position as a percentage of the Total Pension Liability | 96.18% | 111.05% |

The Net Pension Liability (NPL) for the Plan was measured as of June 30, 2022 and 2021. The Plan Fiduciary Net Position (plan assets) and Total Pension Liability (TPL) were valued as of the measurement date and are from actuarial valuations as of July 1, 2022 and 2021, respectively.

*Plan provisions.* The plan provisions used in the measurement of the NPL are the same as those used in the WPERP actuarial valuations as of July 1, 2022 and 2021, respectively.

*Actuarial assumptions.* The TPL as of June 30, 2022 was determined by an actuarial valuation as of July 1, 2022. The actuarial assumptions used in the June 30, 2022 measurement were based on the results of an experience study for the period from July 1, 2018 through June 30, 2021. They are the same as the assumptions used in the July 1, 2022 funding actuarial valuation for the WPERP. The assumptions used in the funding valuation are outlined on page 18 of this report. In particular, the following assumptions were applied to all periods included in the June 30, 2022 measurement:

| | |
|---|---|
| **Inflation:** | 2.50% |
| **Cost of living adjustments:** | 2.75% for Tier 1 and 2.00% for Tier 2 |
| **Salary increases:** | 4.25% to 10.00%, varying by service, including inflation |
| **Investment rate of return:** | 6.50%, net of pension plan investment expense, including inflation |
| **Other assumptions:** | See analysis of actuarial experience during the period July 1, 2018 through June 30, 2021 |

# Section 2: GAS 67 Information

The TPL as of June 30, 2022 also included refinements made to the valuation program.[1]

The TPL as of June 30, 2021 was determined by an actuarial valuation as of July 1, 2021. The actuarial assumptions used in the June 30, 2021 measurement were based on the results of an experience study for the period from July 1, 2015 through June 30, 2018. They are the same as the assumptions used in the July 1, 2021 funding actuarial valuation for the WPERP. In particular, the following assumptions were applied to all periods included in the June 30, 2021 measurement:

| | |
|---|---|
| **Inflation:** | 2.75% |
| **Cost of living adjustments:** | 2.75% for Tier 1 and 2.00% for Tier 2 |
| **Salary increases:** | 4.50% to 10.25%, varying by service, including inflation |
| **Investment rate of return:** | 7.00%, net of pension plan investment expense, including inflation |
| **Other assumptions:** | See analysis of actuarial experience during the period July 1, 2015 through June 30, 2018 |

[1] We have included the following refinements in the June 30, 2022 valuation:
- In the service cost calculation, we have included pre-employment eligibility service for certain members when determining when the members are expected to be eligible to receive benefits.
- We have used recently provided information on combined service credit for determining the applicable retirement factor under the retirement benefit formulas. In previous valuations, Department service was used as an estimate for combined service credit.
- We have reflected the optional form for Additional Annuity for certain retirees whose Additional Annuity optional form is different from the optional form for their normal pension.

## Determination of discount rate and investment rates of return

The long-term expected rate of return on pension plan investments was determined in 2022 using a building-block method in which expected future real rates of return (expected returns, net of inflation) are developed for each major asset class. These returns are combined to produce the long-term expected rate of return by weighting the expected future real rates of return by the target asset allocation percentage, adding expected inflation and subtracting expected investment expenses and a risk margin. The target allocation and projected arithmetic real rates of return for each major asset class, after deducting inflation, but before deducting investment expenses, used in the derivation of the long-term expected investment rate of return assumption as of June 30, 2022 is summarized in the following table. This information will change every three years based on the actuarial experience study.

