

---

## Government of Guam Retirement Fund

Actuarial Valuation as of September 30, 2019

Prepared by:

**Richard A. Wright**  
FSA, MAAA

**Milliman, Inc.**  
650 California Street  
21<sup>st</sup> Floor  
San Francisco, CA 94108  
USA

Tel +1 415 403 1333  
Fax +1 415 403 1334

milliman.com

May 18, 2020

---



650 California Street  
21st Floor  
San Francisco, CA 94108-2702  
USA

Tel +1 415 403 1333  
Fax +1 415 403 1334

milliman.com

May 18, 2020

Government of Guam Retirement Fund  
424 Route 8  
Maite, Guam 96910

**Government of Guam Retirement Fund –  
Actuarial Valuation as of September 30, 2019**

As part of our engagement with the Board of Trustees, we performed an actuarial valuation of the Government of Guam Retirement Fund as of September 30, 2019. The purpose of this valuation is to determine the required contribution under the provisions of GCA Section 8137.

In preparing this report, we relied, without audit, on information (some oral and some in writing) supplied by the Fund's staff. This information includes, but is not limited to, financial information, member census data, and plan provisions. We found this information to be reasonably consistent and comparable with information used for other purposes. The valuation results depend on the integrity of this information. If any of this information is inaccurate or incomplete the results may be different and the calculations may need to be revised.

All costs, liabilities, rates of interest, and other factors for the Fund have been determined on the basis of actuarial assumptions and methods which are individually reasonable (taking into account the experience of the Plan and reasonable expectations); and which, in combination, offer our best estimate of anticipated experience affecting the Fund. The assumptions have been adopted by the Board of Trustees and are based on the 2011-2015 actuarial experience study.

This valuation report is only an estimate of the Fund's financial condition as of a single date. It can neither predict the Fund's future condition nor guarantee future financial soundness. Actuarial valuations do not affect the ultimate cost of Fund benefits, only the timing of Fund contributions. While the valuation is based on an array of individually reasonable assumptions, other assumption sets may also be reasonable and valuation results based on those assumptions would be different. No one set of assumptions is uniquely correct. Determining results using alternative assumptions is outside the scope of our engagement.

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; 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 Fund's funded status); and changes in plan provisions or applicable law. Due to the limited scope of our assignment, we did not perform an analysis of the potential range of future measurements. The Board of Trustees has the final decision regarding the appropriateness of the assumptions and actuarial cost methods.

Actuarial computations presented in this report are for the purposes of determining the recommended funding amounts for the Fund. The calculations in this report have been made on a basis consistent with our understanding of the Fund's funding requirements and goals. Determinations for other purposes may be significantly different from the results contained in this report. Accordingly, additional determinations may be needed for other purposes.

Milliman's work is prepared solely for the use and benefit of the Government of Guam Retirement Fund. To the extent that Milliman's work is not subject to disclosure under applicable public records laws, Milliman's work may not be provided to third parties without Milliman's prior written consent. Milliman does not intend to benefit or create a legal duty to any third party recipient of its work product. Milliman's consent to release its work product to any third party may be conditioned on the third party signing a Release, subject to the following exception(s):

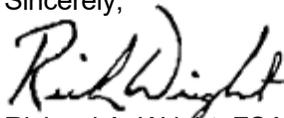
- (a) GGRF may provide a copy of Milliman's work, in its entirety, to its professional service advisors who are subject to a duty of confidentiality and who agree to not use Milliman's work for any purpose other than to benefit GGRF.
- (b) GGRF may provide a copy of Milliman's work, in its entirety, to other governmental entities, as required by law.

No third party recipient of Milliman's work product should rely upon Milliman's work product. Such recipients should engage qualified professionals for advice appropriate to their own specific needs. The consultants who worked on this assignment are pension actuaries. Milliman's advice is not intended to be a substitute for qualified legal or accounting counsel.

The signing actuary is independent of the plan sponsor. We are not aware of any relationship that would impair the objectivity of our work.

On the basis of the foregoing, we hereby certify that, to the best of our knowledge and belief, this report is complete and accurate and has been prepared in accordance with generally recognized and accepted actuarial principles and practices. The undersigned is a member of the American Academy of Actuaries and meets the Qualification Standards of the American Academy of Actuaries to render the actuarial opinion contained herein.

Sincerely,

A handwritten signature in black ink that reads "Richard A. Wright".

Richard A. Wright, FSA, MAAA  
Principal and Consulting Actuary

RAW:jh  
gua2019v\_e (draft)\_v2.doc

**TABLE OF CONTENTS**

Section	Page
<b>I VALUATION SUMMARY</b>	
Introduction .....	1
Highlights .....	1
Results of Valuation .....	3
5-Year Historical Summary .....	4
Actuarial Assumptions .....	5
Funding Method .....	7
<b>II FUND ASSETS</b>	
Exhibit 1. Summary of DB Plan Assets .....	8
Exhibit 2. DB Plan Asset Allocation .....	9
Exhibit 3. Changes in DB Plan Assets .....	10
Exhibit 4. Actuarial Value of Assets .....	11
Exhibit 5. Historical Returns on DB Plan Assets .....	12
<b>III MEMBERSHIP DATA</b>	
Exhibit 6. Active Employees .....	13-14
Exhibit 7. Active Employees by Agency .....	15
Exhibit 8. Retired Employees .....	16-17
Exhibit 9. Terminated and Inactive Members .....	18
Exhibit 10. Reconciliation of Membership Data .....	19-20
<b>IV VALUATION EXHIBITS</b>	
Exhibit 11. Actuarial Accrued Liability .....	21-22
Exhibit 12. Calculation of Unfunded Actuarial Accrued Liability .....	23
Exhibit 13. Calculation of Actuarial Gain/Loss .....	24
Exhibit 14. Normal Cost .....	25
Exhibit 15. Amortization of Unfunded Actuarial Accrued Liability .....	26
Exhibit 16. Actuarially Determined Contribution .....	27
Exhibit 17. Projection of Contribution Rate .....	28-29
Exhibit 18. Projection of Security Ratio .....	30-31
<b>V APPENDICES</b>	
Appendix A. Summary of Pension Plan .....	32-36
Appendix B. Actuarial Cost Method and Assumptions .....	37-39
Appendix C. Summary of Participant Data .....	40-47
Appendix D. Risk Disclosure .....	48-50
Appendix E. Glossary of Key Terms .....	51

*This work product was prepared solely for the Government of Guam Retirement Fund for the purposes described herein and may not be appropriate to use for other purposes. Milliman does not intend to benefit and assumes no duty or liability to other parties who receive this work. Milliman recommends that third parties be aided by their own actuary or other qualified professional when reviewing this Milliman work product.*

## INTRODUCTION

Milliman, Inc. has been retained by the Government of Guam Retirement Fund to provide an actuarial valuation of the retirement fund. In our valuation we:

- Summarize the membership data.
- Calculate the actuarial accrued liability and normal cost.
- Determine the contribution requirements.
- Project the fund balance and security ratio forward 40 years.

The results contained in this report represent our best estimates. However, it is likely that actual experience will vary from these estimates. To the extent that actual experience differs from the anticipated experience, actual plan costs will vary as well.

## HIGHLIGHTS

- The required contribution under GCA Section 8137 is **26.97%** of payroll. Of this amount, 21.44% is for the unfunded actuarial accrued liability of the defined benefit plans (Old DB Plan and DB 1.75 Plan), 2.18% is for the normal cost of the DB plans, and 3.35% is for contributions and expenses for the defined contribution (DC) plan.

The primary reason for the increase in the contribution rate was a decrease in total payroll of 0.94% for the 2018-19 fiscal year instead of an increase of 1.75% which was the expected increase for the 2018-19 fiscal year.

Contribution rate from 9/30/18 actuarial valuation	26.28%
2016-17 investment gain (final 1/3 <sup>rd</sup> recognition) *	(0.50%)
2017-18 investment loss (second 1/3 <sup>rd</sup> recognition) *	0.15%
2018-19 investment loss (first 1/3 <sup>rd</sup> recognition) *	0.51%
Actual payroll increase for 2018-19 of -0.94% vs. assumption of 1.75%	0.55%
Other factors, including demographic changes	<u>(0.02%)</u>
Contribution rate in 9/30/19 actuarial valuation	26.97%

\* Investment returns that differ from the actuarial assumption of 7% are recognized over a 3 year period.

- Public Law 28-150 provided that the current employer contribution rate would increase over a 5-year period starting in the 2006-07 fiscal year until it reached the actuarial contribution rate, which is the rate specified in the Fund's actuarial valuation report. The employer contribution rate for the 2019-20 fiscal year is 26.28%.
- The defined benefit (Old DB) payroll for the 2018-19 fiscal year was \$111.2 million compared with \$122.2 million for the 2017-18 fiscal year. The defined benefit (DB 1.75) payroll for the 2018-19 fiscal year was \$162.3 million compared with \$127.2 million for the 9 months of the 2017-18 fiscal year (starting January 1, 2018) that the DB 1.75 Plan was effective.

- The total defined benefit and defined contribution payroll for the 2018-19 fiscal year, was \$509.1 million compared with \$513.9 million for the 2017-18 fiscal year, a decrease of 0.94%. The prior valuation assumed a 1.75% increase for the 2018-19 fiscal year, followed by 2.75% increases thereafter. If total payroll for the 2018-19 fiscal year had increased by 1.75%, the required contribution rate would have been 26.42%.
- Based on the audited financial statements, we calculated an investment return on the total market value of assets of 2.9% for the fiscal year ending September 30, 2019. The average annual return on the market value of assets for the last 5 fiscal years has been 6.0%. The investment return on the actuarial value of assets, which recognizes investment gains and losses over a 3 year period, was 6.6% for the fiscal year ending September 30, 2019.
- The unfunded actuarial accrued liability decreased from \$1.176 billion as of September 30, 2018, to \$1.155 billion as of September 30, 2019. The payment required to amortize the unfunded actuarial accrued liability under GCA Section 8137 has increased from \$108.2 million to \$112.1 million. The payment as a percentage of payroll has increased from 20.70% to 21.44%.

**RESULTS OF VALUATION**

	9/30/2019		9/30/2018	
<b>Participant Counts</b>				
Active Old DB	1,460		1,697	
Non-Uniformed				
Uniformed	<u>176</u>		<u>173</u>	
Total	1,636		1,870	
Active DB 1.75 Participants	3,214		3,318	
Active DC Participants	<u>6,286</u>		<u>5,921</u>	
Total Active Participants (Old DB, DB 1.75, DC)	11,136		11,109	
Retired (Old DB)	7,291		7,247	
Retired (DB 1.75)	69		26	
Inactive/Terminated (Old DB, DB 1.75)				
Assumed to withdraw contributions	3,047		3,041	
Not assumed to withdraw contributions	115		129	
Total DB Participants (Old DB and DB 1.75)	15,372		15,631	
	<b>(\$millions)</b>		<b>(\$millions)</b>	
<b>Actual Payroll for Prior Fiscal Year</b>				
Defined benefit (Old DB) payroll	\$111.2		\$122.2	
Defined benefit (DB 1.75) payroll	162.3		127.2	
Defined contribution (DC) payroll	<u>235.5</u>		<u>264.5</u>	
Total payroll (DB and DC)	\$509.1		\$513.9	
<b>Expected Payroll for Next Fiscal Year</b>				
Defined benefit (Old DB) payroll	\$101.8		\$116.3	
Defined benefit (DB 1.75) payroll	170.2		171.7	
Defined contribution (DC) payroll	<u>251.1</u>		<u>234.9</u>	
Total payroll (DB and DC)	\$523.1		\$522.9	
<b>Financial Status</b>				
Actuarial accrued liability	\$3,221.3		\$3,197.1	
Actuarial value of assets	<u>2,066.0</u>		<u>2,021.9</u>	
Unfunded actuarial accrued liability (UAAL)	\$1,155.4		\$1,175.2	
Security ratio	64.13%		63.24%	
	<b>% of DB Payroll</b>		<b>% of DB Payroll</b>	
<b>Normal Cost</b>				
Total normal cost <sup>1</sup>	\$ 37.3	13.70%	\$ 39.9	13.86%
Estimated employee contributions	<u>(25.9)</u>	<u>(9.52%)</u>	<u>(27.4)</u>	<u>(9.52%)</u>
Government normal cost	\$ 11.4	4.19%	\$ 12.5	4.34%
	<b>% of Total Payroll</b>		<b>% of Total Payroll</b>	
<b>Required Contribution per GCA §8137</b>				
Unfunded actuarial accrued liability cost	\$ 112.1	21.44%	\$ 108.2	20.70%
Government DB normal cost	11.4	2.18%	12.5	2.39%
Expected government DC contributions <sup>1</sup>	<u>17.5</u>	<u>3.35%</u>	<u>16.7</u>	<u>3.19%</u>
Total DB and DC contribution	\$ 141.1	<b>26.97%</b>	\$ 137.4	<b>26.28%</b>

<sup>1</sup> Includes budgeted administrative expenses.

This work product was prepared solely for the Government of Guam Retirement Fund for the purposes described herein and may not be appropriate to use for other purposes. Milliman does not intend to benefit and assumes no duty or liability to other parties who receive this work. Milliman recommends that third parties be aided by their own actuary or other qualified professional when reviewing this Milliman work product.

**5-YEAR HISTORICAL SUMMARY**

The following table summarizes the principal valuation results over the last 5 years.

	9/30/2019	9/30/2018	9/30/2017	9/30/2016	9/30/2015
<b>Participant Counts</b>					
Active (Old DB)	1,636	1,870	2,058	2,208	2,460
Active (DB 1.75)	3,214	3,318	3,353	n/a	n/a
Retired (Old DB)	7,291	7,247	7,279	7,298	7,197
Retired (DB 1.75)	69	26	n/a	n/a	n/a
Inactives (Old DB)	3,139	3,162	4,289	4,463	4,701
Inactives (DB 1.75)	<u>23</u>	<u>8</u>	<u>n/a</u>	<u>n/a</u>	<u>n/a</u>
Total (DB)	15,372	15,631	16,979	13,969	14,358
Active (DC)	6,286	5,921	5,674	8,858	8,697
<b>Actual Payroll (\$millions)</b>					
DB payroll (Old DB)	\$111.2	\$122.2	\$131.5	\$141.3	\$155.5
DB payroll (DB 1.75)	162.3	127.2	n/a	n/a	n/a
DC payroll	<u>235.5</u>	<u>264.5</u>	<u>376.8</u>	<u>365.1</u>	<u>355.9</u>
Total payroll	\$509.1	\$513.9	\$508.3	\$506.3	\$511.4
<b>Financial Status (\$millions)</b>					
Accrued liability	\$3,221.3	\$3,197.1	\$3,183.2	\$2,904.9	\$2,927.7
Actuarial assets	<u>2,066.0</u>	<u>2,021.9</u>	<u>1,916.4</u>	<u>1,655.6</u>	<u>1,629.4</u>
UAAL	\$1,155.4	\$1,175.2	\$1,266.8	\$1,249.3	\$1,298.3
Security ratio	64.13%	63.24%	60.20%	56.99%	55.66%
<b>Contribution Rate</b>					
DB Normal Cost (as % of DB payroll)	4.19%	4.34%	4.02%	6.42%	6.71%
<b>% of Total Payroll</b>					
UAAL Rate	21.44%	20.70%	21.29%	22.12%	21.60%
DB Normal Cost	2.18%	2.39%	2.29%	1.60%	1.87%
DC Contribution	<u>3.35%</u>	<u>3.19%</u>	<u>2.98%</u>	<u>4.11%</u>	<u>3.94%</u>
Actuarial Rate <sup>1</sup>	26.97%	26.28%	26.56%	27.83 %	27.41%
Budget Rate <sup>2</sup>	**	26.28%	26.56%	27.83 %	27.41%
<b>Investment Yield</b> (Market Value)	2.9%	5.7%	12.0%	9.5%	0.6%

<sup>1</sup> "Actuarial Rate" is the contribution rate determined in the actuarial valuation. Contribution rates apply to the fiscal year beginning one year after the valuation date.

<sup>2</sup> "Budget Rate" is the contribution rate set by the legislature. The budget rate for 2019-20 has not yet been determined.

This work product was prepared solely for the Government of Guam Retirement Fund for the purposes described herein and may not be appropriate to use for other purposes. Milliman does not intend to benefit and assumes no duty or liability to other parties who receive this work. Milliman recommends that third parties be aided by their own actuary or other qualified professional when reviewing this Milliman work product.

