



RETIREMENT PLAN FOR EMPLOYEES OF GBRA

ACTUARIAL VALUATION

AS OF JANUARY 1, 2018

SEPTEMBER 26, 2018



Rudd and Wisdom, Inc.
CONSULTING ACTUARIES

Rudd and Wisdom, Inc.

CONSULTING ACTUARIES

Mitchell L. Bilbe, F.S.A.
Evan L. Dial, F.S.A.
Philip S. Dial, F.S.A.
Philip J. Ellis, A.S.A.
Charles V. Faerber, F.S.A., A.C.A.S.
Mark R. Fenlaw, F.S.A.
Brandon L. Fuller, F.S.A.

Shannon R. Hatfield, A.S.A.
Christopher S. Johnson, F.S.A.
Oliver B. Kiel, F.S.A.
Dustin J. Kim, A.S.A.
Edward A. Mire, F.S.A.
Rebecca B. Morris, A.S.A.
Amanda L. Murphy, F.S.A.
Michael J. Muth, F.S.A.

Khiem Ngo, F.S.A., A.C.A.S.
Elizabeth A. O'Brien, F.S.A.
Timothy B. Seifert, A.S.A.
Chelsea E. Stewart, A.S.A.
Raymond W. Tilotta
Ronald W. Tobleman, F.S.A.
David G. Wilkes, F.S.A.

September 26, 2018

GBRA Retirement and Benefit Committee
Guadalupe-Blanco River Authority
933 E. Court Street
Seguin, Texas 78155

Re: Actuarial Valuation as of January 1, 2018

Dear Committee Members:

Enclosed is the report of the Actuarial Valuation of the Retirement Plan for Employees of the Guadalupe-Blanco River Authority as of January 1, 2018. The purpose of this report is to present the actuarial condition of the plan as of January 1, 2018 and to recommend the GBRA contributions for the plan year ending December 31, 2018.

Recommended Contribution

Eight years ago, in anticipation of the closing of this plan and to accommodate discretionary supplemental contributions, we recommended a funding policy of a predetermined contribution rate of 12% of payroll. We recommend continuation of that funding policy. The sum of the plan year contributions for the closed group defined benefit (DB) plan for employees hired before January 1, 2011 and for the defined contribution (DC) plan for employees hired on or after January 1, 2011 is projected to be 12% of the annual payroll of the employees. The 12% of payroll contributions are expected to be adequate to pay the normal cost each year for both the DB plan and the DC plan and to amortize the unfunded actuarial accrued liability (UAAL) of the DB plan over an appropriate number of years.

The DB plan normal cost contribution is determined in each annual actuarial valuation as the sum of the entry age actuarial cost method normal cost for each plan participant. (The DC plan contribution will be approximately 5% of the total payroll of the employees in that plan, comparable to the DB plan normal cost as a percent of payroll.) The DB plan UAAL amortization contribution is to be a percent of the total payroll of the employees in both the DB plan and the DC plan. (There is no UAAL in the DC plan.) The period required to amortize the UAAL is

determined in each annual valuation assuming level percent of total full-time employee payroll amortization to reflect the recommended funding policy.

Among financially strong public retirement systems, contributions are made which will both pay the current normal cost and amortize the existing UAAL within 10 to 25 years. **We have determined the recommended contribution for the DB plan for the 2017 plan year to be \$1,128,049 as of December 31, 2018.** This amount is equal to the sum of the normal cost contribution and the UAAL amortization contribution. The normal cost contribution in this valuation is \$303,800 as of December 31, 2018, which is 4.71% of the projected compensation for 2018 based on the active plan participants as of January 1, 2018. The UAAL amortization contribution in this valuation is \$824,249 as of December 31, 2018. It was determined as a percent of the projected compensation for 2018 based on all full-time employees as of January 1, 2018. The percent is 7.29%, which is 12% minus the normal cost percent of 4.71%. Assuming that the UAAL amortization contribution in each future year will be 7.29% of the projected annual payroll of all employees and that the total payroll will increase at the rate of 2.75% per year, **the UAAL will be amortized in 7.6 years.**

Of the 161 full-time employees as of January 1, 2018, 88 were in the DB plan. In this valuation, the projected 2018 compensation of the 88 active plan participants is \$6,450,100, while the projected 2018 compensation of all 161 employees is \$11,306,569.

Plan Provisions

There have been no changes in plan provisions in the last year. The plan document was amended effective December 31, 2010 to close the plan to employees hired after December 31, 2010. That amendment reflected the decision by the Board of Directors in 2010 to close the DB plan and put all employees hired after January 1, 2011 in the DC plan. Plan provisions are outlined and summarized in Section 5 of this report.

