Austin Police Retirement System

Annual Actuarial Valuation - Funding

As of December 31, 2021

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June 24, 2022

Board of Trustees
Austin Police Retirement System
2520 South IH 35, Suite 100
Austin, TX 78704

Re: Actuarial Valuation for Funding Purposes as of December 31, 2021

Members of the Board:

We certify that the information contained in this report is accurate and fairly presents the actuarial position of the Austin Police Retirement System (APRS) as of December 31, 2021. This report was prepared at the request of the Board and is intended for use by APRS staff and those designated or approved by the Board. This report may be provided to parties other than APRS only in its entirety and only with the permission of the Board.

Actuarial Valuation

The primary purposes of the actuarial valuation report are to determine the actuarially determined contribution rates for the City and members, describe the current financial condition of APRS, analyze changes in the condition of APRS, and provide various summaries of the data.

Plan Provisions

There were no changes to the plan provisions during the past year. The current plan provisions are outlined in Section E of this report.

Risk Sharing Valuation

This valuation includes special calculations referred to as the "Risk Sharing Valuation" in statute. There is a section in the report (Section RSV) that contains information which is required as part of this valuation. Page RSV-1 contains a discussion of the RSV exhibits. Page RSV-2 contains the contribution corridor for the City's ADC. The corridor mid-point is the minimum City Contribution Rate until APRS is 90% funded. Page RSV-3 shows the calculation of the ADC for the current valuation. This calculated rate will be the City Contribution Rate if it exceeds the corridor mid-point and is less than the corridor maximum. The rate will be contributed in the calendar year that begins one year after the valuation date. Page RSV-4 shows the remaining liability layers and the corresponding amortization payment for the liability layers created after the establishment of the Legacy Liability. Page RSV-5 shows a projection of the Legacy Liability and the schedule of payments to pay-off the Legacy Liability over a 30-year period beginning in 2022.

Actuarial Assumptions and Methods

The assumptions and methods applied in this actuarial valuation were adopted by the Board of Trustees effective with the December 31, 2018 actuarial valuation. The actuarial assumptions used for the December 31, 2021 actuarial valuation are based on an experience review for the five-year period from January 1, 2013 through December 31, 2017. All actuarial assumptions used in this report are reasonable for the purposes of this actuarial valuation. The current actuarial assumptions and methods are outlined in Section F of this report.

Data

The valuation was based upon information as of December 31, 2021 furnished by APRS staff, concerning system benefits, financial transactions, plan provisions and active members, terminated members, retirees and beneficiaries. We checked for internal and year-to-year consistency, but did not audit the data. We are not responsible for the accuracy or completeness of the information provided by APRS staff.

Certification

All of our work conforms with generally accepted actuarial principles and practices, and to the Actuarial Standards of Practice issued by the Actuarial Standards Board. In our opinion, our calculations also comply with the requirements of, where applicable, the Internal Revenue Code and ERISA.

The signing actuaries are independent of the plan sponsor. Ryan Falls is an Enrolled Actuary, a Fellow of the Society of Actuaries, and a Member of the American Academy of Actuaries, and meets the Qualification Standards of the American Academy of Actuaries. Finally, each of the undersigned is experienced in performing valuations for public retirement systems.

Respectfully submitted,
Gabriel, Roeder, Smith & Company

R. Ryan Falls, FSA, EA, MAAA
Senior Consultant & Actuary

Lewis Ward
Consultant

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SECTION RSV

RISK SHARING VALUATION

RSVS Discussion

The purpose of the Risk Sharing Valuation Study (RSVS) is to determine the City Contribution Rate for the APRS fiscal year beginning one year after the valuation date.

The exhibit on page RSV-2 shows the RSVS Corridor which was created from the Initial RSVS. Column 3 shows the Corridor Midpoint for each fiscal year. Columns 2 and 4 show the Corridor Minimum and Corridor Maximum, respectively. Column 5 shows the actual City Contribution Rate for the applicable fiscal year. As shown on the table, the actual City Contribution Rate for FY 2023 is 9.85% of pay.

The exhibit on page RSV-3 shows the individual pieces and total calculated City Contribution Rate. As shown on the table, the calculated City Contribution Rate from this valuation is 9.08% of pay. Because the System is less than 90% funded, the actual City Contribution Rate will be set equal to the greater of the calculated City Contribution Rate and the Corridor Midpoint of 9.85% of pay.

The exhibit on page RSV-4 shows the Liability (Gain)/Loss Layers established each year. Columns 2 and 3 show the original liability layer and any remaining liability layer, respectively. Column 4 is the payment on that particular layer for the fiscal year beginning one year after the valuation date. The payment is determined using a level percentage of payroll and the remaining amortization period as shown in column 5. The payments reflect the one-year delay between the determination of the payment and the beginning of the fiscal year in which the payment is made. The dollar amounts of the payments are summed and then converted to a percentage of payroll based on the projected payroll for the fiscal year beginning one year after the valuation date. As shown in the table, the current year's payment is negative, which means it is a credit toward the contribution rate. The credit is determined to be 0.81% of projected payroll.

The exhibit on page RSV-5 is the Legacy Liability schedule. This table shows the amortization schedule of the Legacy Liability for each of the 30 years over which it is scheduled to be paid. Column 2 shows the remaining Legacy Liability as of that measurement date while Column 3 shows the payment on the Legacy Liability for the fiscal year in which it is contributed.

The unfunded actuarial accrued liability is equal to the sum of the Remaining Layer column on the Liability Gain/Loss Layers exhibit and the Remaining Legacy Liability column as of the valuation date. This illustrates that there is a schedule to pay off every dollar of the current unfunded actuarial accrued liability.

Actuarially Determined Contribution Corridor

Fiscal Year Ending	Corridor Minimum	Corridor Midpoint	Corridor Maximum	Actual City Contribution Rate
(1)	(2)	(3)	(4)	(5)
December 31, 2022	5.10%	10.10%	15.10%	10.10%
December 31, 2023	4.85%	9.85%	14.85%	9.85%
December 31, 2024	4.59%	9.59%	14.59%	
December 31, 2025	4.33%	9.33%	14.33%	
December 31, 2026	4.08%	9.08%	14.08%	
December 31, 2027	3.83%	8.83%	13.83%	
December 31, 2028	3.58%	8.58%	13.58%	
December 31, 2029	3.32%	8.32%	13.32%	
December 31, 2030	3.05%	8.05%	13.05%	
December 31, 2031	2.79%	7.79%	12.79%	
December 31, 2032	2.53%	7.53%	12.53%	
December 31, 2033	2.27%	7.27%	12.27%	
December 31, 2034	2.02%	7.02%	12.02%	
December 31, 2035	1.75%	6.75%	11.75%	
December 31, 2036	1.47%	6.47%	11.47%	
December 31, 2037	1.21%	6.21%	11.21%	
December 31, 2038	0.94%	5.94%	10.94%	
December 31, 2039	0.67%	5.67%	10.67%	
December 31, 2040	0.39%	5.39%	10.39%	
December 31, 2041	0.12%	5.12%	10.12%	
December 31, 2042	-0.13%*	4.87%	9.87%	
December 31, 2043	-0.36%*	4.64%	9.64%	
December 31, 2044	-0.57%*	4.43%	9.43%	
December 31, 2045	-0.77%*	4.23%	9.23%	
December 31, 2046	-0.92%*	4.08%	9.08%	
December 31, 2047	-1.03%*	3.97%	8.97%	
December 31, 2048	-1.13%*	3.87%	8.87%	
December 31, 2049	-1.20%*	3.80%	8.80%	
December 31, 2050	-1.25%*	3.75%	8.75%	
December 31, 2051	-1.29%*	3.71%	8.71%	

* The City Contribution Rate cannot go below zero. In other words, a negative City Contribution Rate will not result in a reduction in the Legacy Liability Payment.

Calculated Actuarially Determined City Contribution Rate

Fiscal Year Ending	Employer Normal Cost[1]	Amortization Payment	Calculated City Contribution Rate
(1)	(2)	(3)	(4)
December 31, 2022	10.10%	0.00%	10.10%
December 31, 2023	9.89%	-0.81%	9.08%

[1] Normal Cost for Actuarially Determined City Contribution Rate is projected from valuation date one year prior to the applicable fiscal year.

Risk Sharing Valuation - Liability (Gain)/Loss Layers

Valuation Date Base Established	Original Layer	Remaining Layer	Payment for 2023 Fiscal Year [1]	Remaining Payments
(1)	(2)	(3)	(4)	(5)
December 31, 2021	$ (21,593,325)	$ (21,593,325)	$ (1,352,503)	30
Total		$ (21,593,325)	$ (1,352,503)	

Projected Payroll for Fiscal Year +1	$ 167,431,238
Amortization Payments as % of Projected Pay	-0.81%
Single Equivalent Amortization Period from the Valuation Date [2]	30.0

[1] The first payment for each new layer will be made during the fiscal year beginning one year after the valuation date.

[2] The single equivalent amortization period includes all liability layers including the Legacy Liability.