## ACTUARIAL ASSUMPTIONS

The following are the major assumptions used in the actuarial valuation. The assumptions are based upon the actuarial experience study for the period October 1, 2011, through September 30, 2015. The rationale for each significant assumption is provided in that experience study and in the discussion below. To the extent that actual experience differs from the assumptions below, future pension costs will differ. The next experience study is scheduled to be performed prior to next year's valuation and will be for the period October 1, 2015 to September 30, 2019. That experience study may recommend changes to some assumptions based upon the Fund's recent experience and economic outlook.

**Interest Rate:** The interest rate used to discount future benefit payments to the present was 7.0% as of September 30, 2019. This assumption is unchanged from the prior valuation. Milliman's expected returns on various asset classes over the next 50 years are shown below, assuming inflation averages 2.50% over the next 50 years. The target asset allocation is the expected long-term asset allocation and is based on the Fund's investment policy.

Asset Class	(a) Target Asset Allocation	(b) Expected Nominal Return	(a) x (b) Component Return
U.S. Equities (large cap)	26%	6.81%	1.77%
U.S. Equities (small cap)	4%	8.12%	0.32%
Non-U.S. Equities	17%	8.33%	1.42%
Non-U.S. Equities (emerging markets)	3%	10.28%	0.31%
U.S. Fixed Income (aggregate)	24%	3.87%	0.93%
Risk Parity	8%	5.56%	0.45%
High Yield Bonds	8%	5.45%	0.44%
Global Real Estate (REITs)	5%	8.01%	0.40%
Global Equity	5%	7.44%	<u>0.37%</u>
Expected average return for one year			6.40%
Expected geometric mean (50 years)			5.85%

The discount rate assumption of 7.0% is higher than the expected arithmetic and geometric returns over 50 years. Note that if investments fail to achieve the assumed interest rate, future pension costs will increase. The 7.0% was based on our experience study from October 1, 2011, through September 30, 2015. Based on the current economic outlook, we may recommend a decrease to the interest rate assumption in the next actuarial valuation.

**Mortality.** The mortality table used as of September 30, 2019, is the RP-2000 combined mortality table, set forward by 3 years for males and 2 years for females. The mortality table used for disabled lives is the RP-2000 disability mortality table, set forward by 6 years for males and 4 years for females. Mortality improvement is assumed to be 30% of Scale BB, projected generationally from 2016. This is the same table used for the prior actuarial valuation.

**Salary Increases.** Salaries are assumed to increase 7.5% per year for employees in their first 5 years of service, 6.0% for service between 6 and 10 years, 5.0% for service between 11 and 15 years, and 4.0% for service after 15 years. These are the same rates used in the prior actuarial valuation.

*Total Payroll Growth.* The total payroll for defined benefit and defined contribution members is assumed to increase 2.75% per year.

*Retirement Age.* We have assumed 50% of employees will retire when first eligible for unreduced retirement. Thereafter, 20% of employees will retire at each year until age 75, at which time all remaining employees are assumed to retire. This is the same assumption used in the prior actuarial valuation.

*Return of Contributions.* We have assumed that any current Old DB Plan employees who terminate employment prior to retirement and who have less than 20 years of service will elect a return of contributions in lieu of a deferred benefit. Old DB Plan employees with at least 20 years of service who terminate employment are assumed to retire upon eligibility for unreduced benefits. Old DB Plan employees with between 20 and 24 years of service who terminate employment and are ineligible for the service retirement benefit and DB 1.75 Plan employees who terminate employment with less than 25 years of service are assumed to retire at age 60 with an unreduced benefit with no survivor benefits.

Current terminated or inactive members with at least 5 years of service and a contributions balance that exceeds \$10,000 who have not withdrawn their contributions and for whom sufficient earnings data are available to value their retirement benefits are assumed to retire upon eligibility for unreduced benefits. All other terminated and inactive members are assumed to elect to withdraw their contributions. These assumptions are unchanged from the prior actuarial valuation.

*Administrative Expenses.* Total administrative expenses are assumed to be \$6,547,000, which is the amount budgeted for the year ending September 30, 2019. Of this amount, \$4,582,900 is allocated to the defined benefit plan and \$1,964,100 to the defined contribution plan. In addition, we have assumed that expenses related to the DB 1.75 Plan will be 5% of the normal cost of that plan.

*Rates of Withdrawal.* The assumed rates of withdrawal are shown in Appendix B. The withdrawal rates are unchanged from the prior actuarial valuation.

*Rates of Disability.* The assumed rates of disability are shown in Appendix B. These rates are based on the 1974-78 Society of Actuaries Long Term Disability Non-Jumbo table, with rates reduced by 50% for males and 75% for females. The disability rates are unchanged from the prior actuarial valuation.

*Probability of Marriage.* We have assumed that 75% of retirees will be married at retirement. This assumption is unchanged from the prior actuarial valuation.

*Leave Adjustments.* We have assumed that unused leave increases a member's service by 1.5 years. For Old DB Plan members, we have assumed that unused leave increases average earnings by 5% at retirement. These assumptions are unchanged from the prior actuarial valuation.

*Survivor Benefit – Minor Children.* We have assumed there to be an average of 0.2 eligible child survivors at the time of a retiree's death, with payments to the child survivor continuing for 6 years. These assumptions are unchanged from the prior actuarial valuation.

Asset Valuation Method. Investment gains/losses relative to the assumed investment return are phased in over a period of 3 years. Certain receivables and liabilities whose payments are deducted from employer contributions to the Fund are excluded from the actuarial value of assets. This valuation method is unchanged from the prior valuation.

A complete summary of actuarial assumptions is in Appendix B.

## FUNDING METHOD

GCA Section 8137 required a contribution sufficient to fully fund the unfunded actuarial accrued liability by 2031 (within 80 years from May 1, 1951). P.L. 33-186 extended this period by 2 years to 2033. The required contribution shown in this report includes a payment for the normal cost of active members of the Fund, and amortizes the unfunded actuarial accrued liability over the remaining 13.58 years as a level percentage of total payroll (including both defined benefit and defined contribution members).

Based on the current funding method, the employer contribution rate is projected to drop substantially in 2034. The employer contribution rate will also become more and more volatile as the remaining period is reduced. For example, in the year 2033, any investment gains or losses for the prior year will be amortized in one year. The next experience study will review the funding method and may include a recommendation to change the method to reduce the future volatility in the employer contribution rate and spread out the projected decline in the rate.

Exhibits 17 and 18 project the employer and employee contributions, fund balance, actuarial accrued liability and security ratio forward 40 years based upon the current funding method.

## SECTION II. FUND ASSETS

## EXHIBIT 1. SUMMARY OF DB PLAN ASSETS

Listed below are the assets reported for the defined benefit (DB) pension plan in the Fund's financial statements, excluding certain receivables and liabilities whose payments are deducted from employer contributions to the Fund.

	9/30/2019	9/30/2018
<b>Investments</b>		
Common stocks	\$ 1,290,830,469	\$ 1,363,025,724
U.S. government securities	227,713,814	207,209,221
Corporate bonds and notes	378,643,717	341,684,213
Money market funds	70,248,164	26,130,425
Mutual funds	<u>62,733,790</u>	<u>73,297,212</u>
Total investments	2,030,169,954	2,011,346,795
<b>Receivables</b>		
Employer contributions, net	3,618,867	4,777,413
Employer contributions, unfunded liability	1,947,253	2,831,437
Member contributions	1,338,071	1,699,660
Interest and penalties on contributions	259,126	202,039
Supplemental/insurance benefits advanced	1,996,097	1,996,097
Notes receivable ERIP	0	0
Notes receivable for service credits	2,394,104	3,185,369
Accrued investment income	6,204,386	5,882,874
Other receivables	594,863	626,228
Due from brokers for unsettled trades	3,589,381	4,096,366
Due from DC plan	<u>685,211</u>	<u>726,713</u>
Total receivables	22,627,359	26,024,196
Cash and cash equivalents	4,785,288	4,803,854
Prepaid expenses	0	6,415
Property and equipment	<u>590,963</u>	<u>651,708</u>
Total assets	\$ 2,058,173,564	\$ 2,042,832,968
<b>Liabilities</b>		
Accounts payable and accrued expenses	\$ 4,451,606	\$ 3,579,149
Due to brokers for unsettled trades	<u>50,948,425</u>	<u>6,908,827</u>
Total liabilities	\$ 55,400,031	\$ 10,487,976
<b>Valuation Assets</b>	<u>\$ 2,002,773,533</u>	<u>\$ 2,032,344,992</u>
<b>Excluded Assets <sup>1</sup></b>		
Supplemental/COLA benefits receivable	\$ 14,339,393	\$ 20,456,178
Deferred revenue for service credits	<u>(4,606,105)</u>	<u>(3,444,429)</u>
Total excluded assets	\$ 9,733,288	\$ 17,011,749

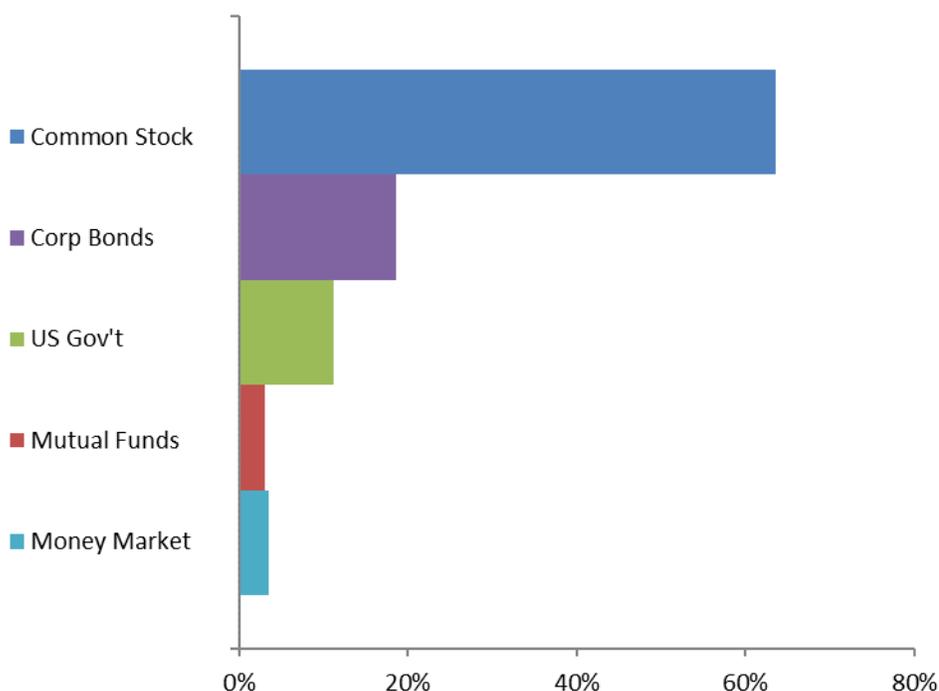
<sup>1</sup> Excluded because payments towards these receivables are deducted from employer contributions.

**SECTION II. FUND ASSETS**

**EXHIBIT 2. DB PLAN ASSET ALLOCATION**

The allocation of assets among various investment classes is an important determinant of expected future investment returns.

	DB ASSET ALLOCATION	
	9/30/2019	9/30/2018
Common stocks	63.5%	67.8%
Corporate bonds and notes	18.7%	17.0%
U.S. government securities	11.2%	10.3%
Mutual funds	3.1%	3.6%
Money market funds	<u>3.5%</u>	<u>1.3%</u>
<b>Total</b>	100.0%	100.0%



*This work product was prepared solely for the Government of Guam Retirement Fund for the purposes described herein and may not be appropriate to use for other purposes. Milliman does not intend to benefit and assumes no duty or liability to other parties who receive this work. Milliman recommends that third parties be aided by their own actuary or other qualified professional when reviewing this Milliman work product.*

## SECTION II. FUND ASSETS

## EXHIBIT 3. CHANGES IN DB PLAN ASSETS

Assets increase or decrease each year due to employer contributions, investment income, benefit payments to retiring participants, plan expenses paid by the trust fund, and any realized and unrealized gains and losses from investments.

	FISCAL YEAR ENDING	
	9/30/2019	9/30/2018
<b>Beginning Balance</b>	\$ 2,032,344,992	\$ 1,759,189,680
<b>Contributions</b>		
Employer contributions	114,278,095	127,072,864
Member contributions	27,012,032	28,895,275
Decrease/(increase) in excluded assets	<u>7,278,461</u>	<u>8,777,850</u>
Total contributions	148,568,588	164,745,989
<b>Investment Income</b>		
Net appreciation in fair value	18,763,630	70,558,548
Interest	27,006,116	24,644,319
Dividends	15,833,624	14,442,841
Other investment income	557,271	410,460
Investment expenses	<u>(5,402,151)</u>	<u>(5,574,493)</u>
Total investment income	56,758,490	104,481,675
<b>Benefit Payments</b>		
Age and service annuities	192,223,728	184,232,873
Disability annuities	5,236,218	5,348,959
Survivor annuities	30,369,206	29,461,972
Refunds to separated employees	2,695,839	1,793,906
Interest on refunded contributions	617,745	516,037
Balances transferred to DC plan	<u>0</u>	<u>0</u>
Total benefit payments	231,142,736	221,353,747
<b>Administrative Expenses</b>	3,755,801	3,794,742
<b>Transfer from DC (for DB 1.75 Plan)</b>	0	229,076,137
<b>Ending Balance</b>	\$ 2,002,773,533	\$ 2,032,344,992

*This work product was prepared solely for the Government of Guam Retirement Fund for the purposes described herein and may not be appropriate to use for other purposes. Milliman does not intend to benefit and assumes no duty or liability to other parties who receive this work. Milliman recommends that third parties be aided by their own actuary or other qualified professional when reviewing this Milliman work product.*

**SECTION II. FUND ASSETS**

**EXHIBIT 4. ACTUARIAL VALUE OF ASSETS**

The actuarial value of assets is equal to the market value of DB plan assets adjusted to phase in gains and losses relative to the assumed rate of return over a 3-year period, and to exclude certain receivables and liabilities whose payments are deducted from employer contributions to the Fund.

	9/30/2019	9/30/2018
Valuation assets at market value	\$ 2,002,773,533	\$ 2,032,344,992
(Gains)/Losses excluded from actuarial value (see below)	<u>63,178,588</u>	<u>(10,436,973)</u>
Actuarial value of assets	\$ 2,065,952,121	\$ 2,021,908,019
Actuarial value as % of market value	103.2%	99.5%

**3-Year Phase-in of Gains and (Losses)**

Year	Expected Return <sup>1</sup>	Actual Return	Gain/(Loss)	Percent Excluded	Excluded From Market Value
2018/2019	\$139,293,705	\$ 56,758,490	\$ (82,535,215)	66.67%	\$ (55,023,477)
2017/2018	128,947,007	104,481,675	(24,465,332)	33.33%	(8,155,111)
2016/2017	112,523,992	192,765,573	80,241,581	0.00%	<u>0</u>
Total					\$ (63,178,588)

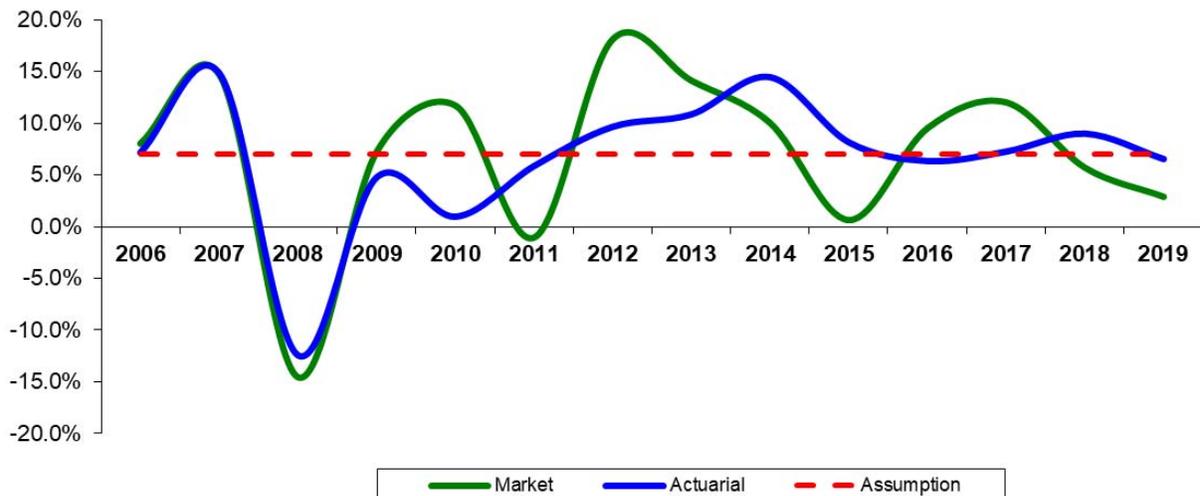
<sup>1</sup> Expected return is based on the assumed investment return, which is 7.0%.

