

City of Norcross

*65 Lawrenceville Street
Norcross, GA 30071*



Meeting Agenda

Thursday, February 17, 2022

9:00 AM

2nd Floor Community Room

Mayor and Council Retreat

Mayor Craig Newton

Mayor Pro Tem Matt Myers

Councilmember Andrew Hixson

Councilmember Josh Bare

Councilmember Bruce Gaynor

Councilmember Arlene Beckles

- A. Roll Call (recorded)**
- B. Welcome & Opening Remarks: Mayor Newton, City Manager**
- C. Discussion of Retiree Benefits: Pension, Health care**
 - [February 2022 Retreat Presentation](#)
 -
 - [Agenda item - December PWS - Retirement Plan](#)
 - [Retirement plan actuarial analysis as of 01012021](#)
 - [Better-Bang-for-the-Buck-3.0-F11](#)
 - [City of Norcross GASB 75 OPEB Actuarial Valuation Report for August 31 2021](#)
 - [Norcross \(City Executed OPEB Agreement\)](#)
- D. Potential allocation of 2023 SPLOST**
- E. Adjourn to Executive Session for Personnel, Real Estate or Legal**



2022 MAYOR AND COUNCIL RETREAT

February 17, 2022

Retiree Benefits

- ✓ Pension Plan
- ✓ Retiree Healthcare

Pension Plan

Employees must work 5 years to vest in the City pension plan. As of January 1, 2021, the last date for which actuarial data is available:

- There were 107 City employees, of whom 65 were vested in the City's pension plan.
- 53 former employees were also vested in the plan.
- Current participants in the plan included 30 retirees, 5 disabled retirees, and 4 dependents.
- Since 2017, new employees contribute 3% of earnings to the pension plan.

- Employees who leave before vesting receive any contribution they have made, and the City's contribution remains in the pension plan as part of covering the cost of those who do vest in the plan.
- The plan is administered by the Georgia Municipal Association.
- The plan, as of that date, was fully funded on an **ongoing** basis – i.e., there were sufficient funds to meet calculated future benefits for current retirees and those expected to retire in the future – if accrued benefits are compared against the market value of assets.
- City contributions are recalculated each year and contributions to the plan are updated based on any changes.

Summary of Key Valuation Results

Valuation date	January 1, 2021	January 1, 2020
Fiscal year-beginning date	September 1, 2021	September 1, 2020
Contributions for fiscal year beginning:		
Recommended	\$540,411	\$476,420
Recommended as a percent of expected payroll	9.12%	8.02%
Funding elements as of the valuation date:		
Mid-year normal cost, including administrative expenses	\$407,201	\$382,022
Market value of assets	13,608,243	12,372,814
Actuarial value of assets	13,566,006	12,591,232
Actuarial accrued liability	14,377,036	13,108,604
Unfunded/(Surplus) actuarial accrued liability	811,030	517,372
Funded ratio on a market value basis	94.65%	94.39%
Funded ratio on an actuarial value basis	94.36%	96.05%
Funded Status as of valuation date:		
Present value of accrued plan benefits on long-term funding assumptions	\$13,179,001	\$11,977,312
Funded percentage relative to market value	103.26%	103.30%
Present value of accrued plan benefits on a plan termination basis	\$33,732,300	\$27,230,988
Funded percentage relative to market value	40.34%	45.44%
Demographic data as of valuation date:		
Number of retired participants and beneficiaries	39	37
Number of vested former participants	53	50
Number of active employees	107	109
Number of active elected officials	--	--
Total valuation payroll	\$5,840,999	\$5,853,882
Average valuation payroll	54,589	53,705

The funded ratios shown above may not be appropriate for assessing the amount of future recommended contributions.

Chart 11

Present Value of Accrued Plan Benefits as of Valuation Date

	Number of Participants	Ongoing Basis	Plan Termination Basis
Benefits for retired participants and beneficiaries	39	\$6,346,545	\$11,861,410
Terminated vested participants	53	1,737,680	5,990,239
Active vested participants	<u>65</u>	<u>4,975,430</u>	<u>14,991,651</u>
Total present value of vested benefits	157	\$13,059,655	\$32,843,300
Nonvested benefits	<u>42</u>	<u>119,346</u>	<u>889,000</u>
Total present value of accrued plan benefits	199	\$13,179,001	\$33,732,300
Market value of assets		13,608,243	13,608,243
Unfunded/(Surplus) present value of accrued plan benefits		-429,242	20,124,057
Funded percentage		103.26%	40.34%

From “A better bang for the buck 3.0”

National Institute for Retirement Security, January 2022

Longevity risk pooling. The pooling of longevity risk in DB pensions enables them to fund benefits based on average life expectancy, and yet pay each worker monthly income no matter how long they live. In contrast, DC plans must receive excess contributions to enable each worker to self-insure against the possibility of living longer than average.

Higher investment returns. DB pensions realize higher net investment returns due to professional management and lower fees from economies of scale

Optimally balanced investment portfolios. DB pensions are “ageless” and therefore can perpetually maintain an optimally balanced investment portfolio rather than the typical individual strategy of down-shifting over time to a lower risk/return asset allocation. This means that over a lifetime, DB pensions earn higher investment returns as compared to DC accounts.

Switching from a pension to a defined contribution plan saves money only if it involves substantial cuts to employee benefits.

Pension Discussion

Other Post-Retirement Benefits - OPEB

- In 2021, the City paid up to \$456 per month for Medicare supplement and drug coverage for each current retiree and \$431 per month for each spouse (if covered) over age 65.
- For retirees aged 55 and over but less than 65, the City paid 83%, or \$67,092 of the \$81,252 in costs.
- The most recent actuarial report did not reflect recent City changes to reduce prescription costs and to begin phasing in higher contributions by those who retire on or after January 1, 2022.
- We instituted modest changes in January related to pharmacy costs and increased contributions by new, 65+ retirees.

Eligibility:	Eligibility for medical, prescription drug and dental benefits is as follows:			
	Hire Date	Public Safety	General Employees	
	Before 1999	Earliest of: Age 55 with 20 Years of Service and Age 65 with 5 Years of Service	Earlier of: Age 62 with 20 Years of Service and Age 65 with 5 Years of Service	
	1999 to 2017	Age 55 with 20 Years of Service	Age 62 with 10 Years of Service	
	After 2017	Age 55 with 20 Years of Service	Age 62 with 20 Years of Service	
Benefit Types:	Medical, Prescription Drug, and Dental			
Duration of Coverage:	Lifetime			
Dependent Benefits:	Medical, Prescription Drug, and Dental			
Dependent Coverage:	Lifetime. Surviving spouses also covered for life for employees hired prior to 2018.			
Retiree Contributions:	Retiree and spouse contribution rates are set by the City. The monthly contributions for medical and dental coverage are shown in the table below:			
		Medical		
		Hired before 1999	Hired 1999 to 2017	Hired after 2017
	Retiree only w/o Medicare	\$150.00	\$150.00	\$200.00
	Retiree + Spouse w/o Medicare	\$200.00	\$200.00	N/A
	Retiree only with Medicare	\$0.00	\$0.00	\$0.00
	Retiree + Spouse with Medicare	\$25.00	\$25.00	N/A
		Dental		
	Retiree	\$0.00	\$0.00	\$ 0.00
	Retiree + Spouse	\$30.00	\$30.00	N/A

From the 2021 May retreat

General information about the OPEB plan

Plan Description

Plan administration. The City of Norcross Other Postemployment Benefits Plan (the “OPEB Plan”) is a defined benefit postretirement health care plan. The OPEB Plan is administered through the Georgia Municipal Employee Benefit System (GMEBS), an agent multiple-employer OPEB Plan administered by the Georgia Municipal Association (GMA).

Plan membership. At July 1, 2019, City plan membership consisted of the following:

Retired members or beneficiaries currently receiving benefits	21
Vested terminated members entitled to but not yet receiving benefits	--
Active members	130
Total	151

Benefits provided. The City has the authority to establish and amend the OPEB Plan. The City provides medical, prescription drug and dental benefits to retirees. Retirees’ spouses are eligible for the same benefits as the retiree. Employees hired prior to 1999 become eligible for those benefits if they retire on or after the age 62 (55 for Public Safety employees) with 20 completed years of service or after the age of 65 with 5 completed years of service. Employees hired after 1998, but before 2018, become eligible for benefits if they retire on or after the age 62 with 10 years of service (55 and 20 years of service for Public Safety employees). Employees hired in or after 2018, who are permanent full-time career employees, and who have been employed a minimum of 20 full-time continuous years with the City and have attained their 62nd birthday (55th birthday for Public Safety) while employed full time by the City, become eligible to purchase single coverage medical insurance under the then current City medical insurance plan.

From the 2021 May retreat

Net OPEB Liability

Reporting Date for Employer under GASB 75 Measurement Date	August 31, 2020 August 31, 2019	August 31, 2019 August 31, 2018
Components of the Net OPEB Liability		
Total OPEB Liability	\$14,787,366	\$8,278,609
Plan Fiduciary Net Position	--	--
Net OPEB Liability	14,787,366	8,278,609
Plan Fiduciary Net Position as a percentage of the Total OPEB Liability	0.00%	0.00%

The Net OPEB Liability was measured as of August 31, 2019 and 2018. Total OPEB Liability was determined from actuarial valuations using data as of July 1, 2019 and 2017 respectively.

The total OPEB Liability of \$14.8 million was equal to 252.6% of covered employee payroll.

Updated information

Net OPEB liability

Reporting Date for Employer under GASB 75	August 31, 2021	August 31, 2020
Measurement Date	August 31, 2020	August 31, 2019
Components of the Net OPEB Liability		
Total OPEB Liability	\$17,576,128	\$14,787,366
Plan Fiduciary Net Position	--	--
Net OPEB Liability	17,576,128	14,787,366
Plan Fiduciary Net Position as a percentage of the Total OPEB Liability	0.00%	0.00%

The Net OPEB Liability was measured as of August 31, 2020 and 2019. Total OPEB Liability was determined from actuarial valuations using data as of July 1, 2019.

The new OPEB Liability of \$17.6 million rose to 293.6% of covered employee payroll. While the City's pension plan is fully funded, the health plan is unfunded. We pay annual premium

Actuarial assumptions. The Total OPEB Liability was measured as of August 31, 2020 using the following actuarial assumption applied to all periods included in the measurement, unless otherwise specified:

Inflation	2.25%
Salary increases	2.25% plus service based merit increases
Discount rate	2.20% 
Healthcare cost trend rates	
Medical	7.00% trended down to 4.50% by 2029
Prescription drug	7.00% trended down to 4.50% by 2029
Dental	4.00%
Mortality rates	Sex-Distinct Pri-2012 (head-count weighted) Tables with adjustments and mortality improvement from 2012

Future costs are discounted back to today's dollars. Accounting standards dictates the rate is the 20-year municipal bond index rate unless the City is funding the liability. A higher "blended" rate can apply if the City commits to funding at least a portion of the liability.

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Dental	4.00%
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Future costs are discounted back to today's dollars. Accounting standards dictates the rate is the 20-year municipal bond index rate unless the City is funding the liability. A higher "blended" rate can apply if the City commits to funding at least a portion of the liability.

So how can we tackle this unfunded liability?

- ✓ Phase in higher contributions from retirees (we did that for those who retire on or after January 1, 2022).
- ✓ Implement cost savings (we lowered pharmacy costs this year).
- ✓ End City subsidy of this benefit for future hires. Allow those under 65 to pay the full cost to participate in the City's employee health insurance.
- ✓ At least partly fund the future liability with a lump sum or annual contributions.
- ✓ Set up an irrevocable OPEB trust fund through GMA to take advantage of their higher long-term rate of return. *The funds can then only be spent on this liability.*

2023 Special Purpose Local Option Sales Tax – SPLOST

2023 SPLOST

- ✓ Referendum will be held in November 2022
- ✓ County-proposed distribution is based entirely on population
- ✓ Estimate of Norcross revenue is \$23.8 million over six years, with collections beginning in April 2023
- ✓ The City allocated the 2014 SPLOST as follows: 16% Administrative Facilities, 15% parking Facilities, 13% Recreation Facilities an Equipment, and 565 Transportation (roads, streets, bridges, drainage, sidewalks, and related facilities and equipment)

2023 SPLOST

- ✓ The City allocated the 2017 SPLOST as follows: 30% Recreation, 30% Parking, and 40% Transportation

Note that the Beaver Ruin Greenway is a transportation project, and the new Norcross Library was primarily a parking project (in 2014 SPLOST as well). Some Library costs were related to transportation. Recent costs related to a police headquarters have been charged to administrative facilities funds remaining from the 2014 SPLOST.

Some potential needs

- Road resurfacing – the City is spending \$1.5 million per year less than proposed in the 2020 pavement condition assessment report.
- Trails (to match future ARC transportation grants)
- Railroad crossings (if not covered by 2017 SPLOST)
- Railroad quiet zone
- Existing parks enhancements
- New park land
- Administrative facilities – Police headquarters or public safety building, and/or City Hall renovations
- Other transportation enhancements – traffic calming, sidewalk improvements
- Cultural arts center
- and everything else...

Adjourn





MAYOR **CRAIG NEWTON** • MAYOR PRO TEM **JOSH BARE** • COUNCILMEMBER **ANDREW HIXSON** • COUNCILMEMBER **MATT MYERS**
COUNCILMEMBER **BRUCE GAYNOR** • COUNCILMEMBER **ARLENE BECKLES** • CITY MANAGER **ERIC JOHNSON** • CITY CLERK **MONIQUE LANG**

Agenda Report

To: Mayor and Council

From: Mayor Pro Tem Josh Bare

Meeting Date: December 20, 2021 – Policy Work Session

Item No.: 21-6342

Title: Participation in retiree benefits for new employees

CC: Eric Johnson

Recommendation

Terminate participation in the City pension plan through the Georgia Municipal Association as well as participation in retiree health and dental benefits for employees hired on or after January 1, 2022. Additionally, consider whether to buy out those benefits from current City employees.

Background

Retiree Health, Prescription, and Dental Benefits – There are separate plans for those who retire prior to age 65 and those who retire at age 65 or later. The former participate in the City's Cigna health insurance plan, while those age 65 or older participate in a Medicare supplement administered by Hartford and a prescription plan administered by Rx Scripts that will transition to Humana on March 1, 2022. Retirees may also participate in the City's Cigna dental plan.

There is a lag between the date for which a valuation is made, the date it is measured, and the reporting date. The most recent actuarial report reflects measurement as of August 31, 2020 and a valuation as of July 1, 2019. As of the most recent report, the City's unfunded liability for current and future retirees was \$17.6 million – reflecting 21 retirees (in 2019) and 130 expected future retirees.

Pension – Employees must work 5 years to vest in the City pension plan. As of January 1, 2021, the last date for which actuarial data is available, there were 107 employees of whom 65 were vested in the City's pension plan, 53 former employees also vested in the plan. Current participants in the plan included 30 retirees, 5 disabled retirees, and 4 dependents.

Employees who leave before vesting receive any contribution they have made and the City's contribution remains in the pension plan as part of covering the cost of those who do vest in the plan. The plan is administered by the Georgia Municipal Association.

The plan, as of that date, was fully funded on an **ongoing** basis – i.e., there were sufficient funds to meet calculated future benefits for current retirees and those expected to retire in the future – if accrued benefits are compared against the market value of assets. City contributions are recalculated each year and contributions to the plan are updated based on any changes.

Calculations are shown on the attachment labeled Chart 11 for current retirees, former employees who are vested in the plan, and current employees – both those who are vested and those who are not. Chart 11 is from the City's most current actuarial valuation report for January 1, 2021.

Financial Impact

Retiree Health - In 2021, the City paid up to \$456 per month for Medicare supplement and drug coverage for each current retiree and \$431 per month for each spouse (if covered) over age 65. For retirees age 55 and over but less than 65, the City paid 83%, or \$67,092 of the \$81,252 in costs.

The most recent actuarial report did not reflect recent City changes to reduce prescription costs and to begin phasing in higher contributions by those who retire on or after January 1, 2022.

If participation is terminated for new hires, future costs will reflect only the ongoing costs, as they may change, for existing retirees and existing employees. Future actuarial analyses would reflect the reduction in eligible future participants.

Pension - There is no cost to cancelling the pension benefit for future hires. Savings would reflect the differential between the 7% of salary currently paid by the City to the pension plan for new hires (net any savings if an employee does not vest in the plan) and any substitute benefit offered by the City *for those employees*. The City currently matches an employee 457 contribution by a contribution to a 401(a) plan of up to 3% in addition to the 7% City pension contribution for any employee hired after 2017.

Using Chart 11 as a basis for calculation:

To buy out former ("terminated") employees who are vested in the retirement system would essentially cost the difference between the \$5,990,239 shown as the plan termination cost for those 53 individuals and the \$1,737,680 shown as available if they remain in the plan – a difference of \$4,252,559. To buy out the 65 current employees who have vested in the plan with 5 or more years of service ("active vested participants") would cost the differential between \$14,991,651 and \$4,975,430 – or \$10,016,221. To buy out the 42 employees who have not yet vested (shown as "Nonvested benefits") would cost the differential between \$889,000 and \$119,346 – or \$769,654. In total, buying out current and former employees who have not yet retired (and based on January 2021 calculations) would cost a total of slightly more than \$15 million.

Actuarial calculations are based on a set of assumptions and the assumptions can be updated annually, so the January 1, 2022 review could show different amounts as could sequential updates to the actuarial valuation and review. A report prepared last year and presented at the City's May retreat projected that the City's required contribution to the pension plan would slowly decline as a percentage of payroll over time



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Consistent with Comprehensive Plan?

There is no specific relationship to the City's Comprehensive Plan goals or policies.

Next Steps

If current retirement benefits – pension and/or health and dental – are terminated for new employees, existing plans will require notification of providers. Consideration should be given for alternate retiree benefits such as an increase in the City's defined contribution plan.

Attachments

Actuarial report Chart 11.

Update

Not applicable.