| Asset Class | Target Allocation | Long-Term Expected Arithmetic Real Rate of Return |
|---|---|---|
| Large Cap US Equity | 21.10% | 5.13% |
| Small Cap US Equity | 2.10% | 5.86% |
| Developed International Large Cap Equity | 12.20% | 6.01% |
| Developed International Small Cap Equity | 1.80% | 5.72% |
| Global Equity | 2.70% | 5.94% |
| Emerging Market Equity | 5.10% | 8.16% |
| TIPS | 3.50% | -0.23% |
| Real Estate | 7.00% | 4.60% |
| Cash and Equivalents | 1.00% | -0.77% |
| Commodities | 1.50% | 2.77% |
| Private Equity | 10.00% | 10.46% |
| Private Credit | 2.40% | 5.94% |
| Hedge Funds | 5.00% | 1.85% |
| Non-Core Real Estate | 3.00% | 7.14% |
| Custom Fixed Income | 21.60% | 0.68% |
| **Total** | **100.00%** | |

*Discount rate:* The discount rate used to measure the TPL was 6.50% and 7.00% as of June 30, 2022 and June 30, 2021, respectively. The projection of cash flows used to determine the discount rate assumed member contributions will be made at the current contribution rates and that employer contributions will be made at rates equal to the required contribution rates. For this purpose, only employee and employer contributions that are intended to fund benefits for current plan members and their beneficiaries are included. Projected employer contributions that are intended to fund the service costs for future plan members and their beneficiaries, as well as projected contributions from future plan members, are not included. Based on those assumptions, the Plan Fiduciary Net Position was projected to be available to make all projected future benefit payments for current plan members. Therefore, the long-term expected rate of return on pension plan investments was applied to all periods of projected benefit payments to determine the TPL as of both June 30, 2022 and June 30, 2021.

## Discount rate sensitivity

*Sensitivity of the Net Pension Liability to changes in the discount rate.* The following presents the NPL of the WPERP as of June 30, 2022, calculated using the discount rate of 6.50%, as well as what the WPERP NPL would be if it were calculated using a discount rate that is 1-percentage-point lower (5.50%) or 1-percentage-point higher (7.50%) than the current rate:

| | **1% Decrease (5.50%)** | **Current Discount Rate (6.50%)** | **1% Increase (7.50%)** |
|---|---|---|---|
| **Net Pension Liability as of June 30, 2022** | $2,814,137,236 | $616,184,363 | $(1,193,123,527) |

## Schedule of changes in Net Pension Liability

| Measurement Date | June 30, 2022 | June 30, 2021 |
|---|---|---|
| **Total Pension Liability** | | |
| • Service cost | 277,243,581 | $275,365,595 |
| • Interest | 1,044,964,004 | 1,008,129,964 |
| • Change of benefit terms | 0 | 0 |
| • Differences between expected and actual experience | (35,733,830) | (62,310,517) |
| • Changes of assumptions or other inputs | 550,825,337 | 0 |
| • Benefit payments, including refunds of member contributions | (716,007,901) | (677,717,014) |
| **Net change in Total Pension Liability** | **$1,121,291,191** | **$543,468,028** |
| **Total Pension Liability – beginning** | **15,008,817,566** | **14,465,349,538** |
| **Total Pension Liability – ending** | **$16,130,108,757** | **$15,008,817,566** |
| **Plan Fiduciary Net Position** | | |
| • Contributions – employer (including those for administrative expenses) | $325,325,721 | $385,071,467 |
| • Contributions – employee | 131,105,102 | 122,316,256 |
| • Net investment income | (888,348,728) | 3,489,200,333 |
| • Benefit payments, including refunds of member contributions | (716,007,901) | (677,717,014) |
| • Administrative expense | (5,613,756) | (5,115,182) |
| • Other | 0 | 0 |
| **Net change in Plan Fiduciary Net Position** | **$(1,153,539,562)** | **$3,313,755,860** |
| **Plan Fiduciary Net Position – beginning** | **16,667,463,956** | **13,353,708,096** |
| **Plan Fiduciary Net Position – ending** | **$15,513,924,394** | **$16,667,463,956** |
| **Net Pension Liability – ending** | **$616,184,363** | **$(1,658,646,390)** |
| **Plan Fiduciary Net Position as a percentage of the Total Pension Liability** | **96.18%** | **111.05%** |
| **Covered payroll[1]** | **$1,178,016,102** | **$1,121,883,556** |
| **Net Pension Liability as percentage of covered payroll** | **52.31%** | **-147.84%** |

