Denver Employees Retirement Plan

Actuarial Valuation Report as of January 1, 2020

Produced by Cheiron

May 2020

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May 14, 2020

Retirement Board
Denver Employees Retirement Plan
777 Pearl Street
Denver, CO 80203

Dear Members of the Retirement Board:

At your request, we have conducted an actuarial valuation of the Denver Employees Retirement Plan (DERP, the Plan) as of January 1, 2020. This report contains information on the Plan's assets and liabilities, and discloses contribution levels. Your attention is called to the Foreword in which we refer to the general approach employed in the preparation of this report.

The purpose of this report is to present the results of the annual actuarial valuation of DERP. This report is for the use of the Retirement Board of Denver and its auditors in preparing financial reports in accordance with applicable law and accounting requirements. Any other user of this report is not an intended user and is considered a third party.

Cheiron's report was prepared solely for the Retirement Board of Denver for the purposes described herein, except that the plan auditor may rely on this report solely for the purpose of completing an audit related to the matters herein. It is not intended to benefit any third party, and Cheiron assumes no duty or liability to any such party.

This report and its contents have been prepared in accordance with generally recognized and accepted actuarial principles and practices, and our understanding of the Code of Professional Conduct and applicable Actuarial Standards of Practice set out by the Actuarial Standards Board as well as applicable laws and regulations. Furthermore, as credentialed actuaries, we meet the Qualification Standards of the American Academy of Actuaries to render the opinion contained in this report. This report does not address any contractual or legal issues. We are not attorneys and our firm does not provide any legal services or advice.

Sincerely,
Cheiron

Anne D. Harper, FSA, EA, MAAA
Principal Consulting Actuary

Graham A. Schmidt, ASA, EA, FCA, MAAA
Consulting Actuary

FOREWORD

Cheiron has performed the actuarial valuation of the Denver Employees Retirement Plan as of January 1, 2020. The valuation is organized as follows:

- In Section I, the **Executive Summary,** we describe the purpose of an actuarial valuation, summarize the key results found in this valuation, and disclose important trends.

- The **Main Body** of the report presents details on the System's

  - Section II – Identification and Assessment of Risk
  - Section III – Assets
  - Section IV – Liabilities
  - Section V – Contributions
  - Section VI – Comprehensive Annual Financial Reporting

- In the **Appendices,** we conclude our report with detailed information describing plan membership (Appendix A), actuarial assumptions and methods employed in the valuation (Appendix B), a summary of pertinent plan provisions (Appendix C), and a glossary of key actuarial terms (Appendix D).

Future results may differ significantly from the current projections presented in this report due to such factors as the following: plan experience different from that anticipated by the assumptions; changes in assumptions; and, changes in plan provisions or applicable law.

In preparing our report, we relied on information (some oral and some written) supplied by DERP staff. This information includes, but is not limited to, the plan provisions, employee data, and financial information. We performed an informal examination of the obvious characteristics of the data for reasonableness and consistency in accordance with Actuarial Standard of Practice No. 23.

SECTION I – EXECUTIVE SUMMARY

The primary purpose of the actuarial valuation and this report is to measure, describe, and identify the following as of the valuation date:

- The funded status of the Plan,
- Past and expected trends in the funding progress of the Plan,
- Employer and employee contribution rates for Fiscal Year Ending December 31, 2020,
- Information required by the GFOA for the Comprehensive Annual Financial Report, and
- The assessment and disclosure of risks.

In the balance of this Executive Summary, we present (A) the basis upon which this year's valuation was completed, (B) the key findings of this valuation including a summary of all key results, (C) an examination of the historical trends, and (D) the projected outlook for the Plan.

A. Valuation Basis

This valuation determines the actuarially determined contributions for the employers' fiscal years beginning January 1, 2020.

The Plan's funding policy is to collect contributions from the employers and employees equal to the sum of:

- The normal cost under the actuarial funding method, and
- The amortization of the Unfunded Actuarial Liability.

The Unfunded Actuarial Liability payment is determined as the amount needed to fund the outstanding Unfunded Actuarial liability (UAL). Effective with the January 1, 2019 valuation, the existing UAL as of January 1, 2019 is amortized over a closed 20-year period as a level percentage of payroll. The additional UAL attributable to the change in funding method and asset valuation method, also effective with the January 1, 2019 valuation, is amortized over a separate 20-year period. All future experience gains and losses will be amortized over new 20-year periods.

This valuation was prepared based on the plan provisions shown in Appendix C.

Actuarial experience studies are performed every five years. This valuation was performed based on the economic and demographic assumptions and methods that were determined in the Denver Employees Retirement Plan Actuarial Experience Study Report performed by the prior actuary for the five-year period ending December 31, 2017 and adopted by the Board. We reviewed the assumptions and found them to be reasonable. A summary of the assumptions and methods used in the current valuation is shown in Appendix B.

B. Key Findings of this Valuation

The key results for the January 1, 2020 actuarial valuation for the combined pension and retiree medical plans are as follows:

- The actuarially determined contribution rate remained very stable with a slight increase from 24.32% to 24.39% of payroll for the current valuation. The rate was expected to increase to 25.10% due to continuing to phase-in of the FYE 2018 investment losses, but was offset by favorable investment returns for FYE 2019 and other factors described below.

- The scheduled contribution rate – the total of the employer and employee contribution rates agreed upon by the City – increased from 21.50% to 25.00% of payroll for 2019. The contribution surplus for the January 1, 2020 valuation is 0.61%.

- During the plan year ending December 31, 2019, the return on the Market Value of Assets was 13.8%, net of investment and administrative expenses and assuming mid-year cash flows, as compared to the 7.50% assumption. Based on the Actuarial Value of Assets, the Plan returned only 5.8% for the year since the recognition of the 2018 investment losses was greater than the recognition of the 2019 investment gains. This produced an actuarial asset loss of $38.2 million.

- The Plan's funded ratio, the ratio of assets over Actuarial Liability, decreased from 61.4% last year to 60.9% based on the Actuarial Value of Assets as of December 31, 2019. The 0.5% decrease in the funded ratio is primarily due to the losses on the Actuarial Value of Assets.

  On a Market Value of Assets basis, the funded ratio increased from 56.2% to 59.8% due to strong investment returns for the year ending December 31, 2019.

- The UAL is the excess of the Plan's Actuarial Liability over the Actuarial Value of Assets. The Plan experienced an increase in the UAL from $1,463.4 million to $1,521.5 million, an increase of $58.1 million. The Actuarial Liability increased by $102.4 million while the Actuarial Value of Assets increased by $44.3 million.

- The Actuarial Liability increased more than expected, resulting in an experience loss of $11.1 million. The experience losses were primarily due to salary increases and benefits for new retirees being greater than expected, offset by mortality gains for members in pay status.

On the following pages, we present Tables I-1, I-2, I-3, and I-4, which summarize the key results of the valuation with respect to DERP assets, liabilities, Unfunded Actuarial Liability, funded ratios, contribution rates, and membership. The results are shown for both the prior and current plan year, and for the total combined plans and separate exhibits for the pension and retiree medical plans.

SECTION I – EXECUTIVE SUMMARY

The key results of the valuation are shown below in Table I-1. The total actuarially determined contribution rate increased from 24.32% to 24.39% of payroll. The normal cost rate decreased from 8.35% to 8.20% primarily due to the new hires entering in Tier 3 at a lower benefit accrual rate. The UAL amortization payment increased from 15.97% to 16.19%, a 0.23% increase. However, 0.60% of the 16.19% UAL payment as a percentage of payroll is going toward paying down the principal on the UAL compared to 0.11% in 2019.

Based on estimated 2020 payroll of $732.1 million, the estimated total employer and employee contributions for 2020 are $178.6 million and an additional DHHA Supplemental Contribution of $0.55 million.

Table I-1
Pension Plan and Retiree Medical Plan (Combined Basis)
Summary of Key Valuation Results
($ in millions)

	January 1, 2019	January 1, 2020	Change
Funded Status			
Actuarial Liability	$ 3,792.51	$ 3,894.92	$ 102.41
Actuarial Value of Assets (AVA)	2,329.12	2,373.43	44.31
Unfunded Actuarial Liability (UAL)	$ 1,463.39	$ 1,521.48	$ 58.09
Funded Ratio - Based on AVA	61.4%	60.9%	-0.5%
Market Value of Assets (MVA)	$ 2,130.04	$ 2,330.17	$ 200.14
Unfunded Actuarial Liability (UAL)	1,662.47	1,564.74	(97.73)
Funded Ratio - Based on MVA	56.2%	59.8%	3.7%
Actuarially Determined Contribution			
Normal Cost	$ 57.79	$ 60.01	$ 2.22
UAL Payment			
Interest	$ 109.75	$ 114.11	$ 4.36
Principal	0.74	4.45	3.71
Total UAL Payment	$ 110.49	$ 118.56	$ 8.07
Total Contributions $	**$ 168.28**	**$ 178.57**	$ 10.29
Contribution Rate Components			
Normal Cost	8.35%	8.20%	-0.15%
UAL Payment			
Interest	15.86%	15.58%	-0.28%
Principal	0.11%	0.61%	0.50%
Total UAL Payment	15.97%	16.19%	0.23%
Total Contribution Rate %	**24.32%**	**24.39%**	0.07%
Equivalent single amortization period	20.0	19.0	(1.0)
DHHA Supplemental Normal Cost	$ 0.69	$ 0.55	$ (0.15)

SECTION I – EXECUTIVE SUMMARY

Table I-1 (Continued)

Pension Plan and Retiree Medical Plan (Combined Basis)
Summary of Key Valuation Results
($ in millions)

	January 1, 2019	January 1, 2020	Change
Total Contribution Rate			
Pension Plan	22.98%	23.11%	0.13%
Retiree Medical Plan	1.34%	1.28%	-0.06%
Total Contribution %	24.32%	24.39%	0.07%
Total Scheduled Contribution	21.50%	25.00%	3.50%
Contribution Surplus / (Shortfall)[1]	-2.82%	0.61%	3.43%
Total Contribution Dollars			
Pension Plan	$ 159.03	$ 169.18	$ 10.15
Retiree Medical Plan	9.26	9.39	0.13
Total Contribution $	$ 168.29	$ 178.57	$ 10.28
DHHA Supplemental Normal Cost			
Pension Plan	$ 0.67	$ 0.52	$ (0.15)
Retiree Medical Plan	0.02	0.02	0.00
Total	$ 0.69	$ 0.55	$ (0.14)

[1] There is generally a one year lag in implementing a change in the contribution requirement. Effective, January 1, 2020, the City implemented a total contribution rate of 25.00% (the projected FYE 2020 total contribution rate was 25.10%) to address the timing lag.

The pension plan actuarially determined contribution rate increased slightly by 0.13% while the retiree medical plan contribution rate decreased slightly by 0.06%, for a net increase of 0.07%.

The 2020 scheduled contribution of 25.00% of payroll compared to the actuarially determined contribution rate of 24.39% results in a contribution surplus of 0.61% of payroll.

The Supplemental Normal Cost for the Denver Health and Hospital Authority (DHHA) decreased slightly for 2020 primarily due to the DHHA's declining payroll since it's a closed group.

Tables I-1(a) and I-1(b) on the following pages show the key results for the pension plan and retiree medical plan independently.

SECTION I – EXECUTIVE SUMMARY

Table I-1(a)

Pension Plan - Summary of Key Valuation Results

($ in millions)

	January 1, 2019	January 1, 2020	Change
Funded Status			
Actuarial Liability	$ 3,623.67	$ 3,727.79	$ 104.12
Actuarial Value of Assets (AVA)	2,255.41	2,300.32	44.91
Unfunded Actuarial Liability (UAL)	$ 1,368.26	$ 1,427.46	$ 59.20
Funded Ratio - Based on AVA	62.2%	61.7%	-0.5%
Market Value of Assets (MVA)	$ 2,062.68	$ 2,258.48	$ 195.80
Unfunded Actuarial Liability (UAL)	1,560.99	1,469.31	(91.68)
Funded Ratio - Based on MVA	56.9%	60.6%	3.7%
Actuarially Determined Contribution			
Normal Cost	$ 55.72	$ 57.96	$ 2.24
UAL Payment	103.31	111.22	7.91
Total Contributions $	$ 159.03	$ 169.18	$ 10.15
Contribution Rate Components			
Normal Cost	8.05%	7.92%	-0.13%
UAL Payment	14.93%	15.19%	0.26%
Total Contribution %	22.98%	23.11%	0.13%
DHHA Supplemental Normal Cost	$ 0.67	$ 0.52	$ (0.15)

SECTION I – EXECUTIVE SUMMARY

Table I-1(b)
Retiree Medical Plan - Summary of Key Valuation Results
($ in millions)

	January 1, 2019	January 1, 2020	Change
Funded Status			
Actuarial Liability	$ 168.84	$ 167.13	$ (1.71)
Actuarial Value of Assets (AVA)	73.71	73.11	(0.60)
Unfunded Actuarial Liability (UAL)	$ 95.13	$ 94.02	$ (1.11)
Funded Ratio - Based on AVA	43.7%	43.7%	0.1%
Market Value of Assets (MVA)	$ 67.37	$ 71.69	$ 4.32
Unfunded Actuarial Liability (UAL)	101.47	95.44	(6.03)
Funded Ratio - Based on MVA	39.9%	42.9%	3.0%
Actuarially Determined Contribution			
Normal Cost	$ 2.08	$ 2.05	$ (0.03)
UAL Payment	7.18	7.34	0.16
Total Contributions $	$ 9.26	$ 9.39	$ 0.12
Contribution Rate Components			
Normal Cost	0.30%	0.28%	-0.02%
UAL Payment	1.04%	1.00%	-0.04%
Total Contribution %	1.34%	1.28%	-0.06%
DHHA Supplemental Normal Cost	$ 0.02	$ 0.02	$ 0.00

SECTION I – EXECUTIVE SUMMARY

As shown in Table I-2 below, pension membership in DERP increased by 2.4%. Active membership and members receiving benefits both increased by 2.1%, while terminated members increased by 3.4%. Retiree medical counts show similar changes. Total projected payroll, based on the census data projected with a full year of assumed salary increases, from the last valuation increased by 6.6%, which is greater than the assumed 3.0% increase. The average pay per active member increased by 4.4%.

Table I-2
Membership Total

	January 1, 2019	January 1, 2020	% Change
Pension			
Actives	9,210	9,401	2.1%
Terminated Employees Entitled to Benefits But Not Yet Receiving Them	3,378	3,411	1.0%
Non-Vested Members Due a Refund of Employee Contributions	2,740	2,913	6.3%
Members Receiving Benefits	9,945	10,153	2.1%
Total Members	25,273	25,878	2.4%
Retiree Medical			
Actives	9,210	9,401	2.1%
Terminated Employees Entitled to Benefits But Not Yet Receiving Them	3,378	3,410	0.9%
Retirees and Beneficiaries Entitled to Health Benefits But Not Receiving Any	3,124	3,236	3.6%
Members Receiving Benefits	6,823	6,920	1.4%
Total Members	22,535	22,967	1.9%
	FYE 2019	**FYE 2020**	
Active Member Projected Payroll	$ 692,150,701	$ 737,532,660	6.6%
Average Pay per Active	$ 75,152	$ 78,453	4.4%

Projected payroll is based on valuation data projected for next calendar year using a full year of salary increases. However, for the January 1, 2020 valuation, the projected payroll used to calculate the UAL payments as a percentage of payroll is $732,074,915, adjusted for assumed attrition during 2020 for the DHHA active membership since they are a closed group.

SECTION I – EXECUTIVE SUMMARY

The combined Unfunded Actuarial Liability (UAL) increased by $58.1 million, from $1,463 million to $1,521 million as a result of demographic and investment experience. Table I-3 presents the specific components of the change in the UAL.

Table I-3
Combined Basis - Change in Unfunded Actuarial Liability
($ in thousands)

Unfunded Actuarial Liability, January 1, 2019	**$**	**1,463,389**
Expected change in unfunded actuarial liability	$	(4,808)
Increase due to investment experience loss		38,188
Increase due to liability loss		11,069
Increase due to net contribution loss		13,647
Total change in unfunded actuarial liability	$	58,096
Unfunded Actuarial Liability, January 1, 2020	**$**	**1,521,484**

The UAL was expected to decrease by $4.8 million since the expected UAL payment for FY 2019 was more than the interest on the UAL. The actuarial asset loss increased the UAL by $38.2 million and the liability experience loss increased the UAL by $11.1 million.

The primary reason for the $13.6 million contribution loss was the one-year delay in the implementation of the actuarially determined contribution rate. For the 2019 plan year, the actuarially determined contribution rate was 24.32% while the scheduled rate was only 21.50%, a shortfall of 2.82%. To mitigate the impact of the contribution timing delay this year, the Board recommended and the City approved a total contribution rate of 25.00% effective January 1, 2020. This contribution rate was based on the projected January 1, 2020 contribution rate from the January 1, 2019 actuarial valuation, if all assumptions, including the 7.50% assumed rate of investment return, were met.

The contribution shortfall for 2019 was somewhat offset by more contributions coming into the Plan as a result of actual DERP payroll growing more than the expected 3.00% payroll growth rate. Actual pensionable payroll grew from $671.1 million in 2018 to $706.4 million in 2019, a 5.3% increase and approximately $15.2 million more than anticipated. With the contribution rate of 21.50% of payroll, this represents about $3 million in additional contributions.

SECTION I – EXECUTIVE SUMMARY

Tables I-3(a) and I-3(b) below show the results for the pension and retiree medical plan independently.

Table I-3(a)

Pension Plan - Development of 2020 Experience Gain/(Loss)
($ in thousands)

1. Unfunded Actuarial Liability (UAL) at January 1, 2019	$	1,368,258
2. Middle of year actuarial liability payment		(103,311)
3. Interest to end of year on 1. and 2.		98,815
4. Expected UAL at January 1, 2020 (1+2+3)	$	1,363,762
5. Actual Unfunded Liability at January 1, 2020		1,427,464
6. Net Gain/(Loss): (4. - 5.)	$	(63,701)
Portion of Net Gain/(Loss) due to:		
a. Investment experience loss	$	(36,962)
b. Salary increases more than expected		(12,270)
c. Retirement and termination experience loss		(8,027)
d. Contribution timing lag, offset by payroll experience		(12,746)
e. Retiree, disabled, and beneficiary mortality gain		6,772
f. Other experience		(469)
g. Total Net Gain/(Loss)	$	(63,701)

In addition to the investment loss and contribution timing lag offset by the payroll experience, larger salaries than expected for some members increased the UAL for the pension plan by $12.3 million, a 0.33% loss on the expected Actuarial Liability. The loss stems from non-DHHA continuing actives (those who were active members in the 2019 and 2020 actuarial valuations), whose average annual salary increased about 7.2%.

