City of Irving Supplemental Benefit Plan

ACTUARIAL VALUATION REPORT
FOR THE YEAR BEGINNING JANUARY 1, 2020

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June 11, 2020

Administrative Board
Supplemental Benefit Plan
City of Irving
825 West Irving Boulevard
Irving, TX 75060

Dear Members of the Board:

Subject: Actuarial Valuation as of January 1, 2020

We take pleasure in presenting you with the report of the actuarial valuation of the City of Irving Supplemental Benefit Plan (the Plan) as of January 1, 2020. The results of this valuation are based upon member data provided by your data processing staff, financial information provided by your bank trustee, and the actuarial assumptions and methods described in the report.

Results of this report should not be used for any other purpose without consultation with the undersigned. Valuations are prepared annually as of January 1, the first day of the plan year. This report was prepared at the request of the Administrative Board (the Board) and is intended for use by the Board and designated City staff and those designated or approved by the Board. This report may be provided to parties, other than those described above, only in its entirety and only with the permission of the Board.

Financing Objectives

The employer contribution rate is set each year by the City Council and the purpose of this actuarial valuation, performed as of January 1, 2020, is to determine whether or not the current City and member contribution rates are sufficient to support the benefits of the Plan. The normal cost and liabilities are computed using the Entry Age Normal actuarial cost method. Both the normal cost and the amortization of the unfunded actuarial accrued liability are determined as a level percentage of pay. The combined City and member rate of 4.61% (2.11% City and 2.50% member) is sufficient to pay the Plan's normal cost and amortize its unfunded liability over a period of 26 years (assuming all actuarial assumptions are met).

The Texas Pension Review Board (PRB) adopted new Pension Funding Guidelines in 2017. These new Guidelines state, in part, that "actual contributions made to the plan should be sufficient to cover the normal cost and to amortize the unfunded actuarial accrued liability over as brief a period as possible, but not to exceed 30 years, with 10 - 25 years being a more the preferable target range."

The Administrative Board adopted a Funding Policy for the Plan in December of 2019. The goal of this policy is to achieve 100% funding by January 1, 2040. In accordance with this goal, the actuarially determined contribution for the January 1, 2020 actuarial valuation will be based on a closed 20-year amortization period. Future unanticipated changes in the unfunded actuarial accrued liability of the Plan in each future valuation will be amortized over 15-year closed amortization periods (layered amortization approach).

Actuarial valuations are snapshot measurements performed as of January 1st each year. However, the results of the valuations are not known until several months after the valuation date. If an actuarial contribution rate is being determined then there needs to be a period of time between the valuation date and the effective date of the contribution rate. Therefore, the actuarial contribution rate determined by the valuation will be assumed to go into effect one year after the valuation date, with adjustments for the delay and the actual contribution rate being paid to the Plan between the valuation date and the date the new rate is effective.

Progress Toward Realization of Financing Objectives

The funded ratio (the ratio of the actuarial value of assets to the actuarial accrued liability) is a standard measure of a plan's funded status. In the absence of benefit improvements, it should increase over time, until it reaches 100%. The funded ratio as of January 1, 2020 is 73.4%. This is a decrease from the 73.5% funded ratio from the prior year's valuation.

However, 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.

Plan Experience

As part of each valuation, we examine the Plan's experience relative to the assumptions. The results of these analyses are disclosed in Table 4. This past fiscal year the Plan had a total experience liability gain of approximately $415,879. While the plan's investment performance exceeded the Plan's investment return assumption on a market value of assets basis, the plan experienced a loss on the actuarial value of assets of $735,969. This loss was a result of the recognition of prior year deferred investment losses.

Assumptions and Methods

Actuarial assumptions and methods are set by the Board, based upon recommendations made by the Plan's actuary. The demographic assumptions and the rates of salary increase assumption were adopted effective with this valuation to match the assumptions used by the Texas Municipal Retirement System (TMRS) in their valuation of the City of Irving's TMRS liabilities. We believe the assumptions are internally consistent and reasonable based on past and anticipated future experience of the Plan. The adoption of the new assumptions and methods increased the unfunded actuarial liabilities of the plan by $1.27 million. These assumptions are explained in detail in Appendix 1.

The results of the actuarial valuation are dependent on the actuarial assumptions and methods used. Actual results can and almost certainly will differ, as actual experience deviates from the assumptions. Even seemingly minor changes in the assumptions can materially change the liabilities, calculated contribution rates and funding periods. The actuarial calculations are intended to provide information for rational decision making.

This report does not include a more robust assessment of the risks of future experience not meeting the actuarial assumptions. Additional assessment of risks was outside the scope of this assignment.

This report does not reflect the recent and still developing impact of the COVID-19 pandemic, which may significantly impact the demographic and economic experience occurring after this valuation date.

Plan Provisions

The principle benefit provisions of the Plan are amended periodically by the City Council. The provisions have not changed since the prior valuation. The benefit provisions are summarized in Appendix 2.

Data

Member data for retired, active and inactive participants was supplied as of January 1, 2020, by the City of Irving staff. We have not subjected the data to any auditing procedures, but we have examined the data for reasonableness and consistency with the prior year's data. Asset information was supplied by the City of Irving's Finance Department. GRS is not responsible for the accuracy or completeness of the information provided to us by the City of Irving.

Actuarial Certification

We certify that the information presented in the January 1, 2020 actuarial valuation report of the City of Irving Supplemental Benefit Plan is accurate and fairly portrays the actuarial position of the Plan as of January 1, 2020.

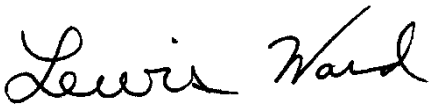
All of our work conforms with generally accepted actuarial principles and practices, and with the Actuarial Standards of Practice issued by the Actuarial Standards Board. In our opinion, our calculations also comply with the requirements of Texas state law and, where applicable, the Internal Revenue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

The undersigned are independent actuaries and consultants. Mr. Siblik is an Associate of the Society of Actuaries, an Enrolled Actuary, and Member of the American Academy of Actuaries and meets the Qualification Standards of the American Academy of Actuaries. Both are experienced in performing valuations for large public retirement systems.

We would like to thank the members of the City of Irving Staff and the Human Resources Department for their assistance. Without such assistance, this study could not have been completed.

We look forward to presenting the results to you.

Sincerely,



Lewis Ward
Consultant

Daniel J. Siblik, ASA, EA, MAAA
Consultant

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SECTION I

BACKGROUND

BACKGROUND

Effective March 1, 1984, the City of Irving established the City of Irving Supplemental Benefit Plan (SBP or "the Plan") in order to provide death, disability and retirement benefits to its employees in conjunction with the Texas Municipal Retirement System (TMRS). The Plan contains substantial death and disability benefits. In addition, there are modest retirement benefits to supplement those of TMRS. The actuarial demographic assumptions (rates of withdrawal, disability, retirement, etc.) reflect the current assumptions used by TMRS.