Review of Actuarial Assumptions

As a part of each actuarial valuation, we review the actuarial assumptions used in the prior actuarial valuation. In 2009 the experience of the retirement rates, termination rates, and disability rates was studied for the six-year period ending January 1, 2009, and the assumed rates were revised to better anticipate future experience. The unused sick leave experience was studied in 2011, and the assumption regarding unused sick leave was changed to better reflect the actual experience. Every year we perform an overall experience analysis in reconciling the change in the UAAL. We also analyze the economic assumptions every year. As the result of our overall review and our economic assumptions analysis, we have selected actuarial assumptions that we consider to be reasonable and appropriate for the plan for the long term future. Their selection complies with the applicable actuarial standards of practice. The actuarial methods and assumptions reflected for

this actuarial valuation are the same as those used in the prior actuarial valuation, with two exceptions. The general compensation increase assumption was reduced from 3% to 2.75%, and the employee payroll growth assumption was reduced from 3% to 2.75%.

Change in UAAL Amortization Period

The period required to amortize the UAAL was determined in the actuarial valuation as of January 1, 2017 to be 8.7 years. Since one year has passed since that valuation date, a 7.7-year amortization period would be expected if all actuarial assumptions had been exactly met, no changes had occurred (other than those expected) in the active participant and pensioner data, no changes in assumptions or methods had been made, and GBRA had contributed exactly the recommended contribution. The actual experience occurring between January 1, 2017 and January 1, 2018 differed from the expected experience so that the resulting amortization period was 7.6 years, which is 0.1 of a year less than the expected 7.7-year period for the following reasons:

1. The annual rate of investment return, net of the investment-related expenses paid by the plan, on the market value of assets during plan year 2017 was 16.72%. However, the actuarial value of assets (AVA) used in the valuation and the determination of the amortization period is based on an adjusted market value. The annual rate of return on the AVA, net of investment expenses, for plan year 2017 was 5.69% compared to the assumed rate of return of 7%. This caused an **increase** in the amortization period of 0.7 of a year.
2. The aggregate employee payroll increased 7.5% instead of increasing at the assumed 3%, which caused the amortization period to **decrease** by 0.4 of a year.
3. The individual salaries in 2017 overall were somewhat less than expected compared to the 2016 salaries, which had the effect of **decreasing** the amortization period by 0.2 of a year.
4. The net result of all experience other than the investment experience, the aggregate payroll experience and the individual salary increase experience had the combined effect of **increasing** the amortization period by 0.3 of a year. This was the net result of demographic experience in 2017 (termination, retirement, mortality, and disability).
5. The net result of the 0.25% reduction in the general compensation rate and employee payroll growth rate assumptions was a **decrease** in the amortization period of 0.5 of a year.

Projected Actuarial Valuation Results

In addition to completing this actuarial valuation, we estimated the amortization periods as of the next four annual valuation dates by making projections from the January 1, 2018 actuarial valuation. A smoothing method is used to determine the actuarial value of assets (AVA) for this valuation. This method phases in over a five-year period any investment gains or losses (net actual investment return greater or less than the actuarially assumed investment return) that the plan has had. The AVA used in this current valuation is deferring recognition of various portions of the gains and losses in 2014-2017 that the plan experienced. The AVA used in this current valuation is \$30,456,456. The market value of assets is \$30,638,650. The \$182,194 difference between the market value and the AVA is the net of the deferred gains and losses that will be recognized in the next four actuarial valuations.

For the purpose of projecting the amortization period through January 1, 2022, we used six scenarios of various assumed annual rates of investment return, net of investment-related expenses to be paid by the plan assets, over the 2018-2021 projection period. For each of those six investment scenarios, we showed the projection without any supplemental contributions during the projection period. The projected amortization periods will not be the same as the actual amortization periods from completed future actuarial valuations but are the result of projected future actuarial valuation results based on the completed January 1, 2018 actuarial valuation. These projections show the expected effects over the next four years (1) of the recognition of the portions of the past investment gains and losses over the past four years that are deferred as of January 1, 2018, and (2) of investment returns over the next four years different from the 7% assumption used in this valuation.