New retirees' benefits were larger than expected primarily due to larger than expected Highest Average Salaries (HAS) used to calculate their retirement benefit. This retirement experience increased the UAL by about $6.2 million, a 0.17% loss on the expected Actuarial Liability. The current assumption for unused sick and vacation hours when converted to pay at retirement increases the members' HAS by 5.0%. However, even with the 5% load, the HAS at retirement for the majority of the retirees was higher than expected by 5.0%. Given the relative size of the loss, we suggest waiting until the next actuarial experience study to revisit this assumption.

There were about 27% more retiree, disabled, and beneficiary deaths than expected which resulted in a liability gain of $6.7 million.

SECTION I – EXECUTIVE SUMMARY

Table I-3(b)

Retiree Medical Plan - Development of 2020 Experience Gain/(Loss)

($ in thousands)

1.	Unfunded Actuarial Liability (UAL) at January 1, 2019	$	95,131
2.	Middle of year actuarial liability payment		(7,183)
3.	Interest to end of year on 1. and 2.		6,870
4.	Expected UAL at January 1, 2020 (1+2+3+4)	$	94,818
5.	Actual Unfunded Liability at January 1, 2020		94,021
6.	Net Gain/(Loss): (5 - 6)	$	797
	Portion of Net Gain/(Loss) due to:		
	a. Investment experience loss	$	(1,226)
	b. Changes in Coverage		1,946
	c. Retirement, termination and disability experience loss		451
	d. Contribution timing lag, offset by payroll experience		(901)
	e. Other experience		528
	f. Total Net Gain/(Loss)	$	797

Aside from the investment loss and contribution timing lag offset by the payroll experience, the liability experience for the retiree medical plan was favorable. Most of the liability gains were due to retirees who had coverage in the last valuation but declined coverage during 2019 along with some retirees changing to coverage with lower premiums.

SECTION I – EXECUTIVE SUMMARY

Contributions Comparison

Thus far, the experience of the 2019 plan year has been presented in terms of the UAL. Table I-4 below compares the contribution rates from the prior year and their components to the current year.

The overall contribution rate increased slightly by 0.07% for the January 1, 2020 valuation, with a decrease of 0.15% in normal cost from 8.35% to 8.20% of payroll and an increase of 0.22% in the amortization of the UAL from 15.97% to 16.19% of payroll.

Table I-4
Combined Basis - Contribution Rate Reconciliation

	Normal Cost	Amortization	Total
2019 Contribution Rate	**8.35%**	**15.97%**	**24.32%**
Impact of Tier 3 New Hires	-0.10%	0.00%	-0.10%
Investment experience	0.00%	0.39%	0.39%
Demographic experience	-0.05%	0.11%	0.06%
Contribution experience	0.00%	0.14%	0.14%
Effect of payroll on amortization	0.00%	-0.42%	-0.42%
2019 Contribution Rate	**8.20%**	**16.19%**	**24.39%**

The offsetting changes in the total employer and employee contribution rate for both the pension and retiree medical plans is detailed below.

- The largest driver of the net increase is the actuarial investment experience, which produced an investment loss since the Actuarial Value of Assets returned 5.8% (less than the assumed rate of 7.50%), even though the Market Value of Assets returned 13.9%. This is due to the partial recognition of the $202 million in deferred losses from 2018, somewhat offset by the partial recognition of the $133 million gain in 2019, which increased the total contribution rate by 0.39% of payroll.
- Payroll used to calculate the Unfunded Actuarial Liability (UAL) payment was higher than expected by about $13 million. As a result, the UAL payment is spread over a larger payroll base than expected, and the contribution as a percentage of payroll decreased by 0.42%.
- As explained previously on page 8, the impact of the net contribution loss increased the UAL, increasing the UAL payment and contribution rate by 0.14% of payroll.
- Tier 3 members are now over 55% of active member payroll. The impact of the increasing number of Tier 3 members was a decrease of 0.10% of payroll since their benefits are lower than those of the Tier 1 and Tier 2 members that are being replaced.
- Overall, the demographic experience was unfavorable but only increased the total contribution rate by 0.06% of payroll.

SECTION I – EXECUTIVE SUMMARY

Tables I-4(a) and I-4(b) below show contribution rate reconciliations for the pension plan and retiree medical plan independently.

Table I-4(a)

Pension Plan - Contribution Rate Reconciliation

	Normal Cost	Amortization	Total
2019 Contribution Rate	**8.05%**	**14.93%**	**22.98%**
Impact of Tier 3 New Hires	-0.10%	0.00%	-0.10%
Investment experience	0.00%	0.38%	0.38%
Demographic experience	-0.03%	0.14%	0.11%
Contribution experience	0.00%	0.13%	0.13%
Effect of payroll on amortization	0.00%	-0.39%	-0.39%
2020 Contribution Rate	**7.92%**	**15.19%**	**23.11%**

Table I-4(b)

Retiree Medical Plan - Contribution Rate Reconciliation

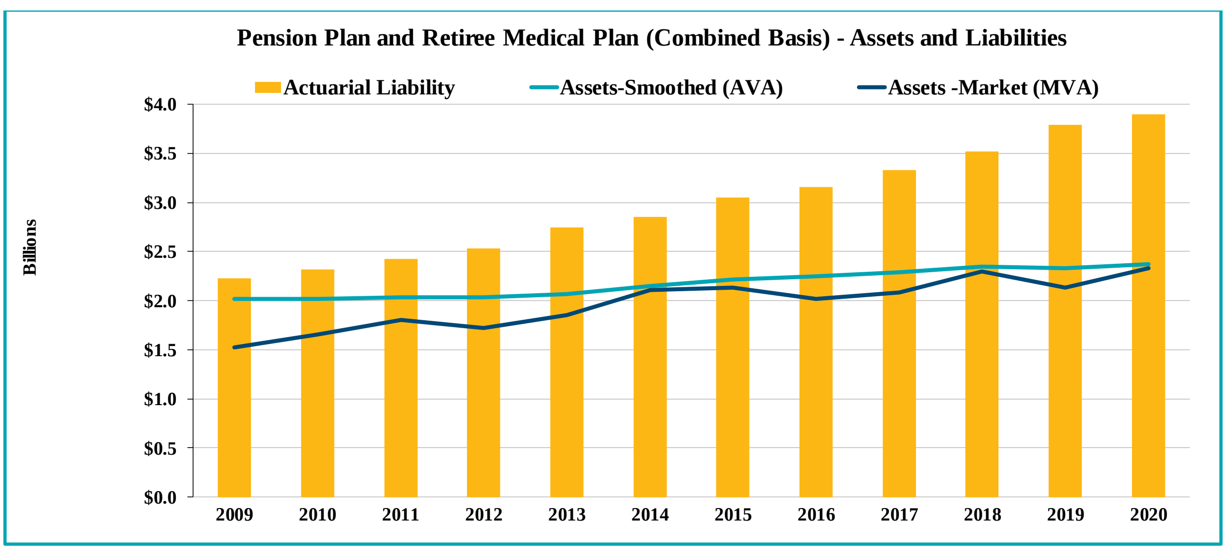
	Normal Cost	Amortization	Total
2019 Contribution Rate	**0.30%**	**1.04%**	**1.34%**
Investment experience	0.00%	0.01%	0.01%
Demographic experience	-0.02%	-0.03%	-0.05%
Contribution experience	0.00%	0.01%	0.01%
Effect of payroll on amortization	0.00%	-0.03%	-0.03%
2020 Contribution Rate	**0.28%**	**1.00%**	**1.28%**

C. Historical Trends

Despite the fact that for most retirement plans the greatest attention is given to the current valuation results and in particular, the size of the current Unfunded Actuarial Liability and the contribution, it is important to remember that each valuation is merely a snapshot in the long-term progress of a pension fund. It is important to evaluate a current year's valuation result relative to historical trends, as well as trends expected into the future.

Assets and Liabilities

The chart below compares the Actuarial Liability, as gold bars, to the assets at both market value (MVA, blue line) and smoothed value (AVA, teal line). The percentages shown in the table below the graph are the ratios of the assets to the Actuarial Liability (the funded ratio) as of the valuation date at the beginning of the year. The funded ratio on an AVA basis has decreased from 90% in 2009 to 61% in 2020, primarily as a result of phasing-in the market value asset losses for calendar year 2008, additional asset losses in 2011, 2014, 2015, and 2018, and changes in the actuarial methods and assumptions. The funded ratio on an MVA basis has decreased from 68% to 60% during that same period. During this period, the average annual rate of return on an AVA basis is slightly higher compared to the average annual return on an MVA basis. The AVA returns are very stable, despite the overall market fluctuations, whereas the MVA is more volatile.



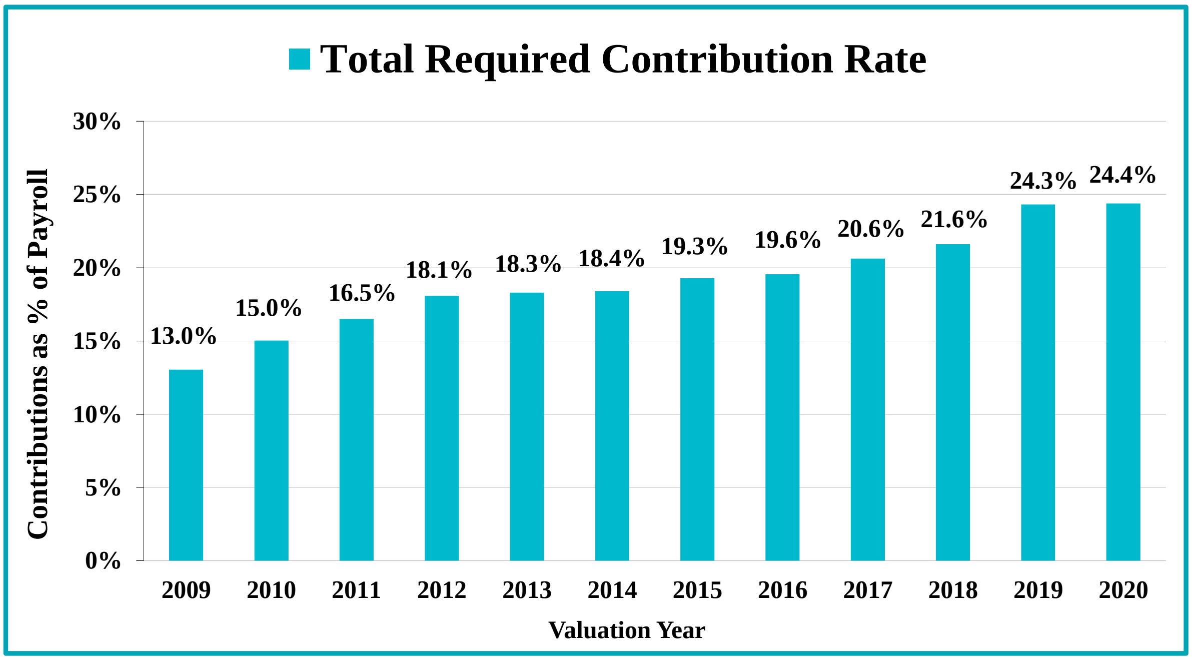
	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	Average Annual Return
Funded Ratio (AVA)	90%	87%	84%	80%	75%	75%	73%	71%	69%	67%	61%	61%	
Rate of Return* (AVA)	1.7%	3.4%	5.0%	3.9%	5.4%	7.6%	7.1%	5.1%	5.5%	7.0%	3.1%	5.8%	5.0%
Funded Ratio (MVA)	68%	72%	74%	68%	68%	74%	70%	64%	63%	65%	56%	60%	
Rate of Return* (MVA)	-26.2%	13.7%	13.9%	-0.3%	12.5%	18.0%	4.9%	-2.0%	7.5%	15.2%	-3.5%	13.9%	4.9%

* Rate of Return for prior year ending 12/31

SECTION I – EXECUTIVE SUMMARY

Contribution Trends

In the chart below, we present the historical trends for the DERP contribution rates. The contribution rates have risen gradually since 2009 as a result of investment experience and actuarial assumption changes. In 2019, there was a significant increase in the contribution rate primarily due to changes in asset smoothing method and amortization policy, which increased the required rate by 2.3%. For 2020, the actuarially determined contribution rate was expected to increase to 25.10%, if all actuarial assumption were met, including a 7.50% return on the Market Value of Assets. However, the 2020 contribution rate remained stable since the Market Value of Assets returned 13.9% and payroll growth was higher than expected, reducing the UAL payments as a percentage of payroll.

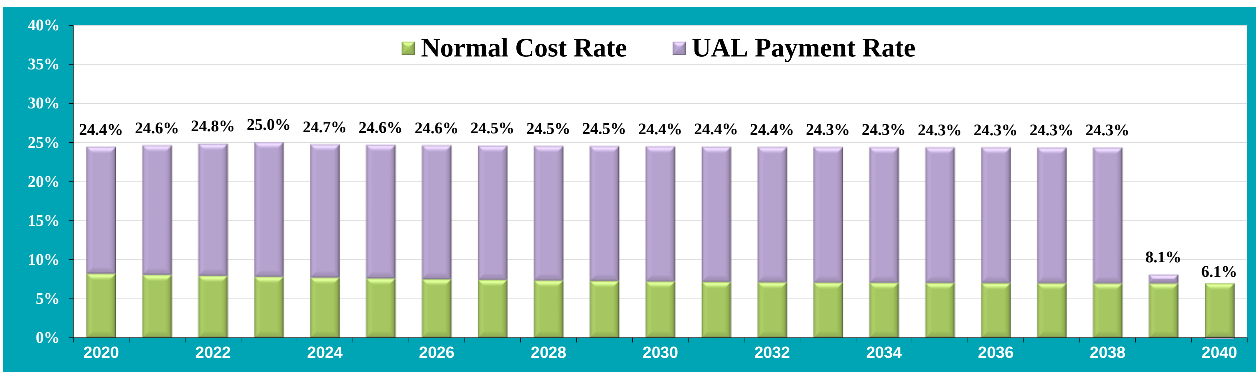


D. Future Expected Financial Trends

The analysis of projected financial trends is an important component of this valuation. All the projections in this section are based on the current investment return assumption of 7.50%. We have assumed future payroll increases of 3.00% per year for the non-DHHA membership. The projections also assume that all other actuarial assumptions are met each year.

Projection of Contributions

The following graph shows the expected contribution rate based on achieving the 7.50% assumption **each year** for the next 20 years. This scenario is highly unlikely; even if the Plan does achieve an **average** return of 7.50% over this time period, the returns in each given year will certainly vary. The projections also assume that the full actuarially determined contribution is contributed each year.

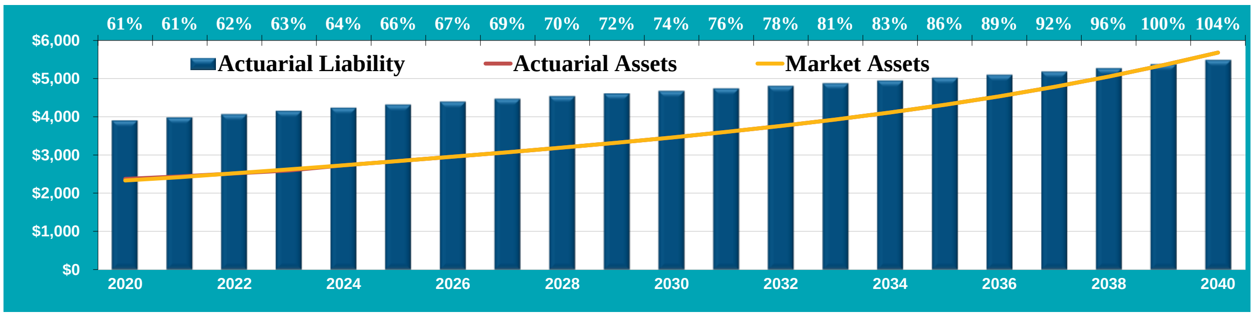


The contribution rate for pension and retiree medical combined is approximately 24.4% of member payroll for the January 1, 2020 valuation. The total contribution is projected to increase to 24.6% of member payroll for the January 1, 2021 valuation. The rate is expected to increase gradually to 25.0% over the next three years, as net deferred investment losses are recognized. Then, it starts to drop slightly through 2039. In 2039, the total contribution rate is expected to drop significantly, when the amortization of the existing unfunded liability as of January 1, 2019 has been fully paid.

SECTION I – EXECUTIVE SUMMARY

Asset and Liability Projections

In this section, we present our assessment of the implications of the January 1, 2020 valuation results in terms of benefit security (assets over liabilities). The following graph shows the projection of assets and liabilities assuming that assets will earn the 7.50% assumption each year during the projection period. The percentages above the graph represent the combined funded status of the Plan (Pension and Retiree Medical) based on the Actuarial Value of Assets.



The projected funded status, based on the Actuarial Value of Assets, slowly increases over the next three years to 63% by 2023. Then when the deferred net investment losses are fully recognized, the funded ratio improves at a steadier pace and reaches 100% funded in 2039.

However, as noted above, it is the **actual** return on Plan assets that will determine the future funded status and actuarially determined contribution rates for the Plan.

SECTION II – IDENTIFICATION AND ASSESSMENT OF RISKS

Actuarial valuations are based on a set of assumptions about future economic and demographic experience. These assumptions represent a reasonable estimate of future experience, but actual future experience will undoubtedly be different and may be significantly different. This section of the report is intended to identify the primary risks to the plan, provide some background information about those risks, and provide an assessment of those risks.

Identification of Risks

A fundamental risk to a pension plan is that the contributions needed to pay the benefits become unaffordable. Even in the case that the Plan remains affordable, the contributions needed to support the Plan may differ significantly from expectations. While there are a number of factors that could lead to contribution amounts deviating from expectations, we believe the primary sources are:

- Investment risk,
- Assumption change risk, and
- Contribution risk.

Other risks that we have not identified may also turn out to be important.

