



Cavanaugh Macdonald
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The experience and dedication you deserve

GASB Statement No. 67 Report

For the

Judges' Retirement System

Prepared as of

June 30, 2019





Cavanaugh Macdonald

CONSULTING, LLC

The experience and dedication you deserve

October 18, 2019

Public Employees' Retirement Board
100 North Park, Suite 200
Helena, MT 59620-0139

Members of the Board:

Presented in this report is information to assist the Judges Retirement System of the State of Montana (JRS) in meeting the requirements of the Governmental Accounting Standards Board (GASB) Statement No. 67. The information is presented for the period ending June 30, 2019.

The annual actuarial valuation used as a basis for much of the information presented in this report was performed as of June 30, 2018. The valuation was based upon data, furnished by the MPERA staff, concerning active, inactive and retired members along with pertinent financial information.

To the best of our knowledge, this report is complete and accurate. The necessary calculations were performed by, and under the supervision of, independent actuaries who are members of the American Academy of Actuaries with experience in performing valuations for public retirement systems.

The calculations were prepared in accordance with the principles of practice prescribed by the Actuarial Standards Board, and, in our opinion, meet the requirements of GASB 67.

The actuarial calculations were performed by qualified actuaries according to generally accepted actuarial procedures and methods. The calculations are based on the current provisions of the System, and on actuarial assumptions that are, individually and in the aggregate, internally consistent and reasonably based on the actual experience of the System. In addition, the calculations were completed in compliance with the laws governing the System. The undersigned are members of the American Academy of Actuaries and meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinions contained herein.



Board of Trustees
October 18, 2019
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Future actuarial results may differ significantly from the current results 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 or additional cost or contribution requirements based on the plan's funded status); and changes in plan provisions or applicable law. Since the potential impact of such factors is outside the scope of a normal annual actuarial valuation, an analysis of the range of results is not presented herein.

Respectfully submitted,

A handwritten signature in blue ink that reads 'Todd B. Green' followed by a horizontal line.

Todd B. Green, ASA, FCA, MAAA
President

A handwritten signature in blue ink that reads 'Beverly V. Bailey'.

Beverly V. Bailey, ASA, EA, FCA, MAAA
Senior Actuary

TBG:bvb



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REPORT OF THE ANNUAL GASB STATEMENT NO. 67

REQUIRED INFORMATION FOR JUDGES' RETIREMENT SYSTEM OF THE STATE OF MONTANA

PREPARED AS OF JUNE 30, 2019

BOARD SUMMARY

This report provides information required by the Judges' Retirement System (JRS) in connection with the Governmental Accounting Standards Board (GASB) Statement No. 67 "Financial Reporting for Pension Plans." The information provided herein was prepared for the purpose of assisting JRS to comply with the financial reporting and disclosure requirements of GASB No. 67 and is not applicable for purposes of funding the System. A calculation of the System's liability for purposes other than GASB No. 67 may produce significantly different results.

The Total Pension Liability (TPL), Fiduciary Net Position (FNP), Net Pension Liability (NPL) and certain sensitivity information shown in this report are based on an actuarial valuation performed as of June 30, 2018. The total pension liability as of the end of the plan year, June 30, 2019, was determined using standard roll forward procedures, which are detailed in Section II of this report.

The System's FNP is projected to cover all future benefit payments of current plan members. Therefore, the discount rate used to measure the TPL is the long-term expected rate of return on pension plan investments of 7.65%.

As of June 30, 2019, the TPL is \$65,318,710 and the FNP is \$104,885,637. The NPL, which is determined by subtracting the FNP from the TPL, is equal to (\$39,566,927). Also included in this report is a sensitivity analysis of the NPL, which shows results using both a 1% increase in the discount rate and 1% decrease in the discount rate. A higher discount rate reduces the NPL while a lower discount increases the NPL.

Schedule A shows three tables of required supplementary information. The first table details the changes in the NPL for the year ending June 30, 2019, with a comparison to the prior five years. The second table shows the ratio of the FNP to the TPL and a ratio of the NPL to the covered-employee payroll for the same six-year period. The final Schedule A table shows a history of the schedule of employer contributions.

The table on the following page highlights information required by GASB No. 67 as of June 30, 2019.