The City contributed 2.17% of the salaries of those covered under the Plan since its inception on March 1, 1984 through the 1989 plan year. Beginning in 1990, the City began to annually adjust its contribution rate to correspond to increases in the TMRS contribution. With the decrease in the City's TMRS contribution rate, the City has once again begun contributing to the SBP. It is our understanding that the City will make a contribution of 2.11% of pay during the 2020 calendar year. The table below shows the City's contribution rate for each year since 1990.

Year	City's Rate	Year	City's Rate
1990	1.85%	2012	1.42%
1991	1.33%	2013-2015	1.49%
1992	1.26%	2016-2017	2.14%
1993	1.41%	2018	2.07%
1994	0.99%	2019	2.23%
1995-2011	0.00%	2020	2.11%

The purpose of this actuarial valuation, performed as of January 1, 2020, is to determine whether or not the current contribution rates (2.11% by the City and 2.50% by the active members) are sufficient to support the benefits of the Plan.

On a market value basis, the SBP's assets outperformed the Plan's assumed rate of return during 2019. Due to recognition of prior years' deferred investment losses, the plan experienced an actuarial loss of $735,969 on the actuarial value of assets. The Plan also continues to be in an underfunded position.

The combined City and member rate of 4.61% (2.11% City and 2.50% member) is sufficient to pay the Plan's normal cost and amortize its unfunded liability over a period of 26 years (assuming all actuarial assumptions are met). For informational purposes, we have also calculated an Actuarially Determined Contribution (ADC) based on the Plan's Funding Policy (see prior discussion). As shown on Table 1, the ADC is 4.85% of payroll (2.35% City and 2.50% member). It is hoped that the City will begin contributing the ADC beginning in calendar year 2021. However, the Board understands that it cannot mandate the City contribute the ADC. Please note that the 26 year funding period and the ADC are based on the actuarial value of assets and do not reflect any of the net deferred investment gains.

In the remainder of the report, we will provide the actuarial valuation results which support this statement. In addition we will describe the actuarial methods, assumptions and techniques utilized in developing the results of this valuation.

BACKGROUND
(Continued)

The Governmental Accounting Standards Board (GASB) has issued Statement No. 67 which provides the manner for the disclosure of the actuarial funding condition of a public sector retirement plan (GASB also issued Statement No. 68 which governs the disclosure for governmental pension plans' sponsors). The new GASB No. 67/68 disclosure requirements have divorced the funding requirements of the Plan from the accounting requirements. For that reason, except as noted below we have removed all GASB disclosure information from this valuation report.

Table 7 contains the Schedule of Funding Progress that was previously required under GASB Statement No. 25. While this table is no longer required we believe the information contained in this table is useful and therefore have decided to retain this exhibit.

ACTUARIAL BASIS OF THE VALUATION

In developing any actuarial valuation, choices must be made relative to actuarial assumptions and methods used in that valuation. These items, plus the member information and financial information, constitute the basis underlying the actuarial results which will be discussed further in this report. TMRS adopted new demographic assumptions for the valuation of the City of Irving TMRS benefits, effective December 31, 2019. After discussions with its actuary, the Board of Trustees elected to adopt these new demographic assumptions effective with the January 1, 2020 SBP valuation.

The actuarial cost method used to determine the Plan's liabilities is known as the Entry Age Normal actuarial cost method (EAN cost method). The EAN cost method assigns the plan's total unfunded liabilities (the actuarial present value of future benefits less the actuarial value of assets) to various periods. The unfunded actuarial accrued liability is assigned to years prior to the valuation, and the normal cost is assigned to the year following the valuation. The remaining costs are the normal costs for future years.

Under the EAN cost method, a calculation is made to determine the rate of contribution which, if applied to the compensation of each individual member during the entire period of anticipated covered service, would be required to meet the cost of all benefits payable on his behalf. The salary-weighted average of these rates is the normal cost rate. This calculation reflects the plan provisions that apply to each individual member.

The actuarial accrued liability is the difference between the total present value of future benefits and the actuarial present value of future normal costs. The unfunded actuarial accrued liability (UAAL) is the excess of the actuarial accrued liability over the actuarial value of assets.

The actuarial value of assets is determined using a method that starts with the market value of assets and is modified by the "Excess/(Shortfall)" between expected investment return and actual income. Only 20% of this Excess/(Shortfall) is recognized in the valuation immediately following the year in which the Excess/(Shortfall) occurs. The remaining 80% of the Excess/(Shortfall) is deferred until future valuations, with an additional 20% recognized in each subsequent valuation until 100% of the difference is recognized by the fifth year.

SECTION II

ACTUARIAL BASIS OF THE VALUATION

ACTUARIAL BASIS OF THE VALUATION

The purpose of this section is to summarize and interpret the results of this actuarial valuation. Table 1 on Page 8 summarizes these results as of January 1, 2020.

The first major area in this table is a breakdown of the actuarial present values of benefits by the three benefit types.

1. Actuarial present value of all future benefits - the value, as of the valuation date, of all benefits estimated to be paid over future years under the Plan to current members of the Plan. Thus, this actuarial present value incorporates projections of pay and service to a retirement date, a date of disability, etc. This value represents the value, with which the fund with interest on those dollars, would pay all estimated benefits. Said another way, if the assets in the fund equal or exceed this value, theoretically, there would never need to be another contribution for current members of the Plan.

2. Actuarial present value of future benefits accrued to date (AAL) - the portion of the actuarial present value of all future benefits which is attributed to years of service prior to the valuation date. It is this item which, under the actuarial cost method, equals the Actuarial Accrued Liability (AAL). The difference between the AAL and the actuarial value of assets is called the Unfunded Actuarial Accrued Liability (UAAL). From Table 1, it is clear that the actuarial value of assets is less than the AAL. Thus, the Plan is underfunded.

   In addition, the actuarial valuations present the funded ratio. It is the ratio of the actuarial value of assets of the fund to the actuarial accrued liability, which is a measure of the funded status. As shown in Table 1, the funded ratio is 73.4%. A ratio less than 100% means that the assets in the Plan as of the valuation date (as measured by the value of actuarial assets as opposed to the market value of those assets) are less than the targeted levels based on the benefits earned to the valuation date.

3. Normal cost of benefits - the value at the valuation date by which the AAL is expected to increase during the 2020 plan year due to service being earned. In other words, the Normal Cost is the average annual actuarial cost of the benefits provided by the Plan for the current employees. The total normal cost (3.28% of pay) is equal to the normal cost of benefits (3.14% of pay) plus the expected administrative expenses for the upcoming year (0.14% of pay).