City of Norcross Retirement Plan

A Participating Member of the
Georgia Municipal Employees Benefit System

Actuarial Valuation and Review
as of January 1, 2021

Segal

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The Burgess Building
201 Pryor Street, SW
Atlanta, GA 30303-3606
404-688-0472
Toll-Free within Georgia:

1-888-488-4462

May 7, 2021

GMEBS Retirement Fund Member:

We are pleased to submit this Actuarial Valuation and Review as of January 1, 2021. It summarizes the actuarial data used in the valuation, establishes the funding requirements for the Plan and analyzes the preceding year's experience. This report was based on the census data submitted to the Georgia Municipal Employees' Benefit System (GMEBS), the financial information prepared by GMEBS, and the terms of the Plan. The actuarial calculations were completed under the supervision of Jeanette R. Cooper, FSA, FCA, MAAA, Enrolled Actuary. We are members of the American Academy of Actuaries and we meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinion herein.

This actuarial valuation has been completed in accordance with generally accepted actuarial principles and practices. To the best of our knowledge, the information supplied in this actuarial valuation is complete and accurate. Further, in our opinion, the assumptions as approved by the GMEBS Board of Trustees are reasonably related to the experience of and the expectations for the Plan. The next page provides an overview of the report contents.

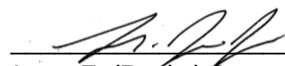
The new cost of the plan as referenced in Section 1, including administrative charges and personalized pension statements, will begin to be invoiced by the Georgia Municipal Association (GMA) with your next fiscal year. Personalized pension statements will be forwarded to you by GMA separately.

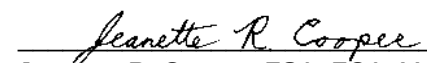
Please contact the following GMA staff if you have any questions. GMA staff can also be reached toll-free at 1-888-488-4462.

- Invoice questions – Yolanda Leaks, Accounting Manager 678-686-6239, or Joel Levy, Accounting Specialist 678-686-6233.
- Pension statements – Michele Powell, Senior Benefit Analyst 678-686-6345.
- Valuation/Funding questions – Marinetty Bienvenu, Director of Employee Benefit Services 678-686-6263.

SEGAL

By:


Leon F. (Rocky) Joyner, Jr., FCA, ASA, MAAA, EA
Senior Vice President and Actuary


Jeanette R. Cooper, FSA, FCA, MAAA, EA
Vice President and Actuary

Report Overview and Helpful Hints to Navigation

This report is presented in five sections with Section 1 providing summary information, and Sections 2 through 5 providing details related to the summary as well as supplementary information required by the Governmental Accounting Standards Board (GASB). The following outline will guide you through the table of contents shown on the next page, as well as the highlights within the report.

Section 1, beginning on page 5 provides a summary of the key results from this year's valuation and describes any major changes from the prior year. The Summary of Key Valuation Results on page 7 shows a side-by-side comparison of the current and prior year's numbers. Included in the comparison is the recommended contribution, major elements used to determine the recommended contribution, funded status results, and demographic data.

Section 2, beginning on page 10 includes valuation details such as the development of the recommended contribution, including the "absolute minimum" under Georgia law, and the smoothed actuarial value of assets used in the contribution calculation. This Section also presents the funded status of the plan on both funding assumptions, an ongoing basis, and on a basis as if the plan were to be terminated.

There are also several charts within this section, with the most notable being:

- Chart 6 (page 14) provides a reconciliation of the market value of assets and the smoothed actuarial value of assets from last year to this year. The actuarial value of assets is used in the development of the recommended contribution.
- Chart 8 (page 17) shows the development of the recommended contribution for both the current and prior fiscal years.
- Chart 11 (page 21) shows the funded percentage of the plan on a funding assumptions, ongoing basis and on a plan termination basis as of the valuation date. These percentages reflect the ratio of the market value of assets to the present value of benefits earned to date.
- Chart 12 (page 22) shows historical funding information on the basis used for determining contributions.

Section 3, beginning on page 24 includes supplemental information including demographic statistics, a reconciliation of the unfunded liability or surplus from last year to this year and a glossary of terms. Exhibit D (page 27) defines the pension terms used throughout the report.

Section 4, beginning on page 30 includes reporting information as specified by the Governmental Accounting Standards Board (GASB) under Statement 68, applicable to the Fiscal Year beginning September 1, 2020 and ending August 31, 2021.

Section 5, beginning on page 41 includes supplementary information.

There are several charts within this section, with the most notable being:

- Exhibit III (page 43) presents a summary of the assumptions and methods used to value the Plan.
- Exhibit IV (page 50) provides a summary of the plan of benefits used for the valuation.

City of Norcross Actuarial Valuation and Review as of January 1, 2021

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Section 1: Actuarial Valuation Summary

Purpose and Basis

This report has been prepared by Segal Consulting to present a valuation of the City of Norcross Retirement Plan as of January 1, 2021. The census information and financial information on which our calculations were based was provided by GMA staff in conjunction with the City of Norcross. The valuation was performed to determine whether the assets and contributions are sufficient to provide the prescribed benefits and to provide information for required disclosures under Governmental Accounting Standards Board (GASB) Statement 68. The contribution requirements presented in this report are based on:

- The benefit provisions of the Retirement Plan;
- The characteristics of covered active participants, inactive vested participants, and retired participants and beneficiaries;
- The assets of the Plan;
- Economic assumptions regarding future salary increases and investment earnings; and
- Other actuarial assumptions, regarding employee terminations, retirement, death, etc.

The assumptions and methods used to value the Plan were approved in December 2019 by the Board based on an experience study for the period January 1, 2015 through June 30, 2019 conducted in November and December of 2019. In our opinion, the assumptions are reasonably related to the experience of and the expectations of the Plan.

The measurements shown in this actuarial valuation may not be applicable for other purposes. Future actuarial measurements may differ significantly from the current measurements 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; and changes in plan provisions or applicable law.

Section 1: Actuarial Valuation Summary

Significant Issues

- The recommended contribution for the Plan for the upcoming fiscal year, including plan changes, administrative charges and pension statements has increased from \$476,420 to \$540,411. The new contribution represents 9.12% of the expected payroll of covered employees, versus 8.02% at the previous valuation. This is an increase of 1.10% of pay.
- Payment of the above recommended contribution will begin with your next fiscal year starting on September 1, 2021.
- There were no changes in plan provisions in this valuation.
- There were no changes in methods or assumptions in this valuation.
- Segal does not perform an in-depth analysis into the cause of contribution fluctuations for GMEBS plans unless the change is more than 2.00% of payroll. Over the long-term, some fluctuation is expected.
- Since the actuarial valuation results are dependent on a given set of assumptions, there is a risk that emerging results may differ significantly as actual experience proves to be different from the assumptions. We have included a discussion of various risks that may affect the Plan in Section 2.
- This year, the report includes reporting information as specified by the GASB under Statement 68, applicable to the Fiscal Year beginning September 1, 2020 and ending August 31, 2021.

Section 1: Actuarial Valuation Summary

Summary of Key Valuation Results

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Number of retired participants and beneficiaries	39	37
Number of vested former participants	53	50
Number of active employees	107	109
Number of active elected officials	--	--
Total valuation payroll	\$5,840,999	\$5,853,882
Average valuation payroll	54,589	53,705

The funded ratios shown above may not be appropriate for assessing the amount of future recommended contributions.

Section 1: Actuarial Valuation Summary

Important Information about Actuarial Valuations

An actuarial valuation is a budgeting tool with respect to the financing of future projected obligations of a pension plan. It is an estimated forecast – the actual long-term cost of the plan will be determined by the actual benefits and expenses paid and the actual investment experience of the plan.

In order to prepare a valuation, Segal Consulting (“Segal”) relies on a number of input items. These include:

- **Plan of benefits** Plan provisions define the rules that will be used to determine benefit payments, and those rules, or the interpretation of them, may change over time. Even where they appear precise, outside factors may change how they operate. It is important to keep Segal informed with respect to plan provisions and administrative procedures, and to review the plan summary included in our report to confirm that Segal has correctly interpreted the plan of benefits.
- **Participant data** An actuarial valuation for a plan is based on data provided to the actuary by the System. Segal does not audit such data for completeness or accuracy, other than reviewing it for obvious inconsistencies compared to prior data and other information that appears unreasonable. It is important for Segal to receive the best possible data and to be informed about any known incomplete or inaccurate data.
- **Assets** The valuation is based on the market value of assets as of the valuation date, as provided by the System. The Plan uses an “actuarial value of assets” that differs from market value to gradually reflect year-to-year changes in the market value of assets in determining the contribution requirements.
- **Actuarial assumptions** In preparing an actuarial valuation, Segal projects the benefits to be paid to existing plan participants for the rest of their lives and the lives of their beneficiaries. This projection requires actuarial assumptions as to the probability of death, disability, withdrawal, and retirement of each participant for each year. In addition, the benefits projected to be paid for each of those events in each future year reflect actuarial assumptions as to salary increases and cost-of-living adjustments. The projected benefits are then discounted to a present value, based on the assumed rate of return that is expected to be achieved on the plan’s assets. There is a reasonable range for each assumption used in the projection and the results may vary materially based on which assumptions are selected. It is important for any user of an actuarial valuation to understand this concept. Actuarial assumptions are periodically reviewed to ensure that future valuations reflect emerging plan experience. While future changes in actuarial assumptions may have a significant impact on the reported results, that does not mean that the previous assumptions were unreasonable.

Section 1: Actuarial Valuation Summary

The user of Segal's actuarial valuation (or other actuarial calculations) should keep the following in mind:

- The actuarial valuation is prepared at the request of the System. Segal is not responsible for the use or misuse of its report, particularly by any other party.
- An actuarial valuation is a measurement of the Plan's assets and liabilities at a specific date. Accordingly, except where otherwise noted, Segal did not perform an analysis of the potential range of future financial measures. The actual long-term cost of the plan will be determined by the actual benefits and expenses paid and the actual investment experience of the Plan.
- Actuarial results in this report are not rounded but that does not imply precision.
- If the System is aware of any event or trend that was not considered in this valuation that may materially change the results of the valuation, Segal should be advised, so that we can evaluate it.
- Segal does not provide investment, legal, accounting, or tax advice. Segal's valuation is based on our understanding of applicable guidance in these areas and of the Plan's provisions, but they may be subject to alternative interpretations. The System should look to their other advisors for expertise in these areas.

As Segal Consulting has no discretionary authority with respect to the management or assets of the Plan, it is not a fiduciary in its capacity as actuaries and consultants with respect to the Plan.

Section 2: Actuarial Valuation Results

Participant Data

The Actuarial Valuation and Review considers the number and demographics of covered participants, including active participants, vested terminated participants, retired participants and beneficiaries.

Segal does not audit the data provided by GMA staff in conjunction with the City of Norcross.

This section presents a summary of significant statistical data on these participant groups.

More detailed information for this valuation year and the preceding valuation can be found in Section 3, Exhibits A and B.

Chart 1

Participant Population: 2012 – 2020

A historical perspective of how the participant population has changed over past valuations can be seen in this chart.

Year Ended	Active Participants	Vested Terminated Participants	Retired Participants and Beneficiaries	Ratio of Non-Actives to Actives
June 30, 2012	85	23	28	0.60
June 30, 2013	94	30	31	0.65
June 30, 2014	91	33	31	0.70
June 30, 2015	95	36	32	0.72
June 30, 2016	101	37	32	0.68
June 30, 2017	104	44	32	0.73
June 30, 2018	110	47	33	0.73
December 31, 2018	113	48	36	0.74
December 31, 2019	109	50	37	0.80
December 31, 2020	107	53	39	0.86

Section 2: Actuarial Valuation Results

Active Participants

Plan costs are affected by the age, years of service and payroll of active participants. In this year's valuation, there were 107 active participants with an average age of 45.0, average years of service of 8.9 years and average payroll of \$54,589. The 109 active participants in the prior valuation had an average age of 44.3, average service of 8.7 years and average payroll of \$53,705. (Payroll is provided for employees only, and not for elected officials, when applicable.)

Inactive Participants

In this year's valuation, there were 53 participants with a vested right to a deferred or immediate vested benefit.

These graphs show a distribution of active participants by age and by years of benefit service.

Chart 2

Distribution of Active Participants by Age as of December 31, 2020

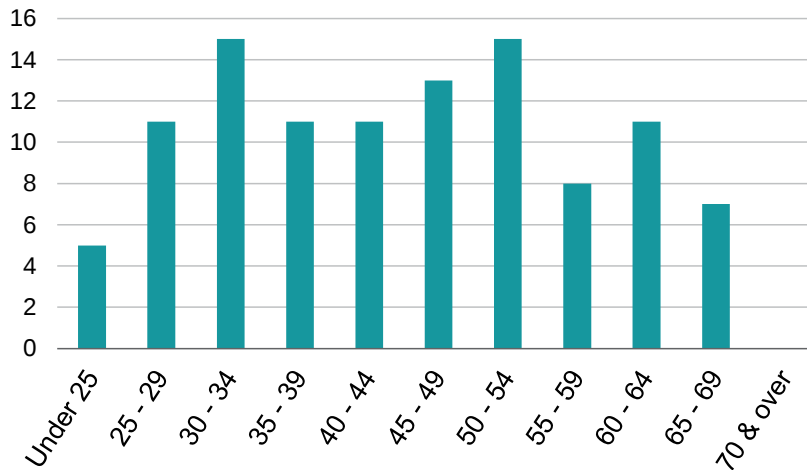
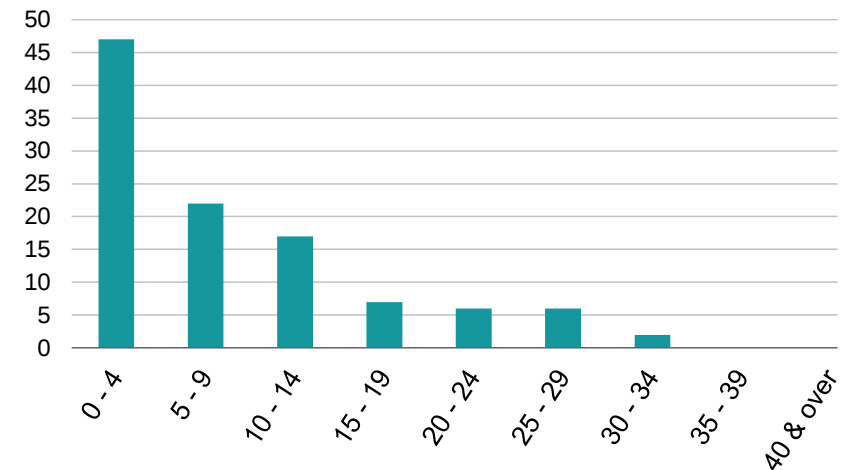


Chart 3

Distribution of Active Participants by Years of Benefit Service as of December 31, 2020



Section 2: Actuarial Valuation Results

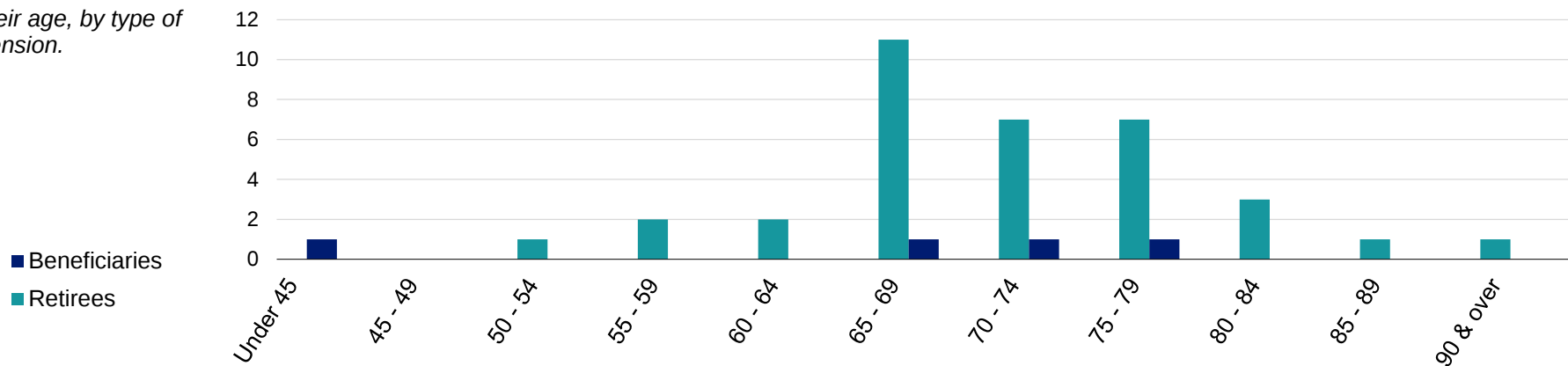
Retired Participants and Beneficiaries

As of December 31, 2020, 35 retired participants and 4 beneficiaries were receiving total monthly benefits of \$53,424. For comparison, in the previous valuation, there were 33 retired participants and 4 beneficiaries receiving total monthly benefits of \$43,365.

These graphs show a distribution of the current retired participants and beneficiaries based on their age, by type of pension.