REPORT OF THE ANNUAL GASB STATEMENT NO. 67

**REQUIRED INFORMATION FOR
JUDGES' RETIREMENT SYSTEM
OF THE STATE OF MONTANA**

PREPARED AS OF JUNE 30, 2019

BOARD SUMMARY

	2019
Valuation Date (VD):	June 30, 2018
Prior Measurement Date:	June 30, 2018
Measurement Date (MD):	June 30, 2019
Membership Data:	
Retirees and Beneficiaries	70
Inactive Members	4
Active Employees	<u>55</u>
Total	129
Discount Rate:	
Long-Term Expected Rate of Return	7.65%
Municipal Bond Index Rate at Prior Measurement Date	3.89%
Municipal Bond Index Rate at Measurement Date	3.50%
Fiscal Year in which Fiduciary Net Position is Projected to be Depleted	n/a
Discount Rate at Prior Measurement Date	7.65%
Discount Rate at Measurement Date	7.65%
Net Pension Liability:	
Total Pension Liability (TPL)	\$ 65,318,710
Fiduciary Net Position (FNP)	<u>104,885,637</u>
Net Pension Liability (NPL = TPL – FNP)	(\$39,566,927)
FNP as a percentage of TPL	160.58%



Section I - Introduction

**REPORT OF THE ANNUAL GASB STATEMENT NO. 67
REQUIRED INFORMATION FOR THE
JUDGES' RETIREMENT SYSTEM
OF THE STATE OF MONTANA
PREPARED AS OF JUNE 30, 2019**

This report was prepared as of June 30, 2019 to assist the Judges' Retirement System of the State of Montana in complying with Governmental Accounting Standards Board Statement No. 67 (GASB 67), "*Financial Reporting For Pension Plans*". Much of the material provided in this report is based on the data, assumptions and results of the annual actuarial valuation of the Judges Retirement System of the State of Montana as of June 30, 2018.

GASB 67 basically divorces accounting and funding, creating disclosure and reporting requirements that may or may not be consistent with the basis used for funding the System.

GASB 67 requires the determination of the Total Pension Liability (TPL) utilizing the Entry Age Normal actuarial funding method. If, as is the case here, the valuation date at which the TPL is determined is before the Measurement Date, the TPL must be rolled forward to the Measurement Date. The Net Pension Liability (NPL) is then set equal to the TPL minus the System's Fiduciary Net Position (FNP) (the market values of assets) as of the Measurement Date. The benefit provisions recognized in the calculation of the TPL are summarized in Schedule B.

Among the assumptions needed for the liability calculation is a Discount Rate. To determine the Discount Rate, the FNP must be projected into the future for as long as there are anticipated benefits payable under the plan's provision applicable to the membership and beneficiaries of the System on the Measurement Date. If the FNP is projected to not be depleted at any point in the future, the long term expected rate of return on plan investments expected to be used to finance the benefit payments may be used as the Discount Rate.



Section I - Introduction

If, however, the FNP is projected to be depleted, the Discount Rate is determined as the single rate that will generate a present value of benefit payments equal to the sum of the present value determined by discounting all projected benefit payments through the date of depletion by the long term expected rate of return, and the present value determined by discounting those benefits after the date of depletion by a 20-year tax-exempt municipal bond (rating AA/Aa or higher) rate. The rate used, if necessary, for this purpose is the monthly average of the Bond Buyers General Obligation 20-year Municipal Bond Index Rate published weekly by The Bond Buyer (www.bondbuyer.com). The Municipal Bond Index Rate as of the measurement date is 3.50%.

The sections that follow provide the results of all the necessary calculations, presented in the order laid out in GASB 67 for note disclosure and Required Supplementary Information (RSI).



Section II – Financial Statement Notes

The material presented herein will follow the order as presented in GASB 67. Paragraph numbers are provided for ease of reference.

Paragraphs 30(a) (1)-(3): The information required is to be supplied by the Plan.

Paragraph 30(a) (4): The data required regarding the membership of the Judges’ Retirement System were furnished by the System’s staff. The following table summarizes the membership of the system as of June 30, 2018, the Valuation Date.