1 Covered payroll represents payroll on which contributions to the pension plan are based.

## Schedule of Employer contributions

| Year Ended June 30 | Actuarially Determined Contributions[1, 2, 3, 4] | Contributions in Relation to the Actuarially Determined Contributions[2, 3] | Contribution Deficiency / (Excess) | Covered Payroll | Contributions as a Percentage of Covered Payroll |
|---|---|---|---|---|---|
| 2013 | $376,667,610 | $368,426,348 | $8,241,262 | $817,421,028 | 45.07% |
| 2014 | 387,823,989 | 384,265,892 | 3,558,097 | 819,923,866 | 46.87% |
| 2015 | 387,464,759 | 376,902,022 | 10,562,737 | 839,213,254 | 44.91% |
| 2016 | 368,599,924 | 362,359,894 | 6,240,030 | 861,818,854 | 42.05% |
| 2017 | 403,780,319 | 391,717,359 | 12,062,960 | 892,332,196 | 43.90% |
| 2018 | 425,512,236 | 433,412,569 | (7,900,333) | 953,635,670 | 45.45% |
| 2019 | 408,750,192 | 410,165,124 | (1,414,932) | 1,028,212,002 | 39.89% |
| 2020 | 424,375,428 | 422,017,394 | 2,358,034 | 1,130,066,141 | 37.34% |
| 2021 | 373,374,390 | 378,990,511 | (5,616,121) | 1,121,883,556 | 33.78% |
| 2022 | 302,800,123 | 318,873,759 | (16,073,636) | 1,178,016,102 | 27.07% |

1 All "Actuarially Determined Contributions" through June 30, 2014 were determined as the "Annual Required Contribution" under GAS 25 and 27.

2 Based on actual covered payroll reported by the Retirement Office. For the year ended June 30, 2015, reflects the effect of the phase-in over two years of the contribution rate impact of new actuarial assumptions adopted by the Board effective with the July 1, 2014 valuation. For the year ended June 30, 2017, reflects the effect of the phase-in over two years of the contribution rate impact of new actuarial assumptions adopted by the Board effective with the July 1, 2016 valuation.

3 Excludes employer contributions towards administrative expenses.

4 Starting in 2019, the actuarially determined contribution is determined by applying the Tier 1 and Tier 2 contribution rates to their respective payroll.

See accompanying notes to this schedule on the next page.

**Notes to Schedule:**

**Methods and assumptions used to establish "actuarially determined contribution" rates:**

| | |
|---|---|
| **Valuation date:** | Actuarially determined contribution rates are calculated as of June 30, one year prior to the end of the fiscal year in which contributions are reported |
| **Actuarial cost method:** | Entry Age Actuarial Cost Method |
| **Amortization method:** | Level dollar amortization |
| **Remaining amortization period:** | The July 1, 2004 Unfunded Actuarial Accrued Liability is amortized over a 15-year period commencing July 1, 2004 (fully amortized as of July 1, 2019). Any subsequent changes in Unfunded Actuarial Accrued Liability are amortized over separate 15-year periods effective with that valuation. |
| **Asset valuation method:** | 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 market return and the expected return on a market value basis, and is recognized over a five-year period. Prior to the July 1, 2020 valuation, as directed by the Retirement Office, the actuarial valuation of assets may be reduced by an amount classified as non-valuation reserve. |

**Actuarial assumptions:**

| **Valuation Date:** | **July 1, 2022 Valuation Date** | **July 1, 2021 Valuation Date** |
|---|---|---|
| **Investment rate of return:** | 6.50%, net of investment expenses | 7.00%, net of investment expenses |
| **Inflation rate:** | 2.50% | 2.75% |
| **Real across-the-board salary increase:** | 0.50% | 0.50% |
| **Projected salary increases:**[1] | 4.25% to 10.00% | 4.50% to 10.25% |
| **Cost of living adjustments:** | 2.75% (actual increases are contingent upon CPI increases with a 3.00% maximum for Tier 1, 2.00% maximum for Tier 2) | 2.75% (actual increases are contingent upon CPI increases with a 3.00% maximum for Tier 1, 2.00% maximum for Tier 2) |
| **Other assumptions:** | Same as those used in the July 1, 2022 funding actuarial valuation | Same as those used in the July 1, 2021 funding actuarial valuation |

1 Includes inflation at 2.50% and 2.75% as of July 1, 2022 and 2021, respectively plus real across-the-board salary increases of 0.50% plus merit and promotion increases.