**SECTION II. FUND ASSETS**

**EXHIBIT 5. HISTORICAL RETURNS ON DB PLAN ASSETS**

The following table shows the historical return on DB plan assets over the last 15 years. The assumed actuarial valuation rate is 7.0%.

Fiscal Year Ending 9/30	Return on Market Value	Return on Actuarial Value
2019	2.9%	6.6%
2018	5.7%	9.0%
2017	12.0%	7.3%
2016	9.5%	6.4%
2015	0.6%	8.2%
2014	10.0%	14.5%
2013	14.1%	10.9%
2012	18.1%	9.7%
2011	(1.1)%	5.9%
2010	11.7%	1.0%
2009	7.2%	4.8%
2008	(14.6)%	(12.4)%
2007	14.7%	14.9%
2006	8.0%	7.2%
2005	9.7%	10.7%
Average of last 5 years	6.0%	7.5%
Average of last 10 years	8.2%	7.9%
Average of last 15 years	6.9%	6.8%



*This work product was prepared solely for the Government of Guam Retirement Fund for the purposes described herein and may not be appropriate to use for other purposes. Milliman does not intend to benefit and assumes no duty or liability to other parties who receive this work. Milliman recommends that third parties be aided by their own actuary or other qualified professional when reviewing this Milliman work product.*

**SECTION III. MEMBERSHIP DATA**

**EXHIBIT 6a. ACTIVE EMPLOYEES (Old DB Plan)**

	9/30/2019	9/30/2018
<b>Reconciliation of Old DB Census</b>		
Members reported in raw data	4,806	5,046
Number excluded due to:		
Reported as inactive	2,909	2,939
Reported as terminated	208	211
Zero earnings	22	12
Refund of contributions	0	0
Duplicate inactive records	0	0
Included as retirees or deceased	<u>31</u>	<u>14</u>
Total exclusions	3,170	3,176
Active employees (Old DB Plan) in valuation	1,636	1,870
<b>Active Employees – Non-Uniformed</b>		
Number vested	1,442	1,677
Number not vested	<u>18</u>	<u>20</u>
Total	1,460	1,697
Average age	55.6	55.1
Average service	27.5	26.9
Average earnings	\$ 62,565	\$ 61,419
Average accumulated contributions	\$ 188,034	\$ 178,336
<b>Active Employees – Uniformed</b>		
Number vested	176	172
Number not vested	<u>0</u>	<u>1</u>
Total	176	173
Average age	52.4	51.6
Average service	27.9	27.7
Average earnings	\$ 89,211	\$ 98,105
Average accumulated contributions	\$ 237,334	\$ 234,524
<b>Active Employees – Total Old DB Plan</b>		
Number vested	1,618	1,849
Number not vested	<u>18</u>	<u>21</u>
Total	1,636	1,870
Average age	55.3	54.8
Average service	27.6	27.0
Average earnings	\$ 65,432	\$ 64,813
Average accumulated contributions	\$ 193,338	\$ 183,534

*This work product was prepared solely for the Government of Guam Retirement Fund for the purposes described herein and may not be appropriate to use for other purposes. Milliman does not intend to benefit and assumes no duty or liability to other parties who receive this work. Milliman recommends that third parties be aided by their own actuary or other qualified professional when reviewing this Milliman work product.*

**SECTION III. MEMBERSHIP DATA**

**EXHIBIT 6b. ACTIVE EMPLOYEES (DB 1.75 Plan)**

	9/30/2019	9/30/2018
<b>Reconciliation of DB 1.75 Census</b>		
Members reported in raw data	3,238	3,329
Number excluded due to:		
Reported as inactive	23	8
Reported as terminated	0	0
Zero earnings	0	0
Refund of contributions	0	0
Duplicate inactive records	0	0
Included as retirees or deceased	<u>1</u>	<u>3</u>
Total exclusions	24	11
Active employees in valuation	3,214	3,318
<b>Active Employees – DB 1.75 Plan</b>		
Number vested	2,484	2,315
Number not vested	<u>730</u>	<u>1,003</u>
Total	3,214	3,318
Average age	45.6	44.6
Average service	12.4	11.3
Average earnings	\$ 53,840	\$ 52,709
Average accumulated contributions	\$ 44,685	\$ 37,837
<b>Active Employees – Total Old DB and DB 1.75</b>		
Number vested	4,102	4,164
Number not vested	<u>748</u>	<u>1,024</u>
Total	4,850	5,188
Average age	48.9	48.3
Average service	17.5	16.9
Average earnings	\$ 57,750	\$ 57,071
Average accumulated contributions	\$ 94,829	\$ 90,353

*This work product was prepared solely for the Government of Guam Retirement Fund for the purposes described herein and may not be appropriate to use for other purposes. Milliman does not intend to benefit and assumes no duty or liability to other parties who receive this work. Milliman recommends that third parties be aided by their own actuary or other qualified professional when reviewing this Milliman work product.*

**SECTION III. MEMBERSHIP DATA**

**EXHIBIT 7. ACTIVE EMPLOYEES BY AGENCY**

	9/30/19 DC	9/30/19 DB 1.75	9/30/19 Old DB	9/30/18 DC	9/30/18 DB 1.75	9/30/18 Old DB
Bureau of Budget & Management Research	3	12	4	2	12	5
Bureau of Statistics and Plans	23	8	9	15	9	9
Chief Medical Examiner	2	0	0	3	0	0
Customs & Quarantine	82	32	30	62	30	29
Dept of Administration <sup>1</sup>	50	56	28	50	60	41
Dept of Agriculture	39	15	19	40	17	22
Dept of Corrections	65	95	22	84	98	21
Dept of Labor <sup>2</sup>	43	18	10	34	22	11
Dept of Land Management	27	6	21	21	7	26
Dept of Law	99	73	26	101	75	31
Dept of Mental Health & Substance Abuse	130	49	23	124	53	27
Dept of Military Affairs	27	15	5	22	13	6
Dept of Parks and Recreation	23	15	10	23	16	11
Dept of Public Health & Social Services	200	140	66	200	145	76
Dept of Public Works	187	75	67	170	75	83
Dept of Revenue and Taxation	89	57	29	85	56	34
Dept of Youth Affairs	34	26	14	36	29	15
D.I.S.I.D.	8	5	3	9	5	3
Governor's Office	113	9	5	92	16	4
Guam Energy Office	4	2	1	4	1	1
Guam Environmental Protection Agency	21	24	7	18	26	8
Guam Fire Dept	49	150	55	49	150	65
Guam Legislature	33	22	4	18	21	5
Guam Police Dept	167	131	58	140	136	61
Judiciary Of Guam	211	133	46	213	136	64
KGTF	3	1	3	2	1	4
Lt. Governor's Office	10	2	1	15	1	1
Mayor's Council	210	24	14	257	23	14
Office of Technology	0	1	7	0	0	0
Public Auditors	9	3	0	11	7	0
Public Defender	<u>35</u>	<u>14</u>	<u>11</u>	<u>33</u>	<u>16</u>	<u>12</u>
<b>General Fund Total</b>	<b>1,996</b>	<b>1,213</b>	<b>598</b>	<b>1,933</b>	<b>1,256</b>	<b>689</b>
Dept of Chamorro Affairs <sup>3</sup>	24	3	9	27	4	6
Dept of Education	2,233	875	531	2,135	908	611
Government of Guam Retirement Fund	19	19	8	15	20	12
Guam Airport Authority	100	90	54	90	95	60
Guam Community College	114	96	38	104	100	45
Guam Economic Development Agency	17	10	5	14	10	5
Guam Housing & Urban Renewal Agency	41	44	16	36	42	18
Guam Housing Corporation	8	10	4	10	11	4
Guam Memorial Hospital Authority	718	231	93	629	238	111
Guam Power Authority	170	192	100	165	194	109
Guam Visitors Bureau	16	18	2	14	20	4
Guam Waterworks Authority	235	108	26	218	110	29
Port Authority Of Guam	165	142	50	157	138	57
University Of Guam	<u>430</u>	<u>163</u>	<u>102</u>	<u>374</u>	<u>172</u>	<u>110</u>
<b>Others Total</b>	<b>4,290</b>	<b>2,001</b>	<b>1,038</b>	<b>3,988</b>	<b>2,062</b>	<b>1,181</b>
<b>GRAND TOTAL</b>	<b>6,286</b>	<b>3,214</b>	<b>1,636</b>	<b>5,921</b>	<b>3,318</b>	<b>1,870</b>

<sup>1</sup> Department of Administration includes Civil Service Commission and Guam Election

<sup>2</sup> Department of Labor includes AHRD

<sup>3</sup> Department of Chamorro Affairs' includes Guam CAHA, Guam Public Library, and Chamorro Land Trust

This work product was prepared solely for the Government of Guam Retirement Fund for the purposes described herein and may not be appropriate to use for other purposes. Milliman does not intend to benefit and assumes no duty or liability to other parties who receive this work. Milliman recommends that third parties be aided by their own actuary or other qualified professional when reviewing this Milliman work product.

## SECTION III. MEMBERSHIP DATA

## EXHIBIT 8a. RETIRED EMPLOYEES (Old DB Plan)

	9/30/2019	9/30/2018
<b>Service Retirees</b>		
Count	5,237	5,186
Average age	70.4	70.1
Average benefit	\$36,801	\$35,813
Median benefit	\$33,081	\$32,293
<b>Disabled Retirees</b>		
Count	219	231
Average age	69.1	68.8
Average benefit	\$23,226	\$22,912
Median benefit	\$21,300	\$21,187
<b>Survivors</b>		
Count	1,682	1,678
Average age	72.7	72.1
Average benefit	\$17,788	\$17,423
Median benefit	\$15,515	\$15,179
<b>Child Pensioners</b>		
Count	153	152
Average age	15.3	16.2
Average benefit	\$2,880	\$2,880
Median benefit	\$2,880	\$2,880
<b>Total Retirees and Survivors <sup>1</sup></b>		
Count	7,138	7,095
Average age	70.9	70.5
Average benefit	\$31,904	\$31,043
Median benefit	\$28,152	\$27,338

<sup>1</sup> Excludes child pensioners.

## SECTION III. MEMBERSHIP DATA

## EXHIBIT 8b. RETIRED EMPLOYEES (DB 1.75 Plan)

	9/30/2019	9/30/2018
<b>Service Retirees</b>		
Count	54	26
Average age	64.6	64.1
Average benefit	\$19,015	\$17,499
Median benefit	\$18,145	\$17,177
<b>Disabled Retirees</b>		
Count	1	n/a
Average age	54.4	n/a
Average benefit	*	n/a
Median benefit	*	n/a
<b>Survivors</b>		
Count	11	n/a
Average age	56.1	n/a
Average benefit	*	n/a
Median benefit	*	n/a
<b>Child Pensioners</b>		
Count	3	n/a
Average age	14.7	n/a
Average benefit	\$2,880	n/a
Median benefit	\$2,880	n/a
<b>Total Retirees and Survivors <sup>1</sup></b>		
Count	66	26
Average age	63.1	64.1
Average benefit	\$17,580	\$17,499
Median benefit	\$16,448	\$17,177

\* Not shown since less than 20 members.

<sup>1</sup> Excludes child pensioners.

**SECTION III. MEMBERSHIP DATA**

**EXHIBIT 9. TERMINATED AND INACTIVE MEMBERS (DB)**

	9/30/2019	9/30/2018
<b>Reported as Inactive</b>		
Count	2,932	2,933
Accumulated contributions	\$ 7,785,341	\$ 9,450,438
<b>Reported as Terminated</b>		
Count	208	211
Accumulated contributions	\$ 542,116	\$ 534,596
<b>Zero Earnings</b>		
Count	22	26
Accumulated contributions	\$ 2,652,670	\$ 2,034,073
<b>Refund of Contributions</b>		
Count	0	0
Accumulated contributions	\$ 0	\$ 0
<b>Total Terminateds and Inactives</b>		
Count	3,162	3,170
Accumulated contributions	\$ 10,980,127	\$ 12,019,107
<hr/>		
<b>Assumed to Withdraw Contributions</b>		
Count	3,047	3,041
Accumulated contributions	\$ 2,964,583	\$ 2,246,142
<b>Not Assumed to Withdraw Contributions</b>		
Count	115	129
Average age	57.4	56.4
Average benefit	\$ 13,966	\$ 14,460
Accumulated contributions	\$ 8,015,544	\$ 9,772,965

*This work product was prepared solely for the Government of Guam Retirement Fund for the purposes described herein and may not be appropriate to use for other purposes. Milliman does not intend to benefit and assumes no duty or liability to other parties who receive this work. Milliman recommends that third parties be aided by their own actuary or other qualified professional when reviewing this Milliman work product.*

**SECTION III. MEMBERSHIP DATA**

**EXHIBIT 10a. RECONCILIATION OF MEMBERSHIP DATA (Old DB Plan)**

	Act	Assumed to Withdraw Contributions				No Withd	Ret	Surv	Disab	Child	Total
		Inact	Term	Zero	Refund	Inact					
<b>9/30/2018</b>	1,870	2,810	211	12	0	129	5,186	1,678	231	152	12,279
<b>Additions from:</b>											
Actives		1				4	217		3		225
Inactives	3			1							4
Terminations											
Zero earnings	2	5					1				8
Refunds											
Inactives no w/d	5			5			6				16
Retiree											
Survivor											
Disability											
Child											
Other adds <sup>1</sup>		1					5	92	1	27	126
<b>Subtotal</b>	<b>10</b>	<b>7</b>	<b>0</b>	<b>6</b>	<b>0</b>	<b>4</b>	<b>229</b>	<b>92</b>	<b>4</b>	<b>27</b>	<b>379</b>
<b>Subtractions due to:</b>											
Actives		-3		-2		-5					-10
Inactives	-1			-5							-6
Terminations											
Zero earnings		-1				-5					-6
Refunds											
Inactives no w/d	-4										-4
Retiree	-217			-1		-6					-224
Survivor											
Disability	-3										-3
Child											
Other drops <sup>2</sup>	-19	-6	-3	-1		-2	-178	-88	-16	-26	-339
<b>Subtotal</b>	<b>-244</b>	<b>-10</b>	<b>-3</b>	<b>-9</b>	<b>0</b>	<b>-18</b>	<b>-178</b>	<b>-88</b>	<b>-16</b>	<b>-26</b>	<b>-592</b>
<b>9/30/2019</b>	1,636	2,807	208	9	0	115	5,237	1,682	219	153	12,066

<sup>1</sup> Other additions indicate members or beneficiaries who were reported this year but who were not included in the prior year's valuation (e.g. a new beneficiary, etc.).

<sup>2</sup> Other drops indicate members or beneficiaries who were in the prior year's valuation but who were not reported in this year's census data (e.g. members who received a complete refund, retirees or beneficiaries who are now deceased, children who have reached the maximum age, etc.).

SECTION III. MEMBERSHIP DATA

EXHIBIT 10b. RECONCILIATION OF MEMBERSHIP DATA (DB 1.75 Plan)

	Act	Assumed to Withdraw Contributions				No With'd	Ret	Surv	Disab	Child	Total
		Inact	Term	Zero	Refund						
<b>9/30/2018</b>	3,318	8	0	0	0	0	26	0	0	0	3,352
<b>Additions from:</b>											
Actives		23					30				53
Inactives	3										3
Terminations											
Zero earnings											
Refunds											
Inactives no w/d											
Retiree											
Survivor											
Disability											
Child											
Other adds <sup>1</sup>	2						1	11	1	3	18
Subtotal	5	23	0	0	0	0	31	11	1	3	74
<b>Subtractions due to:</b>											
Actives		-3									-3
Inactives	-23										-23
Terminations											
Zero earnings											
Refunds											
Inactives no w/d											
Retiree	-30										-30
Survivor											
Disability											
Child											
Other drops <sup>2</sup>	-56	-5					-3				-64
Subtotal	-109	-8	0	0	0	0	-3			0	-120
<b>9/30/2019</b>	3,214	23	0	0	0	0	54	11	1	3	3,306

<sup>1</sup> Other additions indicate members or beneficiaries who were reported this year but who were not included in the prior year's valuation (e.g. a new beneficiary, etc.).  
<sup>2</sup> Other drops indicate members or beneficiaries who were in the prior year's valuation but who were not reported in this year's census data (e.g. members who received a complete refund, retirees or beneficiaries who are now deceased, children who have reached the maximum age, etc.).