Investment Risk is the potential for investment returns to be different from expected. Lower investment returns than anticipated will increase the Unfunded Actuarial Liability (UAL) necessitating higher contributions in the future unless there are other gains that offset these investment losses. Expected future investment returns and their potential volatility are determined by the Plan's asset allocation.

Assumption change risk is the potential for the future plan expectations (i.e., investment returns, member longevity) to deviate from the current assumptions such that an assumption change is warranted. For example, declining interest rates over the last three decades have resulted in lower investment returns for fixed income investments and have resulted in reductions in the assumed rate of investment return, a change in investment policy or both. Assumption change risk captures the cost of recognizing a change in the economic environment or mortality trends when the current assumption is no longer reasonable, rather than waiting to capture the risk as the experience unfolds.

Contribution risk is the potential that the future actuarially determined contributions will not be made. Generally, this will occur when the actuarially determined contributions deviate from their expected levels to the extent that they become a financial strain. However, it could also result from external fiscal stresses that affect the plan sponsors' ability to pay the contributions, or any other factor that prevents the contributions from being made.

The Plan's funding policy is to calculate an Actuarially Determined Contribution (ADC) equal to the sum of the normal cost and amortization of the UAL. The UAL is amortized over a 20-year period as a level percentage of payroll. This means that the payments increase with the assumed payroll growth rate so that over the period the payment remains constant as a percentage of payroll. A significant investment loss, change in assumptions, or a material change in the

SECTION II – IDENTIFICATION AND ASSESSMENT OF RISKS

contribution base (e.g., covered employees, covered payroll) may cause a large increase in the ADC rate. While the Plan can change its Funding Policy when such a situation occurs, any reduction in the ADC will result in a slower recovery in funded status.

The charts below show the components of changes in the Unfunded Actuarial Liability (UAL) for the Pension Plan during the last 11 years, including investment gains and losses on the Actuarial Value of Assets, liability gains and losses, assumption and method changes, and contributions compared to the "tread water" level of contributions (normal cost plus interest on the UAL). The net UAL change in the Pension Plan is shown by the dark blue line.

Chart II-1

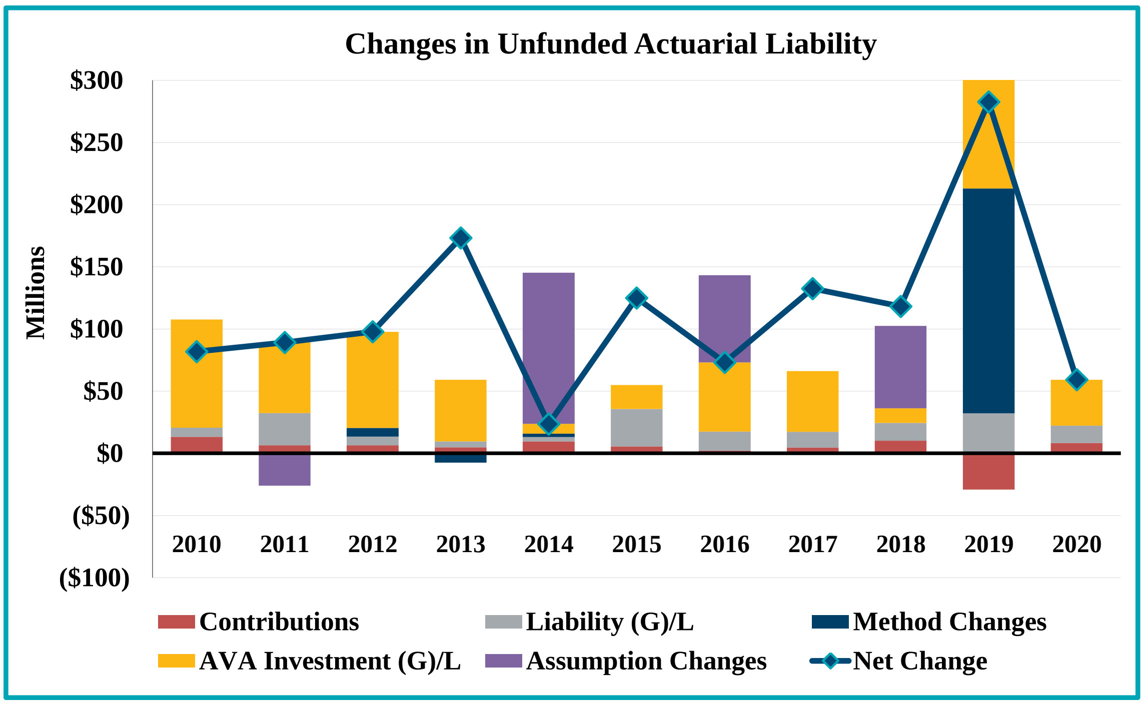


Table II-1 below numerically summarizes the changes in the UAL for each year over the last 11 years. These totals support our identification of investment returns and assumption changes as the primary risks to the Plan.

Table II-1

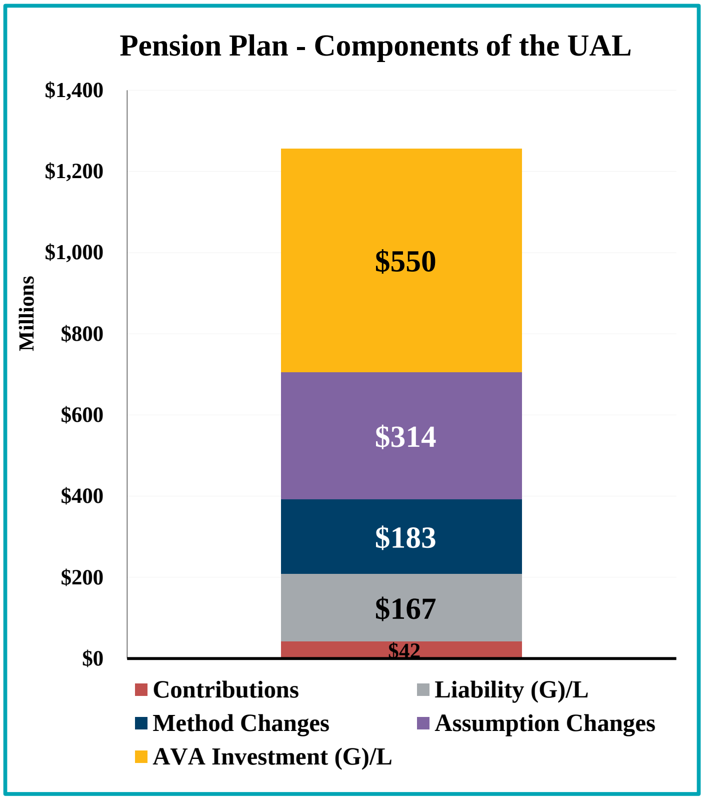
Changes in Unfunded Actuarial Liability ($ in millions)	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	Total
Assumed Rate of Return	**8.00%**	**8.00%**	**8.00%**	**8.00%**	**8.00%**	**7.75%**	**7.75%**	**7.50%**	**7.50%**	**7.50%**	**7.50%**	
Source												
AVA (Gain)/Loss	$ 87.1	$ 56.9	$ 77.3	$ 49.6	$ 7.9	$ 19.2	$ 55.8	$ 48.9	$ 11.8	$ 98.9	$ 37.0	**$ 550.4**
Liability (Gain)/Loss	7.4	25.9	7.1	4.6	3.6	30.2	15.4	12.6	14.2	32.2	14.0	**167.2**
Assumption Change	(25.9)	0.0	0.0	121.6	0.0	70.1	0.0	66.3	82.1	0.0	0.0	**314.2**
Method Change	0.0	0.0	7.0	(7.4)	2.6	0.0	0.0	0.0	0.0	180.8	0.0	**183.0**
Contributions[1]	13.2	6.5	6.4	4.9	9.5	5.5	2.0	4.7	10.2	(29.2)	8.3	**42.0**
Total UAL Change	**$ 81.8**	**$ 89.3**	**$ 97.8**	**$ 173.3**	**$ 23.6**	**$ 125.0**	**$ 73.2**	**$ 132.5**	**$ 118.3**	**$ 282.7**	**$ 59.3**	**$ 1,256.8**

[1] *Actual contributions less than normal cost and interest on the UAL.*

SECTION II – IDENTIFICATION AND ASSESSMENT OF RISKS

Chart II-2 below shows the component sources contributing to the pension plan UAL in total from 2010 through 2020.

Chart II-2



Over the last 11 years, the UAL has increased by approximately $1.3 billion, primarily as a result of investment experience and assumption changes. On a market value basis, the investment losses of -26% in 2008 and the negative returns in 2011, 2015, and 2018 contributed to investment losses on an actuarial value or smoothed asset basis (gold bars). The previous asset smoothing method was slower to recognize actual market losses (or gains) and extended these losses over a longer timeframe than the current method. Over the 11-year period, investment losses have added approximately $550 million to the UAL.

Assumption changes (purple bars) increased the UAL by $314 million. The changes have included reductions in the assumed rate of investment return from 8.0% to 7.5%, decreases in mortality rates, and longevity improvements projected in the future.

The total increase in the UAL due to actuarial method changes over the last 11 years is $183 million. The majority of these changes are a result of the funding methods adopted by the Board in May 2019. The change to the entry age normal actuarial cost method from projected unit credit increased the Pension Plan liabilities by about $140 million. The asset smoothing method change decreased the Actuarial Value of Assets by about $41 million, for a total change in the pension UAL of approximately $181 million.

SECTION II – IDENTIFICATION AND ASSESSMENT OF RISKS

Each year, the UAL is expected to increase for benefits attributable to the current year (the normal cost), administrative expenses, and interest on the UAL. This expected increase is referred to as the tread water level. If contributions are greater than the tread water level, the UAL is expected to decrease. Conversely, if contributions are less than the tread water level, the UAL is expected to increase. The increase in UAL of $8.3 million for 2020 is primarily due to the contribution timing delay where the scheduled total contribution rate during 2019 was 21.50% and the actuarially determined contribution was 24.32%.

Over the 11-year period, contributions (red bars) have increased the UAL by about $42 million since the UAL payment was based on a 30-year amortization schedule prior to 2019, wherein only a portion of the interest on the UAL was paid. Under the new amortization policy, any new UAL layers are amortized over separate 20-year periods as a level percent of payroll. This creates contribution levels intentionally designed to be greater than the tread water level and should begin to pay off principal as well as interest on the UAL.

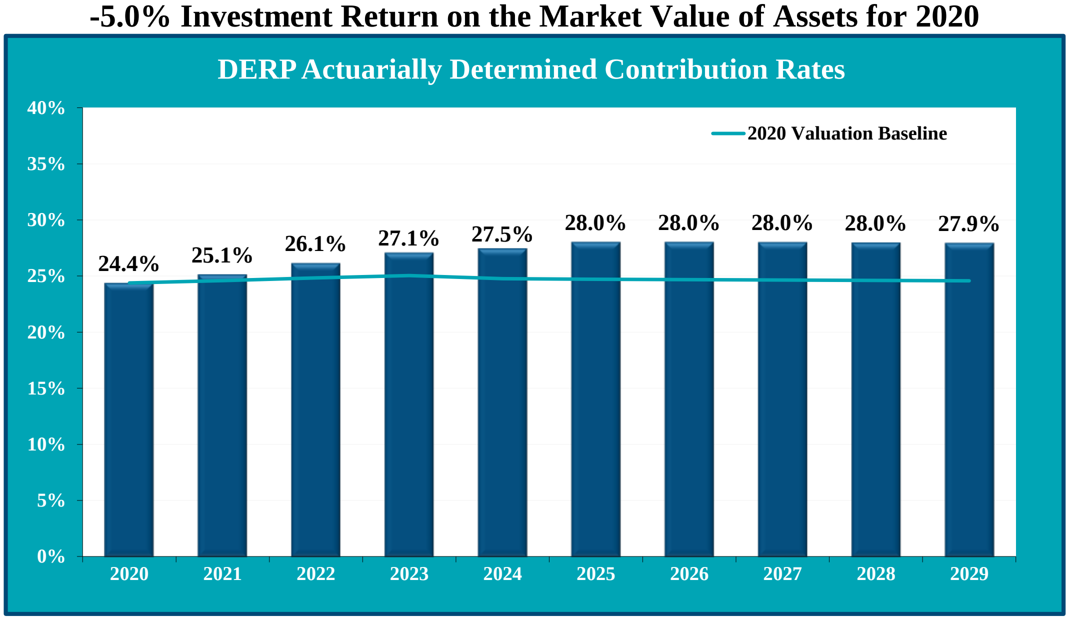
The liability experience (gray bars) has increased the UAL by $167 million.

Assessing Costs and Risks

Sensitivity to Investment Returns – Stress Testing

The chart below and on the following page show the projected contribution rates under two investment return scenarios for calendar year ending 2020: a -5.0% and -15% return on the Market Value of Assets, or a 12.5% and 22.5% actuarial loss compared to the 7.5% expected rate of return. The teal line represents the total projected contribution rate assuming the Market Value of Assets earn 7.5% each year after 2020, all other actuarial assumptions are met, and that the full actuarially determined contribution is contributed each year.

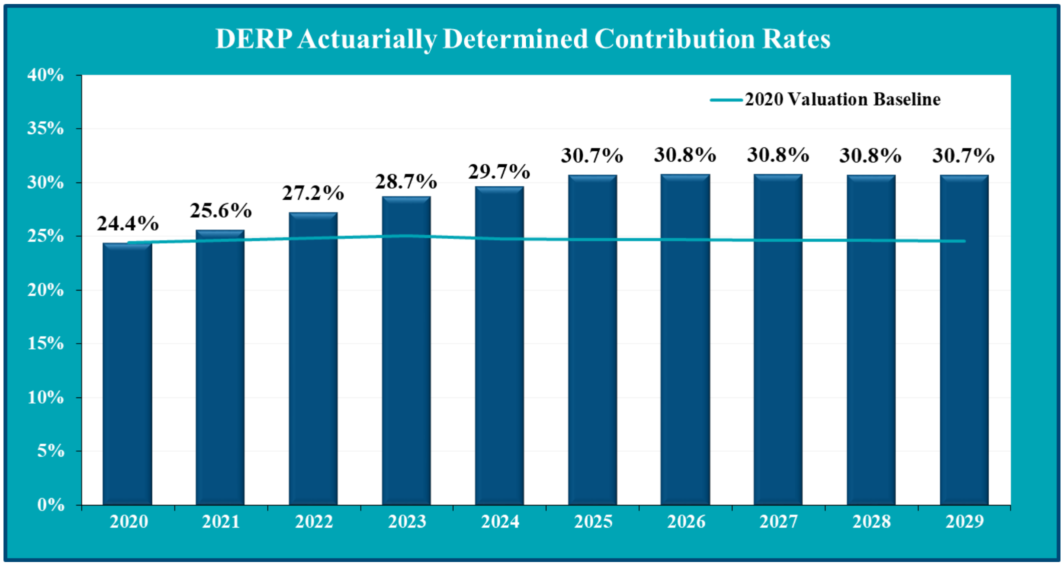
-5.0% Investment Return on the Market Value of Assets for 2020



SECTION II – IDENTIFICATION AND ASSESSMENT OF RISKS

The contribution rate would increase steadily over a five-year period as 1/5th of the investment loss on the Market Value of Assets is recognized each year. The contribution rate would increase from 24.4% to 28.0%, a 3.6% increase. In 2025, the ultimate contribution rate projected to be payable is 28.0%, about 3.4% higher than the baseline rate of 24.6% assuming the assets earned 7.5% for the 2020 plan year.

-15% Investment Return on the Market Value of Assets for 2020



With a -15% investment return for plan year 2020, the contribution rate would eventually increase to 30.7% in 2025, when the net deferred investment losses from 2020 are fully recognized.

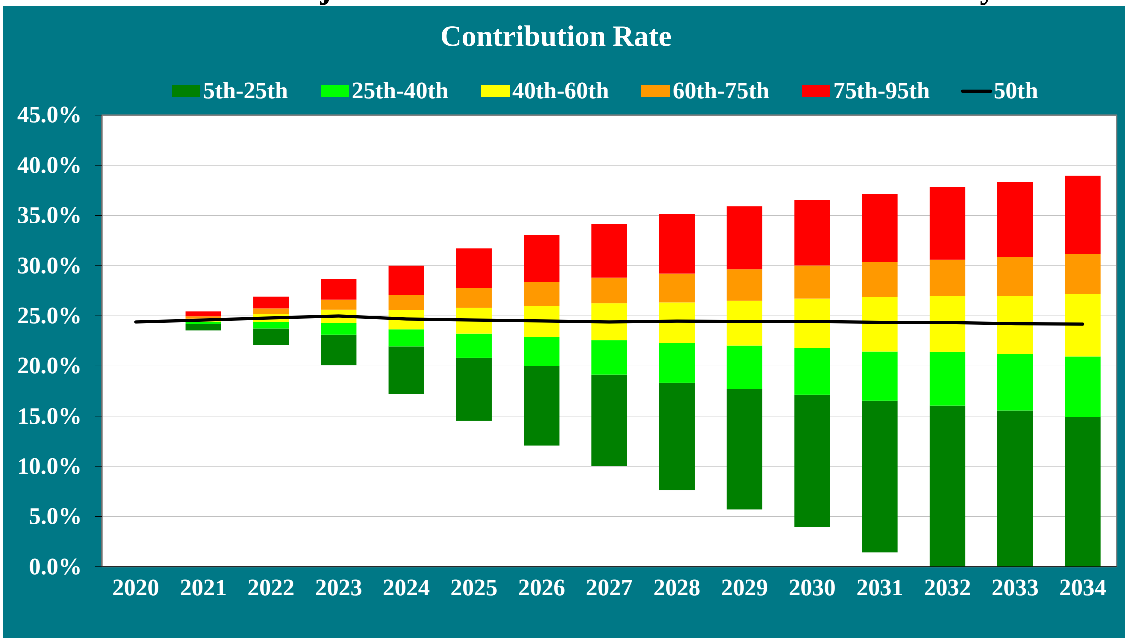
Sensitivity to Investment Returns – Stochastic Projections

If experience has taught us anything, it is that there is a significant level of uncertainty in projections of the future. The largest source of uncertainty is the projection of investment returns. In order to better understand the potential impact of investment returns on the Plan, we have included some stochastic projections in this section of the report. The stochastic projections are based on Meketa's 20-year capital market assumptions for the Plan's investment portfolio, including a 7.5% geometric return – net of investment and administrative expenses – and a 12.57% standard deviation. Each projection contains 5,000 trials that are 15 years in length.