## Appendix A: Projection of Plan Fiduciary Net Position for use in the Calculation of Discount Rate as of June 30, 2022 ($ in millions)

| Year Beginning July 1, | Projected Beginning Plan Fiduciary Net Position (a) | Projected Total Contributions (b) | Projected Benefit Payments (c) | Projected Investment Earnings (d) | Projected Ending Plan Fiduciary Net Position (e) = (a) + (b) - (c) + (d) |
|---|---|---|---|---|---|
| 2022 | $15,514 | $476 | $791 | $998 | $16,197 |
| 2023 | 16,197 | 500 | 826 | 1,042 | 16,913 |
| 2024 | 16,913 | 449 | 868 | 1,086 | 17,580 |
| 2025 | 17,580 | 345 | 910 | 1,124 | 18,139 |
| 2026 | 18,139 | 361 | 950 | 1,160 | 18,710 |
| 2027 | 18,710 | 319 | 989 | 1,194 | 19,234 |
| 2028 | 19,234 | 303 | 1,027 | 1,227 | 19,737 |
| 2029 | 19,737 | 291 | 1,068 | 1,258 | 20,219 |
| 2030 | 20,219 | 339 | 1,109 | 1,289 | 20,738 |
| 2031 | 20,738 | 270 | 1,151 | 1,319 | 21,176 |
| | | | | | |
| 2047 | 25,174 | 159 | 1,781 | 1,584 | 25,135 |
| 2048 | 25,135 | 144 | 1,821 | 1,579 | 25,037 |
| 2049 | 25,037 | 128 | 1,862 | 1,571 | 24,874 |
| 2050 | 24,874 | 112 | 1,902 | 1,559 | 24,642 |
| 2051 | 24,642 | 94 | 1,941 | 1,542 | 24,338 |
| | | | | | |
| 2096 | 282 | 0 | 85 | 16 | 212 |
| 2097 | 212 | 0 | 67 | 12 | 157 |
| 2098 | 157 | 0 | 51 | 9 | 115 |
| 2099 | 115 | 0 | 38 | 6 | 82 |
| 2100 | 82 | 0 | 29 | 4 | 58 |
| | | | | | |
| 2131 | 1 | 0 | 0 * | 0 | 1 |
| 2132 | 1 | | | | |
| 2132 | Discounted Value: 0 ** | | | | |

* Less than $1 million, when rounded.

** $1 million when discounted with interest at the rate of 6.50% per annum has a value of less than $1 million (when rounded) as of June 30, 2022.

**Notes:**

1. Amounts may not total exactly due to rounding.
2. Years 2032-2046, 2052-2095, and 2101-2130 have been omitted from this table.
3. Column (a): Except for the "discounted value" shown for 2132, none of the projected beginning Plan Fiduciary Net Position amounts shown have been adjusted for the time value of money.
4. Column (b): Projected total contributions include employee and employer Normal Cost contributions based on closed group projections (based on covered active members as of June 30, 2022), plus employer contributions to the Unfunded Actuarial Accrued Liability based on the Plan's funding policy. Contributions are assumed to occur halfway through the year, on average.
5. Column (c): Projected benefit payments have been determined in accordance with paragraph 39 of GASB Statement No. 67, and are based on the closed group of active, inactive vested, retired members, and beneficiaries as of June 30, 2022. The projected benefit payments reflect the cost of living increase assumptions used in the June 30, 2022 valuation report. The projected benefit payments are assumed to occur halfway through the year, on average.
6. Column (d): Projected investment earnings are based on the assumed investment rate of return of 6.50% per annum.
7. Throughout the projection, administrative expenses are not shown as they are expected to be offset by additional employer contributions above those shown in this projection.
8. As illustrated in this Appendix, the Plan Fiduciary Net Position was projected to be available to make all projected future benefit payments for current Plan members. In other words, there is no projected "cross-over date" when projected benefits are not covered by projected assets. Therefore, the long-term expected rate of return on Plan investments of 6.50% per annum was applied to all periods of projected benefit payments to determine the Total Pension Liability as of June 30, 2022 shown earlier in this report, pursuant to paragraph 44 of GASB Statement No. 67.
9. This projection is based on a model developed by our Actuarial Technology and Systems unit, comprised of both actuaries and programmers. The model allows the client team, under the supervision of the responsible actuary, control over the entry of future expected contribution income, benefit payments and administrative expenses. The projection of fiduciary net position and the discounting of benefits is part of the model.