Projection of Remaning Legacy Liability and Legacy Liability Payments

Fiscal Year Ending	Remaining Legacy Liability	Fiscal Year Payment
(1)	(2)	(3)
December 31, 2020	$ 637,738,287	$ -
December 31, 2021	667,018,611	-
December 31, 2022	687,421,056	26,994,958
December 31, 2023	701,289,811	34,732,256
December 31, 2024	708,151,183	42,469,554
December 31, 2025	714,190,540	43,743,641
December 31, 2026	719,308,702	45,055,950
December 31, 2027	723,398,111	46,407,629
December 31, 2028	726,342,188	47,799,858
December 31, 2029	728,014,642	49,233,854
December 31, 2030	728,278,727	50,710,870
December 31, 2031	726,986,449	52,232,196
December 31, 2032	723,977,707	53,799,162
December 31, 2033	719,079,373	55,413,137
December 31, 2034	712,104,308	57,075,531
December 31, 2035	702,850,301	58,787,797
December 31, 2036	691,098,932	60,551,431
December 31, 2037	676,614,348	62,367,974
December 31, 2038	659,141,954	64,239,013
December 31, 2039	638,407,004	66,166,183
December 31, 2040	614,113,088	68,151,168
December 31, 2041	585,940,511	70,195,703
December 31, 2042	553,544,549	72,301,574
December 31, 2043	516,553,580	74,470,621
December 31, 2044	474,567,077	76,704,740
December 31, 2045	427,153,454	79,005,882
December 31, 2046	373,847,751	81,376,058
December 31, 2047	314,149,155	83,817,340
December 31, 2048	247,518,334	86,331,860
December 31, 2049	173,374,579	88,921,816
December 31, 2050	91,092,737	91,589,470
December 31, 2051	-	94,337,154

SECTION A

EXECUTIVE SUMMARY

Executive Summary

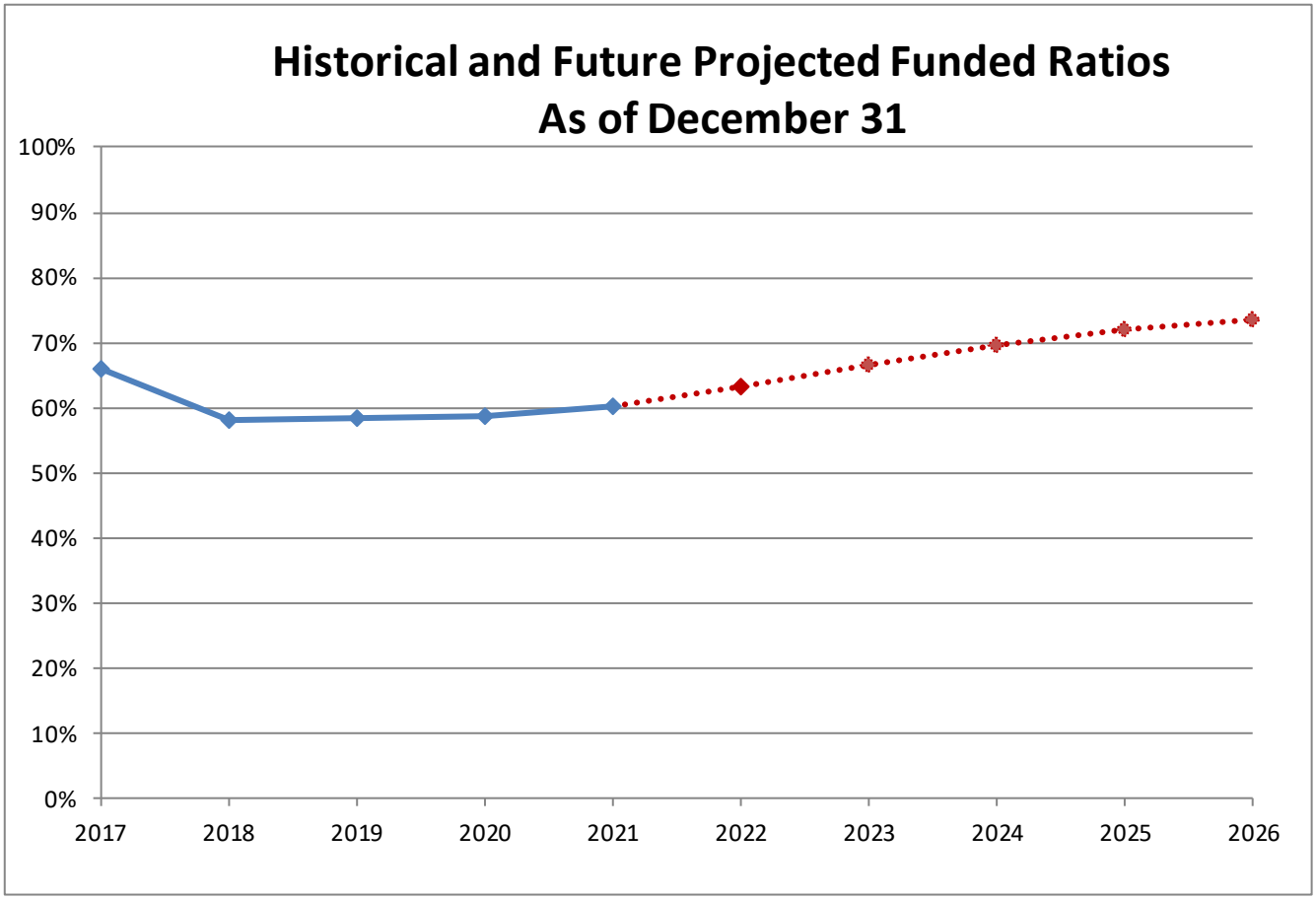
Item	December 31, 2021	December 31, 2020
Membership		
• Number of		
- Active members	1,673	1,775
- Inactive, vested	59	49
- Inactive, nonvested	79	66
- Annuitants	1,164	1,045
- Total	2,975	2,935
• Annualized Payroll on Valuation Date	$ 157,820,000	$ 164,961,691
Statutory member contribution rate for fiscal year following the valuation date	15.000%	13.000%
Estimated RSV Total City Contribution for Fiscal Year	2023	2022
• Estimated City Contribution Rate Payment	$ 16,491,977	$ 17,675,794
• Legacy Liability Payment (City Contribution Amount)	34,732,256	26,994,958
• Total	$ 51,224,233	$ 44,670,752
• Contribution as % of Projected Payroll[1]	30.59%	25.52%
Assets		
• Market value (MVA)	$ 1,080,733,988	$ 938,226,299
• Actuarial value (AVA)	$ 977,909,434	$ 904,436,131
• Return on market value	17.7%	11.6%
• Return on actuarial value	10.7%	8.3%
Actuarial Information on AVA (smoothed)		
• Normal cost %[2]	25.134%	25.101%
• Total normal cost	$ 40,856,473	$ 42,649,245
• Actuarial accrued liability	$ 1,623,334,720	$ 1,542,174,418
• Unfunded actuarial accrued liability (UAAL)	$ 645,425,286	$ 637,738,287
• Funded ratio	60.2%	58.6%
Actuarial Information on MVA		
• Unfunded actuarial accrued liability (UAAL)	$ 542,600,732	$ 603,948,119
• Funded ratio	66.6%	60.8%

Notes:

[1] Based on projected payroll determined as of the valuation date but beginning one year after valuation date.

[2] Includes normal cost associated with the Retiree Death Benefit Fund and a load for assumed administrative expenses of the System.

The following chart illustrates the recent history and outlook of the funded status of APRS:



December 31,	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026
Funded Ratio	65.8%	58.1%	58.4%	58.6%	60.2%	63.2%	66.5%	69.6%	72.1%	73.6%
UAAL (millions)	$406	$582	$607	$638	$645	$620	$586	$552	$523	$512

The projections beyond 2021 are based on the same assumptions, methods and provisions used for the December 31, 2021 valuation. Additionally, the market value of assets is assumed to earn 7.25% per year.

Based on the new statutory contribution patterns, the new benefit provisions and the actuarial assumptions, APRS's UAAL is projected to continue to increase the next few years as the contribution increases are phased-in. The projected decline in the UAAL is due to recognition of the deferred investment gains, should these not occur then the UAAL may continue to grow for a few years. In consistent financial markets, the funded ratio is expected to continue to improve until APRS is 100% funded.

SECTION B

DISCUSSION

Discussion

Introduction

The results of the December 31, 2021 actuarial valuation of the Austin Police Retirement System (APRS) are presented in this report.

The primary purposes of the actuarial valuation report are to determine the actuarially determined contribution rates for the City and members, describe the current financial condition of APRS, analyze changes in the condition of APRS, and provide various summaries of the data.

The City Contribution Rate determined by this valuation will begin one year after the valuation date. In addition to this actuarially determined rate, the City will contribute a Legacy Liability payment beginning in 2022.

There was an unexpected decrease in the unfunded actuarial liabilities of approximately $23.2 million. The net unexpected decrease in the unfunded actuarial accrued liability includes an asset experience gain of $30.7 million and a liability experience loss of $7.5 million.

The Retiree Death Benefit Fund was established in 2003 as a separate account within the system to advance fund and to pay the $10,000 post-retirement lump sum death benefits for retirees. Table 11 outlines the portion of the City contribution rate that should be allocated to the Retiree Death Benefit Fund such that the Retiree Death Benefit Plan will be fully funded 14 years following December 31, 2021. With the exception of Table 11, the amounts outlined in this report represent the total assets and liabilities of APRS, inclusive of the Retiree Death Benefit Plan.