## SECTION IV. VALUATION EXHIBITS

## EXHIBIT 11a. ACTUARIAL ACCRUED LIABILITY (Old DB Plan)

The actuarial accrued liability has been calculated using the Entry Age Normal actuarial cost method, and is equal to the present value of benefits for all Old DB Plan members less the present value of future normal costs for active Old DB Plan employees.

	Old DB Plan 9/30/2019	Old DB Plan 9/30/2018
<b>Present Value of Benefits</b>		
Active employees –		
Retirement	\$ 736,859,928	\$ 805,543,094
Disability	9,585,227	11,233,551
Death	12,494,410	14,209,438
Withdrawal	<u>17,561,692</u>	<u>22,554,220</u>
Total active PVB	776,501,257	853,540,303
Retirees and Survivors		
Retirees	1,855,355,160	1,803,108,871
Disabled retirees	41,853,141	43,934,606
Survivors	<u>257,202,777</u>	<u>255,442,526</u>
Total retirees and survivors	2,154,411,078	2,102,486,003
Terminated and inactive members		
Assumed to retire	14,538,736	15,737,970
Assumed to elect return of contributions	<u>2,964,583</u>	<u>2,246,142</u>
Total terminated and inactive members	17,503,319	17,984,112
Total PVB	\$ 2,948,415,654	\$ 2,974,010,418
<b>Present Value of Future Normal Cost</b>		
Active employees –		
Retirement	\$ 48,726,523	\$ 58,502,274
Disability	2,726,733	3,663,064
Death	2,331,284	3,396,358
Withdrawal	<u>10,690,670</u>	<u>12,641,955</u>
Total active PVFNC	\$ 64,475,210	\$ 78,203,651
<b>Actuarial Accrued Liability</b>		
Active members	\$ 712,026,047	\$ 775,336,652
Retirees and survivors	2,154,411,078	2,102,486,003
Terminations and inactives	<u>17,503,319</u>	<u>17,984,112</u>
Total accrued liability	\$ 2,883,940,444	\$ 2,895,806,767

*This work product was prepared solely for the Government of Guam Retirement Fund for the purposes described herein and may not be appropriate to use for other purposes. Milliman does not intend to benefit and assumes no duty or liability to other parties who receive this work. Milliman recommends that third parties be aided by their own actuary or other qualified professional when reviewing this Milliman work product.*

## SECTION IV. VALUATION EXHIBITS

## EXHIBIT 11b. ACTUARIAL ACCRUED LIABILITY (DB 1.75 Plan)

The actuarial accrued liability has been calculated using the Entry Age Normal actuarial cost method, and is equal to the present value of benefits for all DB 1.75 Plan members less the present value of future normal costs for active DB 1.75 Plan employees.

	DB 1.75 Plan 9/30/2019	DB 1.75 Plan 9/30/2018
<b>Present Value of Benefits</b>		
Active employees –		
Retirement	\$ 373,922,662	\$ 351,845,173
Disability	19,165,873	18,746,673
Death	18,189,496	17,465,130
Withdrawal	<u>78,957,587</u>	<u>79,084,133</u>
Total active PVB	490,235,618	467,141,109
Retirees and Survivors		
Retirees	10,757,705	4,870,668
Disabled retirees	526,168	0
Survivors	<u>1,355,314</u>	<u>0</u>
Total retirees and survivors	12,639,187	4,870,668
Terminated and inactive members		
Assumed to retire	0	0
Assumed to elect return of contributions	<u>0</u>	<u>0</u>
Total terminated and inactive members	0	0
Total PVB	\$ 502,874,805	\$ 472,011,777
<b>Present Value of Future Normal Cost</b>		
Active employees –		
Retirement	\$ 91,694,057	\$ 93,712,177
Disability	8,161,267	8,410,883
Death	7,184,527	7,569,954
Withdrawal	<u>58,465,721</u>	<u>61,024,027</u>
Total active PVFNC	\$ 165,505,572	\$ 170,717,041
<b>Actuarial Accrued Liability</b>		
Active members	\$ 324,730,046	\$ 296,424,068
Retirees and survivors	12,639,187	4,870,668
Terminations and inactives	<u>0</u>	<u>0</u>
Total accrued liability	\$ 337,369,233	\$ 301,294,736

*This work product was prepared solely for the Government of Guam Retirement Fund for the purposes described herein and may not be appropriate to use for other purposes. Milliman does not intend to benefit and assumes no duty or liability to other parties who receive this work. Milliman recommends that third parties be aided by their own actuary or other qualified professional when reviewing this Milliman work product.*

## SECTION IV. VALUATION EXHIBITS

## EXHIBIT 12. CALCULATION OF UNFUNDED ACTUARIAL ACCRUED LIABILITY

The unfunded actuarial accrued liability is used to determine the funding requirements. The unfunded actuarial accrued liability equals the actuarial accrued liability less the valuation assets.

	9/30/2019	9/30/2018
<b>OLD DB PLAN</b>		
Actuarial Accrued Liability		
Active members	\$ 712,026,047	\$ 775,336,652
Retirees and survivors	2,154,411,078	2,102,486,003
Terminations and inactives	<u>17,503,319</u>	<u>17,984,112</u>
Total accrued liability	\$ 2,883,940,444	\$ 2,895,806,767
<b>DB 1.75 PLAN</b>		
Actuarial Accrued Liability		
Active members	\$ 324,730,046	\$ 296,424,068
Retirees and survivors	12,639,187	4,870,668
Terminations and inactives	<u>0</u>	<u>0</u>
Total accrued liability	\$ 337,369,233	\$ 301,294,736
<b>TOTAL (Old DB Plan plus DB 1.75 Plan)</b>		
Actuarial Accrued Liability		
Active members	\$ 1,036,756,093	\$ 1,071,760,720
Retirees and survivors	2,167,050,265	2,107,356,671
Terminations and inactives	<u>17,503,319</u>	<u>17,9984,112</u>
Total accrued liability	\$ 3,221,309,677	\$ 3,197,101,503
Actuarial Value of Assets	<u>2,065,952,121</u>	<u>2,021,908,019</u>
Unfunded Actuarial Accrued Liability	\$ 1,155,357,556	\$ 1,175,193,484
Security Ratio = (Assets/AAL)	64.13%	63.24%

*This work product was prepared solely for the Government of Guam Retirement Fund for the purposes described herein and may not be appropriate to use for other purposes. Milliman does not intend to benefit and assumes no duty or liability to other parties who receive this work. Milliman recommends that third parties be aided by their own actuary or other qualified professional when reviewing this Milliman work product.*

## SECTION IV. VALUATION EXHIBITS

## EXHIBIT 13. CALCULATION OF ACTUARIAL GAIN/LOSS

	Year Ending 9/30/2019	Year Ending 9/30/2018
<b>Unfunded Actuarial Accrued Liability, beginning of year</b>	\$ 1,175,193,484	\$ 1,266,764,356
<b>Additions:</b>		
Employer normal cost	12,085,589	8,640,161
Interest to end of year	<u>83,109,535</u>	<u>89,278,316</u>
Total additions	95,195,124	97,918,477
<b>Deductions:</b>		
Employer contributions for year	121,556,556	135,850,714
Interest on contributions	<u>4,182,523</u>	<u>4,674,357</u>
Total deductions	125,739,079	140,525,071
<b>Other Changes:</b>		
Plan amendments	0	0
Changes in assumptions and methods	<u>0</u>	<u>0</u>
Net other changes	0	0
<b>Expected UAAL, end of year</b>	\$ 1,144,649,529	\$ 1,224,157,762
<b>Actual UAAL, end of year</b>	<u>1,155,357,556</u>	<u>1,175,193,484</u>
<b>Actuarial Gain/(Loss)</b>	\$ (10,708,027)	\$ 48,964,278
<b>Components of Actuarial Gain/(Loss):</b>		
Investment gain/(loss) on actuarial value of assets	\$ (8,189,066)	\$ 36,062,024
Other gains/(losses)	<u>(2,518,961)</u>	<u>12,902,254</u>
Total actuarial gain/(loss)	\$ (10,708,027)	\$ 48,964,278

*This work product was prepared solely for the Government of Guam Retirement Fund for the purposes described herein and may not be appropriate to use for other purposes. Milliman does not intend to benefit and assumes no duty or liability to other parties who receive this work. Milliman recommends that third parties be aided by their own actuary or other qualified professional when reviewing this Milliman work product.*

SECTION IV. VALUATION EXHIBITS

EXHIBIT 14. NORMAL COST

The normal cost has been calculated using the Entry Age Normal actuarial cost method.

	9/30/2019		9/30/2018	
<b>OLD DB Plan</b>				
Expected payroll for next fiscal year	\$ 101,792,930		\$ 116,308,382	
Normal cost <sup>1</sup>		<i>% of Old DB Payroll</i>		<i>% of Old DB Payroll</i>
Retirement	\$ 9,981,532	9.81%	\$ 11,468,981	9.86%
Disability	548,475	0.54%	701,622	0.60%
Withdrawal	2,146,310	2.11%	2,414,399	2.08%
Death	<u>473,965</u>	<u>0.47%</u>	<u>657,483</u>	<u>0.57%</u>
Total active normal cost	\$ 13,150,282	12.92%	\$ 15,242,485	13.11%
Assumed DB administrative expenses	<u>4,582,900</u>	<u>4.50%</u>	<u>4,733,400</u>	<u>4.07%</u>
Total normal cost and expenses	\$ 17,733,182	17.42%	\$ 19,975,885	17.18%
Expected member contributions	<u>(9,712,829)</u>	<u>(9.54%)</u>	<u>(11,095,274)</u>	<u>(9.54%)</u>
Government portion of normal cost	\$ 8,020,353	7.88%	\$ 8,880,611	7.64%
<b>DB 1.75 Plan</b>				
Expected payroll for next fiscal year	\$ 170,156,412		\$ 171,690,091	
Normal cost <sup>1</sup>		<i>% of DB 1.75 Payroll</i>		<i>% of DB 1.75 Payroll</i>
Retirement	\$ 10,494,169	6.17%	\$ 10,629,848	6.19%
Disability	901,251	0.53%	917,001	0.53%
Withdrawal	6,422,966	3.77%	6,610,460	3.85%
Death	<u>816,476</u>	<u>0.48%</u>	<u>855,071</u>	<u>0.50%</u>
Total active normal cost	\$ 18,634,862	10.95%	\$ 19,012,380	11.07%
Assumed DB administrative expenses	<u>900,750</u>	<u>0.53%</u>	<u>918,998</u>	<u>0.54%</u>
Total normal cost and expenses	\$ 19,535,612	11.48%	\$ 19,931,378	11.61%
Expected member contributions	<u>(16,164,859)</u>	<u>(9.50%)</u>	<u>(16,310,559)</u>	<u>(9.50%)</u>
Government portion of normal cost	\$ 3,370,753	1.98%	\$ 3,620,819	2.11%
<b>TOTAL DB Plans</b>				
Expected payroll for next fiscal year	\$ 271,949,342		\$ 287,998,473	
Total active normal cost <sup>1</sup>	\$ 31,785,144	11.68%	\$ 34,254,865	11.89%
Assumed DB administrative expenses	<u>5,483,650</u>	<u>2.02%</u>	<u>5,652,398</u>	<u>1.96%</u>
Total normal cost and expenses	\$ 37,268,794	13.70%	\$ 39,907,263	13.86%
Expected member contributions	<u>(25,877,688)</u>	<u>(9.52%)</u>	<u>(27,405,833)</u>	<u>(9.52%)</u>
Government portion of normal cost	\$ 11,391,106	4.19%	\$ 12,501,430	4.34%

<sup>1</sup> Includes interest to mid-year.

## SECTION IV. VALUATION EXHIBITS

## EXHIBIT 15. AMORTIZATION OF UNFUNDED ACTUARIAL ACCRUED LIABILITY

Pursuant to GCA Section 8137, as modified by P.L. 33-186, the unfunded liabilities of the Government of Guam Retirement Fund are to be completely funded within 82 years from May 1, 1951. As of September 30, 2019, there are 14.58 years remaining in the funding period. The amortization of the unfunded actuarial accrued liability is calculated as a constant percentage of total payroll, which is assumed to grow at 2.75% per year.

	9/30/2019	9/30/2018
Total payroll (DB and DC) for fiscal year following	\$ 523,052,282	\$ 522,859,136
Unfunded actuarial accrued liability	1,155,357,556	1,175,193,484
Remaining funding period	13.58 years	14.58 years
Annual amortization	\$ 112,146,686	\$ 108,215,652
As % of total payroll (DB and DC)	21.44%	20.70%

*This work product was prepared solely for the Government of Guam Retirement Fund for the purposes described herein and may not be appropriate to use for other purposes. Milliman does not intend to benefit and assumes no duty or liability to other parties who receive this work. Milliman recommends that third parties be aided by their own actuary or other qualified professional when reviewing this Milliman work product.*

## SECTION IV. VALUATION EXHIBITS

## EXHIBIT 16. ACTUARIALLY DETERMINED CONTRIBUTION

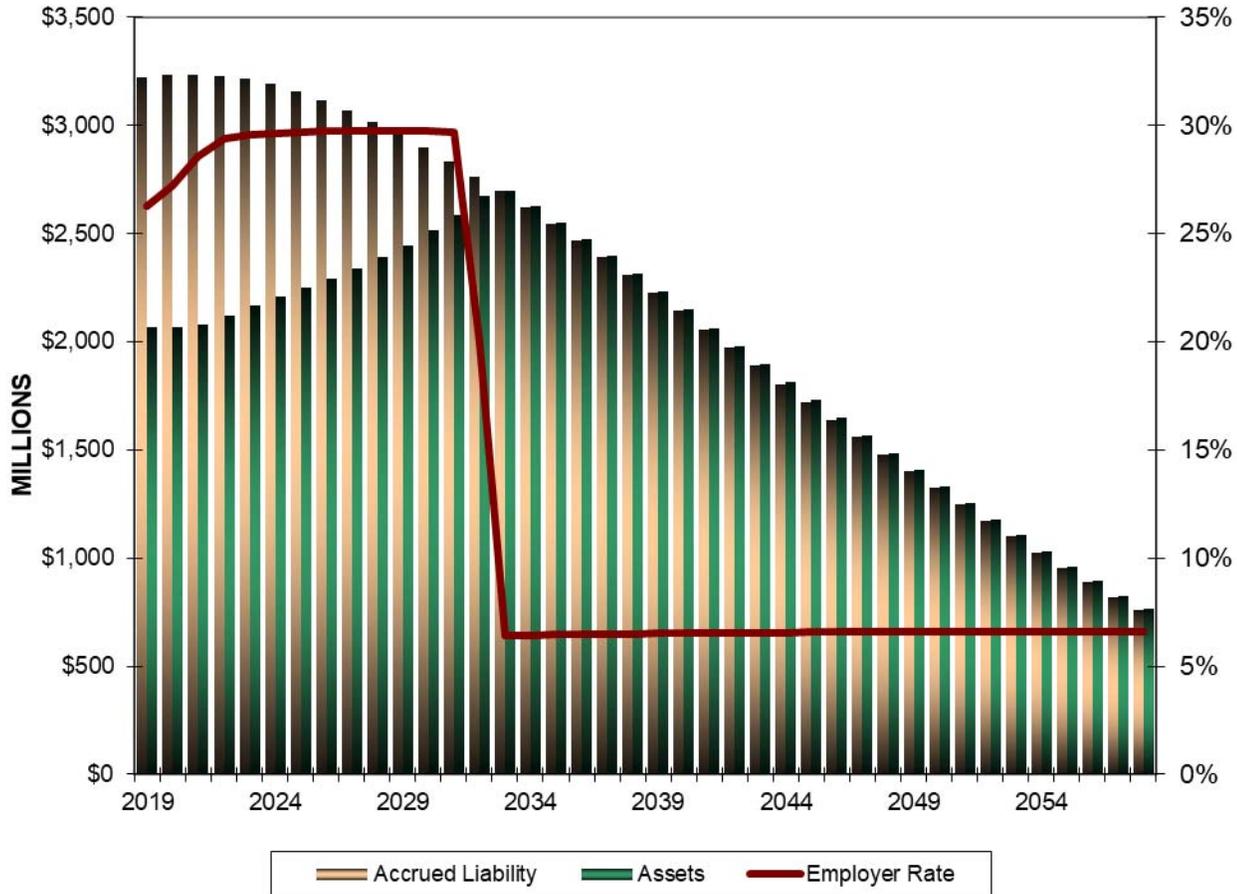
The Actuarially Determined Contribution (ADC) is equal to the sum of (1) the government normal costs for the defined benefit plans (Old DB and DB 1.75), (2) the amortization payment towards the unfunded actuarial accrued liability of the defined benefit plans (Old DB and DB 1.75), and (3) the expected government contributions to the defined contribution (DC) plan. The required contribution is then divided by the sum of the DB and DC payroll to determine the contribution rate as a percentage of payroll.