	Scenario					
	1	2	3	4	5	6
Assumed Investment Return for Calendar Year						
2018	7%	3%	-3%	-3%	12%	9%
2019	7	3	3	12	-3	9
2020	7	3	7	7	7	7
2021	7	3	7	7	7	7
2022 and later	7	7	7	7	7	7
Amortization Period in Years as of January 1:						
2018 (actual)	7.6	7.6	7.6	7.6	7.6	7.6
2019 (projected)	7.3	7.7	8.3	8.3	6.8	7.1
2020 (projected)	6.5	7.8	9.2	8.3	6.4	5.9
2021 (projected)	5.0	7.6	9.3	7.3	5.7	4.0
2022 (projected)	3.3	7.5	9.0	6.0	4.6	1.9

Standing alone, Scenario 1 reveals that instead of decreasing by the expected one year from 7.6 years as of January 1, 2018 to 6.6 years as of January 1, 2019, the amortization period is projected to decrease to only 7.3 years due to the portion of the deferred net investment loss as of January 1, 2018 that will be recognized as of January 1, 2019 in the AVA methodology. Another observation from Scenario 1 is that without any investment gains or losses on the market value of assets in the four years 2018-2021, the amortization period is projected to decrease to 3.3 years in the 2022 actuarial valuation. That is not surprising because if we had fully recognized the \$182,194 in the deferred net gain in this 2018 actuarial valuation, the amortization period would have been 7.3 years as of January 1, 2018 instead of 7.6 years.

Variations in experience from the underlying assumptions, other than investment return, will cause the actual amortization periods to be different from the periods shown above. In addition, the future investment experience in each of the next four years could be better or worse than the assumed rates shown. However, one primary conclusion from the scenarios is that the amortization period is sensitive to investment gains and losses (returns above and below 7%), even with the AVA methodology that dampens market ups and downs.

Variability in Future Actuarial Measurement

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 current economic or demographic assumptions;
- Increases or decreases expected as part of the natural operation of the methodology used for these measurements;
- Changes in economic or demographic assumptions; and
- Changes in plan provisions.

Analysis of the potential range of such future measurements resulting from the possible sources of measurement variability is typically outside the scope of an annual actuarial valuation. However, we provided projected UAAL amortization periods for the next four annual valuations under six scenarios to give the Retirement and Benefit Committee and the GBRA Board of Directors some insight into the potential effects of investment experience in the next four years. If desired, additional analysis could be provided.

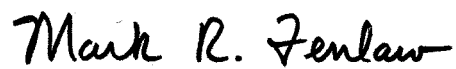
Summary

As a result of our January 1, 2018 actuarial valuation of the GBRA Retirement Plan, we recommend a contribution of \$1,128,049 for the plan year ending December 31, 2018. This recommended year end contribution is based on a funding policy which is expected to be an

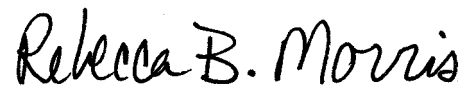
adequate contribution arrangement. The actuarial valuation of the plan reported herein has been performed in accordance with appropriate actuarial methodology, actuarial code of conduct and actuarial standards of practice, and in accordance with funding guidelines established by the Texas Pension Review Board applicable to Texas public employee retirement systems.

Respectfully submitted,

RUDD AND WISDOM, INC.



Mark R. Fenlaw, F.S.A.



Rebecca B. Morris, A.S.A.

MRF/RBM:nlg

Enclosures

cc: Mr. Randy Staats
Ms. Susan Hubbert

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Section I – GBRA Retirement Plan

Certification of Actuarial Valuation (As of January 1, 2018)

At the request of the GBRA Retirement and Benefit Committee, we have performed an actuarial valuation of the plan as of January 1, 2018. The purpose of this report is to present the actuarial condition of the plan as of January 1, 2018 and to recommend a contribution for the January 1, 2018 to December 31, 2018 plan year based on a funding policy which is expected to be an adequate contribution arrangement.

We have relied on and based our valuation on employee data, pensioner data, and asset data provided by GBRA. The financial information we received for the plan year was from the final draft of the financial report of the plan as of December 31, 2017. We have used the actuarial methods and assumptions described in Section 4 of this report. The actuarial valuation has been performed on the basis of the plan benefits described in Section 5.

To the best of our knowledge, no material biases exist with respect to any imperfections in the census data provided. We have not audited the data provided but have reviewed it for reasonableness and consistency relative to the census data received for the January 1, 2017 actuarial valuation.

All current employees eligible to participate in the plan as of the valuation date and all other individuals who either are now receiving a monthly benefit or will later receive a vested deferred monthly benefit under the plan have been included in the valuation. Further, all plan benefits have been considered in the development of plan costs.