Assessment of Risk

Section D of this report, titled "Assessment and Disclosure of Risk Associated with Measuring Pension Obligations and Determining Pension Plan Contributions," outlines a series of risk measures that are intended to aid in the understanding of the effects of future experience differing from the assumptions used in the course of the actuarial valuation.

Plan Provisions

There were no changes to the plan provisions since the prior valuation. The current plan provisions are outlined in Section E of this report.

Actuarial Assumptions and Methods

There were no changes to the actuarial assumptions and methods during the past year. The current actuarial assumptions and methods are outlined in Section F of this report. The assumptions and methods applied in this actuarial valuation were adopted by the Board of Trustees effective with the December 31, 2018 actuarial valuation. The actuarial assumptions used are based on an experience review for the five-year period from January 1, 2013 through December 31, 2017, dated May 15, 2019. The actuarial assumptions used in this report are reasonable for the purposes of this valuation.

Funding Adequacy

The City contribution in calendar year 2022 is comprised of two pieces: 1) a Legacy Liability payment of $27.0 million, and 2) an actuarially determined contribution rate (ADC) of 10.10 % of payroll. Members will contribute 15.000% of payroll effective January 1, 2022. This actuarial valuation determines the ADC for fiscal year 2023. As shown on page RSV-3 the calculated ADC is 9.08%. However, because the System is less than 90% funded and this rate is less than the corridor midpoint (see page RSV-2) the APRS statue states that the City contribution rate will be set to the corridor midpoint of 9.85% of payroll. In addition, to this contribution, the City will make a Legacy Liability payment for calendar year 2023 of $34.7 million.

The unfunded actuarial accrued liability (UAAL) of APRS increased from $638 million as of December 31, 2020 to $645 million as of December 31, 2021. The increase was less than expected due to the gain on the actuarial value of assets. The funded ratio of APRS—actuarial value of assets divided by the actuarial accrued liability—increased from 58.6% to 60.2% as of December 31, 2021. The funded status is one of many metrics used to show trends and develop future expectations about the health of a retirement system. The funded status measure itself is not appropriate for assessing the sufficiency of plan assets to cover the estimated cost of settling the plan's benefit obligations or assessing the need for or the amount of future contributions since it does not reflect normal cost contributions, the timing of amortization payments, or future experience other than expected.

System Assets

This report contains several tables that summarize key information with respect to the APRS assets.

The total market value of assets increased from $938 million as of December 31, 2020 to $1,081 million as of December 31, 2021. Table 5 reconciles the changes in the fund during the year. Total contributions decreased from $60.7 million to $60.6 million (the increase in the member contribution rate and the City's contributions did not go into effect until January 1, 2022).

Table 6 shows the development of the actuarial value of assets. The actuarial value of asset method generally recognizes the difference between the actual and expected market value of assets over a five-year period. The total actuarial value of assets is $978 million, which is lower than the market value of assets of $1,081 million. This indicates that there are currently deferred gains to be recognized in the future.

When measured on a market value, the approximate investment return net of investment-related expenses for the fiscal year ending December 31, 2021 was 17.7%. When measured on an actuarial value, the net investment return was 10.7%, which is higher than the assumed return of 7.25%. APRS experienced a $30.7 million actuarial asset gain over the past year. Table 7 shows a history of investment return rates. The APRS five-year average market return is 10.8% and the five-year average actuarial return is 7.2%.

Table 8 provides a history of the contributions paid into APRS and the administrative expenses and benefit payments that have been paid out of APRS. This table shows that APRS received less contributions than it paid out in administrative expenses and benefit payments, or -$22.0 million (or -2.0% of assets) for the year ending December 31, 2021. Negative cashflow is expected for a pre-funded pension program. The entire reason for setting aside assets is to have the ability to use investment earnings to pay for benefits. If the cashflow was always going to be positive, there would be no reason to pre-fund the system.

All of the tables referenced in this discussion appear in Section C of this report.

Data

The valuation was based upon information as of December 31, 2021 furnished by APRS staff, concerning system benefits, financial transactions, plan provisions and active members, terminated members, retirees and beneficiaries. We checked for internal and year-to-year consistency, but did not audit the data. We are not responsible for the accuracy or completeness of the information provided by APRS staff. The tables in Section G show key census statistics for the various groups included in the valuation.

Sustainability

The financial outlook of APRS continues to improve. The passage of HB 4368 during the past legislative session put in place a new lower tier of benefits which will slow the growth of APRS liabilities over the long-term, but more importantly the legislation changed the financing structure of APRS to a methodology that is intended to insure the long-term sustainability of APRS. In addition, the return on investments for the past several years have exceeded expectations which has led not only to an actuarial gain on assets this year but has also created significant deferred gains which provide a cushion for possible shortfalls in future years.

SECTION C

TABLES

Table 1
Comparison of Valuation Liabilities
(Inclusive of the Retiree Death Benefit Fund)

		December 31, 2021	December 31, 2020
1.	Payroll		
	a. Annualized Payroll on Valuation Date	$ 157,820,000	$ 164,961,691
	b. Projected Contributory Payroll	162,554,600	169,910,542
2.	Total Normal Cost Rate		
	a. Gross normal cost rate	24.234%	24.201%
	b. Administrative expenses	0.900%	0.900%
	c. Total (Item 2a + Item 2b)	25.134%	25.101%
3.	Actuarial Accrued Liability for Active and Active DROP Members		
	a. Present value of future benefits for active members	$ 1,038,865,299	$ 1,090,425,560
	b. Less: present value of future normal costs	(337,512,485)	(352,158,055)
	c. Actuarial accrued liability	$ 701,352,814	$ 738,267,505
4.	Total Actuarial Accrued Liability for:		
	a. Retirees and beneficiaries	$ 910,108,231	$ 793,871,767
	b. Inactive members	11,873,675	10,035,146
	c. Active and Active DROP members (Item 3c)	701,352,814	738,267,505
	d. Total	$ 1,623,334,720	$ 1,542,174,418
5.	Actuarial Value of Assets	$ 977,909,434	$ 904,436,131
6.	Unfunded Actuarial Accrued Liability (UAAL) (Item 4d - Item 5)	$ 645,425,286	$ 637,738,287
7.	Funded Ratio	60.2%	58.6%

Table 2
Actuarial Present Value of Future Benefits
(Inclusive of the Retiree Death Benefit Fund)

		December 31, 2021	December 31, 2020
1.	Active Members (not in DROP at the valuation date)		
	a. Service Retirement	$ 962,053,864	$ 1,009,165,238
	b. Disability Benefits	5,334,123	5,536,956
	c. Death Before Retirement	6,209,105	6,559,534
	d. Termination	17,560,409	18,190,093
	e. Total	$ 991,157,501	$ 1,039,451,821
2.	Active DROP Members	$ 47,707,798	$ 50,973,739
3.	Inactive Members		
	a. Vested Terminated	$ 10,896,084	$ 9,478,294
	b. Non-Vested Terminated	977,591	556,852
	c. Total	$ 11,873,675	$ 10,035,146
4.	Annuitants		
	a. Service Retirement	$ 862,461,808	$ 753,648,618
	b. Disability Retirement	2,701,941	2,718,140
	c. Beneficiaries and QDROs	44,944,482	37,505,009
	d. Total	$ 910,108,231	$ 793,871,767
5.	Total Actuarial Present Value of Future Benefits	$ 1,960,847,205	$ 1,894,332,473

Table 3
Analysis of Normal Cost
(Inclusive of the Retiree Death Benefit Fund)

		December 31, 2021	December 31, 2020
1.	Gross Normal Cost Rate[1]		
	a. Service Retirement	22.532%	22.498%
	b. Disability Benefits	0.285%	0.284%
	c. Death Before Retirement	0.216%	0.218%
	d. Termination	1.201%	1.201%
	e. Total	24.234%	24.201%
2.	Administrative Expenses[2]	0.900%	0.900%
3.	Total Normal Cost	25.134%	25.101%
4.	Less: Member Rate	15.000%	13.000%
5.	Employer Normal Cost Rate	10.134%	12.101%

[1] Normal cost based on the census data as of the stated valuation date.
[2] Includes normal cost associated with the Retiree Death Benefit Fund and a load for assumed administrative expenses of the System.