Chart 4

Distribution of Retired Participants and Beneficiaries by Type and by Age as of December 31, 2020



Section 2: Actuarial Valuation Results

Financial Information

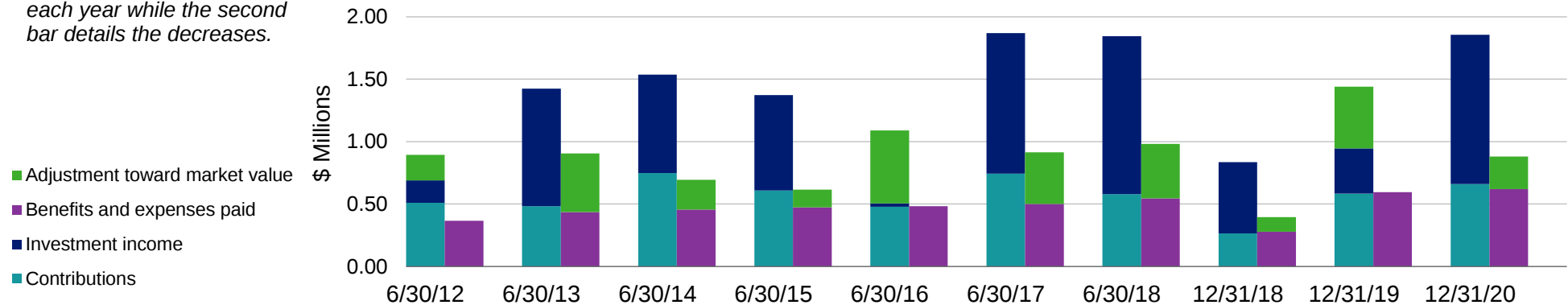
Retirement plan funding anticipates that, over the long term, both contributions and investment earnings will be needed to cover benefit payments and expenses.

Retirement plan assets change as a result of the net impact of these income and expense components.

The chart depicts the components of changes in the actuarial value of assets over prior years. Note: The first bar represents increases in assets during each year while the second bar details the decreases.

Chart 5

Comparison of Increases and Decreases in the Actuarial Value of Assets for Years Ended June 30, 2012 – December 31, 2020



Adjustment toward market value includes any asset method changes.

Section 2: Actuarial Valuation Results

Actuarial Value of Assets

It is desirable to have level and predictable plan costs from one year to the next. For this reason, the GMEBS Board of Trustees approved an asset valuation method that gradually adjusts to market value. Under this valuation method, the full value of market fluctuations is not recognized in a single year and, as a result, the asset value and the plan costs are more stable.

The amount of the adjustment to recognize market value is treated as income, which may be positive or negative. Realized and unrealized gains and losses are treated equally and, therefore, the sale of assets has no immediate effect on the actuarial value.

The chart shows the determination of the actuarial value of assets as of the valuation date.

Chart 6

Determination of Actuarial Value of Assets for Year Ended December 31, 2020

1. Market value as of January 1, 2020	\$12,372,814
2. Contributions	659,431
3. Disbursements	-619,429
4. Investment return	<u>1,195,427</u>
5. Market value as of January 1, 2021	\$13,608,243
6. Actuarial value as of January 1, 2020	\$12,591,232
7. Contributions	659,431
8. Disbursements	-619,429
9. Assumed interest equal to valuation rate	<u>930,079</u>
10. Expected actuarial value as of January 1, 2021	13,561,313
11. Adjustment for difference between expected actuarial value and market value as of January 1, 2021	<u>4,693</u>
12. Preliminary actuarial value of assets as of January 1, 2021	13,566,006
13. Adjustment due to corridor (80%-120% of market value of assets) on actuarial value of assets	<u>0</u>
14. Actuarial value of assets as of January 1, 2021	<u>13,566,006</u>

Section 2: Actuarial Valuation Results

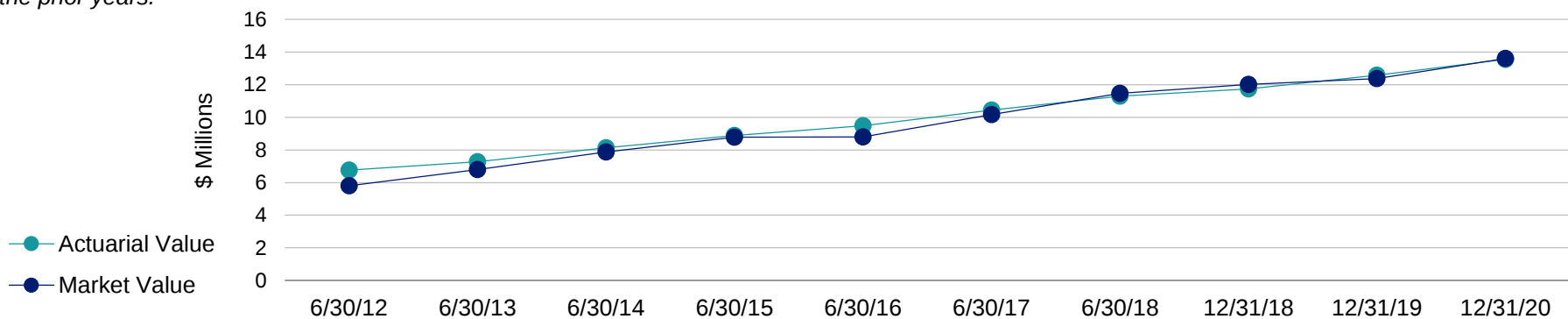
Asset History

Both the actuarial value and market value of assets are representations of the Plan's financial status. As investment gains and losses are gradually taken into account, the actuarial value of assets tracks the market value of assets. The actuarial asset value is significant because the Plan's liabilities are compared to its assets to determine what portion, if any, remains unfunded. Amortization of the unfunded liability is an important element in determining the contribution requirement.

This chart shows the change in the actuarial value of assets versus the market value over the prior years.

Chart 7

Actuarial Value of Assets vs. Market Value of Assets for Years Ended June 30, 2012 – December 31, 2020



Section 2: Actuarial Valuation Results

Actuarial Experience

To calculate the required contribution, assumptions are made about future events that affect the amount and timing of benefits to be paid and assets to be accumulated. Each year actual experience is measured against the assumptions. If overall experience is more favorable than anticipated (an actuarial gain), the contribution requirement will decrease from the previous year. On the other hand, the contribution requirement will increase if overall actuarial experience is less favorable than expected (an actuarial loss).

Taking account of experience gains or losses in one year without making a change in assumptions reflects the belief that the single year's experience was a short-term development and that, over the long term, experience will return to the original assumptions. For contribution requirements to remain stable, assumptions should approximate experience.

If assumptions are changed, the contribution requirement is adjusted to take into account a change in experience anticipated for all future years.

There are differences between the expected and the actual experience that appear when the new valuation is compared with the projections from the previous valuation. These include:

- Net investment return,
- Inflation,
- Administrative expenses,
- The extent of turnover among the participants,
- Retirement experience (earlier or later than expected),
- Mortality (more or fewer deaths than expected),
- The number of disability retirements, and
- Salary increases different than assumed.

Section 2: Actuarial Valuation Results

Recommended Contribution

The GMEBS Board of Trustees has adopted an actuarial funding policy for determination of annual contributions and the systematic funding of liabilities arising under the Plan. The annual minimum contribution is the sum of

- 1) the normal cost (including administrative expenses),
- 2) the closed level dollar amortization of the unfunded actuarial accrued liability over a period that ranges from 10 to 30 years based on the funding policy adopted by the GMEBS Board of Trustees, and
- 3) interest on these

amounts from the valuation date to the date contributions are paid (assumed monthly). The amortization method is described in Section 5, Exhibit II.

Ongoing plans in compliance with GMEBS funding policy are ultimately projected to have no unfunded benefits under this amortization method. Plans where the unfunded liability is not projected to be fully amortized have special funding rules apply such that the unfunded liability is ultimately projected to decline to zero.

Chart 8

Recommended Contribution

The chart compares this valuation's recommended contribution with the prior valuation.

	Year Beginning	
	January 1, 2021	January 1, 2020
1. Total benefit normal cost	\$441,651	\$412,946
2. Administrative expenses	33,521	32,549
3. Expected employee contributions	<u>-67,971</u>	<u>-63,473</u>
4. Employer normal cost: (1) + (2) + (3)	\$407,201	\$382,022
5. Actuarial accrued liability at valuation date	\$14,377,036	\$13,108,604
6. Actuarial value of assets at valuation date	<u>13,566,006</u>	<u>12,591,232</u>
7. Unfunded/(surplus) actuarial accrued liability: (5) – (6)	\$811,030	\$517,372
8. Payment on unfunded/(surplus) actuarial accrued liability ¹	108,172	72,325
9. Full funding credit less impact of state minimum	0	0
10. Recommended mid-year contribution at valuation date: (4) + (8) + (9)	\$515,373	\$454,347
11. Adjustment to fiscal year ²	25,038	22,073
12. Total recommended mid-year contribution, for fiscal year	<u>\$540,411</u>	<u>\$476,420</u>
13. Recommended contribution as a percentage of expected payroll	9.12%	8.02%

¹ Details of the amortization payment are shown in Section 5, Exhibit II.

² Fiscal year begins September 1, 2021.

Section 2: Actuarial Valuation Results

Well-funded plans may have a full funding credit applied to reduce the recommended contributions. This credit ensures that contributions are not required if a plan's assets exceed the present value of future benefits. In a year when the full funding credit applies, the prior year amortization bases are eliminated.

The annual recommended contribution is the greater of 1) the minimum contribution described above and 2) normal cost (including administrative expenses) with interest, adjusted by a full funding credit to ensure that contributions are not required if a plan's assets exceed the present value of future benefits.

State Funding Standards

The Plan is subject to minimum funding standards of the Public Retirement Systems Standards Law (Georgia Code Section 47-20-10). The estimated minimum annual contribution under these standards is \$481,649. This minimum contribution has been determined as the sum of 1) the normal cost (including administrative expenses), 2) the 30-year level percentage of payroll amortization of the unfunded actuarial accrued liability or the 10-year level percentage of payroll amortization of the surplus, and 3) interest on these amounts from the valuation date to the date contributions are paid (assumed monthly). The GMEBS Board of Trustees has adopted an actuarial funding policy that requires a different funding level than the estimated minimum annual contribution to minimize fluctuations in annual contribution amounts and to accumulate sufficient funds to secure benefits under the Plan. If the employer contributes the recommended contribution developed under the actuarial funding policy each year, the Plan will meet applicable state funding standards.

Section 2: Actuarial Valuation Results

Funded Status

The funded status measures the ability of the Plan (through assets in the trust) to pay benefits earned by participants. The funded status percentage is the ratio of the market value of assets to the present value of plan benefits as of the valuation date. A year-by-year comparison of the funded status percentages indicates the plan's progress in securing participants' benefits.

Different techniques are used to gauge a plan's funded status; three customary measures are presented in this section.

Present Value of Accrued Plan Benefits Basis

A comparison of the market value of assets to the present value of accrued plan benefits provides one measure of the funded status of the plan. The present value of accrued

plan benefits represents the benefits earned by plan participants based on their salary and service history as of the valuation date. The calculation of these present values assumes the retirement plan continues on an ongoing basis without recognizing benefit increases from future service or salary adjustments. This funded status is not appropriate for assessing the sufficiency of plan assets to cover the estimated cost of settling the plan's benefit obligations or the amount of future recommended contributions.

The GMEBS funding policy establishes a target level of 125% to 150% on an ongoing plan basis for mature plans. Since ultimate benefits under the plan are related to higher final pay levels for participants, a prudent funding objective exceeds 100% of the present value of benefits based on current salary levels.

Chart 9

Funded Status – Ongoing Plan Basis

	As of Valuation Date	
	January 1, 2021	January 1, 2020
Present value of accrued plan benefits	\$13,179,001	\$11,977,312
Market value of assets	13,608,243	12,372,814
Funded percentage	103.26%	103.30%

Section 2: Actuarial Valuation Results

Plan Termination Basis

Another measure of the funded status of the plan gauges the sufficiency of the plan assets to cover liabilities in the event of a plan termination. The value of benefits on a plan termination basis differs from the ongoing plan basis calculation in the interest assumption for the present values. Lump sum distributions to participants use an interest rate specified by the Plan, which is adjusted each January 1. Since prescribed interest rates produce significantly higher distribution amounts, the funded percentage on the plan termination basis is typically lower than on an ongoing plan basis.

A funded percentage of 100% or more indicates each participant would receive a full distribution of his or her accrued benefit in the event of termination. Lower funded percentages would require the allocation of the assets (in accordance with the plan's terms), yielding less than full distributions for some participants.

Chart 10

Funded Status – Plan Termination Basis

	As of Valuation Date	
	January 1, 2021	January 1, 2020
Lump sum present values	\$33,732,300	\$27,230,988
Market value of assets	13,608,243	12,372,814
Funded percentage	40.34%	45.44%

Section 2: Actuarial Valuation Results

Summary of Funded Status

The following chart shows the number of participants and compares the present value of accrued plan benefits under both an ongoing plan basis and a plan termination basis.

Chart 11

Present Value of Accrued Plan Benefits as of Valuation Date

	Number of Participants	Ongoing Basis	Plan Termination Basis
Benefits for retired participants and beneficiaries	39	\$6,346,545	\$11,861,410
Terminated vested participants	53	1,737,680	5,990,239
Active vested participants	<u>65</u>	<u>4,975,430</u>	<u>14,991,651</u>
Total present value of vested benefits	157	\$13,059,655	\$32,843,300
Nonvested benefits	<u>42</u>	<u>119,346</u>	<u>889,000</u>
Total present value of accrued plan benefits	199	\$13,179,001	\$33,732,300
Market value of assets		13,608,243	13,608,243
Unfunded/(Surplus) present value of accrued plan benefits		-429,242	20,124,057
Funded percentage		103.26%	40.34%

Section 2: Actuarial Valuation Results

Funding History

The following chart shows historical funding information on the basis used for determining contribution requirements. This funding information is based on the actuarial value of assets and the actuarial accrued liability, which includes projected increases in salaries not reflected on the previous measurements of funding status. If the chart were based on the market value of assets instead of the actuarial value of assets, the funded ratios would differ.

This information was previously required by GASB but has been superseded by the exhibits in Section 4 which provide information on the accounting basis required by GASB 68 for accounting purposes.

The unfunded actuarial accrued liability is one of the components used in determining the required contribution and, generally, higher funded ratios on this basis result in reduced contribution requirements.

The funded ratio is not appropriate for assessing the sufficiency of plan assets to cover the estimated cost of settling the plan's obligations or the amount of recommended future contributions.

The covered payroll for the plan is provided as a point of reference to help in understanding the scale of the other numbers.

Chart 12

Funding History

Actuarial Valuation Date	Actuarial Value of Assets (a)	Actuarial Accrued Liability (AAL) (b)	Unfunded/ (Surplus) AAL (UAAL) (b) - (a)	Funded Ratio (a) / (b)	Covered Payroll (c)	UAAL as a Percentage of Covered Payroll ¹ [(b) - (a)] / (c)
07/01/2012	\$6,764,865	\$8,531,603	\$1,766,738	79.29%	\$3,898,465	45.32%
07/01/2013	7,284,888	9,141,971	1,857,083	79.69%	4,409,084	42.12%
07/01/2014	8,126,408	9,478,352	1,351,944	85.74%	4,285,277	31.55%
07/01/2015	8,883,642	9,828,153	944,511	90.39%	4,403,174	21.45%
07/01/2016	9,490,514	10,386,892	896,378	91.37%	4,694,327	19.09%
07/01/2017	10,446,014	10,919,716	473,702	95.66%	5,024,965	9.43%
07/01/2018	11,307,826	12,289,880	982,054	92.01%	5,836,525	16.83%
01/01/2019	11,747,008	12,939,893	1,192,885	90.78%	6,168,363	19.34%
01/01/2020	12,591,232	13,108,604	517,372	96.05%	5,853,882	8.84%
01/01/2021	13,566,006	14,377,036	811,030	94.36%	5,840,999	13.89%

¹ Not less than zero

Section 2: Actuarial Valuation Results

Risk

Since the actuarial valuation results are dependent on a given set of assumptions and data as of a specific date, there is a risk that emerging results may differ significantly as actual experience differs from the assumptions.

This report does not contain a detailed analysis of the potential range of future measurements, but does include a brief discussion of some risks that may affect the Plan.

- Investment Risk (the risk that returns will be different than expected)
 - For example, the liabilities on an ongoing basis differ from those measured on a plan termination basis because they use different assumed rates of return. See Chart 11 of this section.
- Longevity Risk (the risk that mortality experience will be different than expected)
 - The actuarial valuation includes an expectation of life expectancy. Emerging plan experience that does not match these expectations will result in either an increase or decrease in the actuarially determined contribution.
- Contribution Risk (the risk that actual contributions will be different from the actuarially determined contribution)
 - GMEBS funding policy requires payment of the actuarially determined contribution. As long as this policy is adhered to, contribution risk is negligible.
- Demographic Risk (the risk that participant experience will be different than assumed)

Examples of this risk include:

 - Actual retirements occurring earlier or later than assumed. The value of retirement plan benefits is sensitive to the rate of benefit accruals and any early retirement subsidies that apply.
 - More or less active participant turnover than assumed.
- Actual Experience Over the Last Ten Years and Implications for the Future
 - Past experience can help demonstrate the sensitivity of key results to the Plan's actual experience. A ten-year funding history, including the funded ratio on the actuarial value of assets, is provided in Chart 12 of this section.
- Maturity Measures
 - As pension plans mature, the cash needed to fulfill benefit obligations will increase over time. One way to measure the Plan's maturity is the ratio of inactive to active participants. Higher ratios indicate a more mature plan. A ten-year history of the non-active to active participant ratio is provided in Chart 1 of this section. As the Plan matures, more cash will be needed from the investment portfolio to meet benefit payments.