Stochastic projections serve to show the range of probable outcomes of various measurements. The charts on the following pages show the projected range of the total contribution rate and of the funded ratio on an Actuarial Value of Assets basis.

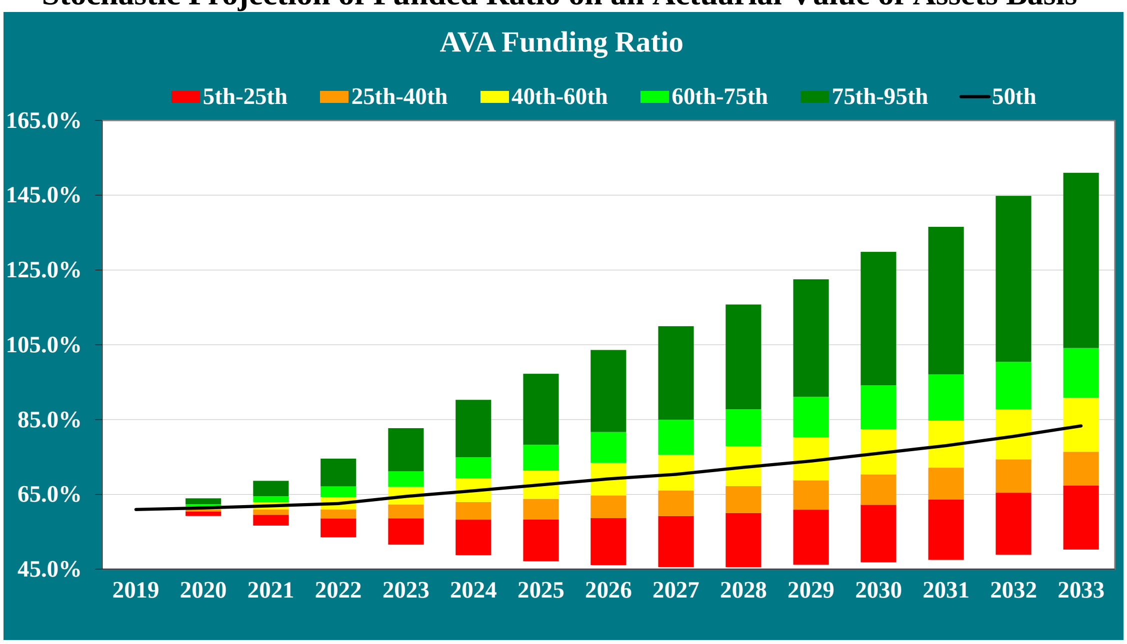
SECTION II – IDENTIFICATION AND ASSESSMENT OF RISKS

Stochastic Projection of Total Contributions as a Percent of Pay



The stochastic projection of total contributions as a percent of pay shows the probable range of future contribution rates. The baseline contribution rate (black line), which is based on the median of the simulations using an average return of 7.50%, aligns closely with the projections discussed in the Executive Summary of this report. The projections do not include any known market events that have occurred after December 31, 2019. In the most pessimistic scenario shown, the 95th percentile, the total projected contribution rate approaches 40% of pay. Conversely, in the most optimistic scenario shown, the 5th percentile, the contribution rate is 0%.

Stochastic Projection of Funded Ratio on an Actuarial Value of Assets Basis



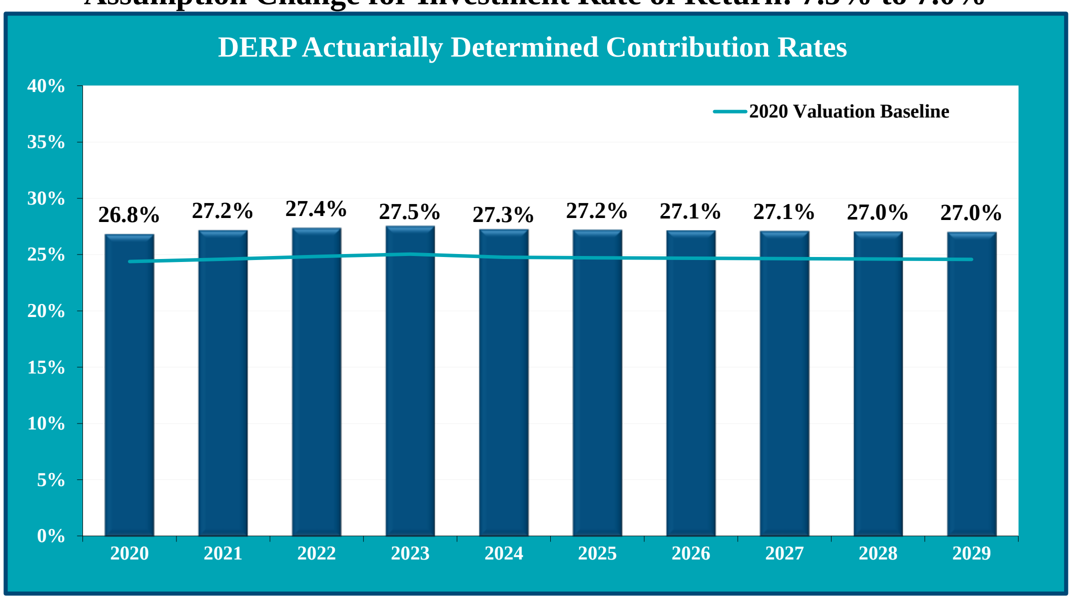
SECTION II – IDENTIFICATION AND ASSESSMENT OF RISKS

While the baseline-funded ratio (black line) is projected to be approximately 83% at the end of the 15-year period shown here, there is a wide range of potential outcomes. Good investment returns have the likelihood of bringing the funded ratio well over 100%. Due to the sound funding policy of the Plan, even in scenarios with unfavorable investment returns, the Plan is projected to remain over 45% funded on an Actuarial Value of Assets basis. However, this assumes that the ADC will continue to be paid by the plan sponsors, regardless of the magnitude of the contributions.

Assumption Change Risk

As stated earlier, lower investment returns for fixed income vehicles along with higher price to earnings ratios could trigger even lower expected returns in the future, resulting in a lower assumed rate of investment return used to discount DERP's liabilities. The graph below illustrates the impact on the January 1, 2020 contribution rate projection of lowering the assumed rate of investment return from 7.5% to 7.0%. The Actuarial Liability would increase by approximately $212 million and the resulting UAL would be amortized over a 20-year period. The normal cost would also increase by about 1.0% of payroll for an overall increase of 2.4% in the contribution rate.

Assumption Change for Investment Rate of Return: 7.5% to 7.0%



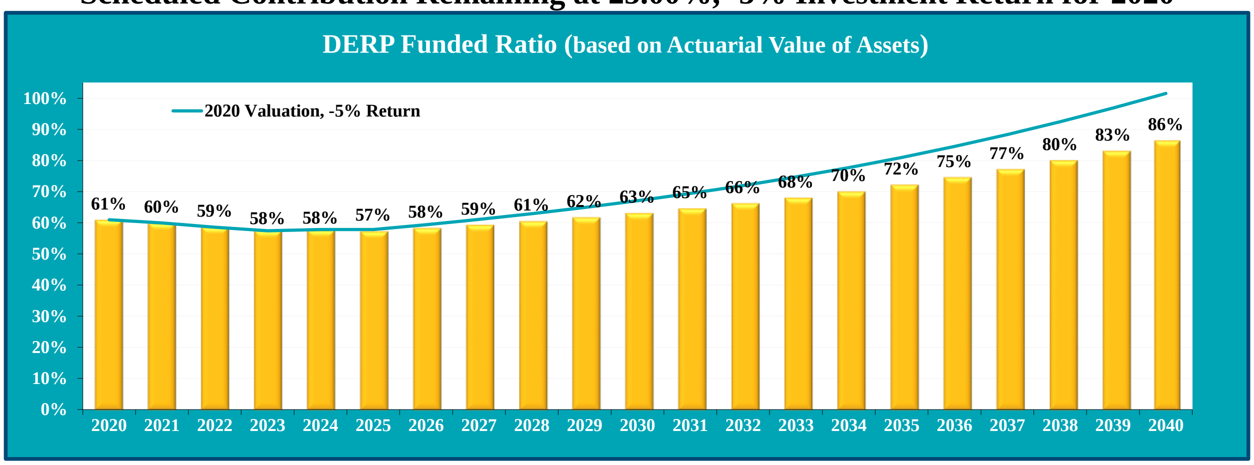
SECTION II – IDENTIFICATION AND ASSESSMENT OF RISKS

Contribution Risk

The Board of Trustees adopts the Actuarially Determined Contributions (ADC) for DERP. However, there is a risk that Plan sponsors will not agree to pay these rates. The ADC rate for 2020 is 24.39% while the actual contribution rate for both employer and employees is higher at 25.00%, a surplus of 0.61%. However, investment losses from the COVID-19 pandemic could likely increase the ADC to levels above the current rate of 25.00%.

As an example, we have shown the impact on the Plan if the actual investment return on a market value basis is -5.0% for 2020, 7.5% for every year after, and the sponsors do not agree to increase the contribution rates. The teal line represents the projected funded ratios, if the ADC is made every year during the period. The yellow bars represent the projected funded ratios, if the contributions made to the Plan remain at the scheduled rate of 25.00%, instead of increasing to the ADC levels.

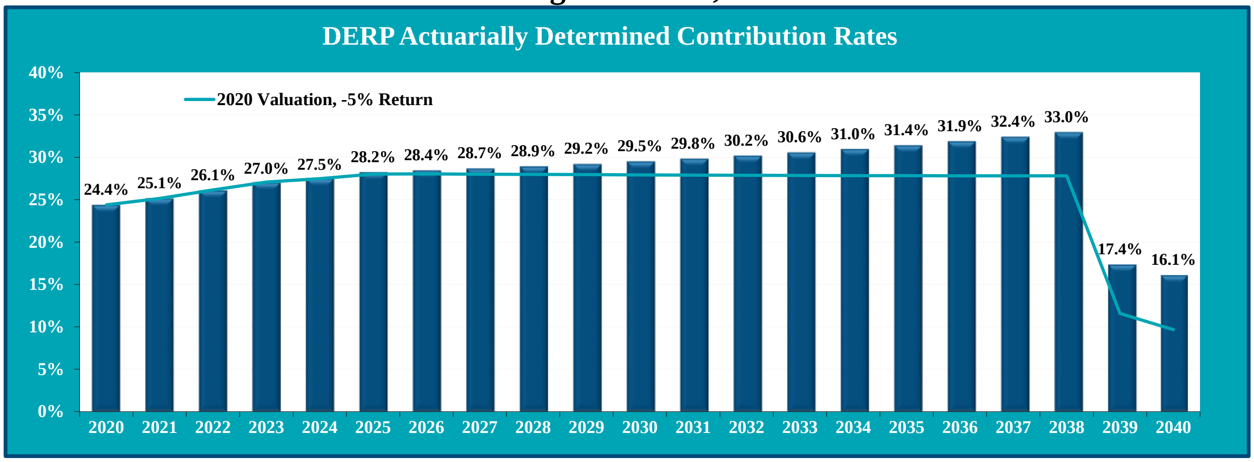
Scheduled Contribution Remaining at 25.00%, -5% Investment Return for 2020



The graph on the next page shows the impact on the ADC rate if contributions to the Plan remain at 25.00% of payroll. Each year an actuarial loss would occur since the actual contributions would be less than the expected ADC. Each year these losses would create a new UAL base with a 20-year amortization schedule that steadily increases the ADC to 33.0% of payroll. These projections below assume that the asset return on a market value basis is 7.5% every year after 2020.

SECTION II – IDENTIFICATION AND ASSESSMENT OF RISKS

Scheduled Contribution Remaining at 25.00%, -5% Investment Return for 2020



The teal line represents the projected ADC, if the ADC is made every year during the period. The blue bars represent the projected ADC, if the contributions made to the Plan remain at the schedule rate of 25.00% instead of increasing to the ADC levels.

Another contribution risk arises when payroll does not grow as expected (for DERP the assumption is annual payroll growth of 3.0%). When member payroll growth stagnates or declines, the dollar level of contributions made to the Plan also stagnate or decline since contributions are based on payroll levels.

There is also a risk of the ADC rate increasing even higher when payroll decreases since the Plan's funding policy amortizes the UAL as a level percentage of pay. This means that the UAL payments increase at the assumed payroll growth rate of 3.0%, so that the payment is expected to remain constant as a percentage of payroll. If payroll growth is less than the expected 3.0% or there is a decline in payroll, the UAL payments are spread over a smaller payroll base and the ADC rate as a percentage of pay increases, potentially making the Plan less affordable plan sponsors.

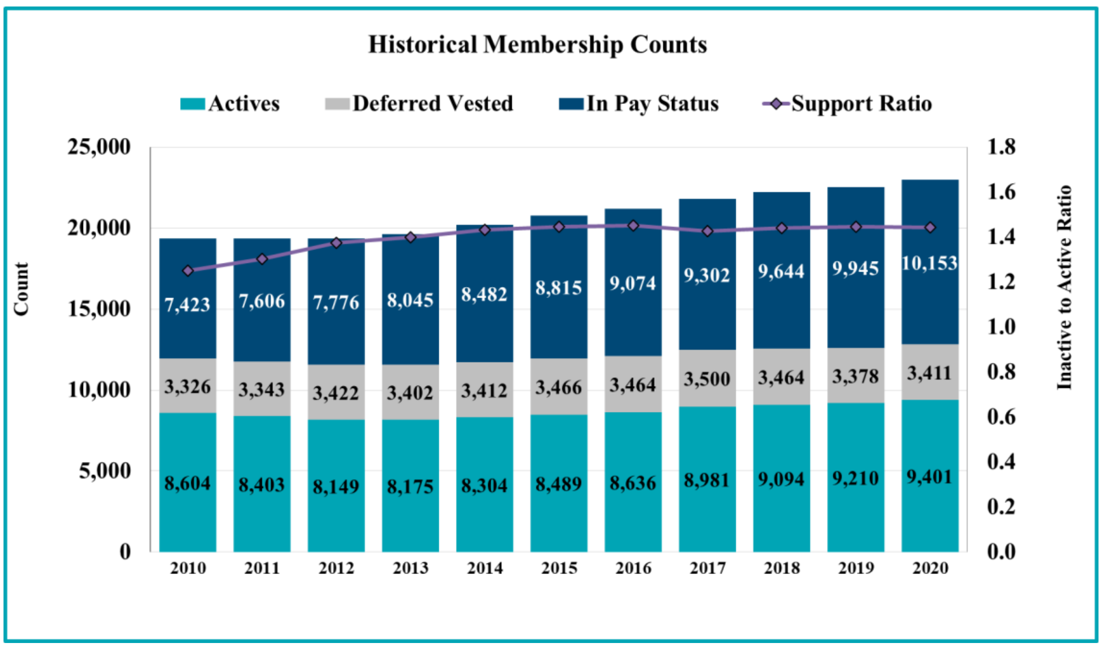
Plan Maturity Measures

The future financial condition of a mature pension plan is more sensitive to each of the risks identified above than a less mature plan. Before assessing each of these risks, it is important to understand the maturity of the plan.

Plan maturity can be measured in a variety of ways, but they all get at one basic dynamic – the larger the plan is compared to the contribution or revenue base that supports it; the more sensitive the plan will be to risk. Maturity measures of the Plan show a gradual increase in maturity.

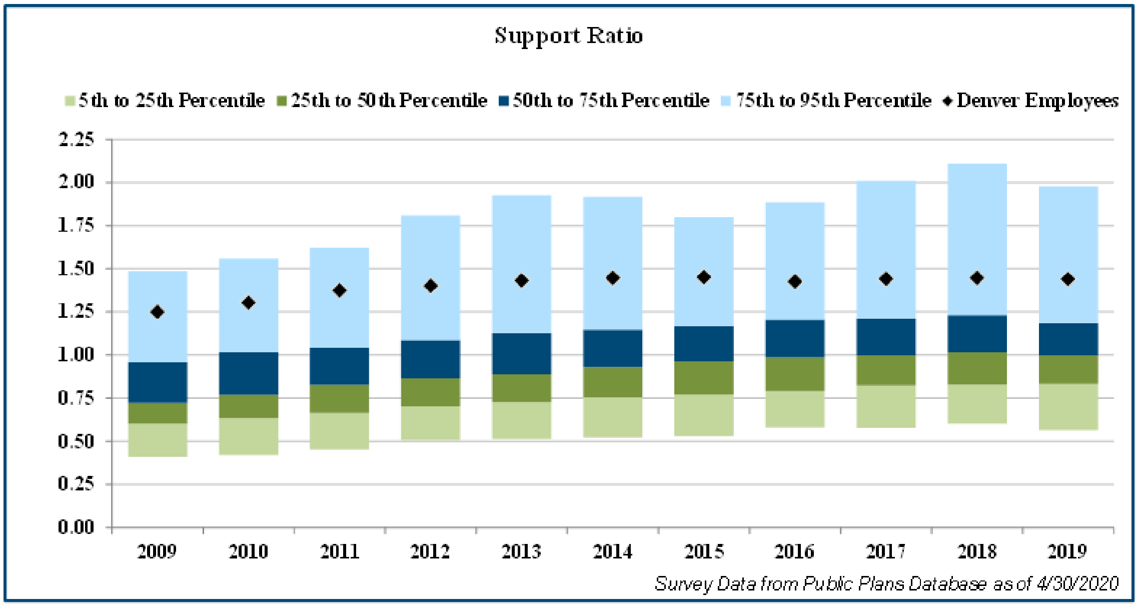
Support Ratio (Inactives per Active)

One simple measure of plan maturity is the ratio of the number of inactive members (those receiving benefits or entitled to a deferred benefit) to the number of active members. The revenue base supporting the plan is usually proportional to the number of active members, so a relatively high number of inactives compared to actives indicate a larger plan relative to its revenue base. The Support Ratio is expected to increase gradually as a Plan matures. The chart below shows the growth in the Support Ratio (purple line) for the Plan for the past 11 years.