As stated previously, the Plan is underfunded. The total normal cost of the Plan (3.28% of pay as shown on Table 3) currently exceeds the 2.50% of pay being contributed by the members; the City contribution of 2.11% will be used to fund the remaining 0.78% of the normal cost. The excess City contribution of 1.33% (2.11% minus 0.78%) will fund the unfunded liabilities of the Plan. As of this valuation, it is expected the City contribution rate is expected to eliminate the unfunded liabilities over the next 26 years.

The 26-year funding period mentioned above is based on the snapshot valuation measurement and assumes that all assumptions will be exactly met, including the 6.75% rate of return on the actuarial value of assets. As shown on Table 9a, the Plan currently has approximately $3.1 million in net deferred excess investment income to be recognized in future valuations.

ACTUARIAL BASIS OF THE VALUATION
(Continued)

When the funding period is determined by the actuarial valuation, these deferred net investment gains are assumed to be offset by investment losses in the future. However, when we performed our projection (shown on Table 5), we assumed that the market value of assets would grow at 6.75% and that any deferred investment excesses or shortfalls would be recognized in the four projected valuations following the current measurement date.

Table 5 shows a fifteen-year projection of selected actuarial information for the Plan. As shown on the table, the dollar amount of the UAAL of the Plan is expected to decrease because of the recognition of the deferred excess investment income. Because the Plan's unfunded liability is being financed as level percentage of pay and the funding period is greater than 20, the contributions towards the UAAL do not yet cover the expected year to year interest growth of the UAAL (in other words we are still in a period of negative amortization). Normally, that would mean the UAAL would be expected to increase. The recognition of the deferred excess investment income is the reason why the UAAL is expected to decline. However, it is important to note that these are estimates. Projections can differ dramatically from actual results if the Plan's experience is significantly different from the actuarial assumptions used in the projection (in particular, this projection does not reflect the possible impact that COVID-19 may have on the investment returns and/or contributions in calendar year 2020 and beyond).

Although the Plan is underfunded, the 2.11% of pay being contributed by the City together with the 2.50% of pay being contributed by the members is expected to be sufficient to cover the on-going costs of the Plan.

SECTION III

RESULTS OF THE ACTUARIAL VALUATION

SUMMARY OF ACTUARIAL VALUATION RESULTS
As of January 1, 2020

Table 1

1. Actuarial Present Values

Benefit Type	Actuarial Present Values of: All Future Benefits	Future Benefits Accrued to Date (AAL)	2019 Portion (Normal Cost)	Normal Cost Rate
(1)	(2)	(3)	(4)	(5)
Active Members				
Retirement	$ 73,406,551	$ 55,251,791	$ 2,224,282	2.08%
Disability	2,734,580	(181,217)	386,640	0.36%
Death	952,909	683,054	33,494	0.03%
Vesting	3,772,132	(311,107)	475,276	0.44%
Refund	468,568	(1,611,480)	246,205	0.23%
Subtotal	$ 81,334,740	$ 53,831,041	$ 3,365,897	3.14%
Terminated Members	9,418,042	$ 9,418,042	0	N/A
Retired Members	28,174,158	28,174,158	0	N/A
Administrative Expenses	N/A	N/A		0.14%
	$ 118,926,940	$ 91,423,241	$ 3,365,897	3.28%

2. Actuarial Value of Assets	$ 67,147,643
3. Unfunded Actuarial Accrued Liability (UAAL)	$ 24,275,598
4. Funded Ratio	
a. Current Valuation	73.4%
b. Prior Valuation	73.5%
5. Projected Payroll	$ 113,282,960
6. Funding Period to Amortize UAAL[1]	26 years
7. Determination of Actuarially Determined Contribution[2]	
a. Projected UAAL as of January 1, 2021	$ 24,407,537
b. Amortization Factor as of January 1, 2021	13.327701
c. Projected Payroll for Calendar Year 2021	$ 116,398,241
d. Actuarially Determined Contribution Rate (7.a. ÷ 7.b. ÷ 7.c.) + Normal Cost Rate	4.85%

[1] Funding period determined based on current member and City contribution rate and all assumptions being exactly met.

[2] The actuarially determined conribution rate is for the plan year beginning one year after the valuation date. The rate reflects the known contribution rate for the current plan year and assumes all other assumptions are exactly met.

Note: the 20-year funding cost if the payments began in calendar year 2020 would be 4.84% of pay.

COMPARISON OF ACTUARIAL VALUES

Table 2

	January 1, 2020 (1)	January 1, 2019 (2)
1. Normal Cost Rate (includes admin expenses)	3.28%	3.34%
2. Present Value of Accrued Benefits (AAL)	$ 91,423,241	$ 85,874,241
Results on the Actuarial Value of Assets		
3. Actuarial Value of Assets	$ 67,147,643	$ 63,087,137
4. Unfunded Actuarial Accrued Liability (UAAL)	$ 24,275,598	$ 22,787,104
5. Actuarially Determined Contribution (ADC) rate for Plan Year Beginning One Year after Valuation Date (Employee + City)*	4.85%	N/A
6. Funded Ratio	73.4%	73.5%
Results on the Market Value of Assets		
7. Market Value of Assets	$ 70,213,418	$ 58,112,359
8. Unfunded Actuarial Accrued Liability (UAAL)	$ 21,209,823	$ 27,761,882
9. Funded Ratio	76.8%	67.7%

*In accordance with the Board's funding policy, the actaurially determined contribution is calcualted so that the UAAL as of 1-1-2020 is fully amortized by Janaury 1, 2040. The rate is assumed to begin one year after the valuation date and reflects the known contribution rate for the current year. Future unanticipated changes in the UAAL will be amortized over 15-year closed periods.

EVALUATION OF CONTRIBUTION LEVEL
January 1, 2020

Table 3

1.	Actuarially Calculated Contribution (ADC) Rate*		
	a.	Normal Cost (includes assumed administrative expenses)	3.28%
	b.	Amortization of UAAL*	1.57%
	c.	TOTAL	4.85%
2.	Current Contribution Rate		
	a.	Member	2.50%
	b.	Total Employer Contribution Rate	2.11%
	c.	TOTAL	4.61%

*In accordance with the Board's funding policy, the amortization of the UAAL as of 1-1-2020 is over a closed 20-year amortization period. Future unanticipated changes in the UAAL will be amortized over 15-year closed periods. The ADC is assumed to be contributed beginning one year after the valuation date.