Membership

	Number
Inactive Members Or Their Beneficiaries Currently Receiving Benefits	70
Inactive Members Entitled To But Not Yet Receiving Benefits	4
Active Members	55
Total	129

Paragraphs 30(a)(5)-(6) and Paragraphs 30(b)-(f): The information required is to be supplied by the Plan.



Section II – Financial Statement Notes

Paragraphs 31(a) (1)-(4): The information is provided in the following table. As stated above, the NPL is equal to the TPL minus the FNP.

	Fiscal Year Ending
	June 30, 2019
Total Pension Liability	\$65,318,710
Fiduciary Net Position	<u>104,885,637</u>
Net Pension Liability	(\$39,566,927)
Ratio of Fiduciary Net Position to Total Pension Liability	160.58%

Paragraph 31(b): This paragraph requires information regarding the actuarial assumptions used to measure the TPL. The actuarial assumptions utilized in developing the TPL are outlined in Schedule C. The total pension liability was determined by an actuarial valuation as of June 30, 2018, using the following actuarial assumptions, applied to all periods included in the measurement:

Inflation	2.75 percent
Salary increases	3.50 percent, including inflation
Investment rate of return	7.65 percent, net of pension plan investment expense, including inflation
Mortality	<p>Healthy Mortality: RP 2000 Combined Employee and Annuitant Mortality Tables Projected to 2020 using Scale BB, set back one year for males</p> <p>Disabled Mortality: RP-2000 Combined Employee and Annuitant Mortality Table</p>



Section II – Financial Statement Notes

Paragraph 31.b.(1)

- (a) **Discount rate:** The discount rate used to measure the total pension liability was 7.65%.
- (b) **Projected cash flows:** The projection of cash flows used to determine the discount rate assumes the System would continue to receive contributions provided for in statute in the future.
- (c) **Long term rate of return:** The long-term expected rate of return on plan investments is reviewed regularly as part of experience studies prepared for the System. The results of the most recent experience study, presented in a report dated May 5, 2017, indicated an assumed rate of return of 7.65%. The average long-term capital market assumptions published in the *Survey of Capital Market Assumptions 2019 Edition* by Horizon Actuarial Service, LLC, yield a median real return of 5.10%. Combining the median real return with the 2.75% assumed inflation assumption results in a nominal return of 7.85%. As a result, we recommend using the long-term assumed rate return assumption adopted by the Board of 7.65%.
- (d) **Municipal bond rate:** The discount rate determination does not use a municipal bond rate.
- (e) **Periods of projected benefit payments:** Future benefit payments for all current plan members were projected through 2105.
- (f) **Assumed Asset Allocation:** The target asset allocation and best estimates of arithmetic real rates of return for each major asset class are summarized in the following table:

Asset Class	Target Allocation	Long-Term Expected Real Rate of Return
Broad US Equity	36.0%	6.05%
Broad Intl Equity	18.0%	7.01%
Private Equity	12.0%	10.53%
Intermediate Bonds	23.0%	2.17%
High Yield Bonds	3.0%	4.09%
Real Estate	8.0%	5.65%
Total	100.0%	



Section II – Financial Statement Notes

(g) Sensitivity analysis: This paragraph requires disclosure of the sensitivity of the net pension liability to changes in the discount rate. The following presents the net pension liability of the System, calculated using the discount rate of 7.65 percent, as well as what the System’s net pension liability would be if it were calculated using a discount rate that is 1-percentage-point lower and 1-percentage-point higher than the current rate:

	1% Decrease 6.65%	Current Discount Rate 7.65%	1% Increase 8.65%
System’s net pension liability	(\$33,241,564)	(\$39,566,927)	(\$45,027,785)

Paragraph 31(c): June 30, 2018 is the actuarial valuation date upon which the TPL is based. An expected TPL is determined as of June 30, 2019 using standard roll forward techniques. The roll forward calculation adds the annual normal cost (also called the service cost), subtracts the actual benefit payments and refunds for the plan year and then applies the expected investment rate of return for the year. The table below summarizes the calculation.