Section 3: Supplemental Information

Exhibit A – Table of Plan Coverage as of Valuation Date

Category	For Valuation as of		Change From Prior Year
	January 1, 2021	January 1, 2020	
Active participants in valuation			
Number of employees	107	109	-1.8%
Number of elected officials	0	0	N/A
Average age	45.0	44.3	N/A
Average service	8.9	8.7	N/A
Total valuation payroll	\$5,840,999	\$5,853,882	-0.2%
Average valuation payroll	54,589	53,705	1.6%
Account balances	411,173	289,731	41.9%
Total active vested participants	65	65	0.0%
Vested terminated participants	53	50	6.0%
Retired participants			
Number in pay status	30	28	7.1%
Average age	72.3	72.1	N/A
Average monthly benefit	\$1,561	\$1,318	18.4%
Disabled participants			
Number in pay status	5	5	0.0%
Average age	64.6	63.6	N/A
Average monthly benefit	\$649	\$636	2.0%
Beneficiaries	4	4	0.0%

Section 3: Supplemental Information

Exhibit B – Participants in Active Service as of Valuation Date By Age, Years of Service, and Average Valuation Payroll

Age	Years of Service									
	Total	0-4	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40 & over
Under 25	5	5	--	--	--	--	--	--	--	--
	\$35,326	\$35,326	--	--	--	--	--	--	--	--
25 - 29	11	11	--	--	--	--	--	--	--	--
	\$45,148	\$45,148	--	--	--	--	--	--	--	--
30 - 34	15	8	7	--	--	--	--	--	--	--
	\$48,298	\$39,120	\$58,787	--	--	--	--	--	--	--
35 - 39	11	7	2	2	--	--	--	--	--	--
	\$58,047	\$58,867	\$53,305	\$59,920	--	--	--	--	--	--
40 - 44	11	6	1	1	3	--	--	--	--	--
	\$56,585	\$51,223	\$69,332	\$69,145	\$58,874	--	--	--	--	--
45 - 49	13	4	2	4	1	1	1	--	--	--
	\$58,408	\$49,251	\$57,902	\$56,639	\$74,958	\$74,286	\$70,699	--	--	--
50 - 54	15	2	2	4	1	2	3	1	--	--
	\$66,676	\$25,934	\$54,995	\$76,892	\$67,299	\$77,351	\$79,359	\$70,627	--	--
55 - 59	8	1	2	1	2	1	1	--	--	--
	\$52,727	\$41,988	\$44,694	\$52,172	\$50,112	\$65,631	\$72,419	--	--	--
60 - 64	11	1	4	3	--	2	--	1	--	--
	\$60,050	\$56,104	\$54,520	\$54,606	--	\$82,726	--	\$57,096	--	--
65 - 69	7	2	2	2	--	--	1	--	--	--
	\$48,645	\$32,092	\$41,084	\$67,846	--	--	\$58,472	--	--	--
70 & over	--	--	--	--	--	--	--	--	--	--
	--	--	--	--	--	--	--	--	--	--
Total	107	47	22	17	7	6	6	2	--	--
	\$54,589	\$45,038	\$54,676	\$63,223	\$59,872	\$76,678	\$73,278	\$63,861	\$0	\$0

Section 3: Supplemental Information

Exhibit C – Development of Unfunded/(Surplus) Actuarial Accrued Liability

	Year Ended December 31, 2020
1. Unfunded/(Surplus) actuarial accrued liability at beginning of year	\$517,372
2. Total normal cost at beginning of year	429,923
3. Total contributions	-659,431
4. Interest	
(a) For whole year on (1) + (2)	\$69,863
(b) For half year on (3)	-24,317
(c) Total interest	<u>45,546</u>
5. Expected unfunded actuarial accrued liability	\$333,410
6. Changes due to:	
(a) (Gain)/Loss	\$477,620
(b) Assumptions	--
(c) Funding/Asset method	--
(d) Plan provisions	--
(e) Total changes	<u>477,620</u>
7. Unfunded/(Surplus) actuarial accrued liability at end of year	<u>\$811,030</u>

Section 3: Supplemental Information

Exhibit D – Definition of Pension Terms

The following list defines certain technical terms for the convenience of the reader:

Actuarial Accrued Liability for Actives:	The equivalent of the accumulated normal costs allocated to the years before the valuation date.
Actuarial Accrued Liability for Pensioners and Beneficiaries:	The single-sum value of lifetime benefits to existing pensioners and beneficiaries. This sum takes account of life expectancies appropriate to the ages of the annuitants and the interest that the sum is expected to earn before it is entirely paid out in benefits.
Actuarial Cost Method:	A procedure allocating the Actuarial Present Value of Future Benefits to various time periods; a method used to determine the Normal Cost and the Actuarial Accrued Liability that are used to determine the actuarially determined contribution.
Actuarial Gain or Loss:	A measure of the difference between actual experience and that expected based upon a set of Actuarial Assumptions, during the period between two Actuarial Valuation dates. Through the actuarial assumptions, rates of decrements, rates of salary increases, and rates of fund earnings have been forecasted. To the extent that actual experience differs from that assumed, Actuarial Accrued Liabilities emerge which may be the same as forecasted, or may be larger or smaller than projected. Actuarial gains are due to favorable experience, e.g., assets earn more than projected, salary increases are less than assumed, members retire later than assumed, etc. Favorable experience means actual results produce actuarial liabilities not as large as projected by the actuarial assumptions. On the other hand, actuarial losses are the result of unfavorable experience, i.e., actual results yield in actuarial liabilities that are larger than projected. Actuarial gains will shorten the time required for funding of the actuarial balance sheet deficiency while actuarial losses will lengthen the funding period.
Actuarially Equivalent:	Of equal actuarial present value, determined as of a given date and based on a given set of Actuarial Assumptions.
Actuarial Present Value (APV):	The value of an amount or series of amounts payable or receivable at various times, determined as of a given date by the application of a particular set of Actuarial Assumptions. Each such amount or series of amounts is: Adjusted for the probable financial effect of certain intervening events (such as changes in compensation levels, marital status, etc.) Multiplied by the probability of the occurrence of an event (such as survival, death, disability, withdrawal, etc.) on which the payment is conditioned, and Discounted according to an assumed rate (or rates) of return to reflect the time value of money.
Actuarial Present Value of Future Plan Benefits:	The Actuarial Present Value of benefit amounts expected to be paid at various future times under a particular set of Actuarial Assumptions, taking into account such items as the effect of advancement in age, anticipated future compensation, and future service credits. The Actuarial Present Value of Future Plan Benefits includes the liabilities for active members, retired members, beneficiaries receiving benefits, and inactive members entitled to either a refund or a future retirement benefit. Expressed another way, it is the value that would have to be invested on the valuation date so that the amount invested plus investment earnings would provide sufficient assets to pay all projected benefits and expenses when due.
Actuarial Valuation:	The determination, as of a valuation date, of the Normal Cost, Actuarial Accrued Liability, Actuarial Value of Assets, and related Actuarial Present Values for a plan. An Actuarial Valuation for a governmental retirement system typically also includes calculation of items needed for compliance with GASB, such as the Actuarially Determined Contribution (ADC) and the Net Pension Liability (NPL).
Actuarial Value of Assets (AVA):	The value of the Fund's assets as of a given date, used by the actuary for valuation purposes. This may be the market or fair value of plan assets, but commonly plans use a smoothed value in order to reduce the year-to-year volatility of calculated results, such as the funded ratio and the recommended contribution.
Actuarially Determined:	Values that have been determined utilizing the principles of actuarial science. An actuarially determined value is derived by application of the appropriate actuarial assumptions to specified values determined by provisions of the law.

Section 3: Supplemental Information

Actuarially Determined Contribution (ADC):

The term used in GASB 67 and 68 for an employer's periodic required contributions, expressed as a dollar amount or a percent of covered plan compensation, determined under the Plan's funding policy. The Recommended Contribution based on the GME funding policy is used as the Actuarially Determined Contribution for GASB 68 disclosures.

Amortization Method:

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

Amortization Payment:

The portion of the Recommended Contribution that is designed to pay interest on and to amortize the Unfunded Actuarial Accrued Liability.

Amortization Period:

The period of time over which an amortization payment needs to be paid in order to fund the current Unfunded Actuarial Accrued Liability.

Assumptions or Actuarial Assumptions:

The estimates upon which the cost of the Fund is calculated, including:

Investment return - the rate of investment yield that the Fund will earn over the long-term future;

Mortality rates - the death rates of employees and pensioners; life expectancy is based on these rates;

Retirement rates - the rate or probability of retirement at a given age or service;

Disability rates - the probability of disability retirement at a given age;

Withdrawal rates - the rates at which employees of various ages are expected to leave employment for reasons other than death, disability, or retirement;

Salary increase rates - the rates of salary increase due to inflation and productivity growth.

Closed Amortization Period:

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

Decrements:

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

Defined Benefit Plan:

A retirement plan in which benefits are defined by a formula applied to the member's compensation and/or years of service.

Defined Contribution Plan:

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

Employer Normal Cost:

The portion of the Normal Cost to be paid by the employer. This is equal to the Normal Cost less expected member contribution.

Experience Study:

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

Full Funding Credit:

The excess of the recommended contribution determined without regard to the full funding limitation over the full funding limit (the present value of future benefits plus administrative expenses less the market value of assets, minimum of the normal cost for administrative expenses).

Funded Ratio:

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

Section 3: Supplemental Information

GASB 67 and GASB 68:

Governmental Accounting Standards Board (GASB) Statements No. 67 and No. 68. These are the governmental accounting standards that set the accounting rules for public retirement systems and the employers that sponsor or contribute to them. Statement No. 68 sets the accounting rules for the employers that sponsor or contribute to public retirement systems, while Statement No. 67 sets the rules for the systems themselves.

Investment Return:

The rate of earnings of the Fund from its investments, including interest, dividends and capital gain and loss adjustments, computed as a percentage of the average value of the fund. For actuarial purposes, the investment return often reflects a smoothing of the capital gains and losses to avoid significant swings in the value of assets from one year to the next.

Minimum Contribution:

The normal cost plus an amount to fully amortize the unfunded actuarial accrued liability over a specified number of years (in a similar manner as monthly payments of principal and interest reduce the outstanding balance of a mortgage). A full description is in Section 2E of this report.

Net Pension Liability (NPL):

The Net Pension Liability is equal to the Total Pension Liability minus the Plan Fiduciary Net Position as described in GASB 67 and 68.

Normal Cost:

That portion of the Actuarial Present Value of pension plan benefits and expenses allocated to a valuation year by the Actuarial Cost Method. Any payment in respect of an Unfunded Actuarial Accrued Liability is not part of Normal Cost (see Amortization Payment). For pension plan benefits that are provided in part by employee contributions, Normal Cost refers to the total of employee contributions and employer Normal Cost unless otherwise specifically stated.

Open Amortization Period:

An open amortization period is one which is used to determine the Amortization Payment but which does not change over time. The initial period is set as 30 years, the same 30-year period is used in determining the Amortization Period each year. In theory, an Open Amortization Period with level percentage of payroll is used to amortize the Unfunded Actuarial Accrued Liability, the UAAL will never decrease, but will become smaller each year, in relation to covered payroll, if the actuarial assumptions are realized.

Plan Fiduciary Net Position:

Term used in GASB 67 and 68 for the market value of assets.

Recommended Contribution:

The normal cost (including administrative expenses) plus the amortization of the unfunded actuarial accrued liability but not less than the minimum contribution, calculated based on methods and assumptions specified in the GMEBS funding policy.

Recommended Contributions as a Percentage of Payroll:

The ratio of the annual contribution to projected covered payroll. In future valuations, this percentage should remain relatively stable (in the absence of changes to the plan provisions or to the actuarial assumptions or methods). As the dollar amount of annual payroll increases or decreases, the recommended contribution is expected to adjust in a like manner. Experience of the plan which differs materially from that expected by the actuarial assumptions will also change the percentage of payroll over time.

Total Pension Liability (TPL):

The actuarial accrued liability under the entry age normal cost method and based on the blended discount rate as described in GASB 67 and 68.

Unfunded Actuarial Accrued Liability (UAAL):

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

Valuation Date or Actuarial Valuation Date:

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

Section 4: GASB 68 Reporting Information

The numbers shown in Exhibit 1 are based on a September 30, 2020 measurement date which would make them applicable to the Fiscal Year beginning September 1, 2020 and ending August 31, 2021.

Exhibit 1 – Net Pension Liability

A. <u>Changes in the Net Pension Liability</u>			
	Total Pension Liability (TPL) (a)	Fiduciary Net Position (FNP) (b)	Net Pension Liability (NPL) (a) - (b)
Balances at September 30, 2019 ¹	\$14,524,387	\$12,372,814	\$2,151,573
Changes for the year:			
Service cost	315,905	--	315,905
Interest	1,072,813	--	1,072,813
Differences between expected and actual experience	417,458	--	417,458
Contributions – employer	--	555,093	(555,093)
Contributions – employee	--	104,338	(104,338)
Net investment income	--	1,195,427	(1,195,427)
Benefit payments, including refunds of employee contributions	(587,339)	(587,339)	--
Administrative expense	--	(32,090)	32,090
Other	--	--	--
Net changes	1,218,837	1,235,429	(16,592)
Balances at September 30, 2020 ²	<u>\$15,743,224</u>	<u>\$13,608,243</u>	<u>\$2,134,981</u>
B. <u>Sensitivity of the Net Pension Liability to Changes in the Discount Rate</u>			
	1% Decrease (6.375%)	Current Discount Rate (7.375%)	1% Increase (8.375%)
	\$4,226,295	\$2,134,981	\$404,769

¹ Entry Age Normal liabilities calculated using ages and service amounts as of January 1, 2020 are used to measure TPL as of September 30, 2019. The balances as of September 30, 2019 constitute measurements of the NPL for the fiscal year ending August 31, 2020.

² Entry Age Normal liabilities calculated using ages and service amounts as of January 1, 2021 are used to measure TPL as of September 30, 2020. The balances as of September 30, 2020 constitute measurements of the NPL for the fiscal year ending August 31, 2021.

Section 4: GASB 68 Reporting Information

The numbers shown in Exhibit 2 are based on a September 30, 2020 measurement date which would make them applicable to the Fiscal Year beginning September 1, 2020 and ending August 31, 2021.

Exhibit 2 – Pension Expense and Deferred Outflows/Inflows of Resources Related to Pensions

A. Pension expense for the year ended August 31, 2021

Service cost	\$315,905	
Interest on TPL	1,072,813	
Employee contributions	(104,338)	
Administrative expenses	32,090	
Expected return on assets	(913,970)	
Expensed portion of current year period differences between expected and actual experience in TPL	83,490	
Expensed portion of current year period assumption changes	- -	
Current year plan changes	- -	
Expensed portion of current year period differences between projected and actual investment earnings	(56,293)	
Current year recognition of deferred inflows and outflows established in prior years	<u>65,692</u>	
Total expense		\$495,389

B. Deferred outflows/inflows of resources related to pensions

	Deferred Outflows of Resources	Deferred Inflows of Resources
Differences between expected and actual experience	742,381	(324,609)
Changes of assumptions	19,322	- -
Net difference between projected and actual earnings on pension plan investments ¹	<u>- -</u>	<u>(158,602)</u>
Total	<u>761,703</u>	<u>(483,211)</u>

¹ Individual period investment outflows and inflows as listed in Exhibit 2F are being shown netted in accordance with GASB 68 paragraph 33b.

Section 4: GASB 68 Reporting Information

Exhibit 2 – Pension Expense and Deferred Outflows/Inflows of Resources Related to Pensions (continued)

C. Projected recognition of deferred outflows/(inflows)

Year Established	Outstanding Balance at September 1, 2020	Amount Recognized During FYE August 31, 2021	Outstanding Balance at August 31, 2021	Deferred Outflows/(Inflows) Recognized in Future Years					
				2022	2023	2024	2025	2026	2027 and Thereafter
Fiscal Year Outflows									
Total Outflows	1,584,029	498,926	1,085,103	428,665	344,585	228,361	83,492	- -	- -
Fiscal Year Inflows									
Total Inflows	(1,212,648)	(406,037)	(806,611)	(331,370)	(240,305)	(178,645)	(56,291)	- -	- -
Total	371,381	92,889	278,492	97,295	104,280	49,716	27,201	- -	- -

Section 4: GASB 68 Reporting Information

Exhibit 2 – Pension Expense and Deferred Outflows/Inflows of Resources Related to Pensions (continued)

D. Projected recognition of deferred outflows/(inflows) due to differences between expected and actuarial experience in TPL

	Year Established	Outstanding Balance at September 1, 2020	Amount Recognized During FYE August 31, 2021	Outstanding Balance at August 31, 2021	Deferred Outflows/(Inflows) Recognized in Future Years					
					2022	2023	2024	2025	2026	2027 and Thereafter
Fiscal Year Outflows										
Demographic	2016	4,976	4,976	--	--	--	--	--	--	--
Demographic	2018	412,830	165,132	247,698	165,132	82,566	--	--	--	--
Demographic	2019	225,001	64,286	160,715	64,286	64,286	32,143	--	--	--
Demographic	2021	417,458	83,490	333,968	83,492	83,492	83,492	83,492	--	--
Total Outflows		1,060,265	317,884	742,381	312,910	230,344	115,635	83,492	--	--
Fiscal Year Inflows										
Demographic	2017	(31,109)	(31,109)	--	--	--	--	--	--	--
Demographic	2020	(432,812)	(108,203)	(324,609)	(108,203)	(108,203)	(108,203)	--	--	--
Total Inflows		(463,921)	(139,312)	(324,609)	(108,203)	(108,203)	(108,203)	--	--	--
Total		596,344	178,572	417,772	204,707	122,141	7,432	83,492	--	--

Section 4: GASB 68 Reporting Information

Exhibit 2 – Pension Expense and Deferred Outflows/Inflows of Resources Related to Pensions (continued)

E. Projected recognition of deferred outflows/(inflows) due to assumption changes

	Year Established	Outstanding Balance at September 1, 2020	Amount Recognized During FYE August 31, 2021	Outstanding Balance at August 31, 2021	Deferred Outflows/(Inflows) Recognized in Future Years					
					2022	2023	2024	2025	2026	2027 and Thereafter
Fiscal Year Outflows										
Assumption	2018	7,573	3,029	4,544	3,029	1,515	--	--	--	--
Assumption	2020	19,704	4,926	14,778	4,926	4,926	4,926	--	--	--
Total Outflows		27,277	7,955	19,322	7,955	6,441	4,926	--	--	--
Fiscal Year Inflows										
Total Inflows		--	--	--	--	--	--	--	--	--
Total		27,277	7,955	19,322	7,955	6,441	4,926	--	--	--

Section 4: GASB 68 Reporting Information

Exhibit 2 – Pension Expense and Deferred Outflows/Inflows of Resources Related to Pensions (continued)