Table 4
Historical Summary of Active Member Data

Valuation as of December 31[1],	Active Members		Covered Payroll		Average Salary			
	Number[2]	Percent Increase	$ Amount (thousands)	Percent Increase	$ Amount	Percent Increase	Average Age	Average Service
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
2011	1,679		133,709		79,636		39.7	11.7
2012	1,709	1.8%	140,273	4.9%	82,079	3.1%	39.6	11.5
2013	1,732	1.3%	145,871	4.0%	84,221	2.6%	39.9	11.6
2014	1,777	2.6%	150,860	3.4%	84,896	0.8%	40.0	11.7
2015	1,761	-0.9%	151,855	0.7%	86,232	1.6%	40.1	11.1
2016	1,837	4.3%	158,761	4.5%	86,424	0.2%	39.8	10.8
2017	1,866	1.6%	162,491	2.3%	87,080	0.8%	40.3	11.7
2018	1,892	1.4%	166,565	2.5%	88,036	1.1%	40.5	12.0
2019	1,872	-1.1%	168,732	1.3%	90,135	2.4%	40.9	12.5
2020	1,775	-5.2%	164,962	-2.2%	92,936	3.1%	41.1	12.7
2021	1,673	-5.7%	157,820	-4.3%	94,334	1.5%	41.0	12.6

Notes:

[1] Information prior to December 31, 2017 is based on the information provided in the prior actuary's actuarial valuation reports

[2] Information for December 31, 2017 and later includes all active and active DROP members
Information prior to December 31, 2017 includes only active members not in DROP at the valuation date

Table 5
Reconciliation of Plan Net Assets

		Total	Pension	RDBF
1.	Market value of assets at beginning of year	$ 938,226,299	$ 936,572,600	$ 1,653,699
2.	Revenue for the year			
	a. Contributions for the year			
	i. Member Contributions - Payroll	$ 21,186,489	$ 21,186,489	$ 0
	ii. Member Contributions - Service Credit Purchases	3,993,033	3,993,033	0
	iii. City Contributions - Pension	34,060,590	34,060,590	0
	iv. City Contributions - Retiree Death Benefit	214,501	0	214,501
	v. City Contributions - Proportionate Retirement	1,154,275	1,154,275	0
	vi. Total	$ 60,608,888	$ 60,394,387	$ 214,501
	b. Net Investment income for the year	$ 164,509,457	$ 164,509,883	$ (426)
	c. Total revenue	$ 225,118,345	$ 224,904,270	$ 214,075
3.	Disbursements for the year			
	a. Retirement and disability benefits	$ 70,134,577	$ 70,134,577	$ 0
	b. Lump Sum DROP Distributions	4,441,672	4,441,672	0
	c. Lump Sum PROP Distributions	3,321,158	3,321,158	0
	d. Retiree Death Benefits	145,000	0	145,000
	e. Refund of Member Contributions	2,164,394	2,164,394	0
	f. Administrative expenses	2,403,855	2,403,855	0
	g. Total disbursements	$ 82,610,656	$ 82,465,656	$ 145,000
4.	Increase in net assets (Item 2c - Item 3g)	$ 142,507,689	$ 142,438,614	$ 69,075
5.	Market value of assets at end of year (Item 1 + Item 4)	$ 1,080,733,988	$ 1,079,011,214	$ 1,722,774
6.	Actual net investment income (Item 2b)	$ 164,509,457	$ 164,509,883	$ (426)
7.	Expected net income at 7.25%			
	a. Market value of assets at beginning of year	$ 68,021,407		
	b. Contributions for the year	2,197,072		
	c. Disbursements	(2,994,636)		
	d. Total	$ 67,223,843		
8.	Excess investment income (Item 6 - Item 7d)	$ 97,285,614		
9.	Estimated dollar weighted market yield	17.7%		
10.	Actuarial Value of Assets			
	a. Actuarial value of assets at the beginning of year	$ 904,436,131	$ 902,782,432	$ 1,653,699
	b. Actuarial value of assets at the end of year	$ 977,909,434	$ 976,186,660	$ 1,722,774
	c. Investment income for the year	$ 95,475,071	$ 95,475,497	$ (426)
	d. Estimated dollar weighted actuarial yield	10.7%		
	e. Expected return on the actuarial value of assets	$ 64,774,055		
	f. Asset gain/(loss) (Item 10c - Item 10e)	$ 30,701,016		

Table 6
Development of Actuarial Value of Assets

		Year Ending December 31, 2021
1.	Excess/(Shortfall) of investment income for 2021 (Table 5, Item 8)	$ 97,285,614

2. Development of amounts to be recognized as of December 31, 2021:

Fiscal Year End	Remaining Deferrals of Excess (Shortfall) of Investment Income (1)	Offsetting of Gains/(Losses) (2)	Net Deferrals Remaining (3) = (1) + (2)	Years Remaining (4)	Recognized for This Valuation (5) = (3) / (4)	Remaining after This Valuation (6) = (3) - (5)
2017	$ 0	$ 0	$ 0	1	$ 0	$ 0
2018	0	0	0	2	0	0
2019	4,158,750	0	4,158,750	3	1,386,250	2,772,500
2020	29,631,418	0	29,631,418	4	7,407,855	22,223,563
2021	97,285,614	0	97,285,614	5	19,457,123	77,828,491
Total	$ 131,075,782	$ 0	$ 131,075,782		$ 28,251,228	$ 102,824,554

3.	Market value of assets including RDFB assets	
	a. Including RDFB assets	$ 1,080,733,988
	b. Excluding RDFB assets	$ 1,079,011,214
4.	Actuarial value of assets	
	a. Including RDFB assets (Item 3.a. - Item 2, Column 6)	$ 977,909,434
	b. Excluding RDFB assets	$ 976,186,660
5.	Ratio of actuarial value to market value	90.5%

Notes: Remaining deferrals in Column (1) for prior years are from Table 6 of the prior year's report. Column 2 is a direct offset of the current year's excess/(shortfall) return against prior years' excess/(shortfall) of the opposite type (offset against oldest base first).

Table 7
History of Investment Return Rates

Year Ending December 31,[1]	Market Returns[2]	Actuarial
(1)	(2)	(3)
2008	-26.3%	
2009	8.8%	
2010	11.8%	
2011	-3.5%	
2012	9.7%	-0.4%
2013	8.9%	6.9%
2014	5.7%	6.5%
2015	-0.3%	4.4%
2016	5.7%	5.4%
2017	11.7%	5.9%
2018	-5.8%	4.5%
2019	20.7%	6.6%
2020	11.6%	8.3%
2021	17.7%	10.7%
Average Returns		
Last Five Years:	10.8%	7.2%
Last Ten Years:	8.3%	5.8%

Notes:

[1] Results prior to December 31, 2017 are based on the information provided in the prior actuary's actuarial valuation reports

[2] Net of Administrative Expenses through December 31, 2018

Table 8
History of Cash Flow
(thousands $)

Year Ending December 31[1],	Contributions	Distributions and Expenditures: Benefit Payments and Refunds	Distributions and Expenditures: Administrative Expenses[2]	Distributions and Expenditures: Total	External Cash Flow for the Year	Market Value of Assets	External Cash Flow as Percent of Market Value
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
2008	$ 34,943	$ (26,118)		$ (26,118)	$ 8,825	$ 387,120	2.3%
2009	38,448	(28,173)		(28,173)	10,275	432,028	2.4%
2010	40,081	(30,876)		(30,876)	9,205	492,545	1.9%
2011	43,641	(34,863)		(34,863)	8,778	484,089	1.8%
2012	47,302	(40,009)	(1,163)	(41,172)	6,130	538,898	1.1%
2013	50,629	(42,825)	(1,115)	(43,940)	6,689	595,110	1.1%
2014	54,065	(45,403)	(1,327)	(46,730)	7,335	638,019	1.1%
2015	57,948	(50,005)	(1,466)	(51,471)	6,477	644,174	1.0%
2016	56,105	(50,828)	(1,397)	(52,225)	3,880	686,020	0.6%
2017	59,493	(56,548)	(1,563)	(58,111)	1,382	769,475	0.2%
2018	57,848	(63,983)	(1,421)	(65,404)	(7,556)	718,520	-1.1%
2019	59,196	(66,319)	(1,721)	(68,040)	(8,844)	857,839	-1.0%
2020	60,699	(76,956)	(1,929)	(78,885)	(18,186)	938,226	-1.9%
2021	60,609	(80,207)	(2,404)	(82,611)	(22,002)	1,080,734	-2.0%

Notes:

[1] Results prior to December 31, 2017 are based on the information provided in the prior actuary's actuarial valuation reports

[2] Information was not provided in the prior actuary's valuation reports

Table 9
Total Experience Gain or Loss
(Inclusive of the Retiree Death Benefit Fund)

Item		December 31, 2021
(1)		(2)
A. Calculation of total actuarial gain or loss		
1. Unfunded actuarial accrued liability (UAAL), previous year		$ 637,738,287
2. Normal cost for the year, including service purchases		43,434,127
3. Administrative expenses for the year		2,403,855
4. Contributions for the year		(60,608,888)
5. Interest at 7.25%		
a. On UAAL		$ 46,236,026
b. On normal cost		1,574,487
c. On administrative expenses		87,140
d. On contributions		(2,197,072)
e. Total		$ 45,700,581
6. Changes due to assumptions		0
7. Expected UAAL, end of year (Sum of Items 1 through 6)		668,667,962
8. Actual UAAL, end of year		645,425,286
9. Total (gain)/loss for the year (Item 8 - Item 7)		$ (23,242,676)
B. Source of gains and losses	% of AAL[1]	
1. Asset (Gain)/Loss	1.90%	$ (30,701,016)
2. Demographic (Gains)/Losses	0.46%	7,458,340
3. Total	1.44%	$ (23,242,676)

[1]Percent of expected Actuarial Accrued Liability

Table 10
Funding History
(Inclusive of the Retiree Death Benefit Fund)