TPL Roll Forward	(1) TPL Reported for Fiscal Year End 2018	(2) Development of TPL for Fiscal Year End 2019
(a) Interest Rate	7.65%	7.65%
(b) Valuation Date for Measurement	June 30, 2017	June 30, 2018
(c) TPL as of June 30, 2018	\$ 60,192,186	\$ 62,740,690
(d) Entry Age Normal Cost for the period July 1, 2018 - June 30, 2019	\$ 1,645,731	\$ 1,645,731
(e) Actual Benefit Payments and Refunds for the period July 1, 2018 - June 30, 2019	\$ 3,846,157	\$ 3,846,157
(f) TPL as of June 30, 2019 = [(c + d) * (1 + (a))] - [e * (1 + (a)/2)]	\$ 62,575,245	\$ 65,318,710
(g) Experience Actuarial (Gain) / Loss: = (2f) - (1f)		\$ 2,743,465



Section III – Required Supplementary Information

There are several tables of Required Supplementary Information (RSI) that need to be included in the System's financial statements:

Paragraphs 32(a)-(c): The required tables are provided in Schedule A.

Paragraph 32(d): The money-weighted rates of return required are to be supplied by the Plan.

Paragraph 34: In addition the following should be noted regarding the RSI:

Changes of benefit terms: The following changes to the plan provisions were made as identified:

2015:

An inactive vested judge's beneficiary is eligible for a survivor benefit or death benefit if the judge dies prior to retiring.

2017

1. Refunds

- Terminating members eligible to retire may, in lieu of receiving a monthly retirement benefit, refund their accumulated contributions in a lump sum.
- Terminating members with accumulated contributions between \$200 and \$1,000 who wish to rollover their refund must do so within 90 days of termination of service.
- Trust, estates, and charitable organizations listed as beneficiaries are entitled to receive only a lump sum payment.

2. Interest credited to member accounts - Effective July 1, 2017, the interest rate credited to member accounts increased from 0.25% to 0.77%.

3. Lump-sum payouts

- Effective July 1, 2017, lump sum payouts in all systems are limited to the member's accumulated contributions rather than the present value of the member's benefit.

Changes of assumption: The following changes to the assumptions were made as identified:

2017

1. The discount rate was lowered from 7.75% to 7.65%.
2. The inflation rate was reduced from 3.00% to 2.75%.
3. The wage inflation rate was reduced from 4.00% to 3.50%.
4. The non-disabled mortality assumption was updated.



Section III – Required Supplementary Information

Method and assumptions used in calculations of actuarially determined contributions. The actuarially determined contribution rates are determined on an annual basis. The following actuarial methods and assumptions were used to determine contribution rates reported in that schedule:

Valuation date	June 30, 2018
Timing	Actuarially determined contributions are determined on the valuation date payable in the fiscal year beginning immediately following the valuation date
Actuarial cost method	Entry age Normal
Amortization method	Level percentage of payroll, open
Remaining amortization period	0 years
Asset valuation method	4-year smoothed market
Wage Inflation	3.50 percent
Salary increase	3.50 percent
Inflation	2.75 percent
Investment rate of return	7.65 percent, net of pension plan investment expense, including inflation
Mortality	Healthy Mortality: RP 2000 Combined Employee and Annuitant Mortality Tables Projected to 2020 using Scale BB, set back one year for males Disabled Mortality: RP-2000 Combined Employee and Annuitant Mortality Table