To the best of our knowledge, the actuarial information supplied in this report is complete and accurate. In our opinion the assumptions used, both in the aggregate and individually, are reasonably related to the experience of the plan and to reasonable expectations. The assumptions represent a reasonable estimate of anticipated experience of the plan over the long-term future, and their selection complies with the applicable actuarial standards of practice.

We certify that we are members of the American Academy of Actuaries who meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinions contained herein.

Mark R. Fenlaw

Mark R. Fenlaw, F.S.A.

Rebecca B. Morris

Rebecca B. Morris, A.S.A.



Section II – Summary of Actuarial Valuations

	January 1, 2017	January 1, 2018
1. Participant Census at Valuation Date		
a. Actives	93	88
b. Disabled and Vested Terminated Participants	43	41
c. Retirees and Beneficiaries	<u>75</u>	<u>81</u>
e. Total	211	210
2. Compensation Projections for Plan year		
a. Participants (Covered Payroll)	\$ 6,621,967	\$ 6,450,100
b. Employees	\$ 10,534,288	\$ 11,306,569
3. Present Value of Future Benefits		
a. Active Participants	\$ 21,862,073	\$ 21,854,387
b. Disabled and Vested Terminated Participants	2,060,305	1,937,952
c. Retirees and Beneficiaries	<u>12,909,574</u>	<u>13,986,735</u>
d. Total	\$ 36,831,952	\$ 37,779,074
4. Present Value of Future Normal Cost	\$ 2,483,372	\$ 2,182,244
5. Actuarial Accrued Liability (Item 3d – Item 4)	\$ 34,348,580	\$ 35,596,830
6. Actuarial Value of Assets	\$ 29,165,967	\$ 30,456,456
7. Unfunded Actuarial Accrued Liability (UAAL) (Item 5 – Item 6)	\$ 5,182,613	\$ 5,140,374
8. Employer Contribution Rate as of December 31		
a. Normal Cost	5.02%	4.71%
b. UAAL Amortization	<u>6.98</u>	<u>7.29</u>
c. Total ¹	12.00%	12.00%
9. Employer Contribution Amount as of December 31		
a. Normal Cost (Item 8a x Item 2a)	\$ 332,423	\$ 303,800
b. UAAL Amortization (Item 8b x Item 2b)	<u>735,293</u>	<u>824,249</u>
c. Total	\$ 1,067,716	\$ 1,128,049
10. Years for Amortizing the UAAL with a Level Percent of Employee Compensation ²	8.7	7.6
11. Funded Ratio (Item 6 ÷ Item 5) ³	84.9%	85.6%

¹ Predetermined contribution rate, with the UAAL amortization rate equal to the 12% predetermined rate minus the calculated normal cost rate. See “Recommended Contributions” on first page of cover letter.

² Period determined based on UAAL amortization contribution rate in Item 8b, employee compensation in Item 2b, and assumed annual increase in Item 2b of 3% for the January 1, 2017 determination and of 2.75% for the January 1, 2018 determination.

³ The funded ratio is not appropriate for assessing either the need for or the amount of future contributions or the adequacy of the assumed contribution rates. Using the market value of assets instead of the actuarial value of assets for item 11 would have resulted in funded ratios of 77.5% as of January 1, 2017 and 86.1% as of January 1, 2018.

Section III – Plan Asset Information

Summary of Assets as of January 1, 2018

Investment Category	Market Value*	Allocation Percent
1. Equities		
a. Domestic large cap	\$ 9,881,118	32.2%
b. Domestic small cap	2,240,552	7.3
c. Developed international	3,379,259	11.0
d. Emerging markets	<u>1,334,143</u>	<u>4.4</u>
	16,835,072	54.9
2. Fixed Income		
a. Global	3,387,669	11.1
b. Emerging market	1,972,043	6.4
c. Domestic bank loans	1,331,429	4.3
d. Domestic core	1,009,567	3.3
e. Distressed debt	<u>732,734</u>	<u>2.4</u>
	8,433,442	27.5
3. Alternatives		
a. Hedge fund	2,703,770	8.8
b. Real estate (timberland)	882,110	2.9
c. Private real estate	<u>1,034,110</u>	<u>3.4</u>
	4,619,990	15.1
4. Cash and Cash Equivalents	<u>750,146</u>	<u>2.5</u>
5. Grand Total	\$ 30,638,650	100.0%

* The amounts by investment category (items 1-3) are from the December 31, 2017 report by the plan's investment consultant. Item 4 is the balancing item to bring the grand total to equal the amount of the assets in the final draft of the plan's financial report for the year ending December 31, 2017 (item 5).