	9/30/2019	9/30/2018
Expected payroll for next fiscal year		
Old defined benefit (Old DB)	\$ 101,792,930	\$ 116,308,382
Defined Benefit 1.75 (DB 1.75)	170,156,412	171,690,091
Defined contribution (DC)	<u>251,102,940</u>	<u>234,860,663</u>
Total payroll (DB and DC)	\$ 523,052,282	\$ 522,859,136
Government normal cost including expenses (DB)	\$ 11,391,106	\$ 12,501,430
As % of DB payroll	4.19%	4.34%
As % of total payroll (DB and DC)	2.18%	2.39%
Amortization of UAAL (DB)	\$ 112,146,686	\$ 108,215,652
As % of total payroll (DB and DC)	21.44%	20.70%
Government DC contributions	\$ 17,532,482	\$ 16,687,961
As % of DC payroll	6.98%	7.11%
As % of total payroll (DB and DC)	3.35%	3.19%
Total DB and DC contributions	\$ 141,070,274	\$ 137,405,043
% of total payroll (DB and DC)	26.97%	26.28%

*This work product was prepared solely for the Government of Guam Retirement Fund for the purposes described herein and may not be appropriate to use for other purposes. Milliman does not intend to benefit and assumes no duty or liability to other parties who receive this work. Milliman recommends that third parties be aided by their own actuary or other qualified professional when reviewing this Milliman work product.*

SECTION IV. VALUATION EXHIBITS

EXHIBIT 17. PROJECTION OF CONTRIBUTION RATE<sup>1</sup>



<sup>1</sup> The contribution rate is the combined employer rate for the DB and DC plans.

SECTION IV. VALUATION EXHIBITS

EXHIBIT 17. PROJECTION OF CONTRIBUTION RATE (values)

Year Ending	PAYROLL <sup>1</sup>		CONTRIB RATE		CONTRIBUTIONS			Invest Gain <sup>3</sup>	Benefits/ Expenses	DB Fund Actuarial
	DB	DC	DB	DC <sup>2</sup>	DB	DC <sup>2</sup>	EE			
2019										\$2,065.95
2020	\$271.95	\$251.10	26.28%	19.30%	\$71.47	48.46	\$25.88	\$135.73	\$(241.84)	2,069.97
2021	256.17	281.27	26.97%	20.07%	69.09	56.46	24.34	138.40	(248.19)	2,082.55
2022	241.13	311.08	27.89%	21.06%	67.25	65.51	22.91	141.16	(254.44)	2,124.94
2023	225.87	341.53	28.65%	21.87%	64.70	74.70	21.46	144.05	(260.91)	2,168.94
2024	210.60	372.40	28.80%	22.08%	60.66	82.21	20.01	146.94	(267.47)	2,211.28
2025	196.60	402.44	28.89%	22.20%	56.79	89.33	18.68	149.76	(272.89)	2,252.95
2026	183.91	431.61	28.95%	22.29%	53.23	96.21	17.47	152.58	(277.05)	2,295.40
2027	172.76	459.67	28.99%	22.36%	50.08	102.79	16.41	155.54	(279.51)	2,340.73
2028	163.39	486.44	29.02%	22.41%	47.41	109.02	15.52	158.77	(280.45)	2,391.00
2029	155.11	512.59	29.02%	22.44%	45.02	115.03	14.74	162.39	(280.30)	2,447.86
2030	147.41	538.66	29.01%	22.45%	42.77	120.92	14.00	166.51	(279.24)	2,512.82
2031	140.17	564.76	28.98%	22.43%	40.62	126.69	13.32	171.22	(277.64)	2,587.03
2032	133.48	590.83	28.92%	22.38%	38.60	132.26	12.68	176.61	(275.37)	2,671.80
2033	127.12	617.11	19.54%	13.02%	24.84	80.35	12.08	180.38	(272.36)	2,697.09
2034	120.09	644.61	6.41%	-0.09%	7.70	(0.59)	11.41	178.86	(269.49)	2,624.98
2035	112.93	672.80	6.43%	-0.06%	7.26	(0.42)	10.73	173.91	(266.21)	2,550.25
2036	106.27	701.06	6.45%	-0.03%	6.85	(0.24)	10.10	168.79	(262.59)	2,473.16
2037	99.77	729.77	6.46%	-0.01%	6.45	(0.06)	9.48	163.53	(258.54)	2,394.02
2038	93.31	759.04	6.48%	0.02%	6.04	0.13	8.86	158.13	(254.23)	2,312.95
2039	86.96	788.83	6.49%	0.04%	5.64	0.32	8.26	152.62	(249.35)	2,230.44
2040	80.98	818.89	6.50%	0.06%	5.27	0.52	7.69	147.03	(243.94)	2,147.01
2041	75.26	849.36	6.52%	0.08%	4.90	0.72	7.15	141.39	(238.16)	2,063.01
2042	69.88	880.17	6.53%	0.10%	4.56	0.91	6.64	135.73	(231.97)	1,978.88
2043	64.69	911.49	6.54%	0.12%	4.23	1.10	6.15	130.07	(225.59)	1,894.83
2044	59.69	943.33	6.54%	0.14%	3.91	1.28	5.67	124.43	(218.87)	1,811.26
2045	54.80	975.80	6.55%	0.15%	3.59	1.47	5.21	118.83	(212.09)	1,728.25
2046	50.22	1,008.72	6.56%	0.16%	3.29	1.66	4.77	113.27	(205.10)	1,646.15
2047	46.03	1,042.03	6.56%	0.18%	3.02	1.83	4.37	107.80	(197.76)	1,565.41
2048	41.70	1,076.28	6.57%	0.19%	2.74	2.00	3.96	102.40	(190.78)	1,485.73
2049	37.54	1,111.19	6.57%	0.20%	2.47	2.18	3.57	97.09	(183.65)	1,407.39
2050	33.53	1,146.79	6.58%	0.21%	2.21	2.36	3.19	91.86	(176.69)	1,330.31
2051	29.44	1,183.34	6.58%	0.21%	1.94	2.53	2.80	86.71	(169.92)	1,254.37
2052	25.40	1,220.73	6.58%	0.22%	1.67	2.71	2.41	81.64	(163.25)	1,179.57
2053	21.26	1,259.14	6.59%	0.23%	1.40	2.90	2.02	76.64	(156.82)	1,105.70
2054	17.33	1,298.28	6.59%	0.24%	1.14	3.09	1.65	71.72	(150.23)	1,033.06
2055	13.93	1,337.86	6.59%	0.24%	0.92	3.27	1.32	66.89	(143.40)	962.06
2056	11.14	1,377.82	6.59%	0.25%	0.73	3.43	1.06	62.19	(136.25)	893.22
2057	8.89	1,418.27	6.59%	0.25%	0.59	3.56	0.84	57.65	(128.97)	826.89
2058	7.05	1,459.36	6.59%	0.25%	0.46	3.67	0.67	53.29	(121.68)	763.30

<sup>1</sup> Payroll is assumed to increase 2.75% per year.

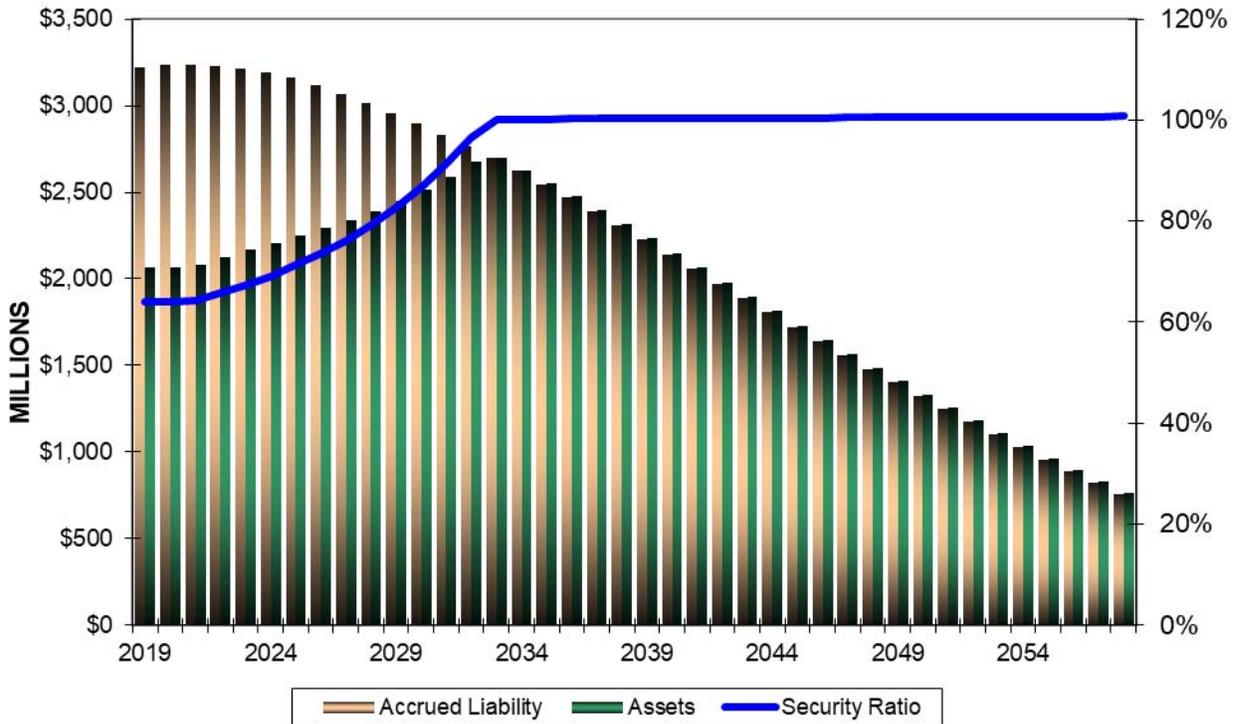
<sup>2</sup> DC rate and contributions are those for payment towards UAAL and plan expenses only.

<sup>3</sup> Investment earnings are assumed to be 7.0% per year on the market value of assets.

This work product was prepared solely for the Government of Guam Retirement Fund for the purposes described herein and may not be appropriate to use for other purposes. Milliman does not intend to benefit and assumes no duty or liability to other parties who receive this work. Milliman recommends that third parties be aided by their own actuary or other qualified professional when reviewing this Milliman work product.

SECTION IV. VALUATION EXHIBITS

EXHIBIT 18. PROJECTION OF SECURITY RATIO



*This work product was prepared solely for the Government of Guam Retirement Fund for the purposes described herein and may not be appropriate to use for other purposes. Milliman does not intend to benefit and assumes no duty or liability to other parties who receive this work. Milliman recommends that third parties be aided by their own actuary or other qualified professional when reviewing this Milliman work product.*

SECTION IV. VALUATION EXHIBITS

EXHIBIT 18. PROJECTION OF SECURITY RATIO (values)

Year Ending	EMPLOYER CONTRIBUTIONS					Security Ratio
	Payroll <sup>1</sup>	DB Rate	Contribs DB Plan	DB Fund AVA <sup>2</sup>	Accrued Liability	
2019				\$2,065.95	\$3,221.31	64.13%
2020	\$523.05	26.28%	\$119.93	2,069.97	3,231.40	64.06%
2021	537.44	26.97%	125.55	2,082.55	3,233.77	64.40%
2022	552.22	27.89%	132.76	2,124.94	3,228.12	65.83%
2023	567.40	28.65%	139.40	2,168.94	3,213.63	67.49%
2024	583.01	28.80%	142.87	2,211.28	3,189.58	69.33%
2025	599.04	28.89%	146.12	2,252.95	3,156.66	71.37%
2026	615.51	28.95%	149.44	2,295.40	3,115.66	73.67%
2027	632.44	28.99%	152.88	2,340.73	3,067.99	76.30%
2028	649.83	29.02%	156.43	2,391.00	3,014.93	79.31%
2029	667.70	29.02%	160.04	2,447.86	2,957.38	82.77%
2030	686.06	29.01%	163.68	2,512.82	2,896.02	86.77%
2031	704.93	28.98%	167.31	2,587.03	2,831.21	91.38%
2032	724.31	28.92%	170.85	2,671.80	2,763.45	96.68%
2033	744.23	19.54%	105.19	2,697.09	2,693.36	100.14%
2034	764.70	6.41%	7.11	2,624.98	2,620.53	100.17%
2035	785.73	6.43%	6.84	2,550.25	2,545.18	100.20%
2036	807.34	6.45%	6.61	2,473.16	2,467.55	100.23%
2037	829.54	6.46%	6.39	2,394.02	2,387.95	100.25%
2038	852.35	6.48%	6.17	2,312.95	2,306.50	100.28%
2039	875.79	6.49%	5.96	2,230.44	2,223.68	100.30%
2040	899.87	6.50%	5.79	2,147.01	2,140.01	100.33%
2041	924.62	6.52%	5.62	2,063.01	2,055.81	100.35%
2042	950.05	6.53%	5.47	1,978.88	1,971.53	100.37%
2043	976.17	6.54%	5.32	1,894.83	1,887.38	100.39%
2044	1,003.02	6.54%	5.19	1,811.26	1,803.74	100.42%
2045	1,030.60	6.55%	5.06	1,728.25	1,720.72	100.44%
2046	1,058.94	6.56%	4.95	1,646.15	1,638.62	100.46%
2047	1,088.06	6.56%	4.86	1,565.41	1,557.92	100.48%
2048	1,117.99	6.57%	4.74	1,485.73	1,478.31	100.50%
2049	1,148.73	6.57%	4.65	1,407.39	1,400.07	100.52%
2050	1,180.32	6.58%	4.56	1,330.31	1,323.11	100.54%
2051	1,212.78	6.58%	4.47	1,254.37	1,247.32	100.57%
2052	1,246.13	6.58%	4.39	1,179.57	1,172.69	100.59%
2053	1,280.40	6.59%	4.30	1,105.70	1,099.03	100.61%
2054	1,315.61	6.59%	4.23	1,033.06	1,026.60	100.63%
2055	1,351.79	6.59%	4.19	962.06	955.81	100.65%
2056	1,388.96	6.59%	4.16	893.22	887.18	100.68%
2057	1,427.16	6.59%	4.15	826.89	821.03	100.71%
2058	1,466.41	6.59%	4.14	763.30	757.62	100.75%

<sup>1</sup> Payroll is assumed to increase 2.75% per year.

<sup>2</sup> Actuarial Value of Assets. Investment earnings are assumed to be 7.0% per year on the market value of assets.

This work product was prepared solely for the Government of Guam Retirement Fund for the purposes described herein and may not be appropriate to use for other purposes. Milliman does not intend to benefit and assumes no duty or liability to other parties who receive this work. Milliman recommends that third parties be aided by their own actuary or other qualified professional when reviewing this Milliman work product.

## APPENDIX A. SUMMARY OF PLAN PROVISIONS

The following description is only a brief summary of the more important provisions of the retirement plan. Actual plan provisions are contained in Chapter 8 of the Guam Code, as modified by Public Law 33-186.

**Membership Conditions and Exclusions (Old DB Plan):** All employees of the Government of Guam hired on or before September 30, 1995 are required to participate as a condition of employment, except:

- a) Persons who are compensated on a fee basis;
- b) Independent contractors;
- c) Persons employed for a specific project;
- d) Persons employed in the Senior Citizens' Community Employment Program; and
- e) Persons with less than 20 years of service prior to September 30, 1995 who elect to transfer to the Government of Guam Defined Contribution Fund. Participants have an annual opportunity to transfer.