Valuation Date December 31[1], (1)	Actuarial Value of Assets (AVA) (2)	Actuarial Accrued Liability (AAL) (3)	Unfunded Actuarial Accrued Liability (UAAL) (3) - (2) (4)	Funded Ratio (2)/(3) (5)	Annual Covered Payroll (6)	UAAL as % of Payroll (4)/(6) (7)
2009	$ 518,433,065	$ 735,334,345	$ 216,901,280	70.5%	$ 122,928,285	176.4%
2010	547,364,486	778,005,374	230,640,888	70.4%	127,731,696	180.6%
2011	554,190,027	826,366,581	272,176,554	67.1%	135,264,530	201.2%
2012	559,077,407	858,949,998	299,872,591	65.1%	141,561,047	211.8%
2013	605,530,903	913,591,470	308,060,567	66.3%	147,138,718	209.4%
2014	653,980,764	971,213,766	317,233,002	67.3%	152,544,227	208.0%
2015	690,696,986	1,039,229,249	348,532,263	66.5%	155,832,755	223.7%
2016	733,105,429	1,109,862,137	376,756,708	66.1%	163,894,324	229.9%
2017	779,484,342	1,185,017,294	405,532,952	65.8%	162,490,560	249.6%
2018	807,978,988	1,389,660,616	581,681,628	58.1%	166,564,996	349.2%
2019	852,294,229	1,459,529,788	607,235,559	58.4%	168,732,391	359.9%
2020	904,436,131	1,542,174,418	637,738,287	58.6%	164,961,691	386.6%
2021	977,909,434	1,623,334,720	645,425,286	60.2%	157,820,000	409.0%

Notes:

[1] Results prior to December 31, 2017 are based on the information provided in the prior actuary's actuarial valuation reports

Table 11
Retiree Death Benefit Fund

The Retiree Death Benefit Fund was established effective September 1, 2003. The Fund operates as a separate account within the system that is used to advance fund and to pay the $10,000 post-retirement lump sum death benefits for retirees. The following table illustrates the allocation of the total plan assets and liabilities between the primary pension fund and the Retiree Death Benefit Fund.

	Pension Fund	Retiree Death Benefit Fund	Total
1. Total Actuarial Present Value of Future Benefits			
a. Active Members	$ 1,037,846,090	$ 1,019,209	$ 1,038,865,299
b. Inactive Members	11,811,783	61,892	11,873,675
c. Annuitants	907,046,891	3,061,340	910,108,231
d. Total	$ 1,956,704,764	$ 4,142,441	$ 1,960,847,205
2. Present Value of Future Normal Costs	$ 337,186,336	$ 326,149	$ 337,512,485
3. Actuarial Accrued Liability (item 1 - item 2)	$ 1,619,518,428	$ 3,816,292	$ 1,623,334,720
4. Valuation Assets	$ 976,186,660	$ 1,722,774	$ 977,909,434
5. Unfunded Actuarial Accrued Liability (UAAL) (item 3 - item 4)	$ 643,331,768	$ 2,093,518	$ 645,425,286
6. City Contribution Rate to be Allocated to the Retiree Death Benefit Fund			
a. Normal Cost Rate		0.023%	
b. Payment Required to Amortize UAAL over 14 years (as of 12/31/2021)		0.115%	
c. Total Allocated Rate		0.138%	

SECTION D

ASSESSMENT AND DISCLOSURE OF RISK ASSOCIATED WITH MEASURING PENSION OBLIGATIONS AND DETERMINING PENSION PLAN CONTRIBUTIONS

Assessment and Disclosure of Risk Associated with Measuring Pension Obligations and Determining Pension Plan Contributions

The determination of the accrued liability and an actuarially determined contribution (or funding period) requires the use of assumptions regarding future economic and demographic experience. Risk measures, as illustrated in this report, are intended to aid in the understanding of the effects of future experience differing from the assumptions used in the course of the actuarial valuation. Risk measures may also help with illustrating the potential volatility in the accrued liability and an actuarially determined contribution (or funding period) that result from the differences between actual experience and the actuarial assumptions.

Future actuarial measurements may differ significantly from the current measurements presented in this report due to such factors as the following: plan experience differing from that anticipated by the economic or demographic assumptions; changes in economic or demographic assumptions due to changing conditions; increases or decreases expected as part of the natural operation of the methodology used for these measurements (such as the end of an amortization period, or additional cost or contribution requirements based on the Plan's funded status); and changes in plan provisions or applicable law. The scope of an actuarial valuation does not include an analysis of the potential range of such future measurements.

Examples of risk that may reasonably be anticipated to significantly affect the plan's future financial condition include:

1. Investment risk – actual investment returns may differ from the expected returns;
2. Asset/Liability mismatch – changes in asset values may not match changes in liabilities, thereby altering the gap between the accrued liability and assets and consequently altering the funded status and contribution requirements;
3. Contribution risk – actual contributions may differ from expected future contributions. For example, actual contributions may not be made in accordance with the plan's funding policy or material changes may occur in the anticipated number of covered employees, covered payroll, or other relevant contribution base;
4. Salary and Payroll risk – actual salaries and total payroll may differ from expected, resulting in actual future accrued liability and contributions differing from expected;
5. Longevity risk – members may live longer or shorter than expected and receive pensions for a period of time other than assumed;
6. Other demographic risks – members may terminate, retire or become disabled at times or with benefits other than assumed resulting in actual future accrued liability and contributions differing from expected.

The effects of certain trends in experience can generally be anticipated. For example, if the investment return since the most recent actuarial valuation is less (or more) than the assumed rate, the cost of the plan can be expected to increase (or decrease). Likewise, if longevity is improving (or worsening), increases (or decreases) in cost can be anticipated.

The actuarially determined employer contribution rates shown on the Executive Summary provide a guide for the adequacy of the current statutory contribution rates received from the membership and the City. As shown on the exhibit, the current contribution rates are not sufficient to ensure the sustainability of the System. The timely receipt of the actuarially determined contributions is critical to support the financial health of the System. Users of this report should be aware that contributions made at the actuarially determined rate do not necessarily guarantee benefit security.

PLAN MATURITY MEASURES

Risks facing a pension plan evolve over time. A young plan with virtually no investments and paying few benefits may experience little investment risk. An older plan with a large number of members in pay status and a significant trust may be much more exposed to investment risk. Generally accepted plan maturity measures include the following (please see a description of the measures following the table):

Valuation as of December 31st	2021	2020	2019	2018	2017
Ratio of market value of assets to payroll	6.8	5.7	5.1	4.3	4.7
Ratio of actuarial accrued liability to payroll	10.3	9.3	8.6	8.3	7.3
Ratio of actives to retirees and beneficiaries	1.4	1.7	2.0	2.1	2.2
Ratio of net cash flows to market value of assets	-2.0%	-1.9%	-1.0%	-1.1%	0.2%
Duration of actuarial accrued liability	14.3	14.6	14.8	15.1	Not available

RATIO OF MARKET VALUE OF ASSETS TO PAYROLL

The relationship between assets and payroll is a useful indicator of the potential volatility of contributions. For example, if the market value of assets is 2.0 times the payroll, a return on assets 5% different than assumed would equal 10% of payroll. A higher (lower) or increasing (decreasing) level of this maturity measure generally indicates a higher (lower) or increasing (decreasing) volatility in plan sponsor contributions as a percentage of payroll.

RATIO OF ACTUARIAL ACCRUED LIABILITY TO PAYROLL

The relationship between actuarial accrued liability and payroll is a useful indicator of the potential volatility of contributions for a fully funded plan. A funding policy that targets a funded ratio of 100% is expected to result in the ratio of assets to payroll and the ratio of liability to payroll converging over time.

The ratio of liability to payroll may also be used as a measure of sensitivity of the liability itself. For example, if the actuarial accrued liability is 2.5 times the payroll (5 to 2 ratio), a change in liability 2% other than assumed would equal 5% of payroll. A higher (lower) or increasing (decreasing) level of this maturity measure generally indicates a higher (lower) or increasing (decreasing) volatility in liability (and also plan sponsor contributions) as a percentage of payroll.

RATIO OF ACTIVES TO RETIREES AND BENEFICIARIES

A young plan with many active members and few retirees will have a high ratio of active to retirees. A mature open plan may have close to the same number of actives to retirees resulting in a ratio near 1.0. A super-mature or closed plan may have significantly more retirees than actives resulting in a ratio below 1.0.

RATIO OF NET CASH FLOW TO MARKET VALUE OF ASSETS

A positive net cash flow means contributions exceed benefits and expenses. A negative cash flow means existing funds are being used to make payments. A certain amount of negative net cash flow is generally expected to occur when benefits are prefunded through a qualified trust. Large negative net cash flows as a percentage of assets may indicate a super-mature plan or a need for additional contributions.

DURATION OF ACTUARIAL ACCRUED LIABILITY

The duration of the actuarial accrued liability may be used to approximate the sensitivity to a 1% change in the assumed rate of return. For example, a duration of 10 indicates that the liability would increase approximately 10% if the assumed rate of return were lowered 1%.

ADDITIONAL RISK ASSESSMENT

Additional assessment may include scenario tests, sensitivity tests, stochastic modeling, stress tests, and a comparison of the present value of accrued benefits at low-risk discount rates with the actuarial accrued liability. A robust measurement of additional risk assessment is outside the scope of the annual actuarial valuation. However, we recommend that some scenario testing and sensitivity testing be included in any sustainability study conducted in the future.