Schedule A – Required Supplementary Tables

**SCHEDULE OF CHANGES IN THE NET PENSION LIABILITY
GASB 67 Paragraph 32(a)**

	2019	2018	2017	2016	2015	2014
Total pension liability						
Service Cost	1,771,629	1,664,039	1,628,290	1,578,705	1,652,926	1,593,854
Interest	4,457,587	4,502,928	4,043,662	3,986,419	3,933,947	3,824,389
Benefit changes	0	0	0	0	0	0
Difference between expected and actual experience	2,743,465	(2,900,423)	862,189	(1,341,332)	(1,032,091)	0
Changes of assumptions	0	0	3,864,700	0	0	0
Benefit payments	(3,846,157)	(3,723,271)	(3,554,335)	(3,416,023)	(3,040,988)	(3,022,512)
Refunds of contributions	<u>0</u>	<u>(149,051)</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
Net change in total pension liability	5,126,524	(605,778)	6,844,506	807,769	1,513,794	2,395,731
Total pension liability - beginning	60,192,186	60,797,964	53,953,458	53,145,689	51,631,895	49,236,164
Total pension liability - ending (a)	65,318,710	60,192,186	60,797,964	53,953,458	53,145,689	51,631,895
Plan net position						
Contributions - employer	(281)	1,084,880	1,800,105	1,807,493	1,683,990	1,651,483
Contributions - member	516,777	575,050	488,208	729,180	534,091	481,461
Net investment income	5,687,228	8,467,204	10,368,402	1,778,748	3,842,387	12,420,597
Benefit payments	(3,846,157)	(3,723,271)	(3,554,335)	(3,416,023)	(3,040,988)	(3,022,512)
Administrative expense	(122,618)	(264,496)	(253,789)	(197,445)	(135,815)	(100,567)
Refunds of contributions	0	(149,051)	0	0	0	0
Other	<u>0</u>	<u>6,737</u>	<u>(674)</u>	<u>(2,742)</u>	<u>0</u>	<u>0</u>
Net change in plan net position	2,234,949	5,997,053	8,847,917	699,211	2,883,665	11,430,462
Plan net position - beginning	102,650,688	96,653,635	87,805,718	87,106,507	84,222,842	72,792,380
Plan net position - ending (b)	104,885,637	102,650,688	96,653,635	87,805,718	87,106,507	84,222,842
Net pension liability - ending (a) - (b)	(39,566,927)	(42,458,502)	(35,855,671)	(33,852,260)	(33,960,818)	(32,590,947)



Schedule A – Required Supplementary Tables

SCHEDULE OF THE NET PENSION LIABILITY GASB 67 Paragraph 32(b)

	2019	2018	2017	2016	2015	2014
Total pension liability	65,318,710	60,192,186	60,797,964	53,953,458	53,145,689	51,631,895
Plan net position	<u>104,885,637</u>	<u>102,650,688</u>	<u>96,653,635</u>	<u>87,805,718</u>	<u>87,106,507</u>	<u>84,222,842</u>
Net pension liability	(39,566,927)	(42,458,502)	(35,855,671)	(33,852,260)	(33,960,818)	(32,590,947)
Ratio of plan net position to total pension liability	160.58%	170.54%	158.98%	162.74%	163.90%	163.12%
Covered-employee payroll	7,382,476	7,290,904	6,974,470	6,920,367	6,524,569	6,354,763
Net pension liability as a percentage of covered- employee payroll	-535.96%	-582.35%	-514.10%	-489.17%	-520.51%	-512.86%



Schedule A – Required Supplementary Tables

SCHEDULE OF EMPLOYER CONTRIBUTIONS GASB 67 Paragraph 32(c)

	2019	2018	2017	2016	2015	2014
Actuarially determined employer contribution	0	0	0	0	0	0
Actual employer contributions	<u>(281)</u>	<u>1,084,880</u>	<u>1,800,105</u>	<u>1,807,493</u>	<u>1,683,990</u>	<u>1,651,483</u>
Non-Employer Contributions	0	0	0	0	0	0
Annual contribution deficiency (excess)	281	(1,084,880)	(1,800,105)	(1,807,493)	(1,683,990)	(1,651,483)
Covered-employee payroll	7,382,476	7,290,904	6,974,470	6,920,367	6,524,569	6,354,763
Actual contributions as a percentage of covered-employee payroll	0.00%	14.88%	25.81%	26.12%	25.81%	25.99%