Membership is optional for:

- a) Temporary, seasonal, intermittent and part-time employees;
- b) Persons employed for a specific period of time and not domiciled in Guam; and
- c) Employees of a public corporation of the Government of Guam.

Membership is also applicable to members of the Legislature with special provisions for:

- a) The determination of average annual salary for pension computation purposes; and
- b) Contributions.

**Membership Conditions and Exclusions (DB 1.75 Plan):** All employees of the Government of Guam who were in the Defined Contribution Plan and were still employed had the option to transfer to the Defined Benefit 1.75 Plan effective January 1, 2018. Employees hired on or after January 1, 2018 are not eligible for the Old DB or DB 1.75 plans.

**Pension Credits:** Employees are entitled to pension credit for:

- a) Service rendered to the Government prior to May 1, 1951 when the Fund began operations.
- b) Service on or after May 1, 1951 for which contributions are required to be made by the employees.
- c) Casual or part-time employment under prescribed conditions for which contributions must be made.
- d) Unused and accumulated sick and annual (vacation) leaves with 12 days of service counted as a full month; 6 to 11 days, ½ month; and less than 6 days disregarded.
- e) For employees hired before June 1, 1989, pension credit is granted up to a maximum of 5 years for Federal service, provided the employee terminates membership in the Federal Civil Service Retirement Fund and makes a contribution to the Government of Guam Retirement Fund equal to the amount contributed by the member and his employer during the period which is equal in length to the period for which service credit is requested, and which ends on the member's

**SECTION V. APPENDICES**

termination date of such employment with interest from the date of such termination to the date of payment.

- f) For employees hired before June 1, 1989, educational leave time or periods of termination for educational training purposes, if contributions are made to the Fund with interest. Members who first joined the fund prior to January 31, 1987, may receive credit for up to the normal period of time required to complete degree without having been employed by the government prior to the period during which the degree was earned.
- g) Military service prior to May 1, 1951, if not considered for any Federal Government Pension other than for disability. If entry into military service occurred after May 1, 1951, total pension credit is limited to 5 years in the aggregate, provided the employee was in the service of the Government of Guam at date of entry into military service and returned to the Government of Guam service within one year following discharge from military service under conditions other than dishonorable, or within 6 months after completion of education under the various education benefits programs for veterans; otherwise the total credit is limited to three years.

**Schedule for Computing Service:** The following schedule shall govern the computation of pension credit: 12 days or more during any month constitutes a month of service; 6 to 11 days, ½ month; less than 6 days is disregarded. Nine months or more during any year constitutes a year of service.

**Vesting of Pension Credit:** Vesting occurs after at least 5 years of service.

Upon separation from service, an employee may optionally leave the contribution credits in the Fund and qualify for a deferred retirement annuity, based upon the total pension credit. If the pension credit is 25 years or more, no refund of contributions is payable and the employee must accept a deferred retirement annuity.

**Conditions for Service Retirement:** With respect to any employee who originally became a member of the Fund prior to October 1, 1981:

- a) Such member may retire on a service retirement annuity at age 60 or over, or at age 55 in the case of a member of the uniformed personnel after at least 10 years of service. Upon retirement, a member of the uniformed personnel shall be considered one grade above that held at date of retirement.
- b) A member with at least 25 years of service may retire at any age on an unreduced retirement annuity.
- c) Any retired employee with at least 25 years of credit service shall be entitled to the full retirement annuity on and after September 30, 1981.
- d) Any member, active or inactive, may retire after 20 years of service, regardless of age. In such case, the retirement annuity shall be reduced ¼ of 1% for each month that the age of the member is less than 60 years (3% per year).

With respect to an employee who became a member of the Fund on or after October 1, 1981, and prior to August 22, 1984, the following provisions shall govern:

- a) Such member may retire on a service retirement annuity at age 60 or over, or at age 55 if a member of the uniformed personnel after at least 15 years of service and upon retirement shall be considered one rank grade above that held at such date.
- b) A member with at least 30 years of service shall be eligible for service retirement, regardless of age, without reduction for early retirement.

**SECTION V. APPENDICES**

- c) Any member, whether in an active or inactive status, may retire after 25 years of service, at any age, on an annuity reduced  $\frac{1}{4}$  of 1% per month (3% per year) for each month member's age is less than 60.

With respect to any employee becoming a member of the Fund on or after August 22, 1984, and a member of the Old DB Plan:

- a) Such member may retire on a service retirement annuity at age 65 or over, or at age 60 in the case of a member of the uniformed personnel after at least 15 years of service. Upon retirement, a member of the uniformed personnel shall be considered one grade above that held at date of retirement.
- b) A member with at least 30 years of service may retire at any age on an unreduced retirement annuity.
- c) Any member, active or inactive, may retire after 25 years of service, regardless of age. In such case, the retirement annuity shall be reduced  $\frac{1}{4}$  of 1% for each month that the age of the member is less than 65 years (3% per year).

With respect to any employee in the DB 1.75 Plan:

- a) Such member may retire on a service retirement annuity at age 62 or over.
- b) Any member, active or inactive, may retire after the attainment of age 55 with 25 years of service. In such case, the retirement annuity shall be reduced  $\frac{1}{2}$  of 1% for each month that the age of the member is less than 62 years (6% per year).

**Amount of Service Retirement Annuity (Old DB Plan):** A basic annuity of 2.00% of "average annual salary" for each of the first 10 years of credited service; and 2.5% of "average annual salary" for each full year of pension credit above 10 years, plus twenty dollars (\$20.00) multiplied by years of credited service reduced by an amount equal to one hundredth of one percent (.01%) of said amount for each one dollar (\$1.00) that a member's average annual salary exceeds the amount of six thousand dollars (\$6,000).

The minimum amount of service retirement annuity payable by the Fund is \$1,200 per year. The maximum retirement annuity is 85% of "average annual salary."

**Amount of Service Retirement Annuity (DB 1.75):** A basic annuity of 1.75% of "average annual salary" for each year of credited service. The minimum amount of service retirement annuity payable by the Fund is \$1,200 per year. The maximum retirement annuity is 85% of "average annual salary."

**Average Annual Salary:** Average of three highest annual salaries received by a member during the entire period of pension credit. A minimum of \$6,000 applies to Old DB Plan members.

The annual salary of the member shall include the basic rate of salary on which contributions were made by the member and any salary on which the member made contributions as required under GCA, Section 8136(a). Effective October 1, 1986, salary can include payment for unused annual leave upon retirement for Old DB Plan members.

In case of members of the Legislature, the average annual salary is the salary of the Director of Administration at the member's date of retirement, or the average of the three highest annual salaries received by the member during the period of membership credit, whichever is greater.

**SECTION V. APPENDICES**

**Automatic Increase in Annuity:** Effective July 1, 1984, any member retiring from service and entitled to benefits after September 1, 1972, is to receive each year, on the anniversary date of retirement, an increment of \$600 if the annual annuity is \$3,500 or less; \$400 if the annuity is between \$3,500 and \$6,300 per year; \$300 if the annuity is between \$6,300 and \$10,100; and \$200 if the annuity exceeds \$10,100 per year.

**Disability Retirement:** Upon total and permanent disability due to physical or mental causes, an employee under age 65 is entitled to a disability retirement annuity. For employees hired prior to August 22, 1984, the amount of the disability retirement annuity will be 66-2/3% of the employee's salary in effect on the date of disability. Subsequent employees will have an annuity amount based on 66-2/3% (50% for DB 1.75 Plan members) of the average of the highest three years of salary. If the disability was not due to occupational causes, the employee must have Government of Guam service credit of at least six years, or five years in the case of terminal illness, in order to qualify, except that new members since May 28, 1985, may not retire if a disability arises from impairment or conditions existing prior to employment.

A disability retirement annuitant must submit to a medical examination at least once a year during the first five years of disability, and at least once every three years thereafter, by a physician or physicians designated by the Board in order to establish continuing disability and entitlement to benefits. Should a disability annuitant resume gainful employment in a position other than the particular job in which he was engaged when declared disabled, the disability retirement benefit shall continue as initially determined.

A member receiving disability retirement benefits since December 1, 1972, is entitled to receive on the anniversary date of retirement, an annual increase of \$300 if the benefit is \$3,000 per year or less; \$250 per year where the annuity is between \$3,000 and \$6,000 per year; \$200 per year where the annuity is between \$6,000 and \$10,000 per year; and \$100 if the annuity exceeds \$10,000 per year.

**Re-entry Into Service:** A member on retirement who re-enters services as an employee eligible for membership shall have the annuity suspended during the period of employment without losing rights to automatic increases in the retirement annuity during the period of re-employment. This provision does not apply to Department of Education employees who occupy positions dealing with the Chamorro Language and Culture Program in Guam schools, persons employed as classroom teachers, guidance or health counselors when critical need arises, nor elected officials.

**Benefits to Survivors:** Benefits are payable to a surviving spouse and children under age 21, upon the death of a member while in service after at least three years of service, or occurring while on retirement. The benefit to children of an annuitant or member whose death occurs while in service after at least three years of service is payable until age 25 if they are full-time students in an accredited educational institution, or payable regardless of age if disabled and disability occurred before age 18.

If only a spouse survives the active or retired member, the annuity payable is 60% of the service or disability retirement annuity earned by the member, subject to a minimum of \$1,200 per year.

The annuity to a child is \$2,880 per year, subject to a maximum payment to five or more minor children of \$14,400 per year. The term "child" or "children" includes any natural child or adopted

**SECTION V. APPENDICES**

child under age 21, or any permanently disabled child whose incapacity began before the child attained age 21.

A survivor annuitant is entitled to an automatic increase in annuity each year on the anniversary date of the annuity of \$600 if the annuity is \$3,500 per year or less; \$400 if the annuity is between \$3,500 and \$6,300 per year; \$300 if the annuity is between \$6,300 and \$10,100; and \$200 if the annuity is more than \$10,100 per year.

A surviving spouse or minor child surviving the member is entitled, in addition to the above, a death benefit of \$1,000 payable in a lump sum.

A survivor's annuity terminates upon death or re-marriage under the age of 40, attainment of age 21 of the child, or the termination of the incapacity of a disabled child.

**Optional Privilege at Retirement:** Upon retirement from service, any unmarried employee, if in good health as determined by medical examination, may elect to receive, on an actuarial equivalent basis in lieu of the full retirement annuity, a reduced retirement annuity payable during the annuitant's lifetime, plus an annuity to a designated beneficiary to become payable at death of the annuitant. The annuity to the beneficiary is to be paid at the same rate and under the same conditions that apply to a survivor of a married member whose death occurs while in service.

**Death Benefit – Active and Retired Members Without Survivors:** Upon death of a member while in service, leaving no survivors eligible for annuities, the designated beneficiary or estate is entitled to a refund of the contribution credits, plus interest, together with a death benefit of \$1,000 payable in a lump sum.

Upon death of a retired member, if no survivors' annuities are payable, the death benefit to a designated beneficiary or the estate of the member consists of the excess, if any, of: (1) the total contribution credits of the member at retirement, plus interest, over (2) the total amount of annuity payments made to the retired member, plus the sum of \$1,000.

**Death Benefit – Inactive Members:** Upon the death of an inactive member with at least 20 years of pension credit, and survived by a spouse or minor children, the following benefit options are provided: (a) the surviving spouse of children, as the case may be, may elect to receive the annuities prescribed if the death of a member occurs while in service; or (b) a refund of the deceased member's total contribution credits, plus interest.

**Refund of Members' Contributions:** Upon complete separation from service, or transfer to the Government of Guam Defined Contribution Fund, a member with less than 25 years of pension credit may receive a refund of the total contributions, plus interest (except that no interest is payable if the total pension credit is less than one year).

**Contributions by Members:** Each Old DB Plan member shall contribute to the Fund 9½% of salary earned and accruing after October 1, 1997; and at the member's option, 10½% of non-base pay subsequent to October 1, 1997. Each DB 1.75 Plan member shall contribute to the Fund 9½% of salary earned and accruing after January 1, 2018.

**SECTION V. APPENDICES**

**APPENDIX B. ACTUARIAL COST METHOD AND ASSUMPTIONS**

	September 30, 2019		September 30, 2018	
<b>Actuarial Cost Method</b>	Entry Age Normal		Entry Age Normal	
<b>Interest Rate</b>	7.00%		7.00%	
<b>Long-term Expected Rate of Return on Plan Assets</b>	7.00%		7.00%	
<b>Salary Increases</b>	<u>Service</u>	<u>% Increase</u>	<u>Service</u>	<u>% Increase</u>
	0 – 5	7.5%	0 – 5	7.5%
	6 – 10	6.0%	6 – 10	6.0%
	11 – 15	5.0%	11 – 15	5.0%
	16 – 20	4.0%	16 – 20	4.0%
	Over 20	4.0%	Over 20	4.0%
<b>Total Payroll Growth (DB and DC)</b>				
First year	2.75%		1.75%	
After first year	2.75%		2.75%	
<b>Cost of Living Adjustment</b>	Specified in Plan		Specified in Plan	
<b>Mortality</b>	RP-2000 Combined Healthy table +3 for males +2 for females projected generationally using 30% of Scale BB		RP-2000 Combined Healthy table +3 for males +2 for females projected generationally using 30% of Scale BB	
<b>Disability</b>				
Incidence	1974-78 SOA LTD Non-Jumbo, with rates reduced by 50% for males and 75% for females		1974-78 SOA LTD Non-Jumbo, with rates reduced by 50% for males and 75% for females	
Post-disability mortality	RP-2000 Disabled table +6 for males +4 for females projected generationally using 30% of Scale BB		RP-2000 Disabled table +6 for males +4 for females projected generationally using 30% of Scale BB	
<b>Withdrawal Rates</b>	Service-based rates (see attached)		Service-based rates (see attached)	
<b>Retirement Age</b>	50% assumed to retire at earliest eligibility for unreduced benefits.		50% assumed to retire at earliest eligibility for unreduced benefits.	
	20% per year thereafter until age 75		20% per year thereafter until age 75	
	100% at age 75		100% at age 75	

*This work product was prepared solely for the Government of Guam Retirement Fund for the purposes described herein and may not be appropriate to use for other purposes. Milliman does not intend to benefit and assumes no duty or liability to other parties who receive this work. Milliman recommends that third parties be aided by their own actuary or other qualified professional when reviewing this Milliman work product.*

**SECTION V. APPENDICES**

	September 30, 2019	September 30, 2018
<b>Return of Contributions</b>	<p>100% of current Old DB Plan employees who withdraw before retirement and who have less than 20 years of service are assumed to elect a return of contributions</p> <p>Terminated or inactive members with at least 5 years of service and an account balance of at least \$10,000 and who have not withdrawn their contributions are assumed to retire upon eligibility for unreduced benefits. All other employees who have previously withdrawn are assumed to elect a return of contributions.</p> <p>Contributions earn 4.5% interest</p>	<p>100% of current Old DB Plan employees who withdraw before retirement and who have less than 20 years of service are assumed to elect a return of contributions</p> <p>Terminated or inactive members with at least 5 years of service and an account balance of at least \$10,000 and who have not withdrawn their contributions are assumed to retire upon eligibility for unreduced benefits. All other employees who have previously withdrawn are assumed to elect a return of contributions.</p> <p>Contributions earn 4.5% interest</p>
<b>Marital Status</b>	<p>Retiree data included spouse information. For active employees, 75% are assumed to have spouses at retirement. The assumed age difference is 3 years (+3 for a male spouse; -3 for a female spouse).</p>	<p>Retiree data included spouse information. For active employees, 75% are assumed to have spouses at retirement. The assumed age difference is 3 years (+3 for a male spouse; -3 for a female spouse).</p>
<b>Leave Adjustments</b>	<p>Assumed to add 1.5 years of service (Old DB and DB 1.75) and increase average earnings (Old DB only) by 5% at retirement</p>	<p>Assumed to add 1.5 years of service (Old DB and DB 1.75) and increase average earnings (Old DB only) by 5% at retirement</p>
<b>Administrative Expenses</b>	<p>\$6,547,000 per year (equal to budgeted expense for year ending 9/30/19), allocated 70% to DB and 30% to DC. In addition, the normal cost for DB 1.75 Plan members is increased by 5% to account for additional expenses.</p>	<p>\$6,860,000 per year (equal to budgeted expense for year ending 9/30/18), allocated 69% to DB and 31% to DC. In addition, the normal cost for DB 1.75 Plan members is increased by 5% to account for additional expenses.</p>
<b>Survivor Benefit – Minor Children</b>	<p>Assumed to be 0.2 eligible child survivors at time of retiree death, with payments to minor child continuing for 6 years</p>	<p>Assumed to be 0.2 eligible child survivors at time of retiree death, with payments to minor child continuing for 6 years</p>
<b>Asset Valuation Method</b>	<p>3-year phase-in of gains/losses relative to interest rate assumption</p>	<p>3-year phase-in of gains/losses relative to interest rate assumption</p>
<b>Data Inconsistencies</b>	<p>None</p>	<p>None</p>