ACTUARIAL GAIN OR LOSS
As of December 31, 2019

Table 4

1.	Unfunded actuarial accrued liability (UAAL) as of December 31, 2018	$ 22,787,104
2.	Normal Cost (NC) for year ending December 31, 2019	$ 3,517,009
3.	Actual administrative expenses for year ending December 31, 2019	$ 114,108
4.	Contributions during year ending Decemeber 31, 2019	$ (5,222,493)
5.	Interest at prior valuation's rate of 6.75%	
	a. On UAAL	$ 1,538,130
	b. On normal cost and administrative expenses	120,549
	c. On contributions	(173,381)
	d. Total	$ 1,485,298
6.	Expected UAAL as of December 31, 2019 (1 + 2 + 3 + 4 + 5)	$ 22,681,026
7.	Actual UAAL as of December 31, 2019	$ 24,275,598
8.	Actuarial gain/(loss) for the period (6 – 7)	$ (1,594,572)
	SOURCE OF GAINS AND LOSSES	
9.	Asset gain/(loss) (See Table 9c)	$ (735,969)
10.	Total liability gain/(loss) (8 – 9)	(858,603)
11.	Gain/(loss) due to benefit enhancements	0
12.	Gain/(loss) due to retiree ad hoc increases	0
13.	Gain/(loss) due to assumption changes	(1,274,482)
14.	Gain/(loss) due to funding method changes	0
15.	Liability Experience gain/(loss) (10 – 11 – 12 – 13 – 14)	$ 415,879
16.	Liability Experience gain/(loss) by source	
	a. Salary increases	$ 107,796
	b. Retirements	(18,736)
	c. Withdrawals	558,828
	d. Active mortality	(34,012)
	e. Disabilities	319,331
	f. Retiree mortality	(247,383)
	g. Other (data)	(269,945)

PROJECTION RESULTS
As of January 1, 2020

Table 5

Valuation as of January 1,	Projected Compensation	Actuarially Determined Employer Contribution Rate[1,2]	Funding Period[2]	UAAL	Funded Ratio
(1)	(2)	(3)	(4)	(5)	(6)
2020	$ 113,282,960	2.35%	26 years	$ 24,275,598	73.4%
2021	116,535,204	2.31%	24 years	23,744,360	75.7%
2022	119,946,150	2.25%	21 years	22,696,062	78.2%
2023	123,456,596	2.24%	20 years	22,197,683	79.9%
2024	127,069,598	2.14%	17 years	20,368,321	82.5%
2025	130,798,060	2.14%	16 years	19,997,049	83.8%
2026	134,746,914	2.14%	15 years	19,549,481	84.9%
2027	138,786,113	2.14%	14 years	19,017,440	86.0%
2028	142,923,291	2.14%	13 years	18,393,981	87.1%
2029	147,126,751	2.14%	12 years	17,671,589	88.1%
2030	151,491,247	2.14%	11 years	16,842,672	89.1%
2031	155,978,376	2.14%	10 years	15,897,830	90.2%
2032	160,694,958	2.14%	9 years	14,827,550	91.2%
2033	165,548,540	2.14%	8 years	13,620,213	92.2%
2034	170,577,586	2.14%	7 years	12,264,684	93.2%
2035	175,782,462	2.14%	6 years	10,748,551	94.3%

[1]Based on the Board adopted Funding Policy.

[2]The projection assumes that market value of assets will return the assumed 6.75% investment return assumption and that all other actuarial assumptions are exactly met. The projection also assumes that the active member population will remain constant, i.e. one new hire for each active member that terminates, dies, retires, or becomes disabled. Finally, the projection assumes that there will be no change in the City or member contribution rates to the Plan.

SUMMARY OF CHARACTERISTICS OF COVERED GROUP

Table 6

	January 1, 2020 (1)	January 1, 2019 (2)
1. Active Members		
a. Vested Members	951	949
b. Non-vested Members	565	536
c. Total	1,516	1,485
d. Average Age	43.58	43.65
e. Average Service	11.28	11.52
f. Reported Payroll	$ 110,207,064	$ 105,124,301
g. Average Annual Pay	$ 72,696	$ 70,791
2. Benefit Recipients		
a. Number	413	400
b. Total Annual Benefit	$ 2,887,161	$ 2,742,767
c. Average Annual Benefit	$ 6,991	$ 6,857
3. Vested Terminated Members		
a. Number	241	223
b. Total Annual Benefit	$ 1,455,233	$ 1,350,687
c. Average Annual Benefit	$ 6,038	$ 6,057

SCHEDULE OF FUNDING PROGRESS

Table 7

Valuation Date	Actuarial Value of Assets (AVA)	Actuarial Accrued Liability (AAL)	Unfunded Actuarial Accrued Liability (UAAL) (2) - (3)	Funded Ratio	Annual Covered Payroll	UAAL as % of Payroll (4)/(6)	Funding Period
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1-1-2011*	$44,288	$52,195	$7,907	84.9%	$83,666	9.5%	Infinite
1-1-2012	$43,158	$55,009	$11,851	78.5%	$83,162	14.3%	25.3 years
1-1-2013	$44,045	$57,702	$13,657	76.3%	$84,495	16.2%	29.1 years
1-1-2014	$47,689	$60,458	$12,769	78.9%	$86,364	14.8%	27.2 years
1-1-2015	$51,244	$63,313	$12,069	80.9%	$89,180	13.5%	24.8 years
1-1-2016*	$53,608	$74,103	$20,495	72.3%	$92,986	22.0%	23.0 years
1-1-2017	$56,606	$78,401	$21,795	72.2%	$95,366	22.9%	26 years
1-1-2018	$60,465	$83,411	$22,946	72.5%	$100,135	22.9%	32 years
1-1-2019	$63,087	$85,874	$22,787	73.5%	$105,124	21.7%	23 years
1-1-2020*	$67,148	$91,423	$24,276	73.4%	$110,207	22.0%	26 years

Note: Dollar amounts in thousands.

*Change in actuarial assumptions

SUMMARY OF FINANCIAL ACTIVITY

Table 8

Type of Asset Value	December 31, 2019 Market Value	December 31, 2018 Market Value
	(1)	(2)
1. Assets at Beginning of Year	$ 58,112,359	$ 59,743,544
2. Contributions		
a. Employer Contributions	2,462,185	2,227,913
b. Employee Contributions	2,760,308	2,596,875
c. Total Contributions	5,222,493	4,824,788
3. Net Investment Return*	11,570,512	(2,288,326)
4. Disbursements		
a. Refunds of Member Contributions	(70,613)	(270,957)
b. Lump Sums to Retirees	(1,513,958)	(1,038,807)
c. Retiree Annuity Payments	(2,993,267)	(2,707,051)
d. Administrative Expenses	(114,108)	(150,832)
e. Total Disbursements	(4,691,946)	(4,167,647)
5. Assets at End of Year	$ 70,213,418	$ 58,112,359