**Statement of Changes in Assets
for the Years Ended December 31, 2017 and 2016**

	<u>12/31/2017¹</u>	<u>12/31/2016²</u>
Additions		
1. Contributions		
a. Employer	\$ 1,067,716	\$ 1,338,202
b. Employees	<u>0</u>	<u>0</u>
c. Total	\$ 1,067,716	\$ 1,338,202
2. Investment Income		
a. Interest and dividends	\$ 504,872	\$ 346,023
b. Net appreciation in fair value	<u>3,898,938</u>	<u>365,234</u>
c. Total	\$ 4,403,810	\$ 711,257
3. Other Additions	<u>0</u>	<u>0</u>
Total Additions	\$ 5,471,526	\$ 2,049,459
Deductions		
4. Benefit Payments	\$ 1,397,727	\$ 1,124,173
5. Expenses		
a. Investment-related	\$ 67,524	\$ 61,071
b. General administrative ³	<u>0</u>	<u>0</u>
c. Total	\$ 67,524	\$ 61,071
Total Deductions	\$ 1,465,251	\$ 1,185,244
Net Increase in Assets	\$ 4,006,275	\$ 864,215
Market Value of Assets (Plan Net Position)		
Beginning of Year	\$ 26,632,375	\$ 25,768,160
End of Year	\$ 30,638,650	\$ 26,632,375
Rate of Return		
Net of Investment-Related Expenses	16.72%	2.58%
Gross	17.00%	2.83%
Investment-Related Expenses (Direct)	0.28%	0.25%

¹ Preliminary

² Audited

³ GBRA pays all administrative expenses and investment consultant fees from other than plan assets.



Development of Actuarial Value of Assets

Calculation of Actuarial Investment Gain/(Loss) Based on Market Value for Plan Years				
	2017	2016	2015	2014
1. Market Value of Assets as of Beginning of Year	\$ 26,632,375	\$ 25,768,160	\$ 25,316,487	\$ 23,844,157
2. Employer Contributions	1,067,716	1,338,202	1,733,464	1,684,302
3. Benefit Payments	(1,397,727)	(1,124,173)	(841,560)	(698,521)
4. Expected Investment Return ¹	<u>1,815,346</u>	<u>1,764,425</u>	<u>1,826,085</u>	<u>1,783,992</u>
5. Expected Market Value of Assets as of End of Year	\$ 28,117,710	\$ 27,746,614	\$ 28,034,476	\$ 26,613,930
6. Actual Market Value of Assets as of End of Year	<u>30,638,650</u>	<u>26,632,375</u>	<u>25,768,160</u>	<u>25,316,487</u>
7. Actuarial Investment Gain/(Loss)	\$ 2,520,940	\$ (1,114,239)	\$ (2,266,316)	\$ (1,297,443)
8. Market Value Rate of Return Net of Expenses	16.72%	2.58%	(1.75)%	2.05%
9. Rate of Actuarial Investment Gain/(Loss)	9.72%	(4.42)%	(9.00)%	(5.45)%

¹ Assuming (1) uniform distribution of payments during the plan year, (2) recommended contributions at the end of the plan year, (3) 7% expected rate of return for 2017 and 2016, 7.25% for 2015, and 7.5% for 2014 and (4) supplemental contributions of \$700,000 on July 31, 2014, \$700,000 on July 31, 2015, and \$300,000 on December 31, 2016.

Deferred Actuarial Investment Gains/(Losses) to be Recognized in Future Years			
Plan Year	Investment Gain/(Loss)	Deferral Percentage	Deferred Gain/(Loss) Amount as of 12/31/2017
2017	\$ 2,520,940	80%	\$ 2,016,752
2016	(1,114,239)	60%	(668,543)
2015	(2,266,316)	40%	(906,526)
2014	(1,297,443)	20%	<u>(259,489)</u>
Total			\$ 182,194

Actuarial Value of Assets as of December 31, 2017	
10. Market Value of Assets as of December 31, 2017	\$ 30,638,650
11. Deferred Gain/(Loss) to be Recognized in Future	<u>182,194</u>
12. Actuarial Value of Assets as of December 31, 2017 (Item 10 – Item 11)	\$ 30,456,456
13. Write Up/(down) of Assets (Item 12 – Item 10)	\$ (182,194)

Section IV – Actuarial Methods and Assumptions

1. Actuarial Cost Method

The entry age actuarial cost method is used in determining the contribution requirements for the plan. The actuarial cost method is the procedure by which the actuary annually identifies a series of annual contributions which, along with current assets and future investment earnings, will fund the expected plan benefits. The entry age cost method compares the excess of the present value of expected future plan benefits over the current value of plan assets. This difference represents the expected present value of current and future contributions that will be paid into the plan. The contributions are divided into two components: an annual normal cost (or current cost) and an amortization charge for the unfunded actuarial accrued liability.