F. Projected recognition of deferred outflows/(inflows) due to differences between projected and actual investment earnings

	Year Established	Outstanding Balance at September 1, 2020	Amount Recognized During FYE August 31, 2021	Outstanding Balance at August 31, 2021	Deferred Outflows/(Inflows) Recognized in Future Years					
					2022	2023	2024	2025	2026	2027 and Thereafter
Fiscal Year Outflows										
Investment	2016	65,287	65,287	--	--	--	--	--	--	--
Investment	2020	431,200	107,800	323,400	107,800	107,800	107,800	--	--	--
Total Outflows		496,487	173,087	323,400	107,800	107,800	107,800	--	--	--
Fiscal Year Inflows										
Investment	2017	(130,668)	(87,112)	(43,556)	(43,556)	--	--	--	--	--
Investment	2018	(237,548)	(95,019)	(142,529)	(95,019)	(47,510)	--	--	--	--
Investment	2019	(99,054)	(28,301)	(70,753)	(28,301)	(28,301)	(14,151)	--	--	--
Investment	2021	(281,457)	(56,293)	(225,164)	(56,291)	(56,291)	(56,291)	(56,291)	--	--
Total Inflows		(748,727)	(266,725)	(482,002)	(223,167)	(132,102)	(70,442)	(56,291)	--	--
Total		(252,240)	(93,638)	(158,602)	(115,367)	(24,302)	37,358	(56,291)	--	--

Section 4: GASB 68 Reporting Information

Exhibit 3 – Schedule of Changes in the Net Pension Liability and Related Ratios for Last Two Fiscal Years

	Fiscal Year End	
	2021	2020
<i>Total pension liability</i>		
Service cost	\$315,905	\$337,236
Interest	1,072,813	1,069,088
Differences between expected and actual experience	417,458	(541,015)
Changes of assumptions	--	24,629
Changes of benefit terms	--	--
Benefit payments, including refunds of employee contributions	(587,339)	(565,654)
Net change in total pension liability	1,218,837	324,284
Total pension liability - beginning	14,524,387	14,200,103
Total pension liability - ending (a)	<u>\$15,743,224</u>	<u>\$14,524,387</u>
<i>Plan fiduciary net position</i>		
Contributions - employer	\$555,093	\$486,235
Contributions - employee	104,338	97,762
Net investment income	1,195,427	362,245
Benefit payments, including refunds of employee contributions	(587,339)	(565,654)
Administrative expense	(32,090)	(30,423)
Other	--	--
Net change in fiduciary net position	1,235,429	350,165
Plan fiduciary net position - beginning	12,372,814	12,022,649
Plan fiduciary net position - ending (b)	<u>\$13,608,243</u>	<u>\$12,372,814</u>
Net pension liability – ending: (a)-(b)	<u>\$2,134,981</u>	<u>\$2,151,573</u>
Plan's fiduciary net position as a percentage of the total pension liability	86.44%	85.19%
Covered-employee payroll	\$5,840,999	\$5,853,882
Net pension liability as a percentage of covered-employee payroll	36.55%	36.75%

Prior years are shown in previous reports.

Section 4: GASB 68 Reporting Information

Exhibit 4 – Schedule of Contributions for Last Two Fiscal Years

	Fiscal Year End	
	2021	2020
Actuarially determined contribution	-- ¹	\$566,303
Contributions in relation to the actuarially determined contribution	-- ¹	575,382 ²
Contribution deficiency (excess)	-- ¹	(9,079)
Covered-employee payroll	-- ¹	5,853,882 ³
Contributions as a percentage of covered-employee payroll	-- ¹	9.83%

¹ 2021 information will be determined after fiscal year end and will be included in the 2022 valuation report.

² Contributions are recorded based on date of receipt into the GMEBS trust. Minor timing issues in receipt of monthly payments are not indicative of non-compliance with GMEBS funding policy. A plan is in compliance with the GMEBS funding policy if it pays either the dollar amount or the percentage of employee-covered payroll of the actuarially determined contributions.

³ 2020 covered payroll is based on data collected as of September 30, 2019 for the 2020 actuarial valuation.

Prior years are shown in previous reports.

Section 4: GASB 68 Reporting Information

Exhibit 5 – Notes to Schedule of Contributions

Valuation Date	The actuarially determined contribution was determined as of January 1, 2021 with an interest adjustment to the fiscal year. Contributions in relation to this actuarially determined contribution will be reported for the fiscal year ending August 31, 2022.
<i>Methods and assumptions used to determine contribution rates:</i>	
Actuarial Cost Method	Projected Unit Credit
Amortization Method	Closed level dollar for remaining unfunded liability; see Section 5, Exhibit II for additional detail
Remaining Amortization Period	Remaining amortization period varies for the bases, with a net effective amortization period of 11 years
Asset Valuation Method	Sum of actuarial value at beginning of year and the cash flow during the year plus the assumed investment return, adjusted by 10% of the amount that the value exceeds or is less than the market value at end of year. The actuarial value is adjusted, if necessary, to be within 20% of market value.
Actuarial Assumptions:	
Net Investment Rate of Return	7.375%
Projected Salary Increases	2.25% plus service based merit increases
Cost of Living Adjustments	2.10%
Retirement Age	See Section 5, Exhibit III for summary of assumption and Section 4, Exhibit 6 for the history of changes to this assumption, if any.
Mortality	See Section 5, Exhibit III for summary of assumption and Section 4, Exhibit 6 for the history of changes to this assumption, if any.
Other information:	See Section 4, Exhibit 6 for the history of changes to plan provisions, if any.

Section 4: GASB 68 Reporting Information

Exhibit 6 – Actuarial Valuation History for Notes to Schedules

This exhibit describes assumption and benefit changes reflected in the last two fiscal years. For earlier changes, please see prior valuation reports.

Changes of assumptions

- Amounts reported for fiscal years ending in 2020 and later reflect the following assumption changes based on an actuarial study conducted in November and December of 2019:
 - The mortality table for healthy retirees and beneficiaries was changed from the sex-distinct RP-2000 Combined Healthy Mortality Table, set forward two years in age for males and one year for females to the sex-distinct Pri-2012 head-count weighted Healthy Retiree Mortality Table with rates multiplied by 1.25.
 - The mortality table for disabled participants was changed from the sex-distinct RP-2000 Disabled Retiree Mortality Table to the sex-distinct Pri-2012 head-count weighted Disabled Retiree Mortality Table with rates multiplied by 1.25.
 - The mortality table for active participants, terminated vested participants, and deferred beneficiaries was changed from the sex-distinct RP-2000 Combined Healthy Mortality Table, set forward two years in age for males and one year for females to the sex-distinct Pri-2012 head-count weighted Employee Mortality Table.
 - Future mortality improvement is based on projecting generationally from 2012 using 60% of the sex-distinct rates under the 2019 OASDI Trustees Report used for the intermediate alternative. Previously future mortality improvements were not explicitly projected.
 - The prior retirement assumption was based on the Plan's normal retirement eligibility. If normal retirement eligibility was only available on or after age 65, the prior assumption was 60% at ages 65 to 69 and 100% at age 70 and older. If normal retirement eligibility was available prior to age 65, the rates were 10% at ages 55 to 59, 20% at age 60, 25% at age 61, 35% at age 62, 40% at age 63, 45% at age 64, 50% at ages 65 to 69, and 100% at age 70 and older as long as a participant was at least eligible for early retirement.
 - The new assumption relates to when a given participant is eligible for normal retirement (either regular normal retirement or alternative normal retirement). Retirement rates do not apply if a participant is not eligible for either early or normal retirement. The retirement rates where normal retirement is available on or after age 65 are 5% at ages 55 to 59, 7% at ages 60 and 61, 20% at age 62, 10% at ages 63 and 64, 35% at age 65, 25% at ages 66 to 71 and 100% at ages 72 and older.
 - Where normal retirement is available to a given participant at age 62, 63, or 64, the new retirement rates are 3% when first eligible for early retirement through age 60, 10% at ages 61 to 64, 35% at age 65, 25% at ages 66 to 71 and 100% at ages 72 and older. In addition, in the first year a participant is eligible for normal retirement, the rate is increased by 30%.
 - Where normal retirement is available at age 60 or 61, the new retirement rates are 3% when first eligible for early retirement through age 59, 10% at ages 60 to 64, 35% at age 65, 25% at ages 66 to 71 and 100% at ages 72 and older. In addition, in the first year a participant is eligible for normal retirement, the rate is increased by 20%.

Section 4: GASB 68 Reporting Information

- Where normal retirement is available prior to age 60, the new retirement rates are 3% when first eligible for early retirement through the year prior to normal retirement eligibility, 10% from normal retirement eligibility through age 59, 20% at age 60, 25% at age 61, 35% at age 62, 40% at age 63, 45% at age 64, 50% at age 65, 25% at ages 66 to 71 and 100% at ages 72 and older. In addition, in the first year a participant is eligible for normal retirement, the rate is increased by 10%.
- The turnover rates were changed from the greater of age-based rates and select rates for the first five years of service followed by age-based rates thereafter to service-based rates only.
- The disability rates were changed to 50% of the rates in the prior age-based table.
- The inflation assumption was decreased from 2.75% to 2.25%.
- The salary increase assumption was changed from a service-based salary scale starting at 8.25% for the first two years of service with an ultimate rate of 3.25% at ten years of service to a service-based scale starting at 8.50% for the first two years of service with an ultimate rate of 3.00% at 15 years of service.
- The investment return assumption was decreased from 7.50% to 7.375%.
- The cost of living increase assumption was decreased from 2.75% to 2.10%.

Benefit changes

- There were no changes in benefit provisions in the last two fiscal years.

Section 5: Actuarial Valuation Basis

Exhibit I – Summary of Actuarial Valuation Results

The valuation was made with respect to the following data supplied to us:

1. Pensioners as of the valuation date (including 4 beneficiaries)	39
2. Participants inactive during year ended December 31, 2020 with vested rights	53
3. Participants active during the year ended December 31, 2020 (including 0 elected officials)	107
Fully vested	65
Not vested	42

The actuarial factors as of the valuation date are as follows:

1. Normal cost, including administrative expenses	\$407,201
2. Present value of future benefits	17,919,114
3. Actuarial accrued liability	14,377,036
Pensioners and beneficiaries	\$6,346,545
Inactive participants with vested rights	1,737,680
Active participants	6,292,811
4. Actuarial value of assets (\$13,608,243 at market value)	13,566,006
5. Unfunded/(Surplus) actuarial accrued liability	811,030

Section 5: Actuarial Valuation Basis

Exhibit II – Table of Amortization Bases

Type	Date Established	Initial Years	Initial Amount	Annual Payment	Years Remaining	Outstanding Balance
Combined Base	01/01/2020	10	\$517,372	\$69,797	9.00	\$480,584
(Gain) / Loss	01/01/2021	15	330,446	34,594	15.00	330,446
Total				\$104,391		\$811,030
30-year corridor				\$63,178	30.00	\$811,030
10-year corridor				109,413	10.00	811,030
Effective Amortization				104,391	10.72	811,030

Section 5: Actuarial Valuation Basis

Exhibit III – Actuarial Assumptions and Actuarial Cost Method

The methods and assumptions used in the January 1, 2021 valuation were approved by the Board in December 2019 based on the results of an actuarial experience study for the period January 1, 2015 through June 30, 2019 conducted by Segal in November and December of 2019.

Mortality Rates:

Healthy retirees and beneficiaries:

Sex-distinct Pri-2012 head-count weighted Healthy Retiree Mortality Table with rates multiplied by 1.25

Disabled participants:

Sex-distinct Pri-2012 head-count weighted Disabled Retiree Mortality Table with rates multiplied by 1.25

*Active participants, terminated
vested participants, and
deferred beneficiaries:*

Sex-distinct Pri-2012 head-count weighted Employee Mortality Table

Plan termination basis (all lives):

1994 Group Annuity Reserving Unisex Table

The mortality tables (other than the one used for the plan termination basis) are projected generationally from 2012 to future years using 60% of the sex-distinct improvement rates under the 2019 OASDI Trustees Report used for the intermediate alternative.

Section 5: Actuarial Valuation Basis

Annuitant Mortality Rates:

Age	Rate (%)			
	Healthy Male	Healthy Female	Disabled Male	Disabled Female
55	1.00	0.62	3.01	2.09
60	1.32	0.82	3.28	2.45
65	1.64	1.15	3.97	3.02
70	2.54	1.75	5.39	3.95
75	4.20	2.96	7.74	5.47
80	7.11	5.17	11.50	7.99
85	12.11	8.98	17.33	12.33
90	20.41	15.57	25.65	20.14

Mortality and Disability Rates before Retirement:

Age	Rate (%)			
	Male Mortality	Female Mortality	Male Disability	Female Disability
20	0.06	0.02	0.03	0.02
25	0.06	0.03	0.03	0.03
30	0.06	0.03	0.03	0.03
35	0.08	0.04	0.03	0.03
40	0.09	0.06	0.07	0.04
45	0.12	0.08	0.11	0.06
50	0.18	0.12	0.17	0.09
55	0.29	0.18	0.25	0.18
60	0.44	0.27	0.33	0.28

Section 5: Actuarial Valuation Basis

Turnover Rates:

Years of Service	Rate (%)	Years of Service	Rate (%)	Years of Service	Rate (%)
0 but less than 1	26.5	6 but less than 7	10.5	12 but less than 13	5.7
1 but less than 2	20.5	7 but less than 8	9.5	13 but less than 14	5.3
2 but less than 3	18.5	8 but less than 9	8.5	14 but less than 15	4.9
3 but less than 4	16.5	9 but less than 10	7.5	15 or more years	4.5
4 but less than 5	14.5	10 but less than 11	6.5		
5 but less than 6	12.5	11 but less than 12	6.1		

Rates end upon eligibility for retirement.

Retirement Rates:

The table below is based on a given participant's age when they first become eligible for regular or alternative normal retirement. Rates do not apply if the participant is not eligible for either early or normal retirement.

Age	NRA attained before 60	NRA attained between 60 and 64	NRA attained after 64
Under 55	3%/10% ¹	3%	0%
55-59	3%/10% ¹	3%	5%
60	20%	3%/10% ²	7%
61	25%	10%	7%
62	35%	10%	20%
63	40%	10%	10%
64	45%	10%	10%
65	50%	35%	35%
66-71	25%	25%	25%
72 & over	100%	100%	100%

The rates above are adjusted in the year the participant achieves NRA. If the NRA is under 60, the adjustment is +10%, if the NRA is 60 or 61, the adjustment is +20%, if the NRA is 62, 63, or 64, the adjustment is +30%, and if the NRA is 65 or over, there is no adjustment.

¹ 3% prior to normal retirement eligibility, but 10% plus adjustment after normal retirement eligibility

² 3% if NRA is between 62 and 64, but 10% plus adjustment if NRA is 60 or 61

Section 5: Actuarial Valuation Basis

Retirement Age for Inactive Vested Participants:	65																								
Form of Payment	Life Annuity																								
Unknown Data for Participants:	Same as those exhibited by Participants with similar known characteristics. If not specified, Participants are assumed to be male.																								
Percent Married:	100%																								
Age of Spouse:	Females three years younger than males																								
Benefit Election:	All participants are assumed to elect the life annuity form of payment and the valuation includes the 36 months of guaranteed benefits. On a system-wide basis, the optional forms of payment are essentially actuarially equivalent.																								
Net Investment Return:																									
On-going basis:	7.375%- On-going basis, based on long-term expected rate of return on pension plan investments The long-term expected rate of return on pension plan investments was determined using a building-block method in which best-estimate ranges of expected future real rates of return (expected returns, net of pension plan investment expense and inflation) are developed for each major asset class. These ranges are combined to produce the long-term expected rate of return by weighting the expected future real rates of return by the target asset allocation percentage and by adding expected inflation. The difference between the resulting rate and the rate on the ongoing basis is a margin for adverse deviation. Best estimates of arithmetic real rates of return for each major asset class included in the pension plan's target asset allocation as of March 31, 2020 (see the discussion of the pension plan's investment policy) are summarized in the following table: <table><tr><td><u>Asset Class</u></td><td><u>Target Allocation</u></td><td><u>Long-Term Expected Real Rate of Return</u></td></tr><tr><td>Domestic equity</td><td>45%</td><td>6.40%</td></tr><tr><td>International equity</td><td>20%</td><td>7.05%</td></tr><tr><td>Domestic fixed income</td><td>20%</td><td>1.15%</td></tr><tr><td>Real estate</td><td>10%</td><td>4.50%</td></tr><tr><td>Global fixed income</td><td>5%</td><td>1.25%</td></tr><tr><td>Cash</td><td>0%</td><td></td></tr><tr><td>Total</td><td>100%</td><td></td></tr></table>	<u>Asset Class</u>	<u>Target Allocation</u>	<u>Long-Term Expected Real Rate of Return</u>	Domestic equity	45%	6.40%	International equity	20%	7.05%	Domestic fixed income	20%	1.15%	Real estate	10%	4.50%	Global fixed income	5%	1.25%	Cash	0%		Total	100%	
<u>Asset Class</u>	<u>Target Allocation</u>	<u>Long-Term Expected Real Rate of Return</u>																							
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Real estate	10%	4.50%																							
Global fixed income	5%	1.25%																							
Cash	0%																								
Total	100%																								
Plan termination basis:	1.36% (30-year Treasury Securities Rate as of August 2020, published in September 2020; 2.12% last year)																								

Section 5: Actuarial Valuation Basis

Inflation: 2.25%

Salary Increases:

Years of Service	Annual Rate (%)
0-1	8.50
2	5.50
3	5.25
4	5.00
5	4.75
6	4.50
7	4.25
8	4.00
9	3.75
10-11	3.50
12-14	3.25
15 or more	3.00

Note the above rates include inflation of 2.25%.