* Net of investment expenses

DEVELOPMENT OF ACTUARIAL VALUE OF ASSETS

Table 9a

	Item	Valuation as of January 1, 2020
	(1)	(2)
1.	Excess/(shortfall) of investment income for current year and previous four years (see Table 9b):	
	a. Current year	$ 7,640,382
	b. Current year - 1	(6,333,726)
	c. Current year - 2	3,044,090
	d. Current year - 3	(2,319,654)
	e. Current year - 4	(4,031,947)
2.	Deferral of excess/(shortfall) of investment income for:	
	a. Current year (80% deferral)	$ 6,112,306
	b. Current year - 1 (60% deferral)	(3,800,236)
	c. Current year - 2 (40% deferral)	1,217,636
	d. Current year - 3 (20% deferral)	(463,931)
	e. Current year - 4 (0% deferral)	0
	f. Total deferred	$ 3,065,775
3.	Market value of plan assets, end of year	$ 70,213,418
4.	Preliminary actuarial value of plan assets, end of year (Item 3 - Item 2.f.)	$ 67,147,643
5.	Actuarial value of assets corridor	
	a. 80% of market value of assets, end of year	$ 56,170,734
	b. 120% of market value of assets, end of year	$ 84,256,102
6.	Final actuarial value of plan assets, end of year (Item 4, but not less than Item 5.a., or greater than Item 5.b.)	$ 67,147,643

CALCULATION OF EXCESS INVESTMENT INCOME FOR ACTUARIAL VALUE OF ASSETS

Table 9b

Item	Plan Year Ending December 31, 2019	2018	2017	2016	2015
(1)	(2)	(3)	(4)	(5)	(6)
1. Net Investment Income (Table 8 Item 3)*	$ 11,570,512	$ (2,288,326)	$ 6,592,197	$ 1,103,719	$ (474,654)
2. Market value of assets, beginning of year	58,112,359	59,743,544	52,258,122	50,538,106	50,860,858
3. Contributions during year	5,222,493	4,824,788	4,669,042	4,516,067	3,724,211
4. Monthly benefits paid during year	(2,993,267)	(2,707,051)	(2,666,892)	(2,500,411)	(2,335,363)
5. Refunds and lump sums paid during year	(1,584,571)	(1,309,764)	(972,115)	(1,233,413)	(1,236,946)
6. Administrative expenses paid during year	(114,108)	(150,832)	(136,810)	(165,946)	N/A
7. Expected net investment income at 6.75%					
a. Market value of assets, beginning of year	3,922,584	4,032,689	3,527,423	3,411,322	3,560,260
b. Contributions	173,381	160,178	155,007	149,929	128,143
c. Benefits	(109,441)	(98,977)	(97,508)	(91,421)	(88,549)
d. Refunds	(52,606)	(43,483)	(32,273)	(40,948)	(42,561)
e. Expenses	(3,788)	(5,007)	(4,542)	(5,509)	N/A
e. Total	3,930,130	4,045,400	3,548,107	3,423,373	3,557,293
8. Excess investment income for year (Item 1 - Item 7.e.)	$ 7,640,382	$ (6,333,726)	$ 3,044,090	$ (2,319,654)	$ (4,031,947)

* Beginning in 2016 Net Investment Income is net of investment expenses only

GAIN/(LOSS) ON ACTUARIAL VALUE OF ASSETS

Table 9c

Item	Plan Year Ending December 31, 2019	Plan Year Ending December 31, 2018
(1)	(2)	(3)
1. Actuarial assets, beginning of year	$ 63,087,137	$ 60,464,787
2. Contributions during year	$ 5,222,493	$ 4,824,788
3. Annuity benefits paid during year	$ (2,993,267)	$ (2,707,051)
4. Refunds and lump sums paid during year	$ (1,584,571)	$ (1,309,764)
5. Adminstrative expenses paid during year	$ (114,108)	$ (150,832)
6. Assumed net investment income at	6.75%	6.75%
a. Beginning of year assets	$ 4,258,382	$ 4,081,373
b. Contributions	173,381	160,178
c. Annuity benefits	(109,441)	(98,977)
d. Refunds and lump sums	(52,606)	(43,483)
e. Administrative expenses	(3,788)	(5,007)
f. Total	$ 4,265,928	$ 4,094,084
7. Expected actuarial assets, end of year (Sum of Items 1 through 6)	$ 67,883,612	$ 65,216,012
8. Actuarial assets, end of year	$ 67,147,643	$ 63,087,137
9. Asset gain/(loss) (Item 8 - Item 7)	$ (735,969)	$ (2,128,875)

ESTIMATE OF YIELDS ON ASSETS

Table 10a

		Period Ending December 31, 2019	
		Market Value	Actuarial Value
		(1)	(2)
1.	Assets in plan at beginning of year **(A)**	$ 58,112,359	$ 63,087,137
2.	Employer contributions	$ 2,462,185	$ 2,462,185
3.	Employee contributions	$ 2,760,308	$ 2,760,308
4.	Annuity benefit payments made	$ (2,993,267)	$ (2,993,267)
5.	Refunds of contributions and lump sums	$ (1,584,571)	$ (1,584,571)
6.	Administrative expenses paid from trust	$ (114,108)	$ (114,108)
7.	Investment return net of investment expenses	$ 11,570,512	$ 3,529,959
8.	Other	0	0
9.	Assets in plan at end of year **(B)** (1 + 2 + 3 + 4 + 5 + 6 + 7 + 8)	$ 70,213,418	$ 67,147,643
10.	Approximate rate of return on average invested assets		
	a. Net investment income (**I**)	$ 11,570,512	$ 3,529,959
	b. Estimated yield based on **(2I/(A + B - I))**	19.82%	5.57%

HISTORICAL INVESTMENT RETURNS

Table 10b

Calendar Year	On Market Value	On Actuarial Value
2000	0.23%	5.61%
2001	2.91%	5.01%
2002	-6.77%	1.68%
2003	11.57%	2.13%
2004	12.44%	3.86%
2005	5.23%	4.88%
2006	10.14%	6.63%
2007	5.46%	8.71%
2008	-22.23%	-3.27%
2009	13.94%	9.31%
2010	9.70%	1.94%
2011	-2.47%	0.03%
2012	8.89%	0.48%
2013	9.64%	7.53%
2014	5.40%	6.30%
2015	-0.93%	4.31%
2016	2.17%	4.42%
2017	12.51%	5.20%
2018	-3.81%	3.23%
2019	19.82%	5.57%
Five-year Average Return	5.59%	4.54%
Ten-year Average Return	5.86%	3.87%
Fifteen-year Average Return	4.42%	4.30%
Twenty-year Average Return	4.27%	4.13%

AGE AND SERVICE DISTRIBUTION

Table 11

Distribution of Active Members by Age Groups and Service Groups as of January 1, 2020