SECTION II – IDENTIFICATION AND ASSESSMENT OF RISKS

The chart below shows the distribution from the 5th to 95th percentile of support ratios for the plans in the Public Plans Database maintained by the Center for Retirement Research and others, with the black diamond representing DERP's support ratios. DERP is a mature plan and has consistently been in the middle of the 75th-95th percentile range for the last 11 years.



Leverage Ratios

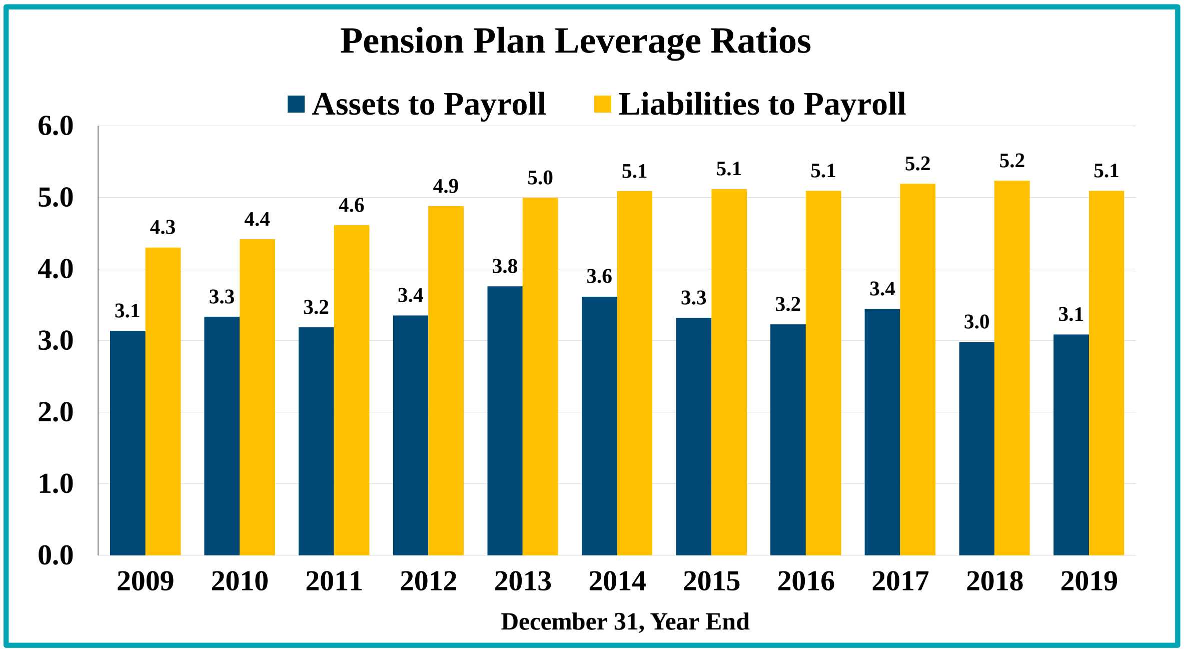
Leverage or volatility ratios (market value of assets to covered payroll and actuarial liabilities to covered payroll) measure the size of the plan compared to its revenue base (payroll) more directly than the Support Ratio. The asset leverage ratio indicates the sensitivity of the Plan to investment returns; while the liability leverage ratio indicates the sensitivity of the Plan to assumption changes or demographic experience.

An asset leverage ratio of 3.0 means that if the Plan experiences a 10% loss on assets compared to the expected return, the loss would be equivalent to 30% of the Plan's payroll. An additional UAL payment of approximately 2.25% of payroll would be required to amortize this asset loss over a 20-year period. However, the same investment loss for a plan with an asset leverage ratio of 6.0 would be equivalent to 60% of payroll and an approximately 4.50% increase in the UAL payment.

As DERP becomes better funded, the asset leverage ratio will increase, and if it was 100% funded, the asset leverage ratio would equal the Actuarial Liability (AL) leverage ratio.

SECTION II – IDENTIFICATION AND ASSESSMENT OF RISKS

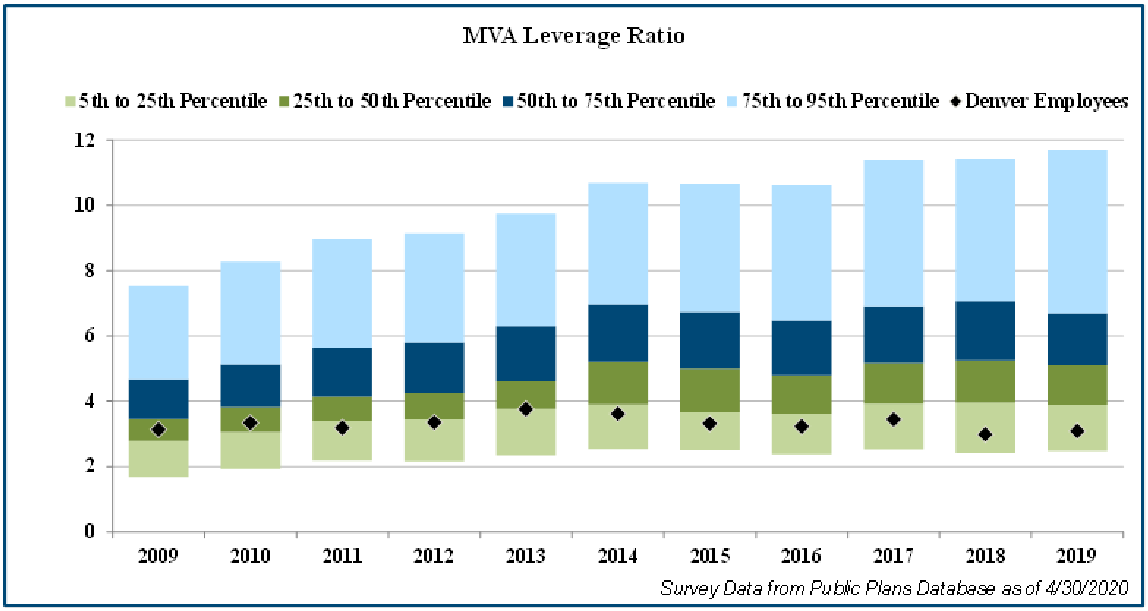
The chart below shows the historical leverage ratios of the Pension Plan. The asset leverage ratios have been relatively stable. The liability leverage ratios have been gradually increasing but have remained stable in the last six years. This indicates a slight increase in sensitivity of the Plan to assumption changes. However, the sensitivity of the Plan to asset returns is relatively unchanged, though as mentioned above, it is expected to increase as the Plan becomes better funded.



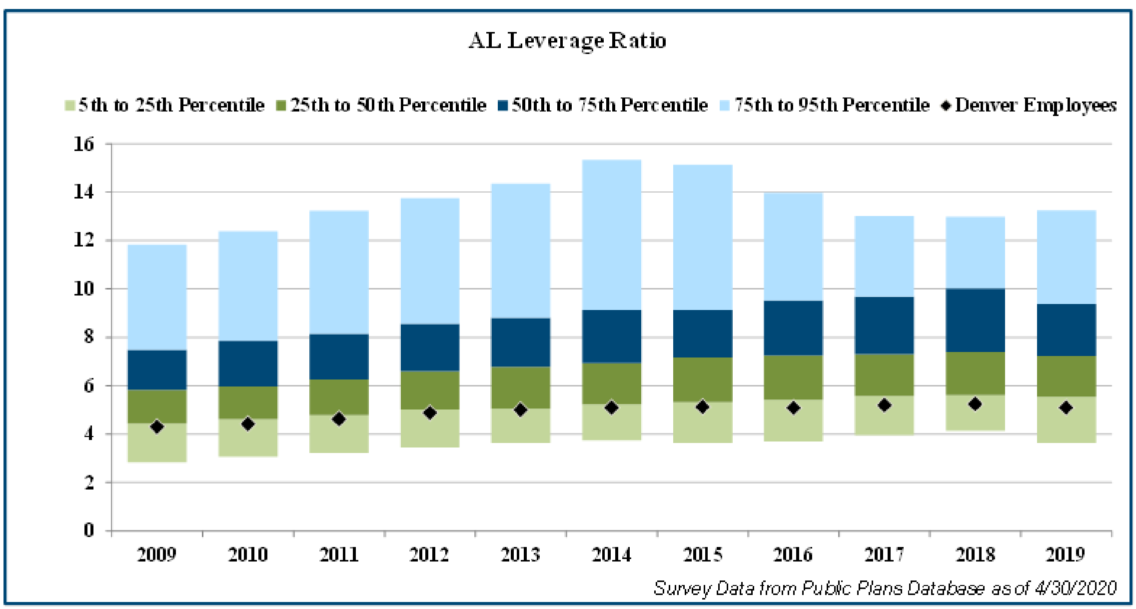
The charts on the next page show the distribution from the 5th to 95th percentile of asset and Actuarial Liability leverage ratios for the plans in the Public Plans Database with the black diamond representing DERP's ratios. The leverage ratios for DERP are much lower than most public plans indicating that DERP is less sensitive to some types of risk than most plans.

SECTION II – IDENTIFICATION AND ASSESSMENT OF RISKS

After the Great Recession in 2009, DERP's Market Value of Assets (MVA) leverage ratio was close to the median, but gradually dropped down to the 5th-25th percentile in 2014 and has remained in this range for the last six years.



The Plan's Actuarial Liability leverage ratio has been consistently at or just below the 25th percentile over the last decade. A lower than average liability leverage ratio generally implies lower average benefit levels, more optimistic assumptions, or a combination of these factors.



SECTION III – ASSETS

Pension plan assets play a key role in the financial operation of the Plan and in the decisions, the Board may make with respect to future deployment of those assets. The level of assets, the allocation of assets among asset classes, and the methodology used to measure assets will likely impact contributions and the ultimate security of participants' benefits.

In this section, we present detailed information on Plan assets including:

- **Disclosure** of Plan assets as of December 31, 2018 and December 31, 2019,
- Statement of the **changes** in market values during the year,
- Development of the Actuarial Value of Assets, and
- An assessment of historical **investment performance.**

Disclosure

There are two types of asset values disclosed in this value, the Market Value of Assets and the Actuarial Value of Assets. The market value represents a "snap-shot" or "cash-out" value, which provides the principal basis for measuring financial performance from one year to the next. Market values, however, can fluctuate widely with corresponding swings in the marketplace. As a result, market values are usually not as suitable for long-term planning as the Actuarial Value of Assets. The Actuarial Value of Assets reflects smoothing of annual investment returns in order to mitigate any wide fluctuations in overall investment returns.

Tables III-1(a) and III-1(b) on the next two pages disclose and compare the asset values as of December 31, 2018 and December 31, 2019, separated by pension plan and retiree medical plan.

Changes in Market Value

The components of asset change are:

- Contributions (employer and employee)
- Benefit payments
- Expenses (investment and administrative)
- Investment income (realized and unrealized)

Tables III-2(a) and III-2(b) on the following pages show the components of change in the Market Value of Assets during the fiscal years ending December 31, 2018 and December 31, 2019.

SECTION III – ASSETS

Table III-1(a)

Pension Plan - Statement of Assets at Market Value

	December 31, 2018	December 31, 2019
Cash and short-term investments	$ 35,195,010	$ 112,797,073
Securities lending collateral	125,371,528	78,772,290
Receivables:		
Interest and dividends	1,478,337	1,791,671
Unsettled securities sold	32,048	192,744
Investments, at fair value		
U.S. Government Bonds	150,139,492	269,453,043
Domestic corporate bonds/Fixed income	297,827,971	255,329,156
Domestic Equity	407,633,082	447,648,651
International Equity	432,529,165	388,961,582
Real Estate	167,569,016	170,123,332
Alternative investments	469,014,755	508,337,159
Absolute return	101,295,924	109,799,309
Total Investments	2,026,009,405	2,149,652,232
Prepaid items	31,492	33,614
Capital assets	3,407,067	3,071,250
Total Assets	**$ 2,191,524,887**	**$ 2,346,310,874**
Liabilities:		
Securities lending obligations	125,371,528	78,772,290
Unsettled securities purchased	1,441,091	475,680
Unearned contributions	0	6,596,810
Accounts payable	2,034,821	1,984,713
Total Liabilities	**$ 128,847,440**	**$ 87,829,493**
Market Value of Assets	**$ 2,062,677,447**	**$ 2,258,481,381**

SECTION III – ASSETS

Table III-1(b)

Retiree Medical Plan - Statement of Assets at Market Value

	December 31, 2018	December 31, 2019
Cash and short-term investments	$ 1,183,557	$ 3,613,427
Securities lending collateral	4,092,422	2,499,233
Receivables:		
Interest and dividends	48,256	56,845
Unsettled securities sold	1,046	6,115
Investments, at fair value		
U.S. Government Bonds	4,900,907	8,549,021
Domestic corporate bonds/Fixed income	9,721,807	8,100,908
Domestic Equity	13,306,104	14,202,688
International Equity	14,118,771	12,340,705
Real Estate	5,469,847	5,397,556
Alternative investments	15,309,747	16,128,172
Absolute return	3,306,538	3,483,637
Total Investments	66,133,721	68,202,687
Prepaid items	1,028	1,066
Capital assets	111,215	97,442
Total Assets	**$ 71,571,245**	**$ 74,476,815**
Liabilities:		
Securities lending obligations	4,092,422	2,499,233
Unsettled securities purchased	47,041	15,092
Unearned contributions	0	209,299
Accounts payable	66,421	62,970
Total Liabilities	**$ 4,205,884**	**$ 2,786,594**
Market Value of Assets	**$ 67,365,361**	**$ 71,690,221**

SECTION III – ASSETS

Table III-2(a)
Pension Plan - Changes in Market Values

	December 31, 2018	December 31, 2019
Additions		
Contributions		
City and County of Denver	$ 75,451,623	$ 83,146,716
DHHA Contributions	6,268,121	4,318,106
Member Contributions	52,700,679	60,074,876
Total Contributions	134,420,423	147,539,698
Net Investment Income		
Net Appreciation/(Depreciation) in Fair Value of Investments	(116,509,425)	253,855,321
Interest	17,082,480	13,680,329
Dividends	11,244,298	15,201,501
Real Estate, Absolute Return, and Alternatives	27,721,970	15,456,728
Investment Expenses	(13,471,680)	(14,538,267)
Net Investment Income	(73,932,357)	283,655,612
Securities Lending Income		
Securities Lending Income	3,460,339	3,272,725
Securities Lending Expense	(2,674,372)	(2,818,112)
Net Securities Lending Income	785,967	454,613
Total Additions	$ 61,274,033	$ 431,649,923
Deductions		
Benefit Payments	$ 207,516,053	$ 218,123,278
DROP Benefits Paid	8,142,084	8,289,671
Refunds of Members' Contributions	4,348,592	5,309,546
Administrative Expenses	4,016,288	4,123,494
Total Deductions	$ 224,023,017	$ 235,845,989
Net Increase (Decrease)	**(162,748,984)**	**195,803,934**
Fiduciary Net Position held in trust for benefits		
Beginning of Year	$ 2,225,426,431	$ 2,062,677,447
End of Year	2,062,677,447	2,258,481,381
Expected Return (Net of All Expenses)	$ 163,755,518	$ 151,601,024
Actual Return (Net of All Expenses)	(77,162,678)	279,986,731
Expected Return	7.50%	7.50%
Approximate Return	-3.54%	13.86%

SECTION III – ASSETS

Table III-2(b)

Retiree Medical Plan - Changes in Market Values

	December 31, 2018	December 31, 2019
Additions		
Contributions		
City and County of Denver	$ 4,670,536	$ 4,850,055
DHHA Contributions	282,218	234,744
Member Contributions	3,132,784	3,310,427
Total Contributions	8,085,538	8,395,226
Net Investment Income		
Net Appreciation/(Depreciation) in Fair Value of Investments	(3,799,662)	8,209,234
Interest	564,491	441,189
Dividends	373,342	490,110
Real Estate, Absolute Return, and Alternatives	916,891	497,339
Investment Expenses	(445,176)	(467,378)
Net Investment Income	(2,390,114)	9,170,494
Securities Lending Income		
Securities Lending Income	114,737	105,745
Securities Lending Expense	(88,639)	(91,076)
Net Securities Lending Income	26,098	14,669
Total Additions	$ 5,721,522	$ 17,580,389
Deductions		
Benefit Payments	$ 12,905,976	$ 12,951,302
DROP Benefits Paid	0	0
Refunds of Members' Contributions	144,189	171,219
Administrative Expenses	133,128	133,008
Total Deductions	$ 13,183,293	$ 13,255,529
Net increase (Decrease)	**(7,461,771)**	**4,324,860**
Fiduciary Net Position held in trust for benefits		
Beginning of Year	$ 74,827,132	$ 67,365,361
End of Year	67,365,361	71,690,221
Expected Return (Net of All Expenses)	$ 5,429,227	$ 4,878,333
Actual Return (Net of All Expenses)	(2,497,144)	9,052,155
Expected Return	7.50%	7.50%
Approximate Return	-3.45%	13.93%

Development of Actuarial Value of Assets

Tables III-3(a) and III-3(b) below show the development of the Actuarial Value of Assets under the new five-year smoothing method for the pension and retiree medical plans, respectively, using a fresh start approach. The period ending December 31, 2018 was the first year to have investment return experience recognized over five years under this method.

Table III-3(a)
Pension Plan - Development of Actuarial Value of Assets

Year End	Actual Return	Expected Return	Investment Gain/(Loss)	Not Recognized	Unrecognized Earnings/(Loss)
December 31, 2018	$ (77,162,678)	$ 163,755,518	$ (240,918,196)	60%	$ (144,550,917)
December 31, 2019	279,986,731	151,601,024	128,385,707	80%	102,708,566
1) Total Unrecognized Net (Loss)					$ (41,842,352)
					Asset Values
2) Market Value of Assets as of December 31, 2019					$ 2,258,481,381
3) Actuarial Value of Assets as of December 31, 2019 [(2) - (1)]					2,300,323,733
4) Ratio of Actuarial Value to Market Value [(3) / (2)]					102%

Table III-3(b)
Retiree Medical Plan - Development of Actuarial Value of Assets

Year End	Actual Return	Expected Return	Investment Gain/(Loss)	Not Recognized	Unrecognized Earnings/(Loss)
December 31, 2018	$ (2,497,144)	$ 5,429,227	$ (7,926,371)	60%	$ (4,755,823)
December 31, 2019	9,052,155	4,878,333	4,173,822	80%	3,339,057
1) Total Unrecognized Amount					$ (1,416,765)
					Asset Values
2) Market Value of Assets as of December 31, 2019					$ 71,690,221
3) Actuarial Value of Assets as of December 31, 2019 [(2) - (1)]					73,106,986
4) Ratio of Actuarial Value to Market Value [(3) / (2)]					102%

SECTION III – ASSETS

Tables III-4(a) and III-4(b) below show a comparison of the Market and Actuarial Value of Assets returns for the pension and retiree medical plans, respectively.