SECTION E

SUMMARY OF PLAN PROVISIONS

Summary of Plan Provisions for Austin Police Retirement System

Creditable Service (APRS Service)

Total years and completed months (excluding a month in which service amount to fewer than 15 days) during which a Member makes contributions to the System.

Earnings

Base pay plus longevity pay. Overtime or special pay is not included.

Average Final Compensation

Average Earnings for the highest 36 months (60 months for new member beginning January 1, 2022) over the last 120 months of service.

Member Contributions

15.000% of Earnings beginning January 1, 2022. Subject to a possible increase of up to 2% of pay (17% of pay total) if the ADC exceeds the corridor maximum.

City Contributions

Beginning January 1, 2022, City contribution will consist of two components:

- City Contribution Amount – Fixed City payment plan established to eliminate the legacy unfunded liability existing as of December 31, 2020 over a 30-year period (see page RSV-5), plus
- City Contribution Rate – An actuarially determined contribution (ADC) based on plan costs (reduced by the member rate) in addition to the fixed payment plan for the legacy unfunded liability, subject to certain constraints. A contribution rate corridor (see page RSV-2) for the ADEC was established (beginning with contributions being paid in fiscal year 2022) to keep the rate within a certain range to ensure long-term funding but moderating volatility. The City Contribution Rate is the ADC except:
    - If the ADC is less than the corridor midpoint but APRS is less than 90% funded then the City Contribution Rate is the corridor midpoint,
    - If the ADC exceeds the corridor maximum the City Contribution Rate is the corridor maximum.

Normal Retirement

Date:

Earlier of age 62, age 55 and 20 years of Creditable Service, or 23 years of Creditable Service, regardless of age. For new members beginning January 1, 2022, age 62, or age 50 and 25 years of Creditable Service. Credible Service for retirement eligibility includes Proportionate Service Credit and excludes pre-membership military service.

Benefit:

3.20% of Average Final Compensation (2.50% for new member beginning January 1, 2022) times Creditable Service (including pre-membership military service).

Form of Benefit:

Life Annuity. At the death of the member, the excess, if any, of the member's accumulated contributions over the amount of payments made to the member will be paid in a lump sum to the member's beneficiary. (Other benefit options available).

Vesting

Schedule:

100% after 10 years of Creditable Service, including Proportionate Service Credit.

Benefit Amount:

Members will receive his (her) accrued benefit payable at the Normal Retirement Date based upon actual Creditable Service prior to termination.

Non-vested members receive a refund of accumulated contributions.

Disability

Eligibility:

10 years of Creditable Service (service requirement is waived if the disability is a direct or proximate result of the performance of the member's employment). Members who are eligible for normal retirement may not apply for disability benefits.

Benefit:

Monthly benefit is calculated in the same manner as the member's normal retirement benefit. Benefit will be calculated with a minimum of 20 years of Creditable Service if the disability is a direct or proximate result of the performance of the member's employment.

Death Benefits

Before Retirement Eligibility:

Lump sum payment equal to twice the amount of the member's accumulated contributions, subject to a minimum of $10,000.

After Retirement Eligibility (member is married at the time of death):

In lieu of the lump sum benefit described above, the surviving spouse may select a retirement option in the same manner as if the member had retired immediately prior to his death. When monthly benefits are payable in lieu of the lump sum, a $10,000 death benefit will be paid to the surviving spouse.

After Retirement Eligibility (member is not married at the time of death):

In lieu of the lump sum benefit described above, the member's beneficiary may select a Fifteen Year Certain benefit calculated in the same manner as if the member had retired immediately prior to his death. When monthly benefits are payable in lieu of the lump sum, a $10,000 death benefit will be paid to the beneficiary.

Retiree Death Benefit Fund

Effective September 1, 2003, a separate fund (funded as a portion of the City's contribution rate) was established to pay post-retirement lump sum death benefits. Effective September 1, 2007, the amount of these benefits was increased to $10,000.

Proportionate Retirement Program

Effective September 1, 2009, the System and the City began participating in the statewide Proportionate Retirement Program (PRP). Service in other participating public employee retirement systems can be combined with service in the System to satisfy the System's requirements for service retirement eligibility and for eligibility for vested benefits of a terminated Member. The participating systems, in addition to the System, are the six statewide systems, the City of Austin Employees' Retirement System, and the systems for the City of El Paso employees.

The City is required to make additional contributions to APRS equal to the cost of the PRP which is currently estimated to be 0.737% of payroll. Beginning in 2022, the cost of the PRP will be included as part of the Legacy Liability and the actuarially determined City Contribution Rate.

Forward DROP

Eligibility:

Completion of 23 years of Creditable Service (including Proportionate Service Credit and excluding pre-membership military service). For members hired on or after January 1, 2022 eligibility is age 50 and 25 years of service.

Participation Period:

Not to exceed 60 months. For members with less than 23 years of APRS Service as of February 17, 2016, the maximum participation period was extended to 84 months.

Rate of Return:

Effective August 1, 2015, equal to the PROP interest rate (currently 2.25%). Members with 23 years of APRS service as of July 31, 2015 will receive 5.00% interest credit per year. Additionally, members with less than 23 years of APRS Service as of February 17, 2016 will not receive interest crediting while in DROP.

DROP Fee/Charge:

For members with less than 23 years of APRS Service as of February 17, 2016, a charge for DROP participation will be applied as shown below. The charge will only apply during the period of DROP participation.

Year of DROP Participation	Fee/Charge
1	25%
2	20
3	15
4	10
5	5
6	5
7	5

Form of Distribution:

Cash lump sum (or rollover to PROP account) at termination of employment.

Miscellaneous:

For members with less than 23 years of APRS Service as of February 17, 2016, member contributions will continue to be required during the DROP participation period, but these contributions will be retained by the System.

Retro DROP

Eligibility:

Completion of 23 years of Creditable Service (included Proportionate Service Credit and excluding pre-membership military service). Members with less than 23 years on April 1, 2015 will not be eligible to participate in Retro DROP.

Participation Period:

Not to exceed 36 months.

Rate of Return:

5.0%.

Form of Distribution:

Cash lump sum (or rollover to PROP account) at termination of employment.

Post-Retirement Option Plan (PROP)

Retiring members who have participated in DROP may transfer all or a portion of their DROP lump sum into their PROP account for later disbursement.

Retired members may defer receipt of a minimum of $250 of their monthly annuity. These deferred benefits will be accumulated and available for later disbursement. Participants may change their deferral amount twice per calendar year. The interest crediting rate on a member's PROP deferrals is set by the Board. The current crediting rate is 2.25%.

Cost of Living Adjustment

None.

SECTION F

ACTUARIAL ASSUMPTIONS AND METHODS

Summary of Actuarial Assumptions and Methods

The assumptions and methods applied in this actuarial valuation were adopted by the Board of Trustees effective with the December 31, 2018 actuarial valuation. The actuarial assumptions used for the December 31, 2021 actuarial valuation are based on an experience review for the five-year period from January 1, 2013 through December 31, 2017, dated May 15, 2019. Please see this report for a discussion of the analysis and rationale for the recommended assumptions.

I. Valuation Date

The valuation date is December 31 of each plan year. This is the date as of which the actuarial present value of future benefits and the actuarial value of assets are determined.

II. Actuarial Cost Method

The actuarial valuation is used to determine the adequacy of the current City contribution rate, describe the current financial condition of APRS, analyze changes in the condition of APRS, and provide various summaries of the data.

The actuarial valuation uses the Entry Age Normal (EAN) actuarial cost method. Under this method, the first step is to determine the contribution rate (level as a percentage of pay) required to provide the benefits to each member, or the normal cost rate. The normal cost rate consists of two pieces: (i) the member's contribution rate, and (ii) the remaining portion of the normal cost rate which is the employer's normal cost rate. The total normal cost rate is based on the benefits payable to each individual active member.

The Unfunded Actuarial Accrued Liability (UAAL) is the liability for future benefits which is in excess of (i) the actuarial value of assets, and (ii) the present value of future normal costs. The employer contribution provided in excess of the employer normal cost is applied to amortize the UAAL.

The Entry Age actuarial cost method is an "immediate gain" method (i.e., experience gains and losses are separately identified as part of the UAAL). However, they are amortized over the same period applied to all other components of the UAAL.

III. Actuarial Value of Assets

The actuarial value of assets is based on the market value of assets with a five-year phase-in of actual investment returns in excess of (less than) expected investment income. Offsetting unrecognized gains and losses are immediately recognized, with the shortest remaining bases recognized first and the net remaining bases continuing to be recognized on their original timeframe. Expected investment income is determined using the assumed investment return rate and the market value of assets (adjusted for receipts and disbursements during the year).

IV. Actuarial Assumptions

Investment Return: 7.25% per year, net of investment-related expenses (composed of an assumed 2.50% inflation rate and a 4.75% real rate of return)

Mortality Decrements:

Pre-retirement

PubS-2010 Employee Mortality Table for males and females. Generational mortality improvements projected from the year 2010 using the ultimate mortality improvement rates in the MP tables.

Healthy Annuitants

PubS-2010 Healthy Retiree Mortality Table for males and females. Generational mortality improvements projected from the year 2010 using the ultimate mortality improvement rates in the MP tables.