	Completed Years of Service												
Age Group	0 No. & Avg. Comp.	1 No. & Avg. Comp.	2 No. & Avg. Comp.	3 No. & Avg. Comp.	4 No. & Avg. Comp.	5-9 No. & Avg. Comp.	10-14 No. & Avg. Comp.	15-19 No. & Avg. Comp.	20-24 No. & Avg. Comp.	25-29 No. & Avg. Comp.	30-34 No. & Avg. Comp.	35 & Over No. & Avg. Comp.	Total
Under 25	35	17	8	7	7	2							76
	$ 44,248	$ 41,677	$ 47,144	$ 41,661	$ 48,312	$ 52,101							$ 44,320
25 – 29	42	33	29	20	10	15	1						150
	$ 48,159	$ 53,415	$ 59,674	$ 58,506	$ 61,305	$ 63,304	$ 42,612						$ 55,275
30 – 34	30	24	18	22	18	47	19						178
	$ 53,548	$ 65,810	$ 67,185	$ 67,510	$ 56,881	$ 70,905	$ 77,948						$ 65,831
35 – 39	12	17	9	7	14	44	62	24					189
	$ 60,907	$ 68,888	$ 61,631	$ 90,141	$ 67,012	$ 78,305	$ 89,394	$ 70,027					$ 77,748
40 – 44	21	14	11	7	8	25	44	48	10				188
	$ 64,214	$ 66,767	$ 75,916	$ 64,018	$ 67,281	$ 83,860	$ 75,478	$ 84,447	$ 88,383				$ 76,912
45 – 49	9	7	6	6	9	23	42	39	36	17	1		195
	$ 58,820	$ 56,395	$ 54,224	$ 38,335	$ 54,896	$ 63,324	$ 81,260	$ 79,008	$ 86,828	$ 97,291	$ 102,813		$ 75,932
50 – 54	7	9	14	6	6	14	31	49	38	30	12		216
	$ 49,855	$ 65,181	$ 47,709	$ 71,447	$ 83,041	$ 84,497	$ 70,217	$ 74,377	$ 90,112	$ 103,354	$ 110,098		$ 80,466
55 – 59	6	3	7	2	9	23	17	26	33	20	28	11	185
	$ 53,622	$ 60,183	$ 71,390	$ 43,476	$ 60,594	$ 77,434	$ 69,720	$ 72,379	$ 84,123	$ 92,893	$ 99,265	$ 78,238	$ 79,764
60 – 64	3		3	2	6	9	22	16	16	14	12	3	106
	$ 58,016		$ 48,355	$ 54,074	$ 80,101	$ 81,544	$ 73,068	$ 71,957	$ 83,783	$ 78,569	$ 93,759	$ 78,384	$ 77,371
65 & Up			2		2	1	10	8	4	3	2	1	33
			$ 60,724		$ 50,277	$ 98,883	$ 73,625	$ 63,084	$ 96,307	$ 85,249	$ 107,260	$ 113,322	$ 76,686
Total	165	124	107	79	89	203	248	210	137	84	55	15	1,516
	$ 52,311	$ 59,019	$ 60,433	$ 61,770	$ 62,588	$ 74,785	$ 78,652	$ 76,179	$ 87,122	$ 94,859	$ 100,783	$ 80,606	$ 72,696

Average:	Age	43.58	Number of participants:	Fully vested	951	Males 1,029
	Service	11.28		Non-vested	565	Females 487

SECTION IV

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:

- Investment risk – actual investment returns may differ from the expected returns;
- 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;
- 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;
- Salary and Payroll risk – actual salaries and total payroll may differ from expected, resulting in actual future accrued liability and contributions differing from expected;
- Longevity risk – members may live longer or shorter than expected and receive pensions for a period of time other than assumed;
- 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.

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

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 Calculated 30-Year Contribution Rate shown in the Table Evaluation of Contribution Level (Table 3) may be considered as a minimum contribution rate that complies with the Texas Pension Review Board's Pension Guideline. The timely receipt of the actuarially determined contributions is critical to support the financial health of the plan. 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. Several generally accepted plan maturity measures are described below and are followed by a table showing a 10-year history of the measurements for the SBP.

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.

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

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 percent 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, duration of 10 indicates that the liability would increase approximately 10% if the assumed rate of return were lowered 1%.

ADDITIONAL RISK ASSESSMENT

Additional risk assessment is outside the scope of the annual actuarial valuation. 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.

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

	2019	2018	2017	2016	2015	2014	2013	2012	2011
Ratio of the market value of assets to payroll	0.64	0.55	0.60	0.55	0.54	0.57	0.55	0.51	0.47
Ratio of actuarial accrued liability to payroll	0.83	0.82	0.83	0.82	0.80	0.71	0.70	0.68	0.66
Ratio of actives to retirees and beneficiaries	2.32	2.38	2.39	2.49	2.68	2.77	2.98	4.20	4.37
Ratio of net cash flow to market value of assets	0.8%	1.1%	1.5%	1.2%	0.1%	0.8%	0.4%	1.4%	-3.2%
Duration of the actuarial present value of benefits*	16.41	15.72	NA	NA	NA	NA	NA	NA	NA

*Duration measure not available prior to 2018

APPENDIX 1

STATEMENT OF ACTUARIAL ASSUMPTIONS AND METHODS

STATEMENT OF ACTUARIAL ASSUMPTIONS AND METHODS
(Adopted Effective January 1, 2020)

I. Actuarial Assumptions: The SBP Board has a practice of adopting the demographic assumptions used for valuing the City of Irving's TMRS plan liabilities. Hence the demographic assumptions were revised effective with the January 1, 2020 actuarial valuation to reflect the new assumptions adopted for TMRS.

A. Assumed Rate of Investment Return: 6.75%, comprised of a 2.50% inflation rate and a 4.25% real return assumption (net of investment expenses).

B. Individual Salary Increases:

Salary increases are assumed to occur once a year, on January 1. Therefore, the pay used for the period year following the valuation date is equal to the reported pay for the prior year, increased by the salary increase assumption. Salaries are assumed to increase by the following graduated service-based scale.

Years of Service	Rate (%)
1	11.50%
2	7.25%
3	6.75%
4	6.25%
5	6.00%
6	5.75%
7	5.50%
8	5.25%
9	5.00%
10	4.75%
11-12	4.50%
13-15	4.25%
16-20	4.00%
21-24	3.75%
25 +	3.50%

C. Mortality:

Pre-Retirement - the PUB(10) Public Safety Mortality Table and the PUB(10) General Employee Mortality Table are used for males and females, respectively. The rates are projected on a fully generational basis by Scale UMP to account for future mortality improvements.

Post-Retirement (Healthy) - the Gender-distinct 2019 Municipal Retirees of Texas mortality tables are used. The rates are projected on a fully generational basis by Scale UMP to account for future mortality improvements.

STATEMENT OF ACTUARIAL ASSUMPTIONS AND METHODS (Continued)

Post-Retirement (Disabled) - the mortality tables for healthy retirees are used with a 4 year set-forward for males and a 3 year set-forward for females. In addition, a 3.5% and 3.0% minimum mortality rate will be applied to reflect the impairment for younger members who become disabled for males and females, respectively. The rates are projected on a fully generational basis by Scale UMP to account for future mortality improvements subjected to 3.5% for males and 3.0% for female floor.