*This work product was prepared solely for the Government of Guam Retirement Fund for the purposes described herein and may not be appropriate to use for other purposes. Milliman does not intend to benefit and assumes no duty or liability to other parties who receive this work. Milliman recommends that third parties be aided by their own actuary or other qualified professional when reviewing this Milliman work product.*

**SECTION V. APPENDICES**

**Probabilities of Separation from Active Service**  
(per 100 working at each age)

MALE					FEMALE				
Age	Death	Disability	Service	Withdrawal	Age	Death	Disability	Service	Withdrawal
20	0.04	0.05	0	15.0	20	0.02	0.03	0	15.0
21	0.04	0.05	1	14.0	21	0.02	0.03	1	14.0
22	0.04	0.05	2	13.0	22	0.02	0.03	2	13.0
23	0.04	0.05	3	12.0	23	0.02	0.03	3	12.0
24	0.04	0.05	4	11.0	24	0.02	0.03	4	11.0
25	0.04	0.05	5	10.0	25	0.02	0.03	5	10.0
26	0.04	0.05	6	9.0	26	0.02	0.03	6	9.0
27	0.04	0.05	7	8.0	27	0.02	0.03	7	8.0
28	0.05	0.05	8	7.0	28	0.03	0.03	8	7.0
29	0.06	0.05	9	6.0	29	0.03	0.03	9	6.0
30	0.06	0.05	10	5.0	30	0.04	0.03	10	5.0
31	0.07	0.05	11	4.5	31	0.04	0.03	11	4.5
32	0.08	0.05	12	4.0	32	0.04	0.03	12	4.0
33	0.08	0.05	13	3.5	33	0.05	0.03	13	3.5
34	0.09	0.05	14	3.0	34	0.05	0.03	14	3.0
35	0.10	0.05	15	2.5	35	0.06	0.03	15	2.5
36	0.10	0.05	16	2.0	36	0.06	0.03	16	2.0
37	0.11	0.05	17	2.0	37	0.06	0.03	17	2.0
38	0.11	0.05	18	2.0	38	0.07	0.03	18	2.0
39	0.12	0.05	19	2.0	39	0.08	0.03	19	2.0
40	0.13	0.10	20 & over	2.0	40	0.09	0.05	20 & over	2.0
41	0.14	0.10			41	0.09	0.05		
42	0.15	0.10			42	0.10	0.05		
43	0.16	0.10			43	0.11	0.05		
44	0.17	0.10			44	0.12	0.05		
45	0.19	0.18			45	0.13	0.09		
46	0.20	0.18			46	0.14	0.09		
47	0.21	0.18			47	0.16	0.09		
48	0.24	0.18			48	0.17	0.09		
49	0.27	0.18			49	0.19	0.09		
50	0.29	0.32			50	0.20	0.16		
51	0.32	0.32			51	0.22	0.16		
52	0.36	0.32			52	0.24	0.16		
53	0.42	0.32			53	0.27	0.16		
54	0.47	0.32			54	0.31	0.16		
55	0.53	0.53			55	0.35	0.27		
56	0.59	0.53			56	0.39	0.27		
57	0.67	0.53			57	0.44	0.27		
58	0.77	0.53			58	0.51	0.27		
59	0.88	0.53			59	0.58	0.27		
60	1.00	0.76			60	0.67	0.38		
61	1.13	0.76			61	0.76	0.38		
62	1.27	0.76			62	0.86	0.38		
63	1.44	0.76			63	0.97	0.38		
64	1.61	0.76			64	1.10	0.38		

*This work product was prepared solely for the Government of Guam Retirement Fund for the purposes described herein and may not be appropriate to use for other purposes. Milliman does not intend to benefit and assumes no duty or liability to other parties who receive this work. Milliman recommends that third parties be aided by their own actuary or other qualified professional when reviewing this Milliman work product.*

**SECTION V. APPENDICES**

**APPENDIX C. SUMMARY OF PARTICIPANT DATA**

**Active Non-Uniformed – Old DB Plan**

Age	COUNT			ANNUAL SALARIES		
	Males	Females	Total	Males	Females	Total
Under 20	-	-	-	-	-	-
20 – 24	-	-	-	-	-	-
25 – 29	-	-	-	-	-	-
30 – 34	-	-	-	-	-	-
35 – 39	-	-	-	-	-	-
40 – 44	14	8	22	*	*	*
45 – 49	111	139	250	\$ 6,097,315	\$ 8,179,279	14,276,594
50 – 54	175	243	418	10,434,139	14,854,720	25,288,859
55 – 59	171	239	410	9,762,641	14,713,788	24,476,429
60 – 64	96	129	225	6,378,519	7,537,266	13,915,785
65 – 69	23	64	87	1,731,623	4,073,674	5,805,297
70 & Over	<u>19</u>	<u>29</u>	<u>48</u>	<u>*</u>	<u>1,746,948</u>	<u>1,746,948</u>
Total	609	851	1,460	\$34,404,237	\$51,105,675	\$85,509,912

\* Not shown if fewer than 20 members. The totals only sum the cells that are displayed.

Age	SERVICE									Total
	0 - 4	5 - 9	10-14	15-19	20-24	25-29	30-34	35-39	40+	
Under 20	-	-	-	-	-	-	-	-	-	-
20 – 24	-	-	-	-	-	-	-	-	-	-
25 – 29	-	-	-	-	-	-	-	-	-	-
30 – 34	-	-	-	-	-	-	-	-	-	-
35 – 39	-	-	-	-	-	-	-	-	-	-
40 – 44	3	1	2	2	4	10	-	-	-	22
45 – 49	1	2	9	11	59	157	11	-	-	250
50 – 54	5	2	11	7	34	243	110	6	-	418
55 – 59	4	9	11	13	32	179	117	39	6	410
60 – 64	5	3	7	7	20	98	59	20	6	225
65 – 69	-	2	-	1	5	40	22	7	10	87
70 & Over	<u>-</u>	<u>1</u>	<u>-</u>	<u>-</u>	<u>4</u>	<u>19</u>	<u>11</u>	<u>5</u>	<u>8</u>	<u>48</u>
Total	18	20	40	41	158	746	330	77	30	1,460

This work product was prepared solely for the Government of Guam Retirement Fund for the purposes described herein and may not be appropriate to use for other purposes. Milliman does not intend to benefit and assumes no duty or liability to other parties who receive this work. Milliman recommends that third parties be aided by their own actuary or other qualified professional when reviewing this Milliman work product.

**SECTION V. APPENDICES**

**Active Uniformed – Old DB Plan**

Age	COUNT			ANNUAL SALARIES		
	Males	Females	Total	Males	Females	Total
Under 20	-	-	-	-	-	-
20 – 24	-	-	-	-	-	-
25 – 29	-	-	-	-	-	-
30 – 34	-	-	-	-	-	-
35 – 39	-	-	-	-	-	-
40 – 44	3	-	3	*	-	*
45 – 49	49	2	51	\$ 3,773,813	*	\$ 3,773,813
50 – 54	62	3	65	5,842,701	*	5,842,701
55 – 59	45	2	47	4,018,094	*	4,018,094
60 – 64	6	3	9	*	*	*
65 – 69	1	-	1	*	-	*
70 & Over	-	-	-	-	-	-
Total	166	10	176	\$ 13,634,608	*	\$ 13,634,608

\* Not shown if fewer than 20 members. The totals only sum the cells that are displayed.

Age	SERVICE									Total
	0 – 4	5 – 9	10-14	15-19	20-24	25-29	30-34	35-39	40+	
Under 20	-	-	-	-	-	-	-	-	-	-
20 – 24	-	-	-	-	-	-	-	-	-	-
25 – 29	-	-	-	-	-	-	-	-	-	-
30 – 34	-	-	-	-	-	-	-	-	-	-
35 – 39	-	-	-	-	-	-	-	-	-	-
40 – 44	-	-	-	-	3	-	-	-	-	3
45 – 49	-	-	-	3	14	32	2	-	-	51
50 – 54	-	1	1	-	7	32	24	-	-	65
55 – 59	-	1	-	-	2	22	20	2	-	47
60 – 64	-	-	-	-	-	2	2	3	2	9
65 – 69	-	-	-	-	-	1	-	-	-	1
70 & Over	-	-	-	-	-	-	-	-	-	-
Total	-	2	1	3	26	89	48	5	2	176

This work product was prepared solely for the Government of Guam Retirement Fund for the purposes described herein and may not be appropriate to use for other purposes. Milliman does not intend to benefit and assumes no duty or liability to other parties who receive this work. Milliman recommends that third parties be aided by their own actuary or other qualified professional when reviewing this Milliman work product.

**SECTION V. APPENDICES**

**Active Total – Old DB Plan**

Age	COUNT			ANNUAL SALARIES		
	Males	Females	Total	Males	Females	Total
Under 20	-	-	-	-	-	-
20 – 24	-	-	-	-	-	-
25 – 29	-	-	-	-	-	-
30 – 34	-	-	-	-	-	-
35 – 39	-	-	-	-	-	-
40 – 44	17	8	25	*	*	*
45 – 49	160	141	301	\$ 9,871,127	\$ 8,179,279	\$ 18,050,407
50 – 54	237	246	483	16,276,840	14,854,720	31,131,559
55 – 59	216	241	457	13,780,735	14,713,788	28,494,523
60 – 64	102	132	234	6,378,519	7,537,266	13,915,785
65 – 69	24	64	88	1,731,623	4,073,674	5,805,297
70 & Over	<u>19</u>	<u>29</u>	<u>48</u>	<u>*</u>	<u>1,746,948</u>	<u>1,746,948</u>
Total	775	861	1,636	\$48,038,845	\$51,105,675	\$99,144,520

\* Not shown if fewer than 20 members. The totals only sum the cells that are displayed.

Age	SERVICE									Total
	0 - 4	5 – 9	10-14	15-19	20-24	25-29	30-34	35-39	40+	
Under 20	-	-	-	-	-	-	-	-	-	-
20 – 24	-	-	-	-	-	-	-	-	-	-
25 – 29	-	-	-	-	-	-	-	-	-	-
30 – 34	-	-	-	-	-	-	-	-	-	-
35 – 39	-	-	-	-	-	-	-	-	-	-
40 – 44	3	1	2	2	7	10	-	-	-	25
45 – 49	1	2	9	14	73	189	13	-	-	301
50 – 54	5	3	12	7	41	275	134	6	-	483
55 – 59	4	10	11	13	34	201	137	41	6	457
60 – 64	5	3	7	7	20	100	61	23	8	234
65 – 69	-	2	-	1	5	41	22	7	10	88
70 & Over	<u>-</u>	<u>1</u>	<u>-</u>	<u>-</u>	<u>4</u>	<u>19</u>	<u>11</u>	<u>5</u>	<u>8</u>	<u>48</u>
Total	18	22	41	44	184	835	378	82	32	1,636

This work product was prepared solely for the Government of Guam Retirement Fund for the purposes described herein and may not be appropriate to use for other purposes. Milliman does not intend to benefit and assumes no duty or liability to other parties who receive this work. Milliman recommends that third parties be aided by their own actuary or other qualified professional when reviewing this Milliman work product.

**SECTION V. APPENDICES**

**Active – DB 1.75 Plan**

Age	COUNT			ANNUAL SALARIES		
	Males	Females	Total	Males	Females	Total
Under 20	-	-	-	-	-	-
20 – 24	18	10	28	*	*	*
25 – 29	115	139	254	\$ 4,067,645	\$ 4,875,145	\$ 8,942,790
30 – 34	177	193	370	7,161,259	7,748,997	14,910,255
35 – 39	177	197	374	7,905,304	8,419,880	16,325,183
40 – 44	212	248	460	11,019,561	11,979,263	22,998,823
45 – 49	272	261	533	15,765,192	13,895,685	29,660,877
50 – 54	227	198	425	14,236,756	10,243,120	24,479,876
55 – 59	180	192	372	11,216,288	10,638,241	21,854,528
60 – 64	115	136	251	7,510,495	7,493,857	15,004,352
65 – 69	46	58	104	3,275,808	3,351,972	6,627,779
70 & Over	<u>24</u>	<u>19</u>	<u>43</u>	<u>1,548,800</u>	<u>*</u>	<u>1,548,800</u>
Total	1,563	1,651	3,214	\$83,707,108	\$78,646,160	\$162,353,263

\* Not shown if fewer than 20 members. The totals only sum the cells that are displayed.

Age	SERVICE									Total
	0 - 4	5 – 9	10-14	15-19	20-24	25-29	30-34	35-39	40+	
Under 20	-	-	-	-	-	-	-	-	-	-
20 – 24	27	-	1	-	-	-	-	-	-	28
25 – 29	175	76	3	-	-	-	-	-	-	254
30 – 34	157	167	46	-	-	-	-	-	-	370
35 – 39	104	135	103	31	-	-	1	-	-	374
40 – 44	84	101	118	98	59	-	-	-	-	460
45 – 49	75	94	105	79	154	25	1	-	-	533
50 – 54	50	78	96	51	95	39	16	-	-	425
55 – 59	34	52	82	53	93	42	13	3	-	372
60 – 64	17	33	54	46	65	24	10	2	-	251
65 – 69	7	9	25	24	22	12	5	-	-	104
70 & Over	<u>-</u>	<u>1</u>	<u>7</u>	<u>15</u>	<u>13</u>	<u>3</u>	<u>1</u>	<u>3</u>	<u>-</u>	<u>43</u>
Total	730	746	640	397	501	145	47	8	-	3,214

This work product was prepared solely for the Government of Guam Retirement Fund for the purposes described herein and may not be appropriate to use for other purposes. Milliman does not intend to benefit and assumes no duty or liability to other parties who receive this work. Milliman recommends that third parties be aided by their own actuary or other qualified professional when reviewing this Milliman work product.

**SECTION V. APPENDICES**

**Service Retirees \*\*\***

Age	COUNT			ANNUAL BENEFITS**		
	Males	Females	Total	Males	Females	Total
Under 25	-	-	-	-	-	-
25 – 29	-	-	-	-	-	-
30 – 34	-	-	-	-	-	-
35 – 39	-	-	-	-	-	-
40 – 44	-	-	-	-	-	-
45 – 49	7	6	13	*	*	*
50 – 54	84	49	133	\$ 4,757,750	\$ 2,163,146	\$ 6,920,896
55 – 59	278	197	475	14,183,870	8,357,706	22,541,576
60 – 64	434	383	817	18,905,181	14,842,993	33,748,174
65 – 69	577	627	1,204	22,760,296	21,450,003	44,210,298
70 – 74	487	553	1,040	18,501,013	17,957,615	36,458,628
75 – 79	324	394	718	12,180,976	11,897,256	24,078,232
80 – 84	200	270	470	6,399,060	7,351,127	13,750,187
85 – 89	111	172	283	3,259,458	4,586,706	7,846,164
90 & Over	<u>47</u>	<u>91</u>	<u>138</u>	<u>1,489,401</u>	<u>2,131,523</u>	<u>3,620,924</u>
Total	2,549	2,742	5,291	\$102,437,007	\$90,738,073	\$193,175,080

\* Not shown if fewer than 20 members. The totals only sum the cells that are displayed.

\*\* Annual benefits shown do not include ad hoc COLAs or Supplemental Annuity Payments.

\*\*\* Payees receiving benefits under Qualified Domestic Relations Orders (QDROs) are included with service retirees.