Disabled Annuitants

PubS-2010 Disability Mortality Table for males and females. Generational mortality improvements projected from the year 2010 using the ultimate mortality improvement rates in the MP tables.

Service Retirement Decrements:

Members Who Have 23 Years of Service by Age 55

The following rates reflect the members expected departure from active service and are applied based on years of service:

Years of Service	Probability of Retirement
23	28%
24	18
25	18
26	18
27	25
28	25
29	25
30+	35

Years of Service includes APRS Service and Proportionate Service Credit.
100% probability of retirement at age 62.

Members Who Do Not Have 23 Years of Service by Age 55

The following rates reflect the members expected departure from active service and are applied based on the member's age:

Age	Probability of Retirement
55	50%
56	25
57	25
58	25
59	25
60	25
61	25
62+	100

Deferred Retirement Option Program (DROP)

Members eligible for either the Back DROP or 5-year Forward DROP (or both) are assumed to select the most valuable option based on their individual situation at each possible retirement age. Members eligible for only the 7-year Forward DROP are assumed to not participate in DROP.

Post-Retirement Option Plan (PROP) Investment Accounts

75% of members with a PROP account at the valuation date will elect to leave their lump sum in APRS until age 60 and 25% of members will elect to receive their PROP balance at the valuation date. No future PROP deferrals are assumed and current active members are not assumed to enter PROP. Average annual rate credited to the PROP accounts will be 2.25%.

Withdrawal of Employee Contributions

Members that terminate with a vested benefit are assumed to choose the most valuable option available to them at the time of termination: withdrawal of contributions or deferred annuity. Non-vested members are assumed to receive an immediate refund of accumulated contributions.

Disability Retirement Decrements:

Disability Rates

Rates for males and females at selected ages are shown below:

Age	Rate
20	0.0004%
25	0.0025
30	0.0099
35	0.0259
40	0.0494
45	0.0804
50	0.1188
55	0.1647
60	0.2180

Disability rates are set to zero when members become eligible for retirement

In Line of Duty Disability

55% of disability retirements assumed to be in the line of duty.

Termination Decrements for Reasons Other Than Death or Retirement:

Withdrawal Rates

The following service-based rates apply:

Years of Service	Probability of Termination
0	12.00%
1	6.00
2-5	2.00
6-22	0.75
23+	0.00

Years of Service includes APRS Service and Proportionate Service Credit.
Termination rates are set to zero when members become eligible for retirement

Salary Increases: Increases are assumed to vary by years of APRS Service. Salary increases include an underlying inflation component of 2.50% and a productivity component of 0.50%.

Anniversary of Academy Graduation	Percentage Increase
1*	15.20%
2	3.00
3	3.00
4	3.00
5	3.00
6	10.00
7	3.00
8	3.00
9	3.00
10	10.00
11	3.00
12	3.00
13	3.00
14	10.00
15	3.00
16	10.00
17+	3.00

*Rate of Increase for 1st Anniversary of Graduation is for an Officer Position. If member is still a cadet on the valuation date then the increase in the upcoming year will be, either: (1) 46.70% for a regular Academy graduate, or (2) 17.40% plus the 15.20% Step Rate for a Modified Academy graduate.

Cost-of-Living Adjustments (COLA): Cost of living adjustments are granted on an ad hoc basis. No future COLAs are assumed.

Administrative Expenses: 0.90% of payroll. Included in this assumption would be any administrative expenses associated with the proportionate retirement program, which is currently assumed to be 0.017% of payroll.

Payroll Growth: Member Payroll is assumed to grow at 3.00% per year.

Marital Assumptions: 85% of active members are assumed to be married. Male spouses are assumed to be three years older than female spouses.

Decrement Timing: All decrements – mortality, service retirement, disability retirement, and termination of employment for reasons other than death or retirement – are assumed to occur at the middle of the valuation year.

Census Data and Assets

- The valuation was based on members of APRS as of the valuation date and does not take into account future members.
- All census data was supplied by APRS and was subject to reasonable consistency checks.
- There were data elements that were modified for some members as part of the valuation in order to make the data complete. However, the number of missing data items was immaterial.
- Asset data was supplied by APRS.

Other Actuarial Valuation Procedures

- No provision was made in this actuarial valuation for the limitations of Internal Revenue Code Sections 415 or 401(a)17.
- Annualized Payroll on Valuation Date is the annualized payroll of active members on the valuation date. Projected Contributory Payroll for the upcoming fiscal year (used in determining the amortization period) is the estimated pensionable earnings received by all plan members for the just completed calendar year (including earnings for members who are no longer active employees on the valuation date) increased by the assumed payroll growth rate.

Actuarial Model: This report was prepared using our proprietary valuation model and related software which in our professional judgment has the capability to provide results that are consistent with the purposes of the valuation. We performed tests to ensure that the model reasonably represents that which is intended to be modeled.

SECTION G

DETAILED SUMMARIES OF MEMBERSHIP DATA

Detailed Summaries of Membership Data

Table A

Summary of Active Membership Data

		December 31, 2021
Active members		
a.	Number	1,637
b.	Total payroll at the valuation date	$ 153,667,438
c.	Average salary	$ 93,871
d.	Average age	40.7
e.	Average benefit service	12.3
Active members currently in DROP		
a.	Number	36
b.	Total payroll at the valuation date	$ 4,152,562
c.	Average salary	$ 115,349
d.	Average age	53.9
e.	Average benefit service	27.6
f.	Total annual benefits	$ 3,170,995
g.	Average annual benefit	$ 88,083
h.	Total DROP Balance	$ 8,412,263
Vested inactive members		
a.	Number	59
b.	Total annual deferred benefits	$ 2,037,854
c.	Average annual deferred benefit	$ 34,540
d.	Average age	48.1
Nonvested inactive members		
a.	Number	79
b.	Member contributions due	$ 977,591
c.	Average refund due	$ 12,375

Table B

Summary of Annuitant Membership Data

		December 31, 2021
Service Retirees		
a.	Number	1,014
b.	Total annual benefits	$ 72,221,604
c.	Average annual benefit	$ 71,224
d.	Average age	62.7
e.	Total PROP Balance	$ 29,964,378
Disability Retirees		
a.	Number	6
b.	Total annual benefits	$ 209,742
c.	Average annual benefit	$ 34,957
d.	Average age	51.5
e.	Total PROP Balance	$ 0
Beneficiaries		
a.	Number	81
b.	Total annual benefits	$ 3,477,853
c.	Average annual benefit	$ 44,023
d.	Average age	73.4
e.	Total PROP Balance	$ 297,787
QDROs		
a.	Number	63
b.	Total annual benefits	$ 1,112,489
c.	Average annual benefit	$ 17,659
d.	Average age	58.5
e.	Total PROP Balance	$ 0
Total Members in Payment		
a.	Number	1,164
b.	Total annual benefits	$ 77,021,688
c.	Average annual benefit	$ 66,170
d.	Average age	63.2
e.	Total PROP Balance	$ 30,262,165

Table C

Status Reconciliation

	Active	Active DROP	Vested Terminated	Non-vested Terminated	Retiree	Disability Retiree	Beneficiary	QDRO
Beginning of Year	**1,737**	**38**	**49**	**66**	**912**	**6**	**70**	**57**
Re-hired	-	-	1	1	-	-	-	-
Termination, non-vested	15	-	-	-	-	-	-	-
Termination, vested	14	-	-	-	-	-	-	-
Entered DROP	10	-	-	-	-	-	-	-
Retirement	101	11	3	-	-	-	-	-
Disability retirement	-	-	-	-	-	-	-	-
Contribution refund	29	-	1	15	-	-	-	-
Death	5	1	-	-	13	-	-	3
Total Out	**174**	**12**	**5**	**16**	**13**	**0**	**0**	**3**
Continuing	**1,563**	**26**	**44**	**50**	**899**	**6**	**70**	**54**
Total In	**74**	**10**	**15**	**29**	**115**	**0**	**11**	**9**
End of Year	**1,637**	**36**	**59**	**79**	**1,014**	**6**	**81**	**63**

Table D

Active Members – Distribution by Age and Service

Age	Years of Service									Total
	0-4	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40+	
Under 25	31									31
	$ 56,681									$ 56,681
25 - 29	129	42								171
	$ 67,840	$ 78,376								$ 70,428
30 - 34	98	121	21							240
	$ 72,080	$ 81,445	$ 85,942							$ 78,015
35 - 39	44	106	146	37	1					334
	$ 71,310	$ 82,886	$ 91,986	$ 105,412	*					$ 87,902
40 - 44	9	45	87	126	43	1				311
	$ 74,011	$ 82,683	$ 92,478	$ 106,366	$ 113,446	*				$ 99,202
45 - 49	4	23	39	86	131	22	1			306
	$ 70,289	$ 84,079	$ 92,283	$ 107,811	$ 118,673	$ 118,087	*			$ 109,051
50 - 54	1	4	16	46	72	54	10			203
	*	$ 86,502	$ 92,566	$ 107,468	$ 118,154	$ 118,626	$ 122,994			$ 113,136
55 - 59			4	18	16	14	11	2		65
			$ 97,936	$ 104,438	$ 119,279	$ 122,557	$ 112,092	*		$ 112,834
60 - 64			1	2	4	2		1		10
			*	*	$ 107,529	*		*		$ 105,541
Over 64		1		1						2
		*		*						*
Total	316	342	314	316	267	93	22	3		1,673
	68,704	$ 82,371	$ 91,896	$ 106,687	$ 117,512	$ 119,177	$ 118,311	$ 102,823		$ 94,334

*For privacy reasons, average salary is not shown for cells with two or fewer employees.