D. Disability – Sample rates follow:

Age	Males & Females
20	0.000003
25	0.000019
30	0.000074
35	0.000194
40	0.000371
45	0.000603
50	0.000891
55	0.001235
60	0.001635
65	0.002090

E. Retirement – Sample rates follow:

Age	Males & Females
40-49	0.05
50-51	0.07
52-54	0.08
55-59	0.13
60	0.16
61	0.17
62	0.25
63-64	0.20
65-74	0.30
75 and over	1.00

STATEMENT OF ACTUARIAL ASSUMPTIONS AND METHODS (Continued)

F. Termination Rates

1. For the first 10 years of service, the base table rates vary by gender, entry age, and length of service. The base table is multiplied by a factor of 75.0% for the City of Irving (based on the experience of the City). A further multiplier is applied depending on an employee's classification.

Category	Select Period	Ultimate Period
Police	86%	83%
General	108%	113%

A sample of the base rates follows:

Male	SERVICE									
Age	0	1	2	3	4	5	6	7	8	9
20	0.3079	0.2766	0.2305	0.2037	0.1951	0.1764	0.1612	0.1311	0.1078	0.0860
25	0.2798	0.2393	0.1911	0.1638	0.1507	0.1336	0.1210	0.1060	0.0976	0.0798
30	0.2585	0.2163	0.1697	0.1395	0.1138	0.1052	0.0945	0.0817	0.0785	0.0655
35	0.2642	0.2183	0.1663	0.1334	0.1107	0.1048	0.0894	0.0758	0.0655	0.0598
40	0.2602	0.2172	0.1647	0.1279	0.1103	0.0994	0.0849	0.0749	0.0633	0.0608
45	0.2392	0.2040	0.1640	0.1287	0.1110	0.0976	0.0857	0.0750	0.0638	0.0607
50	0.2191	0.1825	0.1489	0.1211	0.1072	0.0935	0.0851	0.0755	0.0636	0.0609
55	0.2112	0.1759	0.1334	0.1132	0.0908	0.0911	0.0813	0.0719	0.0643	0.0591
60	0.2108	0.1626	0.1298	0.1118	0.0833	0.0915	0.0794	0.0721	0.0602	0.0579
65	0.2109	0.1542	0.1305	0.1121	0.0847	0.0914	0.0798	0.0738	0.0577	0.0581
70	0.2109	0.1557	0.1304	0.1121	0.0845	0.0914	0.0797	0.0735	0.0581	0.0581

Female	SERVICE									
Age	0	1	2	3	4	5	6	7	8	9
20	0.3080	0.2836	0.2258	0.2132	0.2030	0.2054	0.1561	0.1565	0.1590	0.1600
25	0.2828	0.2449	0.2101	0.1995	0.1739	0.1690	0.1392	0.1375	0.1206	0.1144
30	0.2617	0.2224	0.1981	0.1791	0.1369	0.1370	0.1297	0.1145	0.0989	0.0817
35	0.2464	0.2153	0.1834	0.1462	0.1294	0.1258	0.1130	0.1103	0.1016	0.0782
40	0.2281	0.2026	0.1641	0.1365	0.1316	0.1115	0.1040	0.0940	0.0847	0.0745
45	0.2227	0.1884	0.1450	0.1359	0.1072	0.1034	0.0909	0.0797	0.0717	0.0737
50	0.2238	0.1823	0.1369	0.1249	0.0901	0.0896	0.0837	0.0735	0.0686	0.0628
55	0.2236	0.1766	0.1372	0.1218	0.0848	0.0819	0.0725	0.0717	0.0696	0.0560
60	0.2236	0.1548	0.1372	0.1191	0.0811	0.0856	0.0656	0.0649	0.0436	0.0386
65	0.2236	0.1454	0.1372	0.1169	0.0813	0.0871	0.0678	0.0603	0.0281	0.0285
70	0.2236	0.1471	0.1372	0.1173	0.0813	0.0868	0.0675	0.0611	0.0308	0.0303

2. After 10 years of service, base termination rates vary by gender and by the number of years remaining until first retirement eligibility. The base table is multiplied by 75.0%. A further multiplier is applied depending on an employee's classification as shown above.

Base rates:

Years from Retirement	Male	Female
1	1.82%	2.34%
2	2.43%	3.15%
3	2.87%	3.75%
4	3.24%	4.25%
5	3.55%	4.67%
6	3.83%	5.06%
7	4.08%	5.40%
8	4.32%	5.72%
9	4.53%	6.02%
10	4.74%	6.30%
11	4.93%	6.57%
12	5.11%	6.82%
13	5.28%	7.06%
14	5.45%	7.28%
15	5.60%	7.50%

G. Percent Married – 80%. In addition to the assumed number of married participants, we add an additional 16% load to the cost of pre-retirement death benefits to reflect the possible benefits payable to dependent children.

H. Payroll Growth Rate – 2.75%. Our wage inflation assumption is 3.50% but we expect payroll to grow slower than wage inflation due to the impact of demographics over the next several decades.

I. Administrative Expenses – The expected administrative expenses are added to the plan's normal cost. For the January 1, 2020 valuation, administrative expenses are assumed to be 0.14% of payroll. The expected administrative expenses are generally based on the actual level of administrative expenses over the prior five years.

STATEMENT OF ACTUARIAL ASSUMPTIONS AND METHODS (Continued)

II. Actuarial Cost Method – Entry Age Normal

An Actuarial Cost Method is a technique by which actuaries develop contribution rates for defined benefit retirement plans. There are a number of Actuarial Cost Methods in current use which would be appropriate for use with a plan such as the SBP. Under the Entry Age Normal Method, the contribution rate is sum of (i) the normal cost rate and (ii) a rate that will amortize the unfunded actuarial liability.

The Actuarial Accrued Liability (AAL) at a valuation date is the value of benefits attributable to service prior to that date. The Normal Cost is the value at the valuation date of the expected change in AAL over the year beginning on the valuation date. In other words, the Normal Cost is the actuarial present value of the portion of the total benefit expected to be paid which is attributed to this year.

The current contribution rate is appropriate if such rate results in a reasonable amortization period for the UAAL.

III. Actuarial Value of Assets

The actuarial value of assets is equal to the market value of assets less a five-year phase in of the Excess/ (Shortfall) between expected investment return and actual income with the resulting value not being less than 80% or more than 120% of the market value of assets.

IV. Change in Assumptions and Methods Since Prior Valuation

The demographic assumptions were modified to those used by TMRS for the valuation of the City of Irving's TMRS liabilities. These included changes to the rates of salary increase, retirement, termination, and disability. Also, the rates of mortality (pre-retirement, disabled and healthy post- retirement) were modified. Please see the TMRS Experience study report for more detail and a discussion of the rationale for the selected assumptions.

The payroll growth assumption was decreased from 3.00% to 2.75%.