Social Security Wage Base Increase: 2.25%

Cost of Living Adjustment: 2.10%

Section 5: Actuarial Valuation Basis

Administrative Expenses:	Base fee - \$9,000 Per active and terminated vested participant - \$66 Per retiree and beneficiary - \$78 Percentage of the market value of assets - 0.06% Per active participant for the administration of employee contributions - \$18 Per inactive participant for the administration of employee contributions - \$9
Actuarial Value of Assets:	Sum of the actuarial value at the beginning of year and the cash flow during year plus the assumed investment return, adjusted by 10 percent of the amount that the value exceeds or is less than the market value at end of year. The actuarial value is adjusted, if necessary, to be within 20% of market value.
Actuarial Cost Method:	Projected Unit Credit Cost Method. Normal Cost and Actuarial Accrued Liability are calculated on an individual basis and are allocated by service.
Models:	Segal valuation results are based on proprietary actuarial modeling software. The actuarial valuation models generate a comprehensive set of liability and cost calculations that are presented to meet regulatory, legislative and client requirements. Our Actuarial Technology and Systems unit, comprised of both actuaries and programmers, is responsible for the initial development and maintenance of these models. The models have a modular structure that allows for a high degree of accuracy, flexibility and user control. The client team programs the assumptions and the plan provisions, validates the models, and reviews test lives and results, under the supervision of the responsible actuary.
Amortization:	The amortization of the unfunded actuarial accrued liability is level dollar over 30 years for the initial unfunded accrued liability, 15 years for actuarial gains and losses, 10 years for temporary retirement incentive programs, and 30 years for actuarial assumptions and cost methods. Generally, other plan changes are amortized over 20 years. However, if the funded percentage, measured using the actuarial value of assets and the actuarial accrued liability, is below 80%, the amortization period is shortened. Specifically, if the funded percentage is at least 70% but less than 80%, the amortization period is 15 years and if the funded percentage is less than 70%, the amortization period is 10 years. The total amortization must be within a corridor of the 10-year and the 30-year amortization of the unfunded/(surplus) actuarial accrued liability. In a year when the 10-year or 30-year corridor applies, the following year, the prior year bases are combined into one 10-year or 30-year base.

Section 5: Actuarial Valuation Basis

Asset Data:

GMEBS has supplied all asset data used in the valuation. The market value of assets is based on current values as of three months preceding the valuation date (September 30, 2020) and is assumed to be current through that date.

Participant Data:

The primary source of participant data for the current valuation is a census of all participants which was prepared by the employer through GMEBS. The data is typically collected three months prior to the valuation date and assumed to be current through that date.

Changes in Methods and Assumptions:

There have been no changes in methods or assumptions since the last valuation.

Section 5: Actuarial Valuation Basis

Exhibit IV – Summary of Plan Provisions

EMPLOYER	City of Norcross
SOCIAL SECURITY	Yes
PARTICIPANT CONTRIBUTIONS	Noncontributory (Class 0 and 1) 3.00% (Class 2 and 3)
ORIGINAL EFFECTIVE DATE	3-1-86
MASTER PLAN/ ADOPTION AGREEMENT	4-1-03
SPECIAL JOB CLASS	Class 0 (EMP 00) – Regular employees hired before 11-1-11 (NO NEW ENTRANTS) Class 1 (EMP 01) – Public Safety Officers hired before 11-1-11 (NO NEW ENTRANTS) Class 2 (EMP 02) – Regular employees hired on or after 11-1-11 Class 3 (EMP 03) – Public Safety Officers hired on or after 11-1-11
ELIGIBILITY REQUIREMENTS	Employees: no waiting period Officials: not covered
NORMAL RETIREMENT AGE	Class 0 and 2: 65+5 or 62+10 (participant is required to be in the service of the Employer at the time of satisfying the Alternative Normal) Class 1 and 3: 65+5, 62+10, and 55+20 (participant is required to be in the service of the Employer at the time of satisfying the Alternative Normal)
EARLY RETIREMENT	55+10 (All classes)
BENEFIT FORMULA	1.60% (Class 0, 1, 2, 3) 1.55%-2.00% dynamic breakpoint (Class 0) comparison formula when application would result in a higher benefit

Section 5: Actuarial Valuation Basis

SERVICE NOT CREDITED

Service prior to 3-1-81 is not credited for benefit purposes, but is recognized to qualify participants for vesting and retirement

VESTING

5 years

DEATH BENEFITS

Automatic Option A - participants who are vested are eligible to designate a beneficiary to receive death benefits. (Previous to 4-1-03, participant must have been eligible for early or normal retirement to designate beneficiary).

Term vested Auto A death benefit effective 4-1-03

DISABILITY MINIMUM

--

COST OF LIVING

Variable not to exceed 3% effective 3-1-90 for actives and retired

OTHER

No changes in plan features since last valuation

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POST-RETIREMENT
EXPERIENCE DRIVES
PENSION COST ADVANTAGE



Attachment: Better-Bang-for-the-Buck-3.0-F11 (22-6400 : Participation in Retiree Benefits for New Employees)



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By William B. Fornia, FSA and Dan
Doonan

January 2022

ABOUT THE AUTHORS

William B. Forna, FSA founded Pension Trustee Advisors in 2010 and serves as president. PTA provides consulting services on retirement benefits to eighty clients. Previously, he led the public sector retirement plan actuarial consulting practice of a major consulting firm. His forty-year professional expertise is the analysis, design and modeling of postretirement employee benefits (pensions and health), particularly in the public sector. He has consulted with numerous state and local government bodies regarding their public retirement systems, as well as with private sector and not-for-profit employers in the United States, Brazil and Argentina. He has also worked on federal, state and local compliance and accounting issues for many clients. A frequent speaker, Mr. Forna has testified before legislative and judicial bodies in seventeen states, and served as expert witness, having testified in Federal Court. Mr. Forna has published several papers on retirement and has been interviewed by various periodicals. His most cited paper is NIRS' "A Better Bang for the Buck: The Economic Efficiencies of Defined Benefit Pensions." He has served public sector clients in thirty-seven states, Guam and Puerto Rico, and has consulted on seven of the ten largest US cities. Mr. Forna is on the faculty of Board Smart, an online pension training platform. He is a Fellow of the Society of Actuaries (1986), where he was reelected by its 35,000 membership to its Board of Directors. Mr. Forna is an Enrolled Actuary under ERISA (1984), a Member of the American Academy of Actuaries (1983), and Fellow of the Conference of Consulting Actuaries (2005). He graduated from Whitman College with a Bachelor of Arts degree in Mathematics (1980).

Dan Doonan is the executive director of the National Institute on Retirement Security. With the Board of Directors, Doonan leads the organization's strategic planning, retirement research and education initiatives. Doonan has more than 20 years of experience working on retirement issues from different vantage points including an analyst, consultant, trainer, and a plan trustee. He comes to NIRS after serving as a senior pension specialist with the National Education Association. Doonan began his career at the Department of Labor as a mathematical statistician. He then spent seven years performing actuarial analysis with Buck Consultants in the retirement practice. His experience also includes positions as a research director and labor economist. Doonan holds a B.S. in Mathematics from Elizabethtown College and is a member of the National Academy of Social Insurance.

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I. INTRODUCTION

Over the past four decades, private employers have shifted away from defined benefit (DB) pensions that provide employees with a steady retirement income stream. Instead, many private sector employers have moved towards defined contribution (DC) retirement accounts—such as 401(k) plans—citing costs. Under DC accounts, individual workers manage their own investments and bear all the risks. Many public sector employers faced pressure following the 2008 financial crisis to make a similar change.

Whether this transition meant that employer costs were reduced (or simply shifted to workers along with the risks), it wasn't the result of DC retirement accounts being less costly than a DB pension per dollar of benefit. In fact, DB pensions continue to have substantial economic efficiencies that cannot be replicated by individual DC accounts. Switching from a DB to a DC system saves money only if it involves substantial cuts to employee benefits.

Public sector employers largely have retained DB pensions as the primary retirement plan to ensure state and local workers have a modest but secure retirement. However, because of the concerns over the plans' long-term sustainability, nearly every state and local government in recent years has made significant changes to their DB plans, such as requiring higher employee contributions and increasing retirement ages. At the same time, the DC industry has been working on strategies that seek to close the gap on the advantages that DB plan participants benefit from—like longevity pooling, more competitive investment management fees, and lifetime income.

In fact, DB pensions feature critical efficiencies that make them significantly less expensive to provide a given level of retirement benefit compared to DC plans. These cost savings were documented by the 2008 National Institute on Retirement Security (NIRS) study, “A Better Bang for the Buck: The Economic Efficiencies of Defined Benefit Pensions” and a 2014 follow-up study, “Still a Better Bang for the Buck: an Update on the Economic Efficiencies of Defined Benefit Pensions.”¹ These studies found that a typical large DB pension plan provides a given level of retirement benefit at about half the cost of a 401(k)-style plan, because of three factors:

- **Longevity risk pooling.** The pooling of longevity risk in DB pensions enables them to fund benefits based on average life expectancy, and yet pay each worker monthly income no matter how long they live. In contrast, DC plans must receive excess contributions to enable each worker to self-insure against the possibility of living longer than average.
- **Higher investment returns.** DB pensions realize higher net investment returns due to professional management and lower fees from economies of scale
- **Optimally balanced investment portfolios.** DB pensions are “ageless” and therefore can perpetually maintain an optimally balanced investment portfolio rather than the typical individual strategy of downshifting over time to a lower risk/return asset allocation. This means that over a lifetime, DB pensions earn higher investment returns as compared to DC accounts.

In summary, when it comes to providing retirement income, DB pensions are substantially more economically efficient than individual retirement accounts because of risk pooling across a large number of individuals, a longer investment time horizon, and lower expenses and higher returns.

These facts have not fundamentally changed from the previous two studies. This report updates the comparison of retirement benefit funding costs based on an enhanced methodology that takes into account key changes in the DB and DC plan landscapes with regard to investment strategies and fees. A notable change includes the development of different assumptions for pre- and post-retirement years in DC plans, because DC plans generally have been successful at lowering costs for participants during their working years. However, costs and returns continue to lag dramatically during the post-retirement period.

This study, as in the 2014 update, compares:

1. A typical large public sector DB pension to two kinds of DC plans;
2. An “ideal” DC plan with a typical target date fund (TDF) asset allocation pattern, fees below industry average,

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and asset class investment performance as strong as that managed by professionals; and

3. An individually directed DC plan with industry average fees and reduced investment returns based on typical individual investor behavior.

All three plans—the typical DB plan, the ideal DC plan, and the individually directed DC plan—are modeled with the same underlying demographic and economic assumptions regarding employee wage growth, retirement age, life expectancy, target monthly retirement income, inflation, and projected rates of return for each asset class. This new analysis also assumes that all plans receive consistent, adequate contributions required to fund target benefits.

This study contains two new elements that were not included in the previous studies. First, it considers the impact on all three plans if the current low interest rate environment continues and compares that to a baseline scenario. Second, it analyzes how costs are affected by beginning to save mid-career rather than early career, and how that late start reduces total savings at retirement.

Even with updated assumptions and methodology, DB pensions still offer substantial cost advantage over DC plans. The analysis finds:

- A typical DB plan, with advantages based on longevity risk pooling, asset allocation, low fees and professional management, has a 49 percent cost advantage compared to a typical individually directed DC plan:
 - The longevity risk pooling that occurs in the DB plan accounts for 7 percent cost savings;
 - The DB plan's ability to maintain a more diversified portfolio drives another 12 percent cost savings;
 - Superior net investment returns, due to lower fees and professional management, generate an additional 30 percent reduction in cost.

- A DB pension costs 27 percent less than an “ideal” DC plan with below-average fees and no individual investor deficiencies.
- Roughly four-fifths of the difference in costs between the DB plan and the individually directed DC plan occurs during the post-retirement period, as retirees move from an environment that benefits from a long investment horizon and fiduciary protections to one where they manage their spend-down on a short-term individual basis without the benefits associated with longevity-risk pooling.

In other words, a typical DC plan costs nearly twice as much to provide the same level of retirement benefit as a DB plan, with four-fifths of the difference occurring post-retirement.

Specifically, it would be 96 percent and 37 percent more expensive for a typical DC plan and an ideal DC plan, respectively, to deliver the same level of retirement income as a typical DB plan. Thus, DB pensions continue to offer significant cost advantage. While shifting from a DB pension to a DC plan offers a way to reduce the investment risk borne by employers and taxpayers, this comes with an unavoidable tradeoff—either increased benefit costs or, more likely, significant retirement benefit cuts that are larger than the savings realized by the employer.

II. DEFINED BENEFIT AND DEFINED CONTRIBUTION PLANS

Employers who offer retirement benefits generally consider two basic approaches: a traditional defined benefit (DB) pension plan and a defined contribution (DC) retirement savings plan. The DB plan is designed to provide predictable retirement *income* throughout a worker's retirement years. Assets are pooled, and investments are managed by professionals who are responsible for acting in the best interest of participants. The DC plan, in contrast, is focused on accumulating retirement *wealth* expressed as a lump sum, with individual participants ultimately responsible for garnering adequate investment returns and managing their own accumulated wealth throughout their retirement years. This would entail estimating how much they can safely withdraw each year of retirement without running out of money, attempting to evaluate the best annuitization alternative in the open market, or some combination of the two.

Each type of plan has certain distinguishing characteristics that influence its cost to employers and employees.

How DB Plans Work

While employers have a large degree of flexibility in designing the features of a DB plan, there are some features all DB plans share. DB plans are designed to provide employees with a predictable monthly benefit in retirement. The amount of the monthly pension is typically a function of the number of years an employee devotes to the job and the worker's pay—usually at the end of their career.² For example, the plan might provide a benefit in the amount of 1.5 percent of final average pay for each year worked. Thus, a worker whose final average salary was \$50,000, and who had devoted 30 years to the job, would earn a monthly benefit of \$1,875 (\$22,500 per year), a sum that would “replace” 45 percent of their final average salary after they stop working. This plan design is attractive to employees because of the security it provides. Employees know in advance of making the decision to retire that they will have a steady, predictable income that will enable them to maintain a fairly stable portion of their pre-retirement standard of living.³

Benefits in DB plans are pre-funded. That is, employers (and, in the public sector, most employees) make contributions to a common pension trust fund over the course of a worker's career. These funds are invested by professional asset

managers whose activities are overseen by trustees and other fiduciaries. A typical DB pension fund's asset allocation policy—i.e., the share of holdings allotted to different asset classes such as stock, bonds, and treasuries—is based on a careful analysis of plan demographics and liabilities as well as short- and long-term financial market projections.⁴ The earnings that build up in the fund, along with the dollars initially contributed, pay for the lifetime benefits a worker receives at retirement.

How DC Plans Work

DC plans function very differently than DB plans. First, there is no promise of retirement income in a DC plan. Rather, the level of retirement income that an account will provide depends on a number of factors, such as the level of employer and employee contributions to the plan, the investment returns earned on assets, whether loans are taken or funds are withdrawn prior to retirement, and the individual's lifespan.

While DC plan assets also are held in a trust, that trust is comprised of a large number of individual accounts. DC plans are typically “participant directed,” meaning that each individual employee can decide how much to save, how to invest the funds in the account, how to modify these investments over time, and how to withdraw the funds during retirement.

Retirement experts typically advise individuals in DC plans to change their investment patterns over their lifecycle. In other words, at younger ages, because retirement is a long way off, workers should allocate more funds to stocks, which have higher expected returns but also higher risks. As one gets closer to retirement, experts suggest moving money away from stocks and into safer but lower return assets like bonds. This is to guard against a large drop in retirement savings on the eve of retirement, or in one's retirement years.

The high degree of participant direction makes DC plans very flexible in accommodating individuals' desires, decisions, and control. Unfortunately, a substantial body of empirical and experimental research indicates that this flexibility tends to lead to adverse outcomes. First, too many workers fail to contribute sufficient amounts to the plans.⁵ Second, individuals' lack of expertise in making investment

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decisions can subject individual accounts to extremely unbalanced portfolios with too little or too much invested in one particular asset, such as stocks, bonds, or cash.⁶ One team of researchers thus concluded, “The likelihood of investment success increases as the participant’s involvement in investment decisions decreases.”⁷

Fortunately, the DC industry recognizes these dynamics and has been moving toward offering default investment products where no decision is a good decision, such as Target Date Funds (TDFs) or Lifetime Funds. In addition, legislation has increased the acceptable default contribution levels to be more realistic in terms of what a typical retirement would cost.

Another important difference between DB and DC plans becomes apparent at retirement. Unlike in DB plans, where workers receive regular monthly pension payments, in DC plans it is typically left to the retiree to decide how to spend their retirement savings. Research suggests that many individuals struggle with this task, either drawing down funds too quickly and running out of money, or holding on to funds too tightly and enjoying a lower standard of living as a result. In theory, employers that offer DC plans could provide annuity payout options, but in practice they rarely do.⁸

The Changing Retirement Benefit Landscape

Changing Asset Allocation and Risk Management Strategies among DB Pension Funds

Changes in the financial and regulatory environments for DB pensions during the past several decades have prompted funds to shift financial risk management strategies. Notably, while governmental and corporate DB pension funds had similar asset allocations until 2008, including the share of investments in equities, different regulatory and demographic considerations led to diverging asset allocation after 2008. Given this divergence, and the concentration of DB pension benefits and assets in the governmental sector, this study models a typical public pension’s asset allocation.

In the private sector, corporations began introducing 401(k) plans in the 1980s. Then in the early 21st century, many firms began to close or freeze existing DB pension plans. The long bull market in stocks from the 1980s to 2000 enabled corporate pension sponsors to maintain pension plans with little or no cash contributions and use their overfunded

pensions as a source of income. Plan costs increased after the financial bubble burst. Then after the passage of the Pension Protection Act of 2006, private employers faced more onerous pension funding rules. While the intention was to safeguard retirement benefits promised to private sector workers, these regulations made pension funding and reported liabilities more volatile, and contributed to additional DB pension plan freezes and terminations.⁹ Other accounting and regulatory actions over the decades have added to this trend.