Table E

Annuitants – Distribution by Age

Age	Number	Annual Benefit	Average Annual Benefit
Under 60	467	35,112,809	75,188
60 - 64	213	14,563,358	68,373
65 - 69	222	13,681,283	61,627
70 - 74	129	7,031,501	54,508
75 - 80	58	3,101,702	53,478
Over 80	73	3,531,035	48,370
Total	1,162	77,021,688	66,284

Note: the table above excludes 2 beneficiaries who are owed lump sum payments but who do not have an annuity payable.

SECTION H

GLOSSARY

Glossary

Actuarial Accrued Liability (AAL): That portion, as determined by a particular Actuarial Cost Method, of the Actuarial Present Value of Future Plan Benefits which is not provided for by future Normal Costs. It is equal to the Actuarial Present Value of Future Plan Benefits minus the actuarial present value of future Normal Costs.

Actuarial Assumptions: Assumptions as to future experience under the Fund. These include assumptions about the occurrence of future events affecting costs or liabilities, such as:

- mortality, withdrawal, disablement, and retirement;
- future increases in salary;
- future rates of investment earnings and future investment and administrative expenses;
- characteristics of members not specified in the data, such as marital status;
- characteristics of future members;
- future elections made by members; and
- other relevant items.

Actuarial Cost Method or ***Funding Method:*** A procedure for allocating the Actuarial Present Value of Future Benefits to various time periods; a method used to determine the Normal Cost and the Actuarial Accrued Liability. These items are used to determine the ADC.

Actuarial Gain or ***Actuarial Loss:*** A measure of the difference between actual experience and that expected based upon a set of Actuarial Assumptions, during the period between two Actuarial Valuation dates. Through the actuarial assumptions, rates of decrements, rates of salary increases, and rates of fund earnings have been forecasted. To the extent that actual experience differs from that assumed, Actuarial Accrued Liabilities emerge which may be the same as forecasted, or may be larger or smaller than projected. Actuarial gains are due to favorable experience, e.g., the Fund's assets earn more than projected, salaries do not increase as fast as assumed, members retire later than assumed, etc. Favorable experience means actual results produce actuarial liabilities not as large as projected by the actuarial assumptions. On the other hand, actuarial losses are the result of unfavorable experience, i.e., actual results that produce actuarial liabilities which are larger than projected. Actuarial gains will shorten the time required for funding of the actuarial balance sheet deficiency while actuarial losses will lengthen the funding period.

Actuarially Equivalent: Of equal actuarial present value, determined as of a given date and based on a given set of Actuarial Assumptions.

Actuarial Present Value (APV): The value of an amount or series of amounts payable or receivable at various times, determined as of a given date by the application of a particular set of Actuarial Assumptions. For purposes of this standard, each such amount or series of amounts is:

a. Adjusted for the probable financial effect of certain intervening events (such as changes in compensation levels, marital status, etc.),
b. Multiplied by the probability of the occurrence of an event (such as survival, death, disability, termination of employment, etc.) on which the payment is conditioned, and
c. Discounted according to an assumed rate (or rates) of return to reflect the time value of money.

Actuarial Present Value of Future Plan Benefits: The Actuarial Present Value of those benefit amounts which are expected to be paid at various future times under a particular set of Actuarial Assumptions, taking into account such items as the effect of advancement in age and past and anticipated future compensation and service credits. The Actuarial Present Value of Future Plan Benefits includes the liabilities for active members, retired members, beneficiaries receiving benefits, and inactive, nonretired members either entitled to a refund or a future retirement benefit. Expressed another way, it is the value that would have to be invested on the valuation date so that the amount invested plus investment earnings would be provide sufficient assets to pay all projected benefits and expenses when due.

Actuarial Valuation: The determination, as of a valuation date, of the Normal Cost, Actuarial Accrued Liability, Actuarial Value of Assets, and related Actuarial Present Values for a plan. An Actuarial valuation for a governmental retirement system typically also includes calculations of items needed for compliance with GASB.

Actuarial Value of Assets or ***Valuation Assets:*** The value of the Fund's assets as of a given date, used by the actuary for valuation purposes. This may be the market or fair value of plan assets, but commonly actuaries use a smoothed value in order to reduce the year-to-year volatility of calculated results, such as the funded ratio and the ADC.

Actuarially Determined: Values which have been determined utilizing the principles of actuarial science. An actuarially determined value is derived by application of the appropriate actuarial assumptions to specified values determined by provisions of the law.

Amortization Method: A method for determining the Amortization Payment. The most common methods used are level dollar and level percentage of payroll. Under the Level Dollar method, the Amortization Payment is one of a stream of payments, all equal, whose Actuarial Present Value is equal to the UAAL. Under the Level Percentage of Pay method, the Amortization payment is one of a stream of increasing payments, whose Actuarial Present Value is equal to the UAAL. Under the Level Percentage of Pay method, the stream of payments increases at the assumed rate at which total covered payroll of all active members will increase.

Amortization Payment: That portion of the pension plan contribution or ADC which is designed to pay interest on and to amortize the Unfunded Actuarial Accrued Liability.

Actuarially Determined Contribution (ADC) or ***Annual Required Contribution (ARC):*** A calculated contribution for a defined benefit pension plan for the reporting period, most often determined based on the funding policy of the plan. Typically, the calculated contribution has a normal cost payment and an amortization payment.

Closed Amortization Period: A specific number of years that is counted down by one each year and therefore declines to zero with the passage of time. For example, if the amortization period is initially set at 30 years, it is 29 years at the end of one year, 28 years at the end of two years, etc. See Funding Period and Open Amortization Period.

Decrements: Those causes/events due to which a member's status (active-inactive-retiree-beneficiary) changes, that is: death, retirement, disability, or termination.

Defined Benefit Plan: An employer-sponsored retirement benefit that provides workers, upon attainment of designated age and service thresholds, with a monthly benefit based on the employee's salary and length of service. The value of a benefit from a defined benefit plan is generally not affected by the return on the assets that are invested to fund the benefit.

Defined Contribution Plan: A retirement plan, such as a 401(k) plan, a 403(b) plan, or a 457 plan, in which the contributions to the plan are assigned to an account for each member, and the plan's earnings are allocated to each account, and each member's benefits are a direct function of the account balance.

Employer Normal Cost: The portion of the Normal Cost to be paid by the employers. This is equal to the Normal Cost less expected member contributions.

Experience Study: A periodic review and analysis of the actual experience of the Fund which may lead to a revision of one or more actuarial assumptions. Actual rates of decrement and salary increases are compared to the actuarially assumed values and modified as deemed appropriate by the Actuary.

Funded Ratio: The ratio of the actuarial value of assets (AVA) to the actuarial accrued liability (AAL). Plans sometimes calculate a market funded ratio, using the market value of assets (MVA), rather than the AVA.

Funding Period or ***Amortization Period:*** The term "Funding Period" is used it two ways. In the first sense, it is the period used in calculating the Amortization Payment as a component of the ADC. This funding period is chosen by the Board of Trustees. In the second sense, it is a calculated item: the number of years in the future that will theoretically be required to amortize (i.e., pay off or eliminate) the Unfunded Actuarial Accrued Liability, based on the statutory employer contribution rate, and assuming no future actuarial gains or losses.

GASB: The Governmental Accounting Standards Board is an organization that exists in order to promulgate accounting standards for governmental entities.

Normal Cost: That portion of the Actuarial Present Value of pension plan benefits and expenses which is allocated to a valuation year by the Actuarial Cost Method. Any payment in respect of an Unfunded Actuarial Accrued Liability is not part of Normal Cost (see Amortization Payment). For pension plan benefits which are provided in part by employee contributions, Normal Cost refers to the total of employee contributions and employer Normal Cost unless otherwise specifically stated. Under the entry age normal cost method, the Normal Cost is intended to be the level cost (when expressed as a percentage of pay) needed to fund the benefits of a member from hire until ultimate termination, death, disability or retirement.

Open Amortization Period: An open amortization period is one which is used to determine the Amortization Payment but which does not change over time. In other words, if the initial period is set as 30 years, the same 30-year period is used in determining the Amortization Period each year. In theory, if an Open Amortization Period is used to amortize the Unfunded Actuarial Accrued Liability, the UAAL will never completely disappear, but will become smaller each year, either as a dollar amount or in relation to covered payroll.

Unfunded Actuarial Accrued Liability: The excess of the Actuarial Accrued Liability over the Actuarial Value of Assets. This value may be negative in which case it may be expressed as a negative Unfunded Actuarial Accrued Liability, also called the Funding Surplus.

Valuation Date or ***Actuarial Valuation Date:*** The date as of which the value of assets is determined and as of which the Actuarial Present Value of Future Plan Benefits is determined. The expected benefits to be paid in the future are discounted to this date.