## Appendix B: Definition of Terms

Definitions of certain terms as they are used in Statement 67. The terms may have different meanings in other contexts.

| | |
|---|---|
| **Actuarial Present Value of Projected Benefit Payments:** | Projected benefit payments discounted to reflect the expected effects of the time value (present value) of money and the probabilities of payment. |
| **Actuarial Valuation:** | The determination, as of a point in time (the actuarial valuation date), of the service cost, Total Pension Liability, and related actuarial present value of projected benefit payments for pensions performed in conformity with Actuarial Standards of Practice unless otherwise specified by the GASB. |
| **Actuarial Valuation Date:** | The date as of which an actuarial valuation is performed. |
| **Actuarially Determined Contribution:** | A target or recommended contribution to a defined benefit pension plan for the reporting period, determined in conformity with Actuarial Standards of Practice based on the most recent measurement available when the contribution for the reporting period was adopted. |
| **Ad Hoc Cost-of-Living Adjustments (Ad Hoc COLAs):** | Cost-of-living adjustments that require a decision to grant by the authority responsible for making such decisions. |
| **Ad Hoc Postemployment Benefit Changes:** | Postemployment benefit changes that require a decision to grant by the authority responsible for making such decisions. |
| **Automatic Cost-of-Living Adjustments (Automatic COLAs):** | Cost-of-living adjustments that occur without a requirement for a decision to grant by a responsible authority, including those for which the amounts are determined by reference to a specified experience factor (such as the earnings experience of the pension plan) or to another variable (such as an increase in the consumer price index). |
| **Automatic Postemployment Benefit Changes:** | Postemployment benefit changes that occur without a requirement for a decision to grant by a responsible authority, including those for which the amounts are determined by reference to a specified experience factor (such as the earnings experience of the pension plan) or to another variable (such as an increase in the consumer price index). |
| **Cost-of-Living Adjustments:** | Postemployment benefit changes intended to adjust benefit payments for the effects of inflation. |
| **Cost-Sharing Multiple-Employer Defined Benefit Pension Plan (Cost-Sharing Pension Plan):** | A multiple-employer defined benefit pension plan in which the pension obligations to the employees of more than one employer are pooled and pension plan assets can be used to pay the benefits of the employees of any employer that provides pensions through the pension plan. |
| **Covered Payroll:** | Payroll on which contributions to the pension plan are based. |
| **Defined Benefit Pension Plans:** | Pension plans that are used to provide defined benefit pensions. |