With no new workers entering the system, closed corporate pension plans face a shorter investment horizon. This dynamic, combined with the pension expense volatility created by new funding and accounting rules, motivated corporate DB pension sponsors to de-risk their portfolios by purchasing expensive annuities through third parties instead of continuing to invest in stocks, bonds, and other typical DB investment classes.¹⁰

Public pension plans, in particular state and local government pensions, faced unprecedented challenges in the aftermath of the 2008 financial crisis. Almost every state legislature enacted plan changes to enhance sustainability, and most included measures to increase employee contributions and reduce benefits for at least some employees.¹¹ Very few of these changes included eliminating the core DB plan, though some added combination plans that featured both DB and DC plans, or offered a choice.

Particularly germane to this study are the investment policy decisions made by many public pension funds. First, in response to a desire for reduced volatility and the low interest rate environment, pension fund trustees have reduced plan exposure to US stocks and traditional fixed income securities, and further diversified funds by increasing the share of global stocks and alternative investments such as real estate, private equity, and commodities. Second, the changing financial landscape also has prompted public pension funds to lower their rate of return assumptions. The median investment return assumption dropped from 8.00 percent in 2011 to 7.75 percent in 2014 and 7.00 percent in 2021 (net of expenses).¹²

Efforts to Improve DC Plans

The DC landscape has changed as well. Experts and policymakers have focused on addressing key problems in 401(k) type plans related to fees, investment options, investor behavior, and retirement income outcomes.

First, investment fees within employer-provided plans have been cut by half since 2000. In addition to competitive pressures, the fees have been reduced due to increased regulatory scrutiny of 401(k) and IRA fees, and growing use of lower cost index funds.¹³ The U.S. Department of Labor issued regulations in 2010 and 2012 concerning the disclosure of 401(k) fees. According to the Investment Company Institute, the asset-weighted average equity mutual fund expense ratio declined from 99 basis points in 2000 to 50 basis points in 2020.¹⁴

Annuities have continued to garner increasing interest among policymakers and regulators as a means to convert DC account balances into a lifetime income stream. Individual investment accounts are framed in terms of lump-sum retirement *wealth*, while the challenge facing retirees is securing adequate *income* to last through their lifetime. Annuities are financial products in which a third party (typically an insurance company) promises a stream of income in return for a lump sum. Despite the interest among legislators and plan providers, the availability of annuities as a 401(k) payout option remains limited, and overall participation rates remain low. They tend to be expensive due to today's low interest environment, insurer profit objectives, marketing and administrative costs, and adverse selection. But, as demonstrated by the results of this analysis, the greatest potential for improving the DC plan experience for participants lies in figuring out a safe and economically efficient means of generating post-retirement income. Provisions in the SECURE Act provided more legal protections to plans offering lifetime income options within 401(k) plans, and Section 203 of the SECURE Act will require DC plans to provide members with information about what level of income they might expect from their savings, helping individuals better understand this complex issue.

Growing use of target asset allocation funds. The consensus resulting from a decade of behavioral finance research is that 401(k) participants routinely make asset allocation and investment mistakes, such as buying and selling holdings at the wrong time, failing to regularly rebalance their portfolios, or taking too little or too much risk in their asset allocation. Target asset allocation funds address part of this problem through automatic rebalancing. One such type of fund, called Target Date Funds (TDFs) or lifecycle funds, has gained favor among policymakers, retirement experts, and large employers in the US and has continued to see broader use among DC plans.¹⁵ TDFs gradually and automatically shift their asset allocation from risky stocks to less risky bonds as a worker ages, based on their target retirement year. TDFs were held by 56 percent of 401(k) participants in 2018 and by 62 percent of participants

in their 20's. In total, 27 percent of 401(k) assets were held in TDFs at the end of 2018.¹⁶ These funds now account for the largest share of new 401(k) contributions. While they are not a panacea for individual investor error, the investment behavioral gap is much lower among individuals investing in TDFs compared to most other types of funds.¹⁷

A Note on Hybrid Retirement Benefits

There is ongoing interest in “hybrid” retirement benefits that combine some of the features of DB and DC plans, and offload some risks onto employees while maintaining some of the retirement security offered by traditional DB pensions. There are three main approaches to maintaining a DB but reducing cost volatility: risk-sharing DB plans, Cash Balance (CB) plans, and combination DB/DC plans, as described in *The Hybrid Handbook*.¹⁸ A CB plan is legally a DB plan—benefits are guaranteed, albeit as a lump sum, and assets are pooled in a trust and managed professionally. However, CB plan benefits typically are less generous than a traditional DB pension and too often participants do not obtain longevity protection when choosing a lump sum.

Importantly, the relative costs of hybrid plans depend largely on benefit structure. To the extent that hybrid benefits emphasize DB-like characteristics, they remain more cost effective depending on how plan types are combined.

III. METHODOLOGY

This study compares the relative costs of DB plans and DC accounts by constructing a model that first calculates the cost of achieving a target retirement benefit in a typical public sector DB plan. This includes calculating this cost as a level percent of payroll over a career, then calculating the cost of providing the same retirement benefit under two different types of DC plans—an “ideal” DC plan modeled with generous assumptions and a typical individually directed DC plan. Additional details on the methodology that account for the impact of alternative economic and demographic assumptions can be found in the Technical Appendix to this report.

Demographic Assumptions

The model is based on a group of 1,000 newly-hired employees. For the purposes of simplicity, all individuals have a common set of features. All newly-hired employees are female teachers aged 30 on the starting date of their employment. They work for three years and then take a two-year break from their careers for child rearing. They return to work at age 35 and continue working until age 62. Thus, the length of the career is 30 years. By their final year of work, their salary has reached \$60,000, having grown by 3.31 percent each year.¹⁹ For modeling purposes, the analysis assumes that prior to retirement, no one dies and there is no turnover within the pool of teachers.

The analysis maintains the same \$60,000 age-62 salary that was used in the 2008 report, even though wages have grown in the intervening period. This was done so that the absolute numbers can be compared. The amount of salary does not matter in terms of the most important outcomes of this study – comparing the costs (as a percent of payroll) of providing target benefits under different types of plans and finding that DB plans can provide the same value as DC plans at about half the cost.

Target Benefits

Next, the study defines a target retirement benefit that, combined with Social Security benefits, will allow the 1,000 teachers to achieve generally accepted standards of retirement income adequacy. The target benefit is \$32,036 per year or \$2,670 per month. A cost-of-living adjustment is provided to ensure the benefit maintains its purchasing

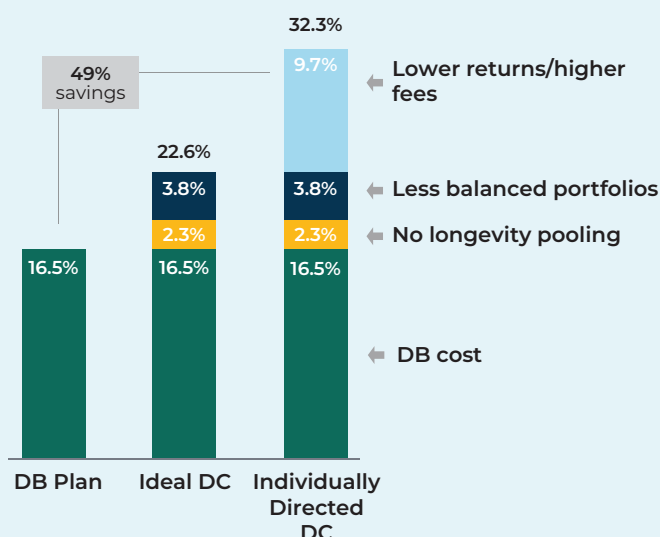
power during retirement. Thus, each teacher will receive a benefit equal to 53 percent of her final year’s salary that adjusts with inflation, which is assumed to be 2.31 percent per year. With this benefit and Social Security benefits, each teacher can expect to receive roughly 83 percent of her pre-retirement income—a level of retirement income that can be considered adequate, but not extravagant. The study defines certain parameters for longevity and investment returns. On the basis of all these inputs, the analysis calculates the contribution—as a percentage of payroll—that will be required to fund the target retirement benefit through the DB plan over the course of a career. The analysis does the same for the DC plans.

IV. FINDINGS: DB PLANS ARE STILL MORE COST EFFECTIVE

The cost of either a DB or DC plan depends, in the first instance, on the generosity of the benefits that it provides. However, for any given level of benefit, a DC plan will cost more than a DB plan. On average a dollar invested in a DB plan will generate more retirement income than a DC plan. In other words, DB plans are more efficient.

The study finds that the cost to fund the target retirement benefit under the DB plan comes to 16.5 percent of payroll each year. By comparison, the analysis finds that the cost to provide the same target retirement benefit is 32.3 percent under the individually directed DC plan and 22.6 percent of payroll under the ideal DC plan. As illustrated in **Figure 1A**, the DB plan can provide the same benefit at a cost that is 49 percent lower than the individually directed DC plan and 27 percent lower than the ideal DC plan.

Figure 1A: Cost of DB and DC Plan as Percentage of Payroll, Baseline Scenario



The DB cost advantage stems from differences in how benefits are paid out in each type of plan, how investment allocations shift in DC plans as individuals age, and how actual investment returns in DC plans compare with those in DB plans.

There are three primary reasons behind DB plans' cost advantage.

- First, because DB plans pool the longevity risks of a large number of individuals, these plans need only accumulate enough funds to provide benefits for the *average* life expectancy of the group. If individuals did this in a DC plan, they would face a 50 percent chance of running out of money in retirement. To reduce the risk of running out of funds to a reasonable level, individuals need to accumulate enough funds to last several years past average life expectancy. Using the 75th percentile life expectancy requires more funding in a DC plan (without longevity risk pooling), but also exposes participants to a one-in-four chance of either running out of money or needing to reduce the amount they withdraw for income.
- Second, because DB plans have a much longer investment horizon than individuals, they take advantage of the enhanced investment returns from maintaining a balanced portfolio over a long period of time. The reason behind the longer investment horizon is that a mature DB plan has a mix of younger workers, older workers, and retirees. By contrast, individuals in DC plans must gradually shift to a more conservative asset allocation as they age to protect against financial market shocks later in life. This means DB plans can withstand bear markets and keep a larger share of their investments in stocks and other assets that offer higher returns over the long term but fluctuate more in the short term compared to bonds and other fixed income securities. DB plans also are better positioned to take advantage of "illiquid" investments that offer premium returns—for instance, real estate and private equity. These factors allow DB pensions to ultimately earn higher returns based on asset allocation.
- Third, DB plans achieve even greater investment returns compared with typical individually directed DC plans based on lower fees and professional management. Superior returns can be attributed partly to lower fees that stem from economies of scale: assets are pooled in DB plans, where DC plans consist of individual accounts. In addition, because of professional management of assets, DB plans achieve superior investment performance compared to the average individual

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investor. DB investment managers have fiduciary duty and must meet the standard of prudence. In contrast, it is well documented that individual investors make inappropriate decisions regarding both asset allocation and market timing—and thus tend to earn returns that lag behind market returns.²⁰ This effect is sometimes called “behavioral drag.”

Longevity Risk Pooling

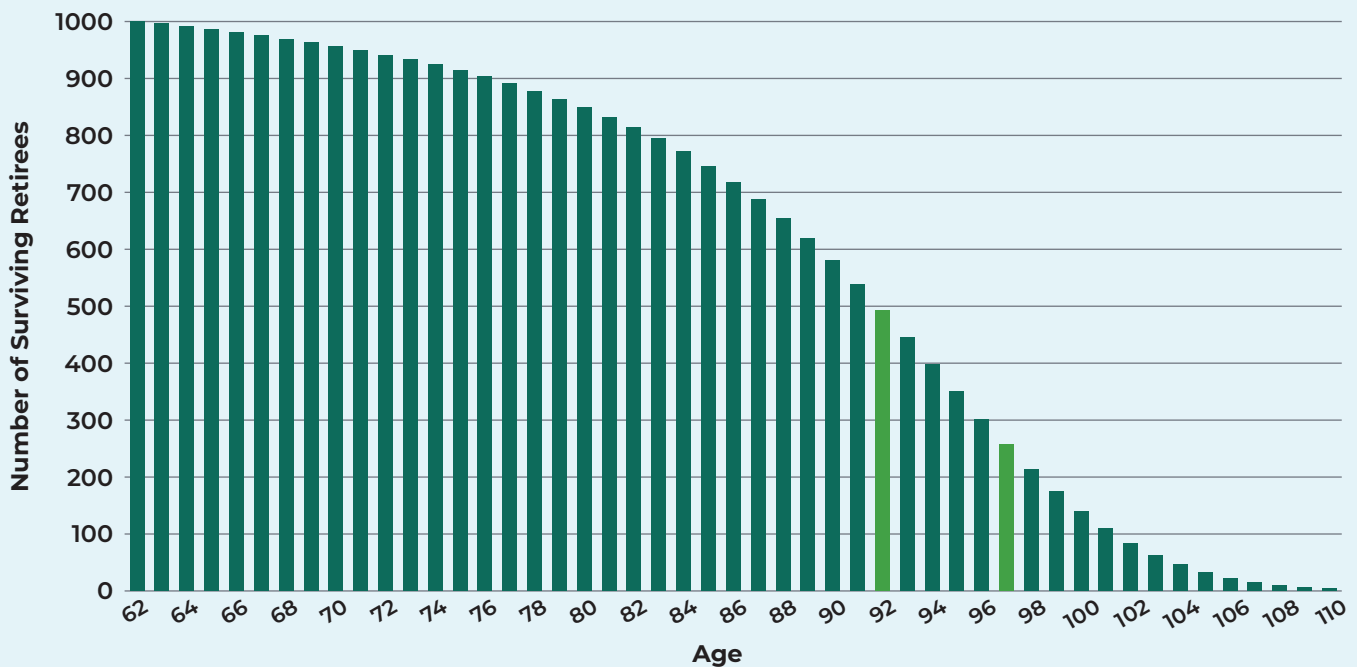
Longevity risk describes the uncertainty an individual faces with respect to their exact lifespan. While actuaries reasonably can predict that, on average, a pool of female teachers who are 30 today and who will retire at age 62 will live to be 92, they also can predict that some will live only a short time, and some will live to be over 100. **Figure 2** illustrates the longevity patterns among the 1,000 teachers. With each passing year, fewer retirees are still living. Age 92 corresponds to the year when roughly half of retirees are still alive.

In a DB plan, the normal form of benefit is a lifetime annuity, that is, a series of monthly payments that lasts until

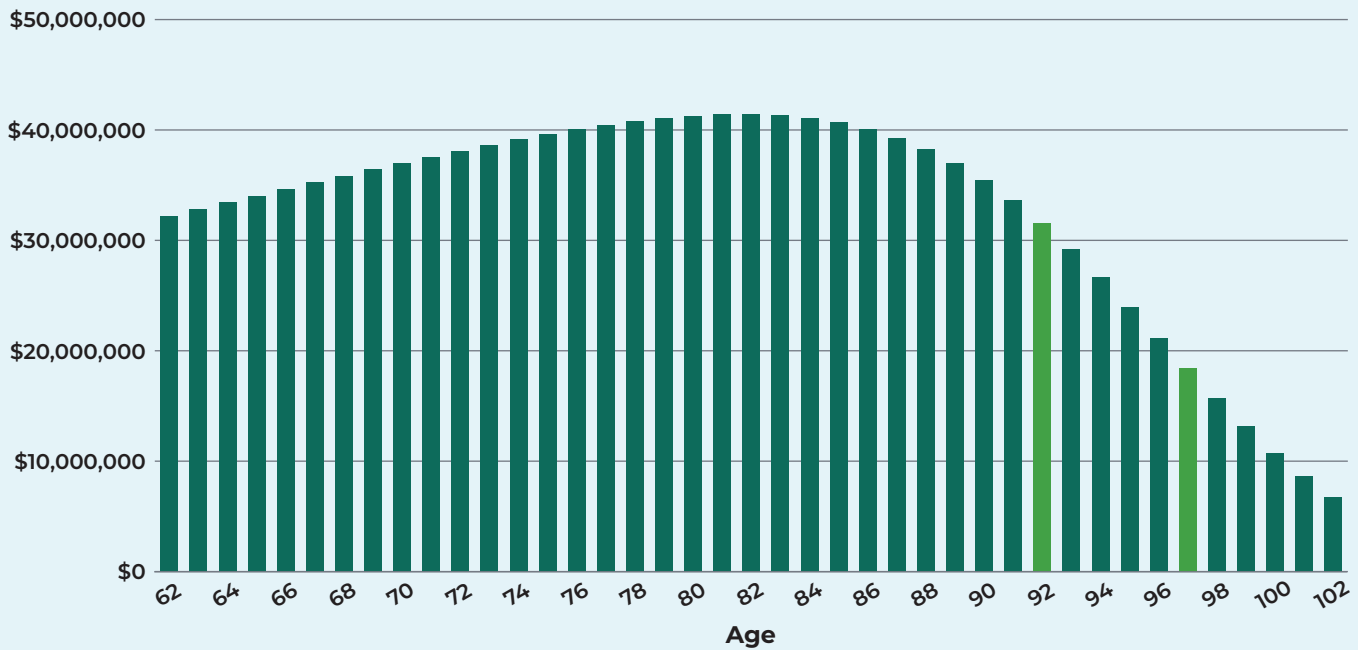
death. A DB plan with a large number of participants can anticipate the fact that some individuals will live longer lives and others will live shorter lives. Thus, a DB plan needs only to ensure that it has enough assets set aside to pay for the average life expectancy of all individuals in the plan, or in this case, to age 92. Based on the target benefit level, the DB plan needs to have accumulated approximately \$520,000 for each participant in the plan by the time they turn 62. This amount is projected to be sufficient for every individual in the plan to receive a regular, inflation-adjusted monthly pension payment that lasts as long as they live. The contribution level required to fund this benefit over a career comes to 16.5 percent of payroll.