The plan's normal cost is the current contribution in a series of annual contributions determined as a level percent of projected active total participant compensation. The normal cost is the portion of the cost which is allocated to a plan year by the entry age actuarial cost method. The normal cost is determined as a level percent of compensation for each active participant as the actuarial present value at hire of projected benefits divided by the actuarial present value at hire of anticipated future compensation. These individual normal cost contribution rates are the level percent of compensation which, if contributed throughout a participant's credited service employment, would fund his projected benefits.

The plan's current actuarial accrued liability is the excess of the present value of expected future benefits over the present value of all future remaining normal cost contributions. The unfunded actuarial accrued liability (UAAL) is the amount by which the actuarial accrued liability exceeds the current actuarial value of plan assets. The UAAL is recalculated each time a valuation is performed. Experience gains and losses, which represent deviations of the UAAL from its expected value based on the prior valuation, are determined at each valuation and are amortized as part of the newly calculated UAAL.

2. Amortization Method

The UAAL is amortized by contributions that are assumed to be a level percent of projected employee compensation, with the compensation assumed to increase each year. The assumed level percent of projected employee compensation (for all employees) is 12% minus the normal cost contribution rate (for the closed group of participants in the plan). This amortization method is unusual for a plan that is closed to new hires, but it was recommended by Rudd and Wisdom, Inc. when the plan was closed and is an integral part of the funding policy that has been recommended and followed each year since then.

3. Actuarial Value of Assets

All assets are valued at market value as determined by the plan trustee, with an adjustment made to uniformly spread actuarial gains or losses (as measured by actual market value investment return vs. assumed market value investment return) over a five-year period.

4. Actuarial Assumptions

We review the actuarial assumptions as a part of each actuarial valuation. Periodically we perform a detailed study or review or analysis of specific assumptions. The year of the most recent detailed study or review or analysis relied on for our overall review this year is indicated parenthetically after each assumption name.

- a. Investment Return (2018): Current and future plan assets are assumed to reflect an annual investment return of 7.0% net of investment-related expenses paid by the plan. Administrative expenses are paid directly by the employer.
- b. Compensation Increase Rates (2018): The levels of participant compensation are assumed to increase at annual rates consisting of general increases of 2.75% per year (the same as the inflation assumption that is a component of the investment return assumption) plus components for merit and promotion that are greatest in the early years of employment. The total compensation increase rates are illustrated in the sample rates shown below:

Years of Service	Entry Age Group								
	20	25	30	35	40	45	50	55	60
0	7.75%	7.25%	6.75%	6.25%	5.75%	5.25%	4.75%	4.25%	3.75%
5	5.25	5.25	4.75	4.75	4.75	4.25	3.75	3.25	2.75
10	4.75	4.75	4.25	4.25	4.25	3.75	3.25	2.75	
15	4.25	4.25	3.75	3.75	3.75	3.25	2.75		
20	3.75	3.75	3.25	3.25	3.25	2.75			
25	3.25	3.25	2.75	2.75	2.75				
30	2.75	2.75	2.75						

- c. Retirement Rates (2009): Active participants eligible for early, normal or late retirement with the present benefits and retirement eligibility provisions are assumed to retire in accordance with annual rates per 1,000 participants as illustrated below:

Attained Age	Entry Age Group								
	20	25	30	35	40	45	50	55	60
55-59	0	0	0	0	0	0	0	0	0
60	250	250	250	100	60	40	0	0	0
61	150	150	150	100	80	40	0	0	0
62	150	150	150	250	100	40	0	0	0
63	150	150	150	150	250	40	0	0	0
64	150	150	150	150	150	40	0	0	0
65-69	500	500	500	500	500	500	500	500	500
70	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000

- d. Termination (2009): The active participants are assumed to terminate their employment for causes other than death, disability or retirement in accordance with annual rates per 1,000 participants as illustrated in the sample rates shown below:

Years of Service	Entry Age Group								
	20	25	30	35	40	45	50	55	60
0	300	225	150	150	150	100	75	75	50
5	175	125	100	100	75	75	75	50	0
10	50	50	25	20	20	20	20	0	0
15	30	20	10	0	0	0	0		
20	20	10	0	0					
25	10	0	0						
30	0	0							

- e. Mortality (2014): The active and retired participants of the plan are assumed to exhibit mortality in accordance with the following published mortality tables:

- i. Pre-retirement Mortality: RP-2000 Combined Healthy Mortality Table projected to 2024 for males and females (sex distinct)
- ii. Post-retirement Mortality: RP-2000 Combined Healthy Mortality Table projected to 2024 for males and females (sex distinct)

- f. Disability (2009): Active participants are expected to become disabled as defined under the plan in accordance with annual rates as illustrated in the sample rates shown below:

Attained Age	Disabilities per 1,000 Participants
20	0.14
30	0.31
40	0.92
45	2.09
50	3.79
55	4.90
60	9.11

- g. Recognition of IRC Section 415 Limitations (2018): The benefit limitations under IRC Section 415(b) are assumed to increase at 2.75% per year.
- h. Additional Credited Service Due to Unused Sick Leave (2011): Retirement benefits for future retirees and vested terminated participants are assumed to be increased by 2% as a result of unused sick leave conversion to credited service at the time of retirement or termination of employment. Vested participants who die or become disabled are assumed to have no unused sick leave when they die or become disabled.

- i. Employee Payroll Growth (2018): The UAAL is assumed to be amortized with contributions by GBRA that are a level percent of employee payroll (12% minus normal cost contribution rate) based on an assumed payroll growth of 2.75% per year.

5. Changes in Actuarial Methods and Assumptions

- a. Even though the investment return assumption was not changed, the inflation component was reduced from 3% to 2.75%, and the real rate of return net of investment-related expenses was increased from 4% to 4.25%. Lower investment fees from switching to passive managers for two of the asset classes resulted in an increase in the weighted average net real rate of return, which allowed a 0.25% reduction in the inflation assumption.
- b. The general compensation increases component of the annual compensation increase rates was reduced from 3% to 2.75%. So each of the assumed annual compensation increase rates, summarized in item 4(b), are 0.25% lower for this actuarial valuation compared to the prior actuarial valuation.
- c. The employee payroll growth rate assumption was reduced from 3% per year to 2.75% per year.

Section V - Outline of Principal Plan Eligibility and Benefit Provisions Reflected in the Actuarial Valuation as of January 1, 2018

1. Identifying Data
 - a. Plan name: Retirement Plan for Employees of Guadalupe-Blanco River Authority
 - b. Type of plan: Defined benefit
 - c. Plan sponsor: Guadalupe-Blanco River Authority
 - d. Plan Year: January 1 – December 31

2. Participation
 - a. Minimum Age: none
 - b. Maximum Age at Hire: none
 - c. Service: 1 year in which 1,000 or more hours are completed
 - d. Employee Classification: All except a Leased Employee or an independent contractor
 - e. Hire Date: first employed by the plan sponsor before January 1, 2011

3. Contributions
 - a. Participant: none required
 - b. Employer: all amounts necessary to adequately finance plan benefits

4. Eligibility for Retirement
 - a. Normal Retirement: age 65
 - b. Early Retirement: age 55 plus 15 years of vesting service

5. Retirement Benefit Monthly Amounts
 - a. Normal Retirement: 1.30% of average monthly compensation per year of credited service
 - b. Late Retirement: same as Normal Retirement increased by 5/9% for every month late retirement follows normal retirement
 - c. Early Retirement:
 - 1) With Satisfaction of Rule of 85 (age and Accrual Service equal to eighty-five (85) or more years and age of sixty (60) or more years): amount equal to monthly normal retirement benefit accrued at early retirement date
 - 2) Without Satisfaction of Rule of 85: amount equal to monthly normal retirement benefit accrued at early retirement date reduced by 5/12% for every month early retirement precedes normal retirement
 - d. Disability: amount payable at normal retirement age assuming continuation of service from date of disability to normal retirement age, but based on average monthly compensation at the date of disability

6. Normal Form of Monthly Payment

10 years certain and life; other actuarially equivalent monthly payment forms are available

7. Vested Termination Benefits

- a. Benefit: entitlement to vested percentage of accrued normal retirement benefit
- b. Vesting Schedule:

Years of Credited Service	Vesting Percent
less than 5	0%
5 or more	100

A participant is 100% vested upon attainment of the participant's normal retirement date while employed by the Employer.

- c. Accrued Normal Retirement Benefit: a monthly benefit payable in the normal form of payment beginning at normal retirement age. The amount of the accrued benefit is determined when a participant terminates employment and is calculated using the normal retirement benefit formula but using only years of credited service and compensation credited at date of termination.