Table III-4(a)

Pension Plan - Development of Investment Returns

		Market Value		Actuarial Value
1) **Assets, Beginning of Year (BOY)**	**$**	**2,062,677,447**	**$**	**2,255,412,003**
a) Contributions		147,539,698		147,539,698
b) Benefit Paid and Refunds of Contributions		231,722,495		231,722,495
c) Expected Investment Earnings at 7.50%		151,601,024		166,056,116
2) Expected Value of Assets, End of Year (EOY)	$	2,130,095,674	$	2,337,285,322
3) **Actual Value, End of Year**	$	2,258,481,381	$	2,300,323,733
4) Investment Gain/(Loss) [(3) - (2)]	$	128,385,707	$	(36,961,589)
5) Actual Investment Earnings [(1c) + (4)]	$	279,986,731	$	129,094,526
6) Rate of Return		13.86%		5.83%
7) Ratio of Actuarial Value of Assets to Market Value				102%

Table III-4(b)

Retiree Medical Plan - Development of Investment Returns

		Market Value		Actuarial Value
1) **Assets, Beginning of Year (BOY)**	**$**	**67,365,361**	**$**	**73,706,458**
a) Contributions		8,395,226		8,395,226
b) Benefit Paid and Refunds of Contributions		13,122,521		13,122,521
c) Expected Investment Earnings at 7.50%		4,878,333		5,353,916
2) Expected Value of Assets, End of Year (EOY)	$	67,516,399	$	74,333,078
3) **Actual Value, End of Year**		$71,690,221	$	73,106,986
4) Investment Gain/(Loss) [(3) - (2)]	$	4,173,822	$	(1,226,092)
5) Actual Investment Earnings [(1c) + (4)]	$	9,052,155	$	4,127,823
6) Rate of Return		13.93%		5.79%
7) Ratio of Actuarial Value of Assets to Market Value				102%

Historical Investment Performance

The following table shows the historical annual asset returns on both a market value and actuarial value basis since 1999. The 10-year and 20-year geometric average annual returns are also included for reference.

Table III-5

History of Investment Rates of Return

Year Ended	Pension Plan		Retiree Medical	
Dec 31	Market	Actuarial	Market	Actuarial
2019	13.9%	5.8%	13.9%	5.8%
2018[1]	-3.5%	3.1%	-3.5%	1.1%
2017	15.2%	7.0%	15.3%	6.5%
2016	7.5%	5.5%	7.5%	5.1%
2015	-2.0%	5.1%	-1.9%	4.7%
2014	4.9%	7.1%	5.0%	6.6%
2013	18.0%	7.6%	18.2%	7.1%
2012	12.5%	5.4%	12.6%	5.0%
2011	-0.3%	3.9%	-0.2%	3.6%
2010	13.9%	5.0%	13.7%	4.7%
2009	13.7%	3.4%	13.6%	3.2%
2008	-26.2%	1.7%	-26.1%	1.7%
2007	10.6%	9.1%	10.6%	9.0%
2006	13.7%	8.7%	13.7%	8.6%
2005	9.3%	7.5%	9.2%	7.4%
2004	11.1%	7.1%	11.0%	7.0%
2003	19.4%	6.1%	19.3%	6.1%
2002	-8.7%	3.5%	8.7%	3.8%
2001	-5.8%	6.3%	-5.7%	6.4%
2000	-1.4%	9.5%	-1.4%	9.8%
Geometric Averages				
20-Year	5.2%	5.9%	6.1%	5.6%
10-Year	7.8%	5.5%	7.8%	5.0%

[1] Actuarial return for 2018 recalculated based on revised AVA smoothing method

SECTION IV – LIABILITIES

In this section, we present detailed information on Plan liabilities including:

- **Disclosure** of Plan liabilities at January 1, 2019 and January 1, 2020,
- Statement of **changes** in these liabilities during the year.

Disclosure

Several types of liabilities are calculated and presented in this report. Each type is distinguished by the people ultimately using the figures and the purpose for which they are using them. Note that these liabilities are not appropriate for settlement purposes, including the purchase of annuities and the payment of lump sums.

- **Present Value of Future Benefits:** Used for measuring all future Plan obligations; the obligations of the Plan earned as of the valuation date and those to be earned in the future by current plan participants, under the current Plan provisions.

- **Actuarial Liability:** Used for funding calculations, this liability is calculated taking the Present Value of Future Benefits and subtracting the present value of future Normal Costs under an acceptable actuarial funding method. The method used for this Plan as of January 1, 2020 is called the **Entry Age Normal** (EAN) funding method. Prior to the January 1, 2019 valuation, the **Projected Unit Credit** (PUC) funding method was used.

- **Unfunded Actuarial Liability:** The excess of the Actuarial Liability over the Actuarial Value of Assets.

Tables IV-1(a) and IV-1(b) on the following page disclose each of these liabilities for the current and prior valuations. The results for the current year are also split between the DHHA and non-DHHA groups. With respect to each disclosure, a subtraction of the appropriate value of Plan assets yields, for each respective type, a **net surplus,** or an **Unfunded Actuarial Liability**.

SECTION IV – LIABILITIES

Table IV-1(a)

Pension Plan - Present Value of Future Benefits and Actuarial Liability
($ in thousands)

	DHHA	non-DHHA	January 1, 2020 Total	January 1, 2019 Total
Present Value of Future Benefits				
Actives	$ 168,596	$ 1,383,518	$ 1,552,114	$ 1,516,580
DROP Balances	32,688	85,632	118,320	118,078
Terminated Vested	44,294	188,186	232,480	217,363
Retirees	377,236	1,634,788	2,012,024	1,947,110
Disabled	4,893	43,594	48,487	48,780
Beneficiaries	1,850	153,728	155,578	147,713
Total PVFB	**$ 629,557**	**$ 3,489,446**	**$ 4,119,003**	**$ 3,995,623**
Actuarial Liability				
Actives	$ 155,472	$ 1,005,427	$ 1,160,898	$ 1,144,627
Inactives	460,961	2,105,928	2,566,889	2,479,043
Total Actuarial Liability	**$ 616,433**	**$ 3,111,354**	**$ 3,727,787**	**$ 3,623,670**
Actuarial Value of Assets			$ 2,300,324	$ 2,255,412
Funded Ratio			61.7%	62.2%
Unfunded Actuarial Liability			$ 1,427,464	$ 1,368,258

Table IV-1(b)

Retiree Medical Plan - Present Value of Future Benefits and Actuarial Liability
($ in thousands)

	DHHA	non-DHHA	January 1, 2020 Total	January 1, 2019 Total
Present Value of Future Benefits				
Actives	$ 5,722	$ 54,164	$ 59,886	$ 60,820
Terminated Vested	1,595	7,869	9,464	9,275
Retirees	15,653	83,444	99,098	100,068
Disabled	434	3,875	4,310	4,450
Beneficiaries	152	6,911	7,063	6,977
Total PVFB	**$ 23,556**	**$ 156,264**	**$ 179,820**	**$ 181,590**
Actuarial Liability				
Actives	$ 5,237	$ 41,956	$ 47,193	$ 48,067
Inactives	17,834	102,100	119,934	120,770
Total Actuarial Liability	**$ 23,072**	**$ 144,056**	**$ 167,128**	**$ 168,837**
Actuarial Value of Assets			$ 73,107	$ 73,706
Funded Ratio			43.7%	43.7%
Unfunded Actuarial Liability			$ 94,021	$ 95,131

SECTION V – CONTRIBUTIONS

In the process of evaluating the financial condition of any pension plan, the actuary analyzes the assets and liabilities to determine what level (if any) of contributions is needed to properly maintain the funding status of the Plan. Typically, the actuarial process will use a funding technique that will result in a pattern of contributions that are both stable and predictable.

For this Plan, the actuarial funding method used to determine the normal cost and the Unfunded Actuarial Liability is the **Entry Age Normal (EAN)** cost method. There are two primary components to the total contribution: the **normal cost rate** (employee and employer) and the **Unfunded Actuarial Liability rate** (UAL rate).

The normal cost rate is determined in the following steps. First, an individual normal cost rate is determined by taking the value of each member's projected future benefits as of the member's entry age into the Plan. This value is then divided by the value of the member's expected future salary, also at entry age, producing a normal cost rate that should remain relatively constant over a member's career.

The total normal cost is computed by adding the expected dollar amount of each active member's normal cost for the current year – known as the Individual Entry Age Method. The total normal cost is adjusted with interest to the middle of the year, to reflect the fact that the normal cost contributions are paid throughout the year as member payroll payments are made. Finally, the total normal cost rate, calculated by dividing the total normal cost by expected payroll of the closed group, is reduced by the member contribution rate to produce the employer normal cost rate.

The Unfunded Actuarial Liability (UAL) is the difference between the EAN Actuarial Liability and the Actuarial Value of Assets. As of January 1, 2019, all of the prior UAL bases were combined and an initial layer to amortize the existing UAL as a level percentage of projected payroll over a 20-year period was created.

An additional layer was created to amortize the change in the actuarial cost method and the asset smoothing method as of January 1, 2019. Any subsequent unexpected changes in the Unfunded Actuarial Liability after January1, 2019 will be amortized over new 20-year periods.

SECTION V – CONTRIBUTIONS

Tables V-1(a) and V-1(b) below shows the development of the amortization payments for the pension plan and retire medical plan, respectively.

Table V-1(a)
Pension Plan - Development of Amortization Payment

Amortization Base	Initial Amount	Initial Amortization Years	January 1, 2020 Outstanding Balance	Remaining Amortization Years	Amortization Amount	% of Pay
2019 Combined Bases	$ 1,187,452,154	20	$ 1,183,550,549	19	$ 92,348,855	12.61%
2019 Funding Method Changes	180,806,014	20	180,211,942	19	14,061,391	1.92%
2020 (Gain)/Loss	63,701,219	20	63,701,219	20	4,809,788	0.66%
Total			$ 1,427,463,710		$ 111,220,034	15.19%

Table V-1(b)
Retiree Medical Plan - Development of Amortization Payment

Amortization Base	Initial Amount	Initial Amortization Years	January 1, 2020 Outstanding Balance	Remaining Amortization Years	Amortization Amount	% of Pay
2019 Combined Bases	$ 86,218,269	20	$ 85,934,982	19	$ 6,705,246	0.92%
2019 Funding Method Changes	8,912,349	20	8,883,065	19	693,119	0.09%
2020 (Gain)/Loss	(797,406)	20	(797,406)	20	(60,209)	-0.01%
Total			$ 94,020,642		$ 7,338,156	1.00%

SECTION V – CONTRIBUTIONS

Tables V-2(a), V-2(b), and V-2(c) show the development of contributions as both a dollar amount and a percentage of projected payroll split between the DHHA and non-DHHA groups.

Table V-2(a)
Pension Plan - Development of Contributions
($ in thousands)

	January 1, 2020 Valuation					
		Non-DHHA			Total	
	DHHA	Tier 1	Tier 2	Tier 3	Non-DHHA	TOTAL[1]
Normal Cost $	$ 2,939	$ 14,323	$ 12,093	$ 29,128	$ 55,545	$ 57,961
Normal Cost % of Pay	9.63%	9.41%	8.61%	7.11%	7.92%	7.92%
Amortization $						$ 111,220
Amortization % of Pay						15.19%
Total Contribution $						$ 169,181
Total Contribution % of Pay						23.11%
Total Salary	$ 30,521	$ 152,113	$ 140,356	$ 409,085	$ 701,554	$ 732,075

[1] *Does not include the DHHA Supplemental Contribution of $522,000, thus the total does not equal the sum of DHHA and Non-DHHA.*

Table V-2(b)
Pension Plan - Development of Contributions
($ in thousands)

	January 1, 2019 Valuation					
		Non-DHHA			Total	
	DHHA	Tier 1	Tier 2	Tier 3	Non-DHHA	TOTAL[1]
Normal Cost $	$ 3,622	$ 15,471	$ 12,385	$ 24,911	$ 52,767	$ 55,718
Normal Cost % of Pay	9.88%	9.47%	8.67%	7.12%	8.05%	8.05%
Amortization $						$ 103,311
Amortization % of Pay						14.93%
Total Contribution $						$ 159,029
Total Contribution % of Pay						22.98%
Total Salary	$ 36,659	$ 163,221	$ 142,718	$ 349,553	$ 655,491	$ 692,151

[1] *Does not include the DHHA Supplemental Contribution of $671,000, thus the total does not equal the sum of DHHA and Non-DHHA.*

SECTION V – CONTRIBUTIONS

Table V-2(c)

Retiree Medical Plan - Development of Contributions
($ in thousands)

	January 1, 2019			January 1, 2020		
	DHHA	Non-DHHA	TOTAL[1]	DHHA	Non-DHHA	TOTAL[1]
Normal Cost $	$ 132	$ 1,971	$ 2,082	$ 110	$ 1,964	$ 2,050
Normal Cost % of Pay	0.36%	0.30%	0.30%	0.36%	0.28%	0.28%
Amortization $			$ 7,183			$ 7,338
Amortization % of Pay			1.04%			1.00%
Total Contribution $			$ 9,264			$ 9,388
Total Contribution % of Pay			1.34%			1.28%
Total Salary	$ 36,659	$ 655,491	$ 692,151	$ 30,521	$ 701,554	$ 732,075

[1] Does not include the DHHA Supplemental Contribution of $22,000 and $24,000 for 2019 and 2020 respectively, thus the total does not equal the sum of DHHA and Non-DHHA.

SECTION V – CONTRIBUTIONS

Tables V-3(a) and V-3(b) present the determination of the DHHA Supplemental Contributions for the pension plan and retiree medical plan for both the current and prior valuations.

Table V-3(a)

Pension Plan - Determination of DHHA Supplemental Contribution

	January 1, 2019	January 1, 2020
Number of Active Members at Hospital	336	313
Average Age for Active Members at Hospital	54.2	54.9
Number of Active Members Non-Hospital	8,874	9,088
Average Age for Active Members Non-Hospital	43.8	43.7
Normal Cost $ for Hospital	$ 3,065,072	$ 2,938,944
Estimated Payroll for Hospital	36,659,325	$ 30,520,691
Normal Cost % of Hospital Payroll	9.88%	9.63%
Normal Cost $ for Non-Hospital	$ 47,707,629	$ 55,544,793
Estimated Payroll for Non-Hospital	655,491,376	$ 701,554,224
Normal Cost % of Non-Hospital Payroll	8.05%	7.92%
Difference in Normal Cost %	1.83%	1.71%
Estimated Payroll for Hospital	$ 36,659,325	$ 30,520,691
DHHA Supplemental Contribution	$ 670,866	$ 521,904

SECTION V – CONTRIBUTIONS

Table V-3(b)
Retiree Medical Plan - Determination of DHHA Supplemental Contribution

	January 1, 2019	January 1, 2020
Number of Active Members at Hospital	336	313
Average Age for Active Members at Hospital	54.2	54.9
Number of Active Members Non-Hospital	8,874	9,088
Average Age for Active Members Non-Hospital	43.8	43.7
Normal Cost $ for Hospital	$ 131,711	$ 109,874
Estimated Payroll for Hospital	$ 36,659,325	$ 30,520,691
Normal Cost % of Hospital Payroll	0.36%	0.36%
Normal Cost $ for Non-Hospital	$ 1,942,924	$ 1,964,352
Estimated Payroll for Non-Hospital	$ 655,491,376	$ 701,554,224
Normal Cost % of Non-Hospital Payroll	0.30%	0.28%
Difference in Normal Cost %	0.06%	0.08%
Estimated Payroll for Hospital	$ 36,659,325	$ 30,520,691
DHHA Supplemental Contribution	$ 21,996	$ 24,417

SECTION VI – COMPREHENSIVE ANNUAL FINANCIAL REPORTING

The GASB adopted Statement Nos. 67 and 68, which replaced GASB Statement Nos. 25 and 27. GASB 67 became effective December 31, 2014 for the Plan and GASB 68 became effective for the fiscal year beginning after June 15, 2014 for the Employers. The disclosures needed to satisfy the GASB requirements can be found in the DERP GASB 67/68 Report as of December 31, 2019.

In accordance with Government Finance Officers Association (GFOA) and their recommended checklist for Comprehensive Annual Financial Reports, we continue to prepare the Schedule of Funded Liabilities by Type (formerly known as the Solvency Test) and the Schedule of Funding Progress.

Tables VI-1(a) and VI-1(b) below and on the next page show the Schedule of Funded Liabilities by Type for the pension plan and Member Benefit Coverage Information for the retiree medical plan.

Tables VI-2(a) and VI-2(b) on the following pages show the Schedule of Funding Progress for the pension plan and retiree medical plan independently.

Table VI-1(a)
Pension Plan - Schedule of Funded Liabilities by Type

	Actuarial Liabilities				Portion of Actuarial Liabilities Covered by Reported Assets		
Valuation Date January 1,	(A) Non-Vested Member Contributions[1]	(B) Retirees, Beneficiaries, and Term Vested	(C) Remaining Active Members' Liabilities	Reported Assets	(A)	(B)	(C)
2011	$ 8,618,000	$ 1,471,749,000 [2]	$ 804,389,000	$ 1,942,871,000	100%	100%	57%
2012	14,330,000	1,567,383,000 [3]	804,817,000	1,946,844,000	100%	100%	45%
2013	14,004,000	1,676,748,000 [4]	902,438,000	1,980,204,000	100%	100%	32%
2014	15,239,000	1,793,125,000 [5]	890,636,000	2,062,323,000	100%	100%	29%
2015	21,758,000	1,938,787,000 [6]	933,123,000	2,132,025,000	100%	100%	18%
2016	30,578,000	2,038,925,000 [7]	934,087,000	2,168,754,000	100%	100%	11%
2017	39,110,000	2,177,513,000 [8]	958,017,000	2,207,268,000	100%	100%	0%
2018	47,644,000	2,345,254,000 [9]	965,324,000	2,272,599,000	100%	95%	0%
2019	53,342,000	2,468,387,000 [10]	1,101,941,000	2,255,412,000	100%	89%	0%
2020	58,696,000	2,554,340,000 [11]	1,114,751,000	2,300,324,000	100%	88%	0%

Amounts for January 1, 2018 and earlier were calculated by the prior actuary, and are based on the Projected Unit Credit actuarial cost method.
Amounts for January 1, 2019 and later were calculated by Cheiron, and are based on the Entry Age Normal actuarial cost method.