Schedule B – Plan Provisions

- | | |
|--|---|
| Service credit | <ul style="list-style-type: none">• Service credit is used to determine the amount of a member’s retirement benefit.• One month of service credit is earned for each month where the member is paid for 160 hours. This includes certain transferred and purchased service. |
| Membership service | <ul style="list-style-type: none">• Membership service is used to determine eligibility for vesting, retirement or other benefits.• One month of membership service is earned for any month member contributions are made, regardless of the number of hours worked.• Eligible members in all systems may purchase service that counts toward membership service.• Additionally, eligible active and inactive Sheriffs’ Retirement System (SRS) members may purchase 1 for 5 (additional) service that will count as membership service. |
| Contributions | <ul style="list-style-type: none">• Member contributions are made through an “employer pick-up” arrangement which results in deferral of taxes on the contributions. |
| Compensation | <ul style="list-style-type: none">• Compensation generally means all remuneration paid, excluding certain allowances, benefits, and lump sum payments. Compensation is specifically defined in law and differs amongst the systems.• Bonuses paid on or after July 1, 2013 to any member will not be treated as compensation for retirement purposes. No member or employer contributions will be paid on bonuses. |
| Withdrawal of employee contributions | <ul style="list-style-type: none">• A member is eligible for a withdrawal of their contributions when they terminate service and are either not eligible for or have not taken a retirement benefit.• The member receives the accumulated member contributions, which consists of member contributions and regular interest.• Upon receipt of a refund of accumulated contributions a member’s vested right to a monthly benefit is forfeited. |
| Member contributions interest credited (regular interest) | <ul style="list-style-type: none">• Interest is credited to member accounts at the rates determined by the Board.• The current interest rate credited to member accounts is 2.02%. |



Schedule B – Plan Provisions

Refunds	<ul style="list-style-type: none">• Terminating members eligible to retire may, in lieu of receiving a monthly retirement benefit, refund their accumulated contributions in a lump sum.• Terminating members with accumulated contributions between \$200 and \$1,000 who wish to rollover their refund must do so within 90 days of termination of service.• Trusts, estates, and charitable organizations listed as beneficiaries are entitled to receive only a lump sum payment.
Lump-sum payouts	<ul style="list-style-type: none">• Effective July 1, 2017, lump sum payouts in all systems are limited to the member's accumulated contributions rather than the present value of the member's benefit.
Type of plan	<ul style="list-style-type: none">• Single-employer defined benefit
Membership eligibility	<ul style="list-style-type: none">• Judges of district courts• Justices of supreme court• Chief water judge• Associate water judge (effective July 1, 2011)
Member contributions	<ul style="list-style-type: none">• 7% of member's compensation
Employer contributions	<ul style="list-style-type: none">• 25.81% of each member's compensation
Compensation period used in benefit calculation	<ul style="list-style-type: none">• Current salary or HAC = Highest Average Compensation• Hired prior to July 1, 1997, and did not elect GABA, benefits are calculated using current salary of the office from which the member retired.• Hired on or after July 1, 1997, or hired prior to July 1, 1997 and elected GABA, benefits are calculated using HAC, the average of the highest 36 consecutive months (or shorter period of total service) of compensation paid to the member.• Hired on or after July 1, 2013: 110% annual cap on compensation considered as part of a member's HAC.



Schedule B – Plan Provisions

Service retirement eligibility and benefit	<ul style="list-style-type: none">• Age 60 with 5 years of membership service• First 15 years of service credit: 3$\frac{1}{3}$% per year of current salary or HAC, and• Over 15 years of service credit: 1.785% per year of current salary or HAC
Disability eligibility and benefit	<p>Non-duty disability:</p> <ul style="list-style-type: none">• 5 years membership service• Regular disability benefit: Actuarial equivalent of the normal retirement benefit available at the time of disability. <p>Duty-related disability:</p> <ul style="list-style-type: none">• Any amount of membership service• Duty-related disability benefit: Greater of 50% of current salary or 50% of HAC
Survivor's eligibility and benefit	<p>Duty-related death:</p> <ul style="list-style-type: none">• Active or retired member• Member's service retirement benefit on the date of the death. <p>Non-duty-related death:</p> <ul style="list-style-type: none">• Vested member• Refund of the member's accumulated contributions, or• Actuarial equivalent of the member's service retirement benefit on date of death.• A beneficiary may elect to receive the present value of the benefit as a single lump sum• For retired members without a contingent annuitant, a payment will be made to the member's designated beneficiary equal to the accumulated contributions reduced by any retirement benefits already paid.
Vesting eligibility and benefit	<ul style="list-style-type: none">• 5 years of membership service• Accrued normal retirement benefit, payable when eligible for retirement.• In lieu of a pension, a member may receive a refund of accumulated contributions.• Upon receipt of a refund of accumulated contributions, a member's vested right to a monthly benefit is forfeited.



Schedule B – Plan Provisions

Retirement benefits - Form of payment

Option 1, the normal form of payment is a single life annuity with a refund of any remaining accumulated contributions (account balance) to a designated beneficiary.