| | |
|---|---|
| **Defined Benefit Pensions:** | Pensions for which the income or other benefits that the employee will receive at or after separation from employment are defined by the benefit terms. The pensions may be stated as a specified dollar amount or as an amount that is calculated based on one or more factors such as age, years of service, and compensation. (A pension that does not meet the criteria of a defined contribution pension is classified as a defined benefit pension for purposes of Statement 67.) |
| **Defined Contribution Pension Plans:** | Pension plans that are used to provide defined contribution pensions. |
| **Defined Contribution Pensions:** | Pensions having terms that (1) provide an individual account for each employee; (2) define the contributions that an employer is required to make (or the credits that it is required to provide) to an active employee's account for periods in which that employee renders service; and (3) provide that the pensions an employee will receive will depend only on the contributions (or credits) to the employee's account, actual earnings on investments of those contributions (or credits), and the effects of forfeitures of contributions (or credits) made for other employees, as well as pension plan administrative costs, that are allocated to the employee's account. |
| **Discount Rate:** | The single rate of return that, when applied to all projected benefit payments, results in an actuarial present value of projected benefit payments equal to the total of the following:<br>1. The actuarial present value of benefit payments projected to be made in future periods in which (a) the amount of the pension Plan Fiduciary Net Position is projected (under the requirements of Statement 67) to be greater than the benefit payments that are projected to be made in that period and (b) pension plan assets up to that point are expected to be invested using a strategy to achieve the long-term expected rate of return, calculated using the long-term expected rate of return on pension plan investments.<br>2. The actuarial present value of projected benefit payments not included in (1), calculated using the municipal bond rate. |
| **Entry Age Actuarial Cost Method:** | A method under which the actuarial present value of the projected benefits of each individual included in an actuarial valuation is allocated on a level basis over the earnings or service of the individual between entry age and assumed exit age(s). The portion of this actuarial present value allocated to a valuation year is called the normal cost. The portion of this actuarial present value not provided for at a valuation date by the actuarial present value of future normal costs is called the actuarial accrued liability. |
| **Inactive Employees:** | Terminated individuals that have accumulated benefits but are not yet receiving them, and retirees or their beneficiaries currently receiving benefits. |
| **Multiple-Employer Defined Benefit Pension Plan:** | A defined benefit pension plan that is used to provide pensions to the employees of more than one employer. |
| **Net Pension Liability (NPL):** | The liability of employers and non-employer contributing entities to employees for benefits provided through a defined benefit pension plan. |

| | |
|---|---|
| **Other Postemployment Benefits:** | All postemployment benefits other than retirement income (such as death benefits, life insurance, disability, and long-term care) that are provided separately from a pension plan, as well as postemployment healthcare benefits, regardless of the manner in which they are provided. Other postemployment benefits do not include termination benefits. |
| **Pension Plans:** | Arrangements through which pensions are determined, assets dedicated for pensions are accumulated and managed and benefits are paid as they come due. |
| **Pensions:** | Retirement income and, if provided through a pension plan, postemployment benefits other than retirement income (such as death benefits, life insurance, and disability benefits). Pensions do not include postemployment healthcare benefits and termination benefits. |
| **Plan Members:** | Individuals that are covered under the terms of a pension plan. Plan members generally include (1) employees in active service (active plan members) and (2) terminated employees who have accumulated benefits but are not yet receiving them and retirees or their beneficiaries currently receiving benefits (inactive plan members). |
| **Postemployment:** | The period after employment. |
| **Postemployment Benefit Changes:** | Adjustments to the pension of an inactive employee. |
| **Postemployment Healthcare Benefits:** | Medical, dental, vision, and other health-related benefits paid subsequent to the termination of employment. |
| **Projected Benefit Payments:** | All benefits estimated to be payable through the pension plan to current active and inactive employees as a result of their past service and their expected future service. |
| **Public Employee Retirement System:** | A special-purpose government that administers one or more pension plans; also may administer other types of employee benefit plans, including postemployment healthcare plans and deferred compensation plans. |
| **Real Rate of Return:** | The rate of return on an investment after adjustment to eliminate inflation. |
| **Service Costs:** | The portions of the actuarial present value of projected benefit payments that are attributed to valuation years. |
| **Single-Employer Defined Benefit Pension Plan (Single-Employer Pension Plan):** | A defined benefit pension plan that is used to provide pensions to employees of only one employer. |
| **Termination Benefits:** | Inducements offered by employers to active employees to hasten the termination of services, or payments made in consequence of the early termination of services. Termination benefits include early-retirement incentives, severance benefits, and other termination-related benefits. |
| **Total Pension Liability (TPL):** | The portion of the actuarial present value of projected benefit payments that is attributed to past periods of employee service in conformity with the requirements of Statement 67. |

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