Age	ANNUAL BENEFIT LEVEL									Total
	<\$5k	\$5-10k	\$10-15k	\$15-20k	\$20-25k	\$25-30k	\$30-40k	\$40-50k	\$50k+	
Under 40	-	-	-	-	-	-	-	-	-	-
40 – 44	-	-	-	-	-	-	-	-	-	-
45 – 49	-	1	-	2	2	-	-	3	5	13
50 – 54	-	1	3	6	3	12	25	25	58	133
55 – 59	-	2	11	21	23	45	95	102	176	475
60 – 64	3	9	22	44	77	104	184	147	227	817
65 – 69	5	16	49	62	120	164	354	231	203	1,204
70 – 74	1	11	44	86	130	173	285	174	136	1,040
75 – 79	-	9	48	74	110	116	164	106	91	718
80 – 84	1	7	56	76	67	74	109	37	43	470
85 – 89	-	1	44	68	55	28	45	20	22	283
90 & Over	<u>-</u>	<u>-</u>	<u>30</u>	<u>28</u>	<u>18</u>	<u>19</u>	<u>28</u>	<u>4</u>	<u>11</u>	<u>138</u>
Total	10	57	307	467	605	735	1,289	849	972	5,291

This work product was prepared solely for the Government of Guam Retirement Fund for the purposes described herein and may not be appropriate to use for other purposes. Milliman does not intend to benefit and assumes no duty or liability to other parties who receive this work. Milliman recommends that third parties be aided by their own actuary or other qualified professional when reviewing this Milliman work product.

**SECTION V. APPENDICES**

**Disabled Retirees**

Age	COUNT			ANNUAL BENEFITS**		
	Males	Females	Total	Males	Females	Total
Under 25	-	-	-	-	-	-
25 – 29	-	-	-	-	-	-
30 – 34	-	-	-	-	-	-
35 – 39	-	-	-	-	-	-
40 – 44	-	-	-	-	-	-
45 – 49	3	3	6	*	*	*
50 – 54	9	3	12	*	*	*
55 – 59	11	8	19	*	*	*
60 – 64	19	12	31	*	*	*
65 – 69	22	21	43	\$ 583,702	\$ 414,211	\$ 997,912
70 – 74	16	25	41	*	591,850	591,850
75 – 79	16	22	38	*	421,877	421,877
80 – 84	8	14	22	*	*	*
85 – 89	2	4	6	*	*	*
90 & Over	<u>1</u>	<u>1</u>	<u>2</u>	<u>*</u>	<u>*</u>	<u>*</u>
Total	107	113	220	\$583,702	\$1,427,938	\$2,011,639

\* Not shown if fewer than 20 members. The totals only sum the cells that are displayed.

\*\* Annual benefits shown do not include ad hoc COLAs or Supplemental Annuity Payments.

Age	ANNUAL BENEFIT LEVEL									Total
	<\$5k	\$5-10k	\$10-15k	\$15-20k	\$20-25k	\$25-30k	\$30-40k	\$40-50k	\$50k+	
Under 40	-	-	-	-	-	-	-	-	-	-
40 – 44	-	-	-	-	-	-	-	-	-	-
45 – 49	-	-	-	4	1	-	1	-	-	6
50 – 54	-	-	-	3	1	3	3	2	-	12
55 – 59	-	-	1	3	6	5	2	-	2	19
60 – 64	-	-	1	13	7	3	5	1	1	31
65 – 69	-	-	5	12	9	11	5	1	-	43
70 – 74	-	-	4	11	7	10	7	2	-	41
75 – 79	-	-	5	18	10	2	2	-	1	38
80 – 84	-	-	3	6	8	3	2	-	-	22
85 – 89	-	-	4	2	-	-	-	-	-	6
90 & Over	<u>-</u>	<u>-</u>	<u>1</u>	<u>1</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>2</u>
Total	-	-	24	73	49	37	27	6	4	220

This work product was prepared solely for the Government of Guam Retirement Fund for the purposes described herein and may not be appropriate to use for other purposes. Milliman does not intend to benefit and assumes no duty or liability to other parties who receive this work. Milliman recommends that third parties be aided by their own actuary or other qualified professional when reviewing this Milliman work product.

## SECTION V. APPENDICES

## Surviving Spouses and Child Pensioners

Age	COUNT			ANNUAL BENEFITS**		
	Males	Females	Total	Males	Females	Total
Under 25	57	60	117	\$ 167,040	\$ 204,480	\$ 371,520
25 – 29	1	3	4	*	*	*
30 – 34	-	1	1	-	*	*
35 – 39	2	5	7	*	*	*
40 – 44	4	16	20	*	*	*
45 – 49	4	29	33	*	475,747	475,747
50 – 54	9	62	71	*	992,655	992,655
55 – 59	8	103	111	*	1,854,983	1,854,983
60 – 64	28	168	196	403,234	3,280,795	3,684,030
65 – 69	39	234	273	605,760	4,619,586	5,225,345
70 – 74	50	241	291	859,890	4,400,423	5,260,314
75 – 79	55	176	231	905,997	3,168,387	4,074,384
80 – 84	40	180	220	648,921	3,077,499	3,726,420
85 – 89	31	126	157	420,000	1,999,428	2,419,428
90 & Over	<u>24</u>	<u>93</u>	<u>117</u>	<u>461,029</u>	<u>1,378,049</u>	<u>1,839,078</u>
Total	352	1,497	1,849	\$4,471,872	\$25,452,033	\$29,923,904

\* Not shown if fewer than 20 members. The totals only sum the cells that are displayed.

\*\* Annual benefits shown do not include ad hoc COLAs or Supplemental Annuity Payments.

## Surviving Spouses Only

Age	ANNUAL BENEFIT LEVEL									Total
	<\$5k	\$5-10k	\$10-15k	\$15-20k	\$20-25k	\$25-30k	\$30-40k	\$40-50k	\$50k+	
Under 40	-	-	1	1	-	-	-	-	-	2
40 – 44	-	4	4	2	1	1	1	-	-	13
45 – 49	-	3	11	8	3	2	2	-	-	29
50 – 54	1	3	22	24	6	5	2	1	-	64
55 – 59	-	12	39	25	14	10	8	1	1	110
60 – 64	-	9	60	51	38	13	12	4	3	190
65 – 69	1	12	96	63	46	23	24	5	2	272
70 – 74	-	15	109	73	48	18	21	4	-	288
75 – 79	-	12	94	60	33	17	10	4	1	231
80 – 84	-	18	82	64	32	13	10	1	-	220
85 – 89	-	10	85	38	13	7	2	2	-	157
90 & Over	<u>-</u>	<u>9</u>	<u>68</u>	<u>22</u>	<u>10</u>	<u>5</u>	<u>2</u>	<u>-</u>	<u>1</u>	<u>117</u>
Total	2	107	671	431	244	114	94	22	8	1,693

This work product was prepared solely for the Government of Guam Retirement Fund for the purposes described herein and may not be appropriate to use for other purposes. Milliman does not intend to benefit and assumes no duty or liability to other parties who receive this work. Milliman recommends that third parties be aided by their own actuary or other qualified professional when reviewing this Milliman work product.

**SECTION V. APPENDICES**

**Inactive and Terminated Members Who are Assumed Not to Withdraw Contributions**

Age	COUNT			ANNUAL BENEFITS		
	Males	Females	Total	Males	Females	Total
Under 25	-	-	-	-	-	-
25 – 29	-	-	-	-	-	-
30 – 34	-	-	-	-	-	-
35 – 39	-	-	-	-	-	-
40 – 44	2	1	3	*	*	*
45 – 49	10	6	16	*	*	*
50 – 54	16	11	27	*	*	*
55 – 59	18	18	36	*	*	*
60 – 64	7	7	14	*	*	*
65 – 69	5	3	8	*	*	*
70 – 74	4	2	6	*	*	*
75 – 79	1	1	2	*	*	*
80 – 84	2	1	3	*	*	*
85 – 89	-	-	-	-	-	-
90 & Over	-	-	-	-	-	-
Total	65	50	115	-	-	-

\* Not shown if fewer than 20 members. The totals only sum the cells that are displayed.

Age	ANNUAL BENEFIT LEVEL									Total
	<\$5k	\$5-10k	\$10-15k	\$15-20k	\$20-25k	\$25-30k	\$30-40k	\$40-50k	\$50k+	
Under 40	-	-	-	-	-	-	-	-	-	-
40 – 44	-	1	1	-	1	-	-	-	-	3
45 – 49	2	8	6	-	-	-	-	-	-	16
50 – 54	7	6	4	8	-	1	1	-	-	27
55 – 59	3	7	8	7	5	1	2	1	2	36
60 – 64	-	7	2	-	1	2	1	1	-	14
65 – 69	1	3	2	-	1	-	-	-	1	8
70 – 74	2	3	-	-	-	-	1	-	-	6
75 – 79	1	-	-	-	-	1	-	-	-	2
80 – 84	1	2	-	-	-	-	-	-	-	3
85 – 89	-	-	-	-	-	-	-	-	-	-
90 & Over	-	-	-	-	-	-	-	-	-	-
Total	17	37	23	15	8	5	5	2	3	115

This work product was prepared solely for the Government of Guam Retirement Fund for the purposes described herein and may not be appropriate to use for other purposes. Milliman does not intend to benefit and assumes no duty or liability to other parties who receive this work. Milliman recommends that third parties be aided by their own actuary or other qualified professional when reviewing this Milliman work product.

## APPENDIX D. RISK DISCLOSURE

The purpose of this appendix is to identify, assess, and provide illustrations of risks that are significant to the Plan, and in some cases to the Plan's participants. Historical data is included.

The results of the actuarial valuation are based on one set of reasonable assumptions. However, it is almost certain that future experience will not exactly match the assumptions. As an example, investments may perform better or worse than assumed in any single year and over any longer time horizon. It is therefore important to consider the potential impacts of these likely differences when making decisions that may affect the future financial health of the Plan, or of the Plan's participants.

In addition, as plans mature they accumulate larger pools of assets and liabilities. This increases the potential risk to plan funding and the finances of those who are responsible for plan funding. As an example, it is more difficult for a plan sponsor to deal with the effects of a 10% investment loss on a plan with \$1 billion in assets and liabilities than if the same plan sponsor is responsible for a 10% investment loss on a plan with \$1 million in assets and liabilities. Since pension plans make long-term promises and rely on long-term funding, it is important to consider how mature the Plan is today, and how mature it may become in the future.

Actuarial Standard of Practice No. 51 (ASOP 51) addresses these issues by providing actuaries with guidance for assessing and disclosing the risk associated with measuring pension liabilities and the determination of pension plan contributions. Specifically, it directs the actuary to:

- Identify risks that may be significant to the Plan.
- Assess the risks identified as significant to the Plan. The assessment does not need to include numerical calculations.
- Disclose plan maturity measures and historical information that are significant to understanding the Plan's risks.

ASOP 51 states that if in the actuary's professional judgment, a more detailed assessment would be significantly beneficial in helping the individuals responsible for the Plan to understand the risks identified by the actuary, then the actuary should recommend that such an assessment be performed.

This appendix uses the framework of ASOP 51 to communicate important information about: significant risks to the Plan, the Plan's maturity, and relevant historical plan data.

**SECTION V. APPENDICES****Investment Risk**

**Definition:** The potential that investment returns will be different than expected.

**Identification:** To the extent that actual investment returns differ from the assumed investment return, the Plan's future assets, funding contributions, and funded status may differ significantly from those presented in this valuation.

**Assessment:** If the prior year's investment performance had been 150 basis points less than the 7.0% investment return assumption, it would have resulted in assets on a market value basis approximately \$30 million lower than expected. The asset loss would be recognized in the actuarial value of assets as a \$10 million loss in each of the next three years. A \$10 million decrease in actuarial value of assets would increase the contribution rate by 0.19% (from 26.97% to 27.16% in this valuation).

**Interest Rate Risk**

**Definition:** The potential that interest rates will be different than expected.

**Identification:** The pension liabilities reported herein have been calculated by computing the present value of expected future benefit payments using the interest rate(s) described in Appendix B. If interest rates in future valuations differ from this valuation, future pension liabilities, funding contributions, and funded status may differ significantly from those presented in this valuation. As a general rule, using a higher interest rate to compute the present value of future benefit payments will result in a lower pension liability, and vice versa.

**Assessment:** If the interest rate changes by 1%, the estimated change in pension liability is approximately 10%.

**Demographic Risks**

**Definition:** The potential that mortality or other demographic experience will be different than expected.

**Identification:** The pension liabilities reported herein have been calculated by assuming that participants will follow patterns of demographic experience (e.g., mortality, withdrawal, disability, retirement, form of payment election, etc.) as described in Appendix B. If actual demographic experience or future demographic assumptions are different from what is assumed to occur in this valuation, future pension liabilities, funding contributions, and funded status may differ significantly from those presented in this valuation. Note that we periodically perform an actuarial experience study of the Plan and provide recommendations for revisions where appropriate. The last experience study performed was in 2017 and was for the period October 1, 2011 to September 30, 2015. The next experience study is scheduled to be performed later this year and will be for the period October 1, 2015 to September 30, 2019.

**Retirement Risk**

**Definition:** The potential for participants to retire and receive subsidized benefits more valuable than expected.

**SECTION V. APPENDICES**

**Identification:** The Old DB Plan has valuable early retirement benefits. For example, for an employee who originally became a member of the Fund prior to October 1, 1981, the benefit is unreduced at 25 years of service (regardless of age). If the participant has reached 20 years of service, the benefits is reduced at 3% per year below age 60. For employees who became members of the Fund after October 1, 1981, the early retirement benefits are also subsidized but not as subsidized as for those prior to October 1, 1981.

**Duration Risk**

**Definition:** Duration is a measure of the weighted average time until the plan's benefits are expected to be paid. It is an indicator of sensitivity to changes in interest rates: the higher the plan's duration, the more sensitive a plan's obligations are to changes in interest rates. Duration typically decreases as a plan matures and retiree liabilities exceed liabilities for active members.

**Identification:** The combined duration for the Old DB Plan and the DB 1.75 plan is approximately 11 years, which implies that plan liabilities would be expected to increase about 11% in response to a 1% decrease in interest rate.

**Amortization/Funding Period**

**Definition:** The Unfunded Actuarial Accrued Liability (UAAL) is the portion of the liability that has not yet been funded (equals liabilities minus assets). This amount is amortized over a specific period of time and is included in the determination of the contributions that are required each year.

**Identification:** The plan currently has a UAAL of \$1,155 million, which is approximately 36% of the total liabilities. This amount is currently amortized over 13.58 years which produces a contribution requirement for this component of \$112.1 million, which represents approximately 79% of the total of DB and DC contributions required for this year (\$141.1 million).

**Assessment:** Based on the current amortization method, the employer contribution rate is projected to drop substantially in 2034. The employer contribution rate will also become more and more volatile as the remaining period is reduced. For example, in the actuarial valuation as of September 30, 2032, any investment gains or losses for the prior year will be amortized in less than 1 year. The next experience study will review the funding method and may include a recommendation to change the method to reduce the future volatility in the employer contribution rate and spread out the projected decline in the rate.

## APPENDIX E. GLOSSARY OF KEY TERMS

**Actuarial Accrued Liability or Total Pension Liability.** The Present Value of Future Benefits allocated to past service in accordance with the actuarial cost method. GASB 67 uses the term Total Pension Liability.

**Actuarial Cost Method.** A method of allocating the present value of benefits to past and future periods. Actuarial cost methods take into consideration the effect of wage inflation.

**Actuarial Gains and Losses.** Changes to the Actuarial Accrued Liability due to deviations from the actuarial assumptions. These can include gains and losses from investments, employee turnover, disability, retirement, mortality, and administrative expenses.

**Actuarial Value of Assets.** A method of valuing Fund assets that may smooth gains and losses that occur in the market value over a period of time.

**GASB.** Government Accounting Standards Board. GASB Statements No. 67, and 68 are accounting standards issued by GASB that require certain items be disclosed in the Fund's financial statements.

**Fiduciary Net Position.** The market value of Fund assets.

**Net Pension Liability.** The dollar value of the Total Pension Liability that exceeds the market value of Fund assets. A fully funded plan will have no Net Pension Liability.

**Normal Cost or Service Cost.** The value of benefits earned for one year of service. The normal cost is calculated in accordance with the actuarial cost method. The accumulation of all normal costs assigned to past service equals the Actuarial Accrued Liability. GASB 68 uses the term Service Cost.

**Present Value of Benefits.** The sum of all benefits expected to be paid in the future by the retirement system, with the payments discounted to the present using the valuation interest rate. This includes benefits to be earned in the future for current employees.

**Present Value of Future Normal Cost.** The sum of all future normal costs expected for current employees, with the costs discounted back to the present using the valuation interest rate.

**Security Ratio.** The percentage of the Actuarial Accrued Liability that is funded by the Fund assets. A fully funded plan will have a security ratio of 100%.

**Unfunded Actuarial Accrued Liability.** The dollar value of the Actuarial Accrued Liability that exceeds the Actuarial Value of Assets. A fully funded plan will have no unfunded actuarial accrued liability.