Optional Benefits:

- Option 2, a life annuity and joint 100% survivor benefit,
- Option 3, a life annuity and joint 50% survivor benefit, and
- Option 4, a life annuity with a period certain.

If a retiring member selects Option 2 or 3 and the contingent annuitant predeceases or is divorced from the member, the retiree may, within 18 months of the death or divorce, choose to revert to the higher Option 1 benefit available at retirement or the retiree may select a different contingent annuitant and/or a different option.

Post retirement benefit increases

- For retired members who have been retired for at least 12 months and who were either hired **after** June 30, 1997 **or** hired **prior to** July 1, 1997 **and elected** GABA, a GABA will be made January 1 of each year equal to 3%.
- For retired members who were hired **prior to** July 1, 1997 **and did not elect** GABA, the current salary of an active member in the same position is used to recalculate the monthly benefit.

Changes since last valuation

- None



Schedule C – Actuarial Assumptions and Methods

The assumptions and methods utilized in the valuation were developed in the six-year experience study for the period ending June 30, 2016.

Tables C-2 through C-4 give rates of decrement for service retirement, disablement and mortality.

Actuarial Cost Method

The actuarial valuation was prepared using the entry age actuarial cost method. Under this method, the actuarial present value of the projected benefits of each individual included in the valuation is allocated as a level percentage of the individual's projected compensation between entry age and assumed exit. The portion of this actuarial present value allocated to a valuation year is called the normal cost. The normal cost was first calculated for each individual member. The normal cost rate is the total of the individual normal costs, divided by the total pay rate.

The portion of this actuarial present value not provided for at a valuation date by the sum of (a) the actuarial value of the assets and (b) the actuarial present value of future normal costs is called the UAAL. The UAAL is amortized as a level percentage of the projected salaries of present and future members of the System.

Records and Data

The data used in the valuation consists of financial information, records of age, sex, service, salary, contribution rates, and account balances of contributing members and records of age, sex, and amount of benefit for retired members and beneficiaries. All of the data has been supplied by the System and was accepted for valuation purposes without audit.

Replacement of Terminated Members

The ages at entry and distribution by sex of future members are assumed to average the same as those of the present members they replace. If the number of active members should increase, it is further assumed that the average entry age of the larger group will be the same, from an actuarial standpoint, as that of the present group. Under these assumptions, the normal cost rates for active members will not vary with the termination of present members.

Administrative and Investment Expenses

The investment expenses of the System are assumed to be funded by investment earnings in excess of 7.65% per year.

Administrative expenses are assumed to equal 0.17% of payroll.

Valuation of Assets

Market value of assets.



Schedule C – Actuarial Assumptions and Methods

Investment Earnings

The annual rate of investment earnings of the assets of the System is assumed to be 7.65% per year net of investment expenses, compounded annually.

Interest on Member Contributions

Interest on member contributions is assumed to accrue at a rate of 2.75% per annum, compounded annually.

Future Salaries

The rates of annual salary increase assumed for the purpose of the valuation are an assumed 3.5% annual rate of increase in the general wage level of the membership. There are no separate merit and seniority increases assumed.

Service Retirement

Table C-2 shows the annual assumed rates of retirement among members eligible for service retirement. Separate rates are used when a member is eligible for reduced benefits, for the first year a member is eligible for full benefits, and for the years following the first year a member is eligible for full benefits.

Disablement

The rates of disablement used in this valuation are illustrated in Table C-3.

Mortality

The mortality rates used in this valuation are illustrated in Table C-4. A written description of each table used is included in Table C-1.

Other Terminations of Employment

No terminations are assumed other than for retirement, death and disability.

Probability of Marriage & Dependent Children

If death occurs in active status, all members are assumed to have an eligible surviving spouse with no dependent children. Female spouses are three years younger than their male spouse.

Records with no Birth Date

New records with no birth date are assumed to be 37 years old. Records that are not new and have no birth date used the same birth date as the prior year's valuation.