[1] *Member contributions are allocated between pension and health benefits based on the proportion of the total contribution.*
[2] *Includes DROP accounts of $98,884,000.*
[3] *Includes DROP accounts of $101,401,000.*
[4] *Includes DROP accounts of $105,677,000.*
[5] *Includes DROP accounts of $107,944,000.*
[6] *Includes DROP accounts of $110,655,000.*
[7] *Includes DROP accounts of $113,006,000.*
[8] *Includes DROP accounts of $116,493,000.*
[9] *Includes DROP accounts of $125,524,000.*
[10] *Includes DROP accounts of $118,078,000.*
[11] *Includes DROP accounts of $118,320,000.*

SECTION VI – COMPREHENSIVE ANNUAL FINANCIAL REPORTING

Table VI-1(b)
Retiree Medical Plan - Member Benefit Coverage Information

	Actuarial Liabilities[1]						
	(A)	(B)	(C)		Portion of Actuarial Liabilities Covered by Reported Assets		
Valuation Date January 1,	Non-Vested Member Contributions[2]	Retirees, Beneficiaries, and Term Vested	Remaining Active Members' Liabilities	Reported Assets	(A)	(B)	(C)
2011	$ 535,000	$ 102,248,000	$ 40,329,000	$ 87,609,000	100%	85%	0%
2012	889,000	102,538,000	39,540,000	84,680,000	100%	82%	0%
2013	869,000	104,349,000	43,668,000	82,993,000	100%	79%	0%
2014	946,000	106,514,000	42,322,000	82,737,000	100%	77%	0%
2015	1,350,000	108,982,000	42,590,000	82,195,000	100%	74%	0%
2016	1,898,000	110,239,000	41,118,000	80,383,000	100%	71%	0%
2017	2,427,000	112,599,000	41,076,000	78,723,000	100%	68%	0%
2018	2,957,000	117,103,000	42,200,000	77,858,000	100%	64%	0%
2019	3,311,000	120,108,000	45,418,000	73,706,000	100%	59%	0%
2020	3,257,000	119,238,000	44,633,000	73,107,000	100%	59%	0%

Amounts for January 1, 2018 and earlier were calculated by the prior actuary, and are based on the Projected Unit Credit actuarial cost method.

Amounts for January 1, 2019 and later were calculated by Cheiron, and are based on the Entry Age Normal actuarial cost method.

1 These liabilities only represent the value of the explicit benefit without regard to the implicit rate subsidy, and therefore are not compliant with GASB No. 75.

2 Member contributions are allocated between pension and health benefits based on the proportion of the total contribution.

The Schedule of Funded Liabilities by Type (pension) and Member Benefit Coverage Information (retiree medical) shows the portion of actuarial liabilities for active member contributions, inactive members, and the employer-financed portion of the active members that are covered by the Actuarial Value of Assets. As of December 31, 2019, liabilities are discounted at the assumed valuation interest rate of 7.50%.

SECTION VI – COMPREHENSIVE ANNUAL FINANCIAL REPORTING

Table VI-2(a)
Pension Plan - Schedule of Funding Progress

Valuation Date January 1,	Actuarial Value of Assets	Actuarial Liability (AL)	Unfunded AL	Funded Ratio	Covered Payroll	Unfunded AL as a % of Covered Payroll
2011	$ 1,942,871,000	$ 2,284,756,000	$ 341,885,000	85.0%	$ 517,398,000	66.1%
2012	1,946,844,000	2,386,530,000	439,686,000	81.6%	517,396,000	85.0%
2013	1,980,204,000	2,593,190,000	612,986,000	76.4%	531,559,000	115.3%
2014	2,062,323,000	2,699,000,000	636,677,000	76.4%	540,229,000	117.9%
2015	2,132,025,000	2,893,668,000	761,643,000	73.7%	568,563,000	134.0%
2016	2,168,754,000	3,003,590,000	834,836,000	72.2%	586,819,000	142.3%
2017	2,207,268,000	3,174,640,000	967,372,000	69.5%	623,098,000	155.3%
2018	2,272,599,000	3,358,222,000	1,085,623,000	67.7%	646,777,000	167.9%
2019	2,255,412,000	3,623,670,000	1,368,258,000	62.2%	692,151,000	197.7%
2020	2,300,324,000	3,727,787,000	1,427,463,000	61.7%	732,075,000	195.0%

Amounts for January 1, 2018 and earlier were calculated by the prior actuary, and are based on the Projected Unit Credit actuarial cost method.

Amounts for January 1, 2019 and later were calculated by Cheiron, and are based on the Entry Age Normal actuarial cost method.

Table VI-2(b)
Retiree Medical Plan - Schedule of Funding Progress

Valuation Date January 1,	Actuarial Value of Assets	Actuarial Liability (AL)	Unfunded AL	Funded Ratio	Covered Payroll	Unfunded AL as a % of Covered Payroll
2011	$ 87,609,000	$ 143,112,000	$ 55,503,000	61.2%	$ 517,398,000	10.7%
2012	84,680,000	142,967,000	58,287,000	59.2%	517,396,000	11.3%
2013	82,993,000	148,886,000	65,893,000	55.7%	531,559,000	12.4%
2014	82,737,000	149,782,000	67,045,000	55.2%	540,229,000	12.4%
2015	82,195,000	152,922,000	70,727,000	53.7%	568,563,000	12.4%
2016	80,383,000	153,255,000	72,872,000	52.5%	586,819,000	12.4%
2017	78,723,000	156,102,000	77,379,000	50.4%	623,098,000	12.4%
2018	77,858,000	162,260,000	84,402,000	48.0%	646,777,000	13.0%
2019	73,706,000	168,837,000	95,131,000	43.7%	692,151,000	13.7%
2020	73,107,000	167,128,000	94,021,000	43.7%	732,075,000	12.8%

Amounts for January 1, 2018 and earlier were calculated by the prior actuary, and are based on the Projected Unit Credit actuarial cost method.

Amounts for January 1, 2019 and later were calculated by Cheiron, and are based on the Entry Age Normal actuarial cost method.

APPENDIX A – MEMBERSHIP INFORMATION

The data for this valuation was provided by the Plan staff as of January 1, 2020. We performed an informal examination of the obvious characteristics of the data for reasonableness and consistency in accordance with Actuarial Standard of Practice No. 23.

Denver Employees Retirement Plan - Pension Plan
Valuation Data Comparison - Actives

	January 1, 2019	January 1, 2020	Change
Total Actives			
Count	9,210	9,401	2.1 %
Average Age	44.2	44.1	(0.1)
Average Service	9.3	9.1	(0.2)
Total Salaries	$ 692,150,700	$ 737,532,660	6.6 %
Average Salaries	$ 75,152	$ 78,453	4.4 %
DHHA			
Count	336	313	(6.8)%
Average Age	54.1	54.9	0.8
Average Service	23.1	23.9	0.9
Total Salaries	$ 36,659,325	$ 35,978,436	(1.9)%
Average Salaries	$ 109,105	$ 114,947	5.4 %
Non-DHHA			
Count	8,874	9,088	2.4 %
Average Age	43.8	43.7	(0.1)
Average Service	8.8	8.6	(0.2)
Total Salaries	$ 655,491,375	$ 701,554,224	7.0 %
Average Salaries	$ 73,867	$ 77,196	4.5 %

Total salaries are based on valuation data projected for the next calendar year using a full year of salary increases. However, for the January 1, 2020 valuation, the projected payroll used to calculate the UAL payments as a percentage of payroll is $732,074,915, adjusted for assumed attrition during 2020 for the DHHA active membership since they are a closed group.

APPENDIX A – MEMBERSHIP INFORMATION

Denver Employees Retirement Plan - Pension Plan
Valuation Data Comparison - Actives

	January 1, 2019	January 1, 2020	Change
Total Actives: Tier 1			
Count	2,275	2,038	(10.4)%
Average Age	53.0	53.4	0.5
Average Service	22.2	23.1	0.9
Total Salaries	$ 199,594,833	$ 188,091,802	(5.8)%
Average Salaries	$ 87,734	$ 92,292	5.2 %
Total Actives: Tier 2			
Count	1,827	1,697	(7.1)%
Average Age	47.5	48.1	0.6
Average Service	11.4	12.3	0.9
Total Salaries	$ 143,003,080	$ 140,355,868	(1.9)%
Average Salaries	$ 78,272	$ 82,708	5.7 %
Total Actives: Tier 3			
Count	5,108	5,666	10.9 %
Average Age	39.1	39.5	0.4
Average Service	2.8	3.1	0.3
Total Salaries	$ 349,552,788	$ 409,084,990	17.0 %
Average Salaries	$ 68,432	$ 72,200	5.5 %

APPENDIX A – MEMBERSHIP INFORMATION

Denver Employees Retirement Plan - Pension Plan Valuation Data Comparison - Inactives					
		January 1, 2019		January 1, 2020	Change
Vested Inactive Members					
Count		3,378		3,411	1.0 %
Average Age		50.6		50.6	0.0
Non-Vested Inactive Members					
Count		2,740		2,913	6.3 %
Average Age		42.4		42.5	0.1
Member Contribution Balances	$	11,317,861	$	13,245,147	17.0 %
MEMBERS IN PAY STATUS					
Retirees					
Count		8,399		8,554	1.8 %
Average Age		69.9		70.2	0.2
Total Annual Benefits	$	190,698,956	$	197,794,296	3.7 %
Average Annual Benefits	$	22,742	$	23,123	1.7 %
QDROs					
Count		58		60	3.4 %
Average Age		63.5		64.3	0.8
Total Annual Benefits	$	547,907	$	572,738	4.5 %
Average Annual Benefits	$	9,447	$	9,546	1.0 %
Disabled Members					
Count		289		285	(1.4)%
Average Age		66.3		66.7	0.4
Total Annual Benefits	$	4,707,365	$	4,699,969	(0.2)%
Average Annual Benefit	$	16,288	$	16,491	1.2 %
Beneficiaries					
Count		1,177		1,227	4.2 %
Average Age		70.5		70.6	0.1
Total Annual Benefits	$	15,821,764	$	17,003,908	7.5 %
Average Annual Benefits	$	13,443	$	13,858	3.1 %
Children					
Count		22		27	22.7 %
Average Age		17.1		16.1	(1.0)
Total Annual Benefits	$	146,890	$	182,823	24.5 %
Average Annual Benefits	$	6,677	$	6,771	1.4 %

APPENDIX A – MEMBERSHIP INFORMATION

Membership Data Reconcilation							
	Active	Disability	Terminated Vested	Terminated Non-Vested	Retiree	Beneficiary	Total
As of January 1, 2019	**9,210**	**289**	**3,378**	**2,740**	**8,457**	**1,199**	**25,273**
New Entrants	1,280				4		1,284
Rehires	51		(21)	(30)			0
Terminated Vested	(243)		243				0
Terminated Non-Vested	(618)			618			0
Return of Contributions				(599)			(599)
Retired	(262)		(137)		399		0
Disabled	(4)	11	(3)		(4)		0
Deceased w/ Beneficiary	(5)	(10)	(16)		(94)	125	0
Deceased w/o Beneficiary	(8)	(5)	(35)		(162)	(63)	(273)
Benefits Expired						(6)	(6)
Data Corrections			2	184	14	(1)	199
As of January 1, 2020	**9,401**	**285**	**3,411**	**2,913**	**8,614**	**1,254**	**25,878**

APPENDIX A – MEMBERSHIP INFORMATION

Age and Service Distribution for Active Members									
Attained	Years of Service as of January 1, 2020								
Age	0 - 4	5 - 9	10 - 14	15 - 19	20 - 24	25 - 29	30+	Count	Payroll
< 25	240	3						243	12,266,726
25 - 29	872	74	1					947	57,150,133
30 - 34	927	282	66	2				1,277	87,968,845
35 - 39	716	317	211	50	11			1,305	99,065,438
40 - 44	491	234	251	136	74	5		1,191	97,868,738
45 - 49	404	189	200	174	231	79	3	1,280	110,055,919
50 - 54	289	179	155	179	244	216	70	1,332	115,159,236
55 - 59	236	125	142	122	152	120	72	969	84,005,255
60 - 64	129	88	107	71	81	49	75	600	51,863,895
65 - 69	42	31	34	27	21	22	22	199	17,101,868
70 +	9	9	16	9	10	2	3	58	5,026,607
Total	**4,355**	**1,531**	**1,183**	**770**	**824**	**493**	**245**	**9,401**	**737,532,660**

Historical Summary of Active Member Data								
	Active Members		Projected Payroll		Projected Average Payroll		Average	
January 1,	Number	% Increase	$ Amount	% Increase	$ Amount	% Increase	Age	Service
2011	8,403	-2.3%	517,398,105	2.2%	61,573	4.7%	46.2	11.7
2012	8,149	-3.0%	517,396,257	0.0%	63,492	3.1%	46.3	11.9
2013	8,175	0.3%	531,559,017	2.7%	65,023	2.4%	46.4	11.8
2014	8,304	1.6%	540,229,189	1.6%	65,057	0.1%	45.9	11.3
2015	8,489	2.2%	568,562,500	5.2%	66,976	3.0%	45.5	10.9
2016	8,636	1.7%	586,819,180	3.2%	67,950	1.5%	45.1	10.6
2017	8,981	4.0%	623,098,077	6.2%	69,380	2.1%	44.5	10.0
2018	9,094	1.3%	646,777,231	3.8%	71,121	2.5%	44.3	9.7
2019	9,210	1.3%	692,150,700	7.0%	75,152	5.7%	44.2	9.3
2020	9,401	2.1%	737,532,660	6.6%	78,453	4.4%	44.1	9.1

APPENDIX A – MEMBERSHIP INFORMATION

Schedule of Retirees, Disabled, and Beneficiaries								
Valuation Date Jan 1,	Added to Rolls		Removed from Rolls		Rolls at Valuation Date		Average Annual Benefit	Increase in Average Benefit
	Count	Allowances	Count	Allowances	Count	Annual Benefits		
2011	410	7,484,590	227	2,827,899	7,606	130,319,793	17,134	2.0%
2012	457	9,392,512	287	2,922,903	7,776	138,317,723	17,788	3.8%
2013	540	11,227,434	271	9,273,325	8,045	146,837,873	18,252	2.6%
2014	658	15,872,322	221	3,126,984	8,482	159,503,726	18,805	3.0%
2015	597	13,833,209	264	4,026,993	8,815	169,735,929	19,255	2.4%
2016	560	12,947,276	301	3,846,224	9,074	179,304,283	19,760	2.6%
2017	558	13,549,263	330	4,951,335	9,302	188,483,949	20,263	2.5%
2018	610	15,814,329	268	3,358,163	9,644	201,456,870	20,889	3.1%
2019	600	15,257,198	299	4,791,186	9,945	211,922,882	21,309	2.0%
2020	553	13,314,532	345	5,448,419	10,153	220,253,735	21,693	1.8%

Amounts for January 1, 2018 and earlier were calculated by the prior actuary

APPENDIX B – STATEMENT OF CURRENT ACTUARIAL ASSUMPTIONS AND METHODS

Contribution Allocation Procedure

The contribution allocation procedure primarily consists of an actuarial cost method, an asset valuation method, and an amortization method as described below. The actuarial cost method, amortization method, and asset valuation method were all changed as of the January 1, 2019 valuation as described below.

1. Actuarial Cost Method

The cost method for the valuation of liabilities used for this valuation is the Entry Age Normal (EAN) method. The actuarial present value of the projected benefits of each active members is allocated as a level percentage of each individual's projected pay to the period between their date of hire and their assumed maximum retirement age. The normal cost for the Plan is the sum of the individual normal costs for each member. The EAN Actuarial Liability is the difference between the Plan's total present value of future benefits and the present value of future normal costs. The unfunded actuarial liability is the difference between the Actuarial Liability and the Actuarial Value of Assets.

2. Amortization Method

The UAL (or Surplus Funding) is amortized as a percentage of the projected salaries of DERP members. Effective with the January 1, 2019 valuation, the UAL as of January 1, 2019 is amortized over a closed 20-year period. The additional UAL attributable to the change in funding method is amortized over a separate 20-year period. All future gains and losses will be amortized over new 20-year periods, called layers.

3. Asset Valuation Method

As of January 1, 2019, the Actuarial Value of Assets is determined as the Market Value of Assets less any unrecognized investment gains or losses in each of the last five years. For the initial application of this method, the unrecognized loss is only from the previous plan year ending December 31, 2018. In general, the gains and losses are equal to the difference between the actual market return and the expected market return and are recognized over a five-year period or 20% per year.

APPENDIX B – STATEMENT OF CURRENT ACTUARIAL ASSUMPTIONS AND METHODS

Actuarial Assumptions

The assumptions used in this report reflect the results of an Experience Study performed by the prior actuary covering the period from January 1, 2013 through December 31, 2017 and adopted by the Board for the January 1, 2018 actuarial valuation. More details on the rationale for the demographic and economic assumptions can be found in the Actuarial Experience Study dated May 18, 2018.

1. Investment Rate of Return

Assets are assumed to earn 7.50%, net of investment and administrative expenses

2. Administrative Expenses

No explicit assumption because assumed rate of return is net of administrative expenses

3. Cost-of-Living / Inflation

2.50%

4. Post Retirement COLA

0.00% per year

5. Internal Revenue Code Section 415 Limit

The Internal Revenue Code Section 415 maximum benefit limitation for 2020 is reflected in the valuation and increased annually for future years by the assumed CPI of 2.50%.

6. Internal Revenue Code Section 401(a)(17)

The Internal Revenue Code Section 401(a)(17) maximum compensation limitation for 2020 is reflected in the valuation and increased annually for future years by assumed CPI of 2.50%.

7. Interest on Member Contributions

The annual credited interest rate on non-vested member contributions is assumed to be 1.0%.