8. Pre-retirement Death Benefits

- a. Payment of benefit which is actuarially equivalent to the present value of the participant's vested accrued benefit
- b. Accrued Benefit: a monthly benefit payable in the normal form of payment beginning at normal retirement age. The amount of the benefit is calculated using the normal retirement benefit formula but using only years of credited service and compensation credited at the date of death. If death occurs after normal retirement age, the late retirement benefit formula is used.

9. Basis of Actuarial Equivalence

8% and UP84 Mortality Table set back one year

10. Average Monthly Compensation

Gross compensation averaged over the three consecutive complete calendar years of highest total compensation over the last ten completed calendar years of employment. Except that the year in which a member terminates shall be considered a complete calendar year of employment, and the compensation for such calendar year shall be deemed equal to the annualized rate of compensation which he actually received for such calendar year, excluding any amount paid for unused vacation or for unused sick leave or for any reason related to termination of employment, and with the portion of such calendar year following such member's termination of employment being included in determining the number of months for which such compensation was received.



11. Unused Sick Leave

Accumulated unused sick leave for members who terminate employment with a vested benefit is added to credited service at the rate of 173-1/3 hours equals 1 month of credited service.

Section VI - Summary of Participant Data

Participant Data Reconciliation

	Active Participants	Current Payment Status	Deferred Payment Status	Total
1. As of January 1, 2017	93	75	43	211
2. Change of status				
a. normal retirement	0	2	(2)	0
b. late retirement	(3)	3	0	0
c. early retirement	(1)	2	(1)	0
d. disability	0	0	0	0
e. death	0	(3)	0	(3)
f. nonvested termination	0	0	0	0
f. vested termination	(1)	0	1	0
h. completion of payment	0	0	0	0
i. alternate payee	0	1	0	1
j. start of survivor benefit	<u>0</u>	<u>1</u>	<u>0</u>	<u>1</u>
k. net changes	(5)	6	(2)	(1)
3. New participants (rehire)	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
4. As of January 1, 2018	88	81	41	210



**Distribution of Active Participants
by Age and Service as of January 1, 2018**

Age	Years of Service									Total	Percent	
	0-4	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40+			
Under 25	0	0	0	0	0	0	0	0	0	0	0	0%
25-29	0	0	0	0	0	0	0	0	0	0	0	0
30-34	0	1	3	0	0	0	0	0	0	0	4	5
35-39	0	2	1	1	0	0	0	0	0	0	4	5
40-44	0	1	4	5	1	0	0	0	0	0	11	12
45-49	0	1	2	4	1	1	0	0	0	0	9	10
50-54	1	1	3	0	1	4	3	1	0	0	14	16
55-59	0	1	4	4	1	1	3	3	2	2	19	22
60-64	0	0	1	0	1	2	3	6	5	5	18	20
Over 65	0	0	2	2	0	0	2	1	2	2	9	10
Total	1	7	20	16	5	8	11	11	9	9	88	100%
Percent	1%	8%	23%	19%	6%	9%	12%	12%	10%	10%	100%	

Average age = 53.2 years
Average service = 23.0 years

Section VII - Definitions

1. Actuarial Accrued Liability That portion, as determined by the particular actuarial cost method used, of the Actuarial Present Value of future pension plan benefits as of the Valuation Date that is not provided for by the Actuarial Present Value of future Normal Costs.

2. Actuarial Assumptions Assumptions as to the occurrence of future events affecting pension costs, such as: mortality, termination, disablement and retirement; changes in compensation; rates of investment earnings and asset appreciation; and other relevant items.

3. Actuarially Equivalent Of equal Actuarial Present Value, determined as of a given date, with each value based on the same set of Actuarial Assumptions.

4. Actuarial Gain (Loss) A measure of the difference between actual experience and that expected based on the Actuarial Assumptions during the period between two Actuarial Valuation dates, as determined in accordance with the particular actuarial cost method used.

5. Actuarial Present Value The value of an amount or series of amounts payable or receivable at various times, determined as of a given date (the Valuation Date) by the application of the Actuarial Assumptions.

6. 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 pension plan.

7. Actuarial Value of Assets The value of cash, investments and other property belonging to a pension plan, as determined by a method and used by the actuary for the purpose of an Actuarial Valuation.

8. Entry Age Actuarial Cost Method An actuarial cost method under which the Actuarial Present Value of the Projected Benefits of each individual included in the Actuarial Valuation is allocated as a level percentage of the earnings of the individual between entry age and assumed termination. The portion of this Actuarial Present Value allocated to a valuation year is called the Normal Cost. The portion of this Actuarial Present Value not provided for