Schedule C – Actuarial Assumptions and Methods

Table C-1

Summary of Valuation Assumptions

I. Economic assumptions	
A. General wage increases	3.50%
B. Investment return	7.65%
C. Price Inflation Assumption	2.75%
D. Growth in membership	0.00%
E. Interest on member accounts	2.75%
II. Demographic assumptions	
A. Retirement	Table C-2
B. Disablement	Table C-3
C. Mortality among contributing members, service retired members, and beneficiaries. The tables include margins for mortality improvement which is expected to occur in the future. For Males and Females: RP 2000 Combined Employee and Annuitant Mortality Tables Projected to 2020 using Scale BB, set back one year for males.	Table C-4
D. Mortality among disabled members For Males and Females: RP 2000 Combined Employee and Annuitant Mortality Tables with no projections.	Table C-4



Schedule C – Actuarial Assumptions and Methods

Table C-2

**Retirement
Annual Rates**

Age	Rate
60	15.0%
61	5.0
62	5.0
63	5.0
64	5.0
65	15.0
66	5.0
67	5.0
68	5.0
69	5.0
70 & Over	100.0

Vested terminations are assumed to retire at their earliest unreduced eligibility.



Schedule C – Actuarial Assumptions and Methods

Table C-3
Disablement
Annual Rates

<u>Age</u>	<u>All Members</u>
22	.00%
27	.00
32	.01
37	.04
42	.10
47	.13
52	.25
57	.36
62	.00

10% of disabilities are assumed to be duty-related and 90% are assumed to be non-duty related. All disabilities are assumed to be permanent without recovery.



Schedule C – Actuarial Assumptions and Methods

Table C-4
Mortality
Annual Rates

Age	Contributing Members, Service Retired Members and Beneficiaries		Disabled Members	
	Men	Women	Men	Women
25	0.0354%	0.0195%	0.0376%	0.0207%
30	0.0388	0.0249	0.0444	0.0264
35	0.0661	0.0447	0.0773	0.0475
40	0.0961	0.0665	0.1079	0.0706
45	0.1316	0.1058	0.1508	0.1124
50	0.1879	0.1578	0.2138	0.1676
55	0.3010	0.2458	0.3624	0.2717
60	0.5271	0.4135	0.6747	0.5055
65	0.9041	0.7624	1.2737	0.9706
70	1.4636	1.3151	2.2206	1.6742
75	2.5057	2.2077	3.7834	2.8106
80	4.2816	3.6037	6.4368	4.5879
85	7.3750	6.0833	11.0757	7.7446
90	13.0721	10.5549	18.3408	13.1682
95	21.7835	17.2452	26.7491	19.4509



Schedule D – Glossary of Terms

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 and based on the most recent measurement date available when the contribution for the reporting period was adopted.

Cost-Sharing Multiple Employer Defined Benefit Pension Plan (Cost-Sharing Pension Plan)

A multiple-employer defined benefit pension plan in which the pension obligation 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 Employee Payroll

The payroll on which contributions to a pension plan are based.



Schedule D – Glossary of Terms

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:

1. The actuarial present value of benefit payments projected to be made in future periods in which (a) the amount of the pension plan's 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 the 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.
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 the 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.

Money-Weighted Rate of Return

A method of calculating period-by-period returns on pension plan investments that adjust for the changing amounts actually invested. For purpose of Statement 67, money-weighted rate of return is calculated as the internal rate of return on pension plan investments, net of pension plan investment expense.

Net Pension Liability

The liability of employers and non-employer contributing entities to plan members for benefits provided through a defined benefit pension plan. It is calculated by subtracting the plan's fiduciary net position from the plan's total pension liability.

Non-Employer Contributing Entity

Entities that make contributions to a pension plan that is used to provide pensions to the employees of other entities. For purposes of Statement 67, plan members are not considered non-employer contributing entities.



Schedule D – Glossary of Terms

Plan Members

Individuals that are covered under the terms of a pension plan. Plan Members generally included (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).

Projected Benefit Payments

All benefits estimated to be payable through the pension plan to current active and inactive plan members as a result of their past service and their expected future service.

Real Rate of Return

The rate of return on an investment after adjustment to eliminate inflation.

Service Cost

The portion of the actuarial present value of projected benefit payments that is attributed to a valuation year.

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.

Total Pension Liability

The portion of the actuarial present value of projected benefit payments that is attributed to past periods of member service in conformity with the requirements of Statement 67.