APPENDIX 2

SUMMARY OF PRINCIPAL PROVISIONS OF THE PLAN

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I. Eligibility for Participation – All full time regular employees of the City who are eligible to participate in TMRS are eligible to participate in the Plan as of the later of the employee's date of hire and the date the employee becomes full-time and eligible to participate in TMRS. Fire Civil Services Employees are excluded.

II. Participant Contributions – All participants make contributions of 2.5% of Annual Earnings.

III. Earnings Recognized

Annual Earnings – Total cash remuneration as included on the employee's W-2 form for the year plus any reductions in salary under a plan described in the IRS Code.

Final Average Earnings – Average earnings in the three consecutive calendar years of service producing the highest such average.

IV. Service Recognized

Service – 1/12 of a year of service for each month for which participant has been employed by the employer.

Benefit Service – 1/12 of a year of service for each month for which the participant has made a contribution to the Plan. In addition, beginning January 1, 1993, service for each month of employment prior to March 1, 1984 is included for benefit purposes.

V. Normal Retirement

Eligibility – Retirement at or after attainment of age 65 and completion of 5 years of service.

Benefit – A monthly income equal to 1/12 of 0.6% of Final Average Earnings for each year of Benefit Service.

Forms of Benefit – Normal form is an income payable for the lifetime of the retiree. Options are available on an actuarial equivalent basis.

VI. Early Retirement

Eligibility – Retirement after satisfying any of the following:

a. Attainment of age 60 and completion of 5 years of service,

b. Completion of 20 years of service at any age.

Benefit – A monthly income calculated as described above under Normal Retirement, reduced by 1/180 for each of the first 60 months and 1/360 for each month in excess of 60 by which Early Retirement Date precedes the Normal Retirement Date.

SUMMARY OF PRINCIPAL PROVISIONS OF THE PLAN (Continued)

Options – Same as for Normal Retirement.

VII. Disability

Eligibility – A participant is disabled under Section 8.01 of the Plan as defined below:

a. For the first 18 months the participant must be unable to perform the duties of his/her occupation,

b. For the next 24 months the participant must be unable to perform the duties of any occupation,

c. For the period following the first 42 months, the participant must be unable to engage in any substantial gainful employment.

Benefit – A monthly income equal to 1/12 of 70% annualized pay rate at date of disablement, reduced by disability income from:

a. TMRS,

b. Social Security (including dependent benefits),

c. Workers' compensation.

VIII. Survivor Benefits

Eligibility – Death from any cause while an employee.

Benefit

a. Dependent Children – An eligible child shall receive a monthly benefit equal to all or a portion of 1/12 of 100% of the deceased employee's retirement benefit based on pay history to date of death and service projected to Normal Retirement Date. If there is only one eligible child, the child shall receive the entire benefit. If there is more than one eligible child, then the benefit shall be divided equally among all eligible children. The benefit is payable until attainment of age 25 or earlier death (minimum benefit duration - 30 months).

b. Surviving Spouse – If a Dependent Children benefit is not payable and there is a surviving spouse, then a surviving spouse benefit will be payable. The benefit will be equal to a single sum benefit equal to the larger of 96 payments of 25% of the deceased employee's projected monthly Normal Retirement Benefit (as described above), and the total contributions made by the participant to the Plan (accumulated without interest). If the employee was eligible for retirement upon his or her death, then the surviving spouse shall have the option to elect to receive the annuity that would have been payable if the employee had retired the day before his or her death and had elected the Joint and 100% Contingent form of payment.

SUMMARY OF PRINCIPAL PROVISIONS OF THE PLAN (Continued)

IX. Termination Benefit

Eligibility – Termination of employment for reasons other than retirement, disability or death.

Benefit

a. With less than 5 years of service – Refund, in a lump-sum, of all contributions made by the participant to the Plan, without interest.

b. With 5 or more years of service – Participant may select either a refund of his/her contributions (as described above) or a monthly income payable at age 65 equal to the retirement benefit earned to date of termination. If eligible, early commencement and optional forms are available.

X. Plan Amendments

a. Effective January 1, 1993 – Benefit service includes service back to date of employment. Benefit service was previously limited to the later of March 1, 1984 and the date of employment.

b. Effective January 1, 1993 – Members receiving a benefit shall receive an increase based on the greater of 1 and 2 below:

1. Recalculation of their benefit using service back to date of employment.

2. A compound cost of living adjustment of 70% of the CPI from their date of retirement to January 1, 1993.

c. Effective January 1, 1997 – Members receiving a benefit shall receive an increase based on the greater of 1 and 2 below:

1. A compound cost of living adjustment of 70% of the CPI from the later of their date of retirement or January 1, 1993 to January 1, 1997.

2. A compound cost of living adjustment of 3.0%.

d. Effective January 1, 1998 – The gross monthly disability benefit was increased to 70% of pay. The maximum monthly benefit cap of $3,000 was eliminated.

e. Effective January 1, 1999 – Members (not disabled) and beneficiaries receiving a benefit shall receive a 20% increase.

f. Effective January 1, 1999 – The multiplier in the plan formula has been increased from 0.5% to 0.6%.

SUMMARY OF PRINCIPAL PROVISIONS OF THE PLAN (Continued)

g. Effective January 1, 1999 – The single sum value payable to the spouse of a deceased member is increased from 125% of the deceased employee's projected monthly Normal Retirement Benefit to 200% of such amount.

h. Effective January 1, 1999 – Retirees who retired prior to January 1, 1999, who elected a joint lives optional form of payment, and whose joint annuitant is still alive as of January 1, 1999 shall be treated as if they had elected a "pop-up" option.

i. Effective January 1, 2001 – If an employee who is eligible for retirement dies while in active service and a surviving spouse benefit is payable, then the surviving spouse shall have the option to elect to receive an annuity equal to the amount that would have been payable if the employee had retired the day prior to his or her date of death and had elected the Joint and 100% Contingent optional form of payment.

j. Effective January 1, 2001 – An optional form of payment has been added to permit a retiree to take an actuarially equivalent lump-sum payment.

k. Effective January 1, 2003 – Members receiving a benefit who retired on or before January 1, 2002, shall receive an increase equal to 70% of the compound cost of living adjustment of the CPI from the later of 1) the members date of retirement or 2) January 1, 1997, to January 1, 2003.

l. Effective January 1, 2006 – The service requirement for plan vesting changed from 10 years to 5 years of Credited Service. This also changes the eligibility for Early Retirement to a minimum age of 60 with 5 years of Credited Service. Similarly, the Early Retirement eligibility at 25 years of credited service at any age was changed to 20 years of credited service.

m. Effective November 2, 2006 – Revised Article 8 on Disability Retirement to require that disability must be supported by Objective Medical Evidence; clarify the requirements for approval at the each of the three levels of disability retirement benefit; establish a deadline for submitting application; and set consequences for not submitting required documentation for ongoing review within a reasonable timeline. The revision also includes the requirement that disability retirement benefit shall be discontinued for noncompliance with attending physician's prescribed medical treatment or rehabilitative treatment.