8. Unused Sick and Vacation Hours

For members hired prior to January 1, 2010 and District Attorney's Office and Denver Sheriff Department members regardless of hire date, unused sick and vacation hours are converted into pay at retirement, death, disability or termination. That converted amount is

APPENDIX B – STATEMENT OF CURRENT ACTUARIAL ASSUMPTIONS AND METHODS

included in the Highest Average Salary. The valuation accounts for this by assuming the FAC will be increased by 5.00% for active retirement benefits and increased by 2.25% for active ordinary death and termination benefits for eligible members.

9. Family Composition

Percentage married for all active members who retire, become disabled, or die during active service is shown in the table below. Spouses are assumed to be the same age for active members and retirees whose beneficiary has a missing date of birth.

Gender	Percent Married
Male	75%
Female	60%

10. Increases in Pay

Wage inflation component: 3.00%
Additional longevity and promotion component:

Service	Non-DHHA
1	7.00%
2	5.50%
3	3.50%
4	3.25%
5	3.00%
6	2.75%
7	2.50%
8	2.25%
9	2.00%
10	1.50%
11	1.50%
12	1.25%
13	1.25%
14	1.00%
15	0.75%
16	0.50%
17	0.50%
18	0.25%
19	0.25%
20	0.25%
21+	0.00%

Age	DHHA
≤ 25	2.00%
26	2.00%
27	2.00%
28	2.00%
29	2.00%
30	2.00%
31	2.00%
32	2.00%
33	2.00%
34	2.00%
35	0.75%
36	0.75%
37	0.75%
38	0.75%
39	0.75%
40	0.50%
41	0.50%
42	0.50%
43	0.50%
44	0.50%
≥ 45	0.00%

APPENDIX B – STATEMENT OF CURRENT ACTUARIAL ASSUMPTIONS AND METHODS

11. Rates of Termination

Sample rates of termination are shown in the following table below.

	Non-DHHA	
Service	Male	Female
0-1	18%	23%
1-2	15%	18%
2-3	14%	16%
3-4	11%	13%
4-5	10%	12%
5-6	9%	11%
6-7	8%	10%
7-8	8%	10%
8-9	7%	9%
9-10	6%	9%
10-11	5%	8%
11-12	5%	7%
12-13	5%	5%
13-14	5%	5%
14-15	4%	4%
15-16	4%	4%
16-17	3%	3%
17-18	3%	3%
18-19	3%	3%
19-20	3%	3%
21+	2%	2%

DHHA	
Age	Unisex
≤ 29	10.0%
30 – 39	5.0%
40 – 49	4.0%
50 – 54	2.5%
55+	0%

APPENDIX B – STATEMENT OF CURRENT ACTUARIAL ASSUMPTIONS AND METHODS

12. Rates of Disability

Disability rates of active participants are shown below.

Age	Rate
30	0.0150%
31	0.0150%
32	0.0150%
33	0.0188%
34	0.0203%
35	0.0225%
36	0.0300%
37	0.0375%
38	0.0450%
39	0.0450%
40	0.0525%
41	0.0600%
42	0.0750%
43	0.0825%
44	0.0900%
45	0.0975%
46	0.1200%
47	0.1425%
48	0.1650%
49	0.1875%

Age	Rate
50	0.2025%
51	0.2250%
52	0.2550%
53	0.2775%
54	0.3000%
55	0.3300%
56	0.3675%
57	0.3975%
58	0.4350%
59	0.4725%
60	0.5025%
61	0.5625%
62	0.6000%
63	0.6375%
64	0.6750%
65	0.7500%

15% of disabilities are assumed to be duty-related and 85% are assumed to be non-duty related.

APPENDIX B – STATEMENT OF CURRENT ACTUARIAL ASSUMPTIONS AND METHODS

13. Rates of Mortality

Mortality rates were adjusted to include margin for future longevity improvement as described below:

Active Mortality
Male: RP-2014 Employee Mortality Table for males with generational projection using Ultimate MP Scale

Female: RP-2014 Employee Mortality Table for females with generational projection using Ultimate MP Scale

15% of deaths are assumed to be duty-related and 85% are assumed to be non-duty related

Healthy Retirees, Beneficiaries, and Deferred Vested Members
Male: RP-2014 Healthy Annuitant Mortality Table for males with a 110% multiplier applied to the base rates and generational projection using Ultimate MP-Scale

Female: RP-2014 Healthy Annuitant Mortality Table for females projected with a 105% multiplier applied to the base rates and generational projection using Ultimate MP-Scale

Disabled Retirees
Male: RP-2014 Disabled Retiree Mortality Table for males with generational projection using Ultimate MP Scale

Female: RP-2014 Disabled Retiree Mortality Table for females with generational projection using Ultimate MP Scale

14. Form of Benefit Payment and Timing

When active members retire or become disabled, they are assumed to choose a life annuity. Benefits are assumed to be paid at the beginning of the month

APPENDIX B – STATEMENT OF CURRENT ACTUARIAL ASSUMPTIONS AND METHODS

15. Rates of Retirement

Non-DHHA Rates of Retirement

	Early Retirement		
Age	Hired before July 1, 2011	Hired after June 30, 2011	Normal Retirement
55	2.5%	N/A	N/A
56	4.0%	N/A	N/A
57	4.0%	N/A	N/A
58	4.0%	N/A	N/A
59	4.0%	N/A	N/A
60	5.0%	2.5%	N/A
61	9.0%	4.5%	N/A
62	10.0%	5.0%	N/A
63	6.0%	3.0%	N/A
64	6.0%	3.0%	N/A
65	N/A	N/A	20.0%
66	N/A	N/A	18.0%
67	N/A	N/A	18.0%
68	N/A	N/A	18.0%
69	N/A	N/A	25.0%
70	N/A	N/A	30.0%
71	N/A	N/A	30.0%
72	N/A	N/A	100.0%

APPENDIX B – STATEMENT OF CURRENT ACTUARIAL ASSUMPTIONS AND METHODS

Eligible for Rule of 75 or Rule of 85

Age	Rule of 75/85
NAR	25.0%
NAR+1	17.0%
NAR+2	17.0%
NAR+3	17.0%
NAR+4	17.0%
NAR+5	17.0%
NAR+6	27.0%
NAR+7	27.0%
NAR+8	27.0%
NAR+9	33.0%
NAR+10	33.0%
NAR+11	100.0%

Normal Age at Retirement (NAR) is defined as the first age at which a member is eligible to retirement under the Rule of 75 or Rule of 85.

All DHHA members are assumed to retire under "Rule of" retirement.

The retirement assumption is 100% after attainment of age 72 (age 75 for the DHHA group) or NAR+11.

Inactive members are assumed to retire at the age when they are first eligible.

16. Retiree Medical Election Percentages

The assumptions for members who elect retiree medical benefits are as follows:

Retirees	85%
Inactives	30%
Beneficiaries	80%
Disabled	80%

17. Maximum Retiree Medical Benefit

The retiree medical benefit is limited to the monthly health premium.

APPENDIX C – SUMMARY OF PLAN PROVISIONS

All actuarial calculations are based on our understanding of the statutes governing the Denver Employees Retirement Plan, as amended and restated under Denver Municipal Code Section 18-391 through 18-430.7, with provisions adopted by the Retirement Board, effective through December 31, 2019. The benefit and contribution provisions of the Plan are summarized briefly below. This summary does not attempt to cover all the detailed provisions of the Plan.

There have been no changes to the plan provisions since the prior valuation.

1. Effective Date

January 1, 1963

2. Plan Year

January 1 through December 31

3. Type of Plan

Qualified, 401(a) governmental defined benefit retirement plan; for GASB purposes it is multi-employer cost sharing plan.

4. Eligibility Requirements

Elected Officials, Appointed Officials, and Employees as defined in Denver Municipal Code Sections 18-402 and 18-406.

5. Credited Service

Service measured in months from date of employment to date of retirement or prior Termination.

6. Compensation

Gross pay, compensation, and salary shall mean the amount of remuneration, including wages, salaries, other amounts received for personal services actually rendered in the course of employment with the employer, and other amounts actually included or that could be included in gross income of an due to an employee, including employees on disability leave as provided for in division 4 of article V of chapter 18 of the Denver Municipal Code, or otherwise, from the employer in the full amount as calculated before any reductions or deductions are made for any purpose, including reductions or deductions by reason of sections 125, 132(f)(4) or 457 of the Internal Revenue Code, but not including distributions made from a plan of the employer designated to be eligible under section 457.

APPENDIX C – SUMMARY OF PLAN PROVISIONS

Employer provided fringe benefits receiving special tax benefits, such as premiums for group term life insurance (to the extent excludible from gross income), shall be excluded from the definition of compensation. The calendar year shall be the limitation year(determination period) for purposes of section 415 of the Internal Revenue Code.

7. Highest Average Salary (HAS)

Highest average salary during 36 (60 for members hired on or after July 1, 2011) consecutive calendar months of covered service.

8. Normal Retirement

Eligibility: For employees hired prior to July 1, 2011, attainment of age 65, or attainment of age 55 with age plus credited service equal to 75. For Employees hired July 1, 2011 or after, attainment of age 65 with five years of service, or attainment of age 60 with age plus credited service equal to 85

Benefit: 1.5% (2.0% if hired before September 1, 2004) of HAS times credited service

Normal Form: Single Life Annuity

9. Early Retirement

Eligibility: Attainment of age 55 (60 for members hired on or after July 1, 2011) and completion of five years

Benefit: Benefit accrued to date of retirement, reduced by 3% (6% for members hired on or after July 1, 2011) per year from age 65 to reflect commencement of benefit at an earlier age

10. Temporary Early Retirement

Pending approval of a disability application, a retirement benefit is available to an active, vested member who is at least age 55 (60 for members hired on or after July 1, 2011). This benefit is designed to provide income to the member during the process of fulfilling the disability application requirements. There is a three-year limit on this retirement benefit.

APPENDIX C – SUMMARY OF PLAN PROVISIONS

11. Deferred Retirement

Eligibility: Any vested employee who terminates service for any reason other than retirement, disability or death.

Benefit: Based on the formula in effect at the time of separation from service. Payment may commence any month after the member's 55th if hired prior to July 1, 2011, or after the member's 60th birthday for members hired on or after July 1, 2011.

12. Service Connected Disability

Eligibility: Any employee who becomes totally and permanently disabled as defined in Denver Municipal Code Section 18-408(d), which arises out of and in the course of the member's employment with the employer

Benefit: Based on the greater of 20 years of service or actual service plus 10 years. Total credited service cannot exceed the credited service the member would have earned as of age 65

Normal Form: Single Life Annuity

13. Non-Service Connected Disability

Eligibility: Any vested employee who becomes totally and permanently disabled as defined in Denver Municipal Code Section 18-408(e) which does not occur as a result of a service connected disability

Benefit: The higher of 75% of the amount calculated for a service-connected disability or the amount calculated for an early retirement

Normal Form: Single Life Annuity

14. Death in the Life of Duty

The active member's surviving spouse is awarded the retirement benefit the member would have been entitled at their normal retirement date based on the higher of 15 years of service or actual credited service plus five years. Total credited service cannot exceed the credited service the member would have earned at age 65. If there is no surviving spouse but the member has children under age 21, then the benefit shall be paid until the youngest child becomes age 21. If there is no surviving spouse and no children under age 21, then the benefit shall be paid to a designated beneficiary.

APPENDIX C – SUMMARY OF PLAN PROVISIONS

15. Other Pre-Retirement Death

The active member's surviving spouse is awarded 75% of the benefit that would have been entitled had the death been service connected. If an active member who has attained the age of fifty five (55) or the age of sixty (60) if hired on or after July 1, 2011 dies prior to the actual retirement date, the member shall be deemed to have retired on the first day of the month following the month in which death occurs and the surviving spouse will receive an annuity as if the member had elected the 100% joint and survivor option if this will result in a greater benefit to the spouse than the above provision.

16. Post-Retirement Death

1) For Normal Retirement (with at least five years of service), Disability Retirement (after age 65), and for Temporary Early Retirement (pending approval of disability) the lump-sum death benefit is $5,000.

2) For Disability Retirement before age 65, the death benefit is 150% of the member's annualized average monthly salary, limited to $50,000. This benefit reduces to $5,000 upon the disabled member reaching age 65.

3) If hired prior to July 1, 2011, for Early Retirement, the lump-sum at age:

Age	Lump Sum
64	$4,750
63	$4,500
62	$4,250
61	$4,000
60	$3,750
59	$3,500
58	$3,250
57	$3,000
56	$2,750
55	$2,500

4) If hired on or after July 1, 2011, for Early Retirement, the lump-sum at age:

Age	Lump Sum
64	$4,500
63	$4,000
62	$3,500
61	$3,000
60	$2,500

APPENDIX C – SUMMARY OF PLAN PROVISIONS

5) In lieu of a single lump-sum payment that would be paid upon death, a retired member may elect to receive the appropriate death benefit limited to five thousand dollars ($5,000) in the form of periodic payments.

17. Optional Forms

Joint and Survivor Options – Any employee retiring under the normal retirement provision may elect a joint and survivor benefit. The member's benefit is actuarially reduced based on their election: 100%, 75% or 50%. Once the benefit commences, this election cannot be changed. If the spouse or designated beneficiary predeceases the member, the benefit paid to the member shall be increased to the full single straight life annuity as if no joint and survivor benefit had been selected.

18. Deferred Retirement Option Plan

1. DROP – From January 1, 2001 through April 30, 2003, in lieu of immediate termination of employment and receipt of a normal retirement benefit, eligible members were permitted to continue employment for four years and have their normal retirement benefit paid into the deferred retirement option plan (DROP) account, after which time the participant either terminated employment or continued to be employed and resumed regular membership with the retirement plan.

2. DROP II – From May 1, 2003 through September 1, 2003, in lieu of immediate termination of employment and receipt of a normal retirement benefit, eligible members were permitted to continue employment for five years and have their normal retirement benefit paid into the DROP II account after which time all participants terminated employment.

19. Other Ancillary Benefits

Social Security Make Up Benefit – For members hired before July 1, 2011 and retiring on or after January 1, 1996, an additional retirement benefit equal to the applicable percentage (per Denver Municipal Code Section 18-409(i)) of the member's estimated primary Social Security benefit, multiplied by credited service with the City/DHHA during which the contributions were made to Social Security (up to a maximum of 35 years of credited service), divided by 35. This additional benefit is payable beginning on the first day of the month after the member's 62 birthday or the member's retirement date, whichever is later, but will not be paid before retirement benefits have begun from the Plan. Members retiring under a disability form of retirement are not eligible for this benefit.

20. Medical Benefits

Retiree Medical Plan Benefits – Participants and their surviving spouses or dependents receiving retirement benefits are eligible to elect to receive plan-provided retiree medical coverage and a plan-provided subsidy (benefit) to help provide for the payment of health

APPENDIX C – SUMMARY OF PLAN PROVISIONS

insurance premiums. The Plan contributes $6.25 per month for each year of service for members who are Medicare eligible. The Plan contributes $12.50 per month for each year of service for members not eligible for Medicare.

In the event of the election of a Joint and Survivor option, the benefit is calculated based on the age of the member. If the member predeceases the joint and survivor beneficiary then the full benefit is transferred to the surviving spouse or dependent regardless of the joint and survivor election percentage.

The monthly benefit is limited to the monthly premium amount for the coverage elected. If a member dies and leaves a beneficiary who is not a spouse or dependent, that beneficiary can elect to participate in the group health plan, but must pay the full cost. No plan contribution can be made for non-spouse or non-dependent beneficiaries.

21. Refunds

Eligibility: All members leaving covered employment with less than five years of service are eligible. Vested members (those with five or more years of service) may not withdraw their accumulated contributions plus interest in lieu of the deferred benefits otherwise due.

Benefit: Members who withdraw receive a lump-sum payment of his/her employee contributions, plus the interest credited on these contributions. Interest is currently credited at 1.00%.

22. Member Contributions

8.50% of compensation, effective January 1, 2019 (increased from 8.00% effective January 1, 2018)

23. Employer Contributions

13.00% of compensation, effective January 1, 2019 for each member (increased from 12.50% effective January 1, 2018)

24. Cost-of-Living Increases

Given on an ad hoc basis. There have been no cost of living increases since 2002.

25. Changes Since Prior Valuation

None.

APPENDIX D – GLOSSARY

1. Actuarial Assumptions

Assumptions as to the occurrence of future events affecting pension costs such as mortality, withdrawal, disability, retirement, changes in compensation, and rates of investment return.

2. Actuarial Cost Method

A procedure for determining the actuarial present value of pension plan benefits and expenses and for developing an allocation of such value to each year of service, usually in the form of a normal cost and an Actuarial Liability.

3. Actuarial Gain (Loss)

The difference between actual experience and that expected based upon a set of actuarial assumptions during the period between two actuarial valuation dates, as determined in accordance with a particular actuarial cost method.

4. Actuarial Liability

The portion of the actuarial present value of projected benefits that will not be paid by future normal costs. It represents the value of the past normal costs with interest to the valuation date.

5. Actuarial Present Value (Present Value)

The value as of a given date of a future amount or series of payments. The actuarial present value discounts the payments to the given date at the assumed investment return and includes the probability of the payment being made.

6. Actuarial Valuation

The determination, as of a specified date, of the normal cost, Actuarial Liability, Actuarial Value of Assets, and related actuarial present values for a pension plan.

7. Actuarial Value of Assets

The value of cash, investments, and other property belonging to a pension plan as used by the actuary for the purpose of an actuarial valuation. The purpose of an Actuarial Value of Assets is to smooth out fluctuations in market values.

8. Actuarially Equivalent

Of equal actuarial present value, determined as of a given date, with each value based on the same set of actuarial assumptions.

APPENDIX D – GLOSSARY

9. Amortization Payment

The portion of the pension plan contribution, which is designed to pay interest and principal on the Unfunded Actuarial Liability in order to pay for that liability in a given number of years.

10. Entry Age Normal 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 of the individual between entry age and assumed exit ages.

11. Funded Ratio

The ratio of the Markel Value of Assets to the Actuarial Liability.

12. Normal Cost

That portion of the actuarial present value of pension plan benefits and expenses that is allocated to a valuation year by the actuarial cost method.

13. Projected Benefits

Those pension plan benefit amounts which are expected to be paid in the future under a particular set of actuarial assumptions, taking into account such items as increases in future compensation and service credits.

14. Unfunded Actuarial Liability

The excess of the Actuarial Liability over the Actuarial Value of Assets.

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