Total annual payments out of the DB plan will have a hump shaped pattern as seen in **Figure 3**. The amount of benefits paid out will increase for a number of years, because the effect of inflation adjustments is greater than the effect of individuals gradually dying off. At age 82, the impact of retiree deaths overtakes the effect of the cost-of-living adjustments and payments decline with each passing year. In the DB plan, every retiree receives a steady inflation-adjusted monthly income that lasts until her death.

Figure 2: Longevity of 1,000 Retired Female Teachers



Note: Chart represents life expectancy at age 62 for female teachers hired at age 30 in 2021.

Figure 3: Total Payments Under the Defined Benefit Plan

Next, the study contrasts this situation with that in a DC plan. In the vast majority of cases, individuals must self-insure longevity risks (or purchase an annuity as discussed below). This can be an expensive proposition.

Because an individual in a DC plan does not know exactly how long they will live, they probably will not be satisfied with a benefit sufficient to last only for the *average* life span, for if they live past age 92, they will have depleted retirement savings. For this reason, an individual probably will want to be sure that they have enough money saved to last for several years past average life expectancy.

The analysis models the DC plan to provide income for the 75th percentile life expectancy, age 97. It corresponds to the age beyond which only 25 percent of individuals survive.²¹ This is a conservative target. In fact, the mortality table indicates that it is likely that one individual out of the 1,000 will celebrate their 112th birthday. It is not clear that most individuals will be satisfied with a 75 percent chance of not outliving their money, and in using this life expectancy, the study understates the cost of the DC plan. **Figure 4** illustrates the payout pattern under the DC plan, where individuals withdraw funds on an equivalent basis

to the DB plan until age 97—that is, in a series of regular, inflation adjusted payments. At age 97, there are no more withdrawals. The money has simply run out.

Of course, those 25 percent of individuals who do survive to age 97 and beyond would want to avoid the possibility of having their retirement income reduced to zero. It is likely that individuals will respond to longer lives by gradually reducing their withdrawals from the plan to avoid running out of money. This means that those with very long lives will see their standard of living reduced significantly. At the same time, it is difficult to exactly predict one's lifespan, some retirees who live past age 96 will reduce their withdrawals more than they actually need to. Finally, if a retiree dies before exhausting all of her retirement savings, the money in the account passes to her estate. The funds that were intended to be retirement income become death benefits paid to heirs instead. **Figure 5** illustrates the combined effect of reduced withdrawals and estate payments.

Figure 4: Total Benefit Payments Under the DC Plan Based on Life Expectancy of 97

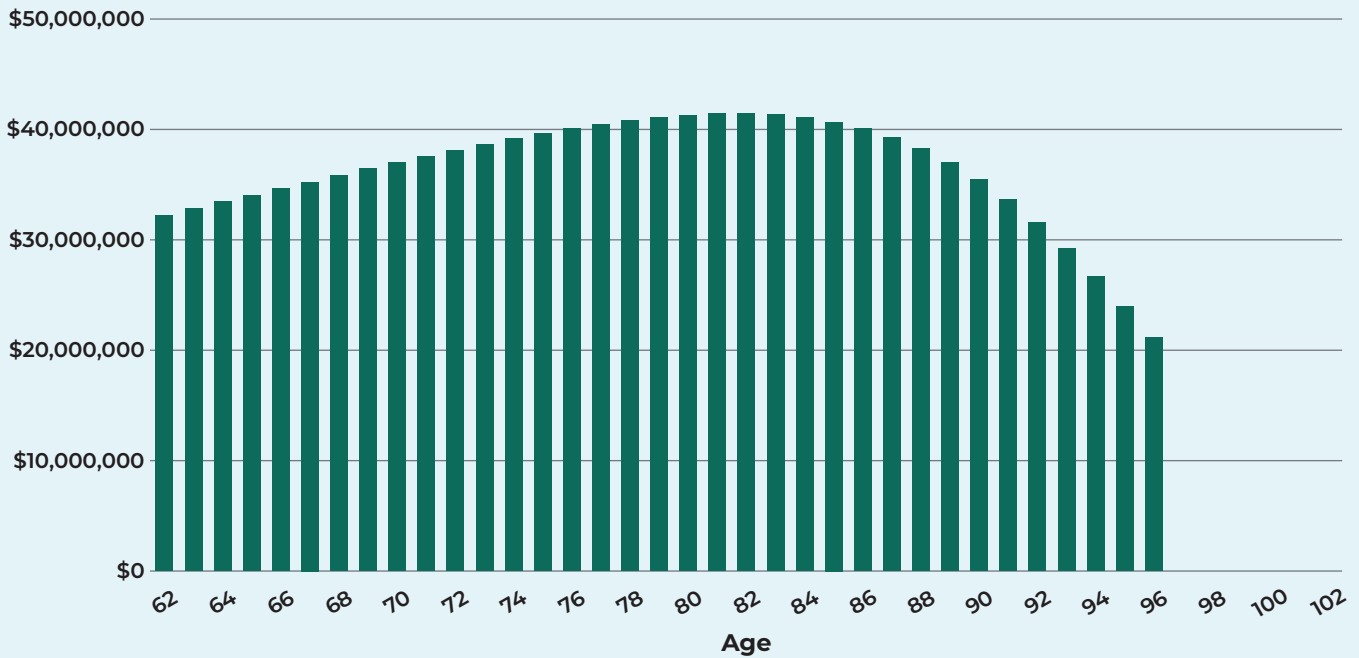


Figure 5: Total Benefit and Estate Payments Under the DC Plan Based on Adjusted Withdrawal Strategy



The aggregate amount of money transferred to estates is substantial—15 percent of the value of the DC plan. While some individual heirs will benefit from these intergenerational transfers of wealth, such transfers are not economically efficient from a taxpayer or employer perspective. Because heirs did not provide services from which the employer/taxpayer benefited, providing additional benefits to heirs is economically inefficient. Moreover, the amount of these additional “death benefits” are not tied in any direct way to an individual employee’s productivity during her working years.

In addition, although annuities purchased through private insurance companies may offer full protection against longevity risk, this protection comes at a significantly higher cost than the same protection provided by a DB pension.²²

DB plans avoid this problem entirely. By pooling longevity risks, DB plans not only provide all participants in the plan with enough money to last a lifetime, but also accomplish this goal with less money than would be required in a DC plan. Because DB plans need to fund only the *average* life expectancy of the group, rather than the *maximum* life expectancy for all individuals in the plan, less money needs to be accumulated in the pension fund. Remember that the DB plan needs to accumulate about \$520,000 for each participant in the plan by the time they turn 62 in order to fund the target level of benefit.

In contrast, DC plans must accumulate almost \$600,000 per participant, or nearly \$75,000 more, in order to minimize the likelihood of that individual running out of funds. This additional amount extends retirement income from average life expectancy to the 75th percentile life expectancy. **In order to accumulate the additional amount necessary for DC plan participants to self-insure against this level of longevity risk, contributions to the plan would climb to 18.8 percent of pay, from 16.5 percent under the DB plan** (an increase of 14 percent). This assumes the same net investment returns, but as demonstrated below, the two remaining factors contribute to DC plans having inferior returns compared to the DB plan.

Maintenance of Portfolio Diversification (Staying Invested in Equities)

A retirement system that achieves higher investment returns can deliver a given level of benefit at a lower cost. All else being equal, the greater the level of investment earnings, the lower contributions to the plan will need to be. Prior research substantiates DB plans’ significant advantage in investment returns, as compared with DC plans.

Part of the reason why DB plans tend to achieve higher investment returns as compared with DC plans is that they are long-lived. That is, unlike individuals, who have a finite career and a finite lifespan, a DB pension fund endures across generations; thus, a DB plan, unlike the individuals in it, can maintain a well-diversified portfolio over time. This well-diversified portfolio will include investments which are expected to earn higher returns, but which come with greater risk, whereas a less diversified portfolio in a DC plan will focus on more secure, but lower returning asset classes. In DC plans, individuals’ sensitivity to the risk of financial market shocks increases as they age. The consequences of a sharp stock market downturn on retirement assets when one is in their late 50s are substantial, compared to when one is in their 20s with sufficient time to recover their losses.

For this reason, individuals are advised to gradually shift away from higher risk/higher return assets as they approach retirement, which is built into the design of TDFs. While this shift offers some insurance against the downside risk of a bear market, it also sacrifices expected return since more money will be held in bonds, cash, and similar assets that offer lower rates of return in exchange for more security. A reduction in expected investment returns will require greater contributions to be made to the plan in order to achieve the same target benefit.

Researchers have found a large and persistent gap when comparing individually directed investment returns against market performance. A 2018 report from CEM Benchmarking found that DB pensions outperformed DC plans in average net returns by 46 basis points, net of fees, over the 10 years ending in 2016. Note that this was considerably smaller than the 99 basis point difference found in their 2013 report. The analysis credits this narrowing gap to an improved asset mix, better plan design, and lower costs in DC plans.²³ The difference in returns has a long history and has been noted in prior reports as well, as Watson Wyatt found that DB plans outperformed DC plans by an annual average of 76 basis points, net of investment expenses, from 1995 to 2011.²⁴

Within DC plans, the gap between individual and market performance seems to have narrowed, particularly for investors using TDFs. When participants use a fully self-directed approach rather than through the employer DC plans, however, the large gap seems to persist. Morningstar continues to find a 1.7 percent difference between actual investor returns and the total returns their funds generated over the same time period.²⁵ Morningstar also found that the gap was the smallest for investor dollars in allocation funds, such as TDFs, which combine stocks, bonds, and other asset classes, which they note are now core holdings in employer

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401(k)s. The improvement within DC plans, but continued lagging performance overall, suggests that changes to DC plan design and offerings are helping participants significantly during their working years.

These studies aggregate asset allocation and investment returns. This does not present much of a problem for DB plans, because asset allocation is relatively consistent across large funds that tend to be mature and have roughly similar demographic profiles. However, aggregated DC plan data tells us less about the “typical” investor because there is a large dispersion of asset allocations and returns among individual investors. In addition, aggregated data is of limited usefulness in determining long-term returns over a typical individual’s career and retirement years as their asset allocation shifts from equities to fixed income securities, as prescribed by the TDF or lifecycle investment strategy.

In order to estimate investment returns for the DB and DC plans over teachers’ working and retirement years, the analysis starts with asset allocation for each plan and then applies a uniform set of assumptions about the long-term returns for each asset class. The DB plan is assumed to have an asset allocation typical of a large public sector DB plan. In the ideal and individually directed DC plans, participants are expected to gradually shift out of higher risk/higher return assets in favor of lower-risk/lower return assets.

Figures 6A and 6B show the expected net annual investment return by age for the DB plan and both DC plans for the two scenarios studied. Figure 6A reflects a baseline scenario, while Figure 6B represents a future with persistently low interest rates. In the baseline model, the well-diversified DB plan is expected to achieve investment returns of 6.80 percent per year, net of fees. The low interest rate scenario begins with a DB return of only 5.68 percent. The net returns for the ideal DC plan (modeled with the same expenses and investment skill assumptions as the baseline DB plan, as explained later) show that while the typical TDF asset allocation glide path used for the DC plans in this study earns higher returns than the DB plan during the first half of a teacher’s career, those returns drop below the DB plan when she is in her late 40s. To preserve her retirement wealth after she stops working, the teacher needs to reduce her exposure to equities even more. This results in a sacrifice of expected annual returns of 2.30 percent by age 96 in the ideal DC plan and 3.98 percent in the individually directed DC plan. For detailed DB and DC asset allocation and projected investment returns, including a discussion of the low interest rate scenario, see Table A1 in the Technical Appendix.

Figure 6A: Expected Annual Investment Return, Baseline Scenario (net of fees)

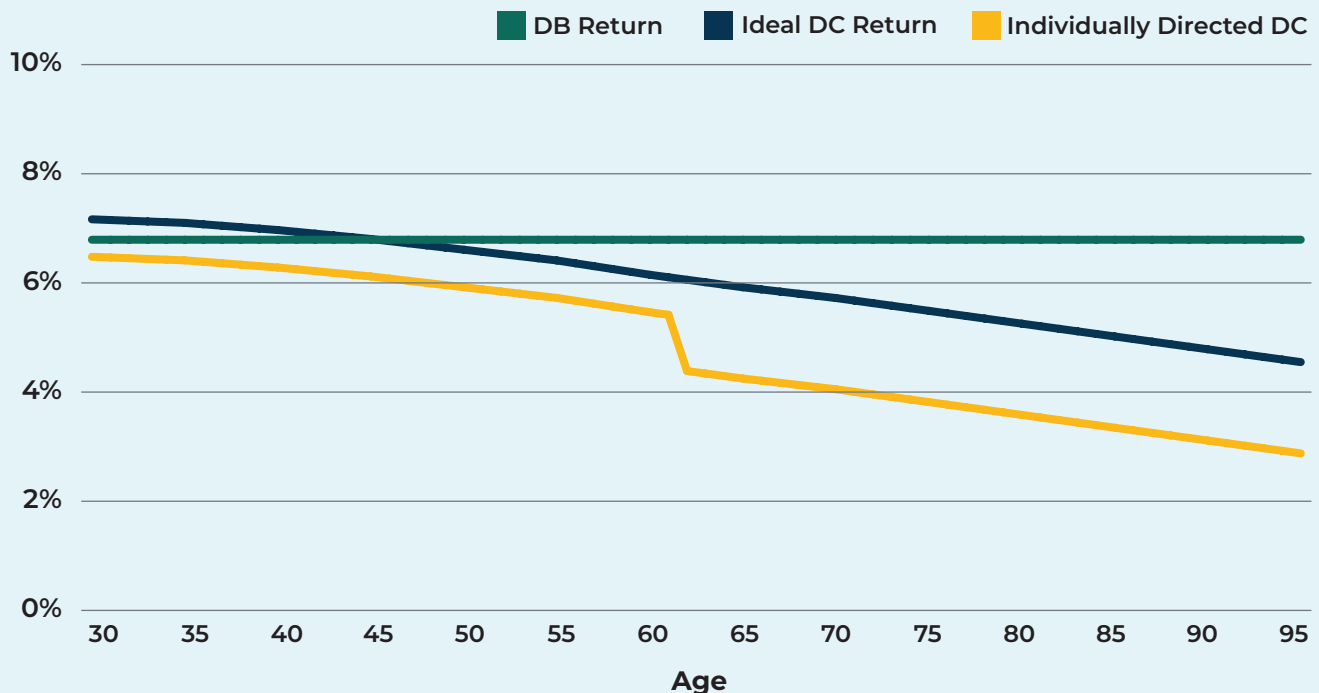
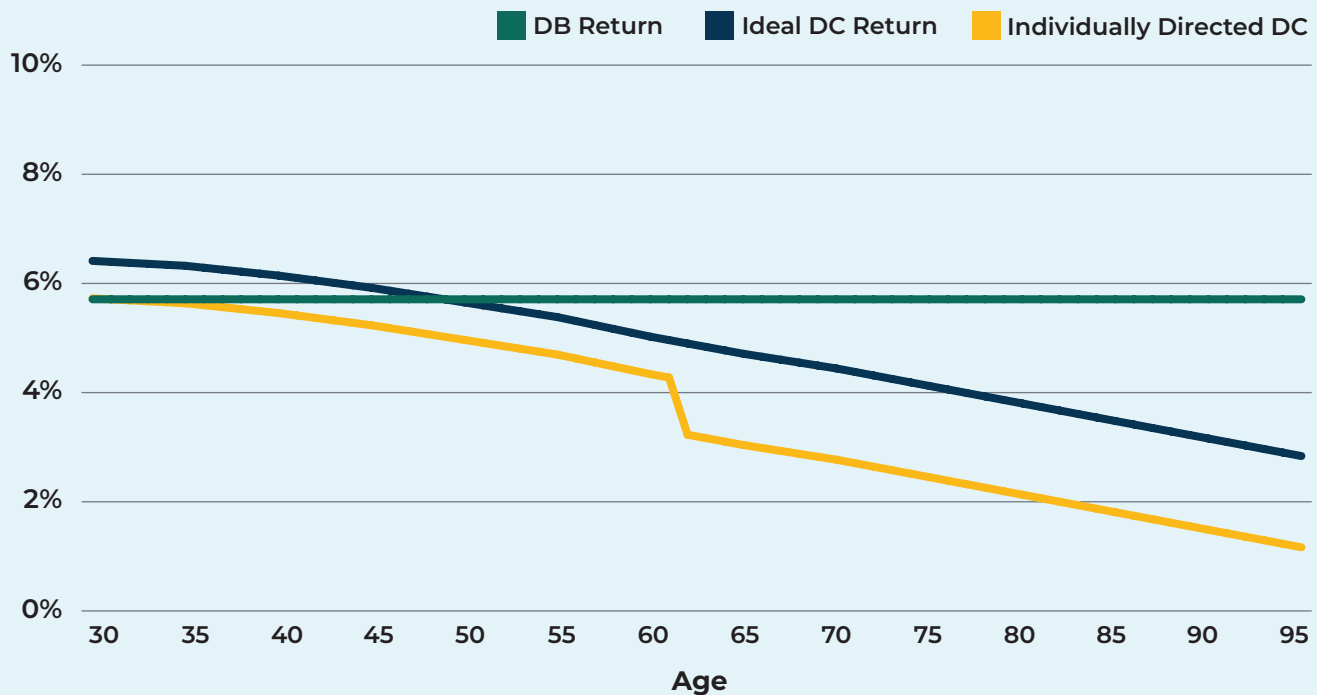


Figure 6B: Expected Annual Investment Return, Low Interest Rate Scenario (net of fees)



The analysis finds that the shift in portfolio allocation has a modest, but nonetheless significant, effect on cost. Specifically, the analysis finds that the per-retiree amount that must be accumulated in the DC plan by retirement age now climbs to nearly \$700,000. By comparison, the DB plan requires just over \$520,000. After accounting for asset allocation in addition to longevity risk, contributions required to fund the target benefit now climb to 22.6 percent of payroll in the DC plan compared to 16.5 percent of payroll under the DB plan (an increase of 37 percent). This summarizes the cost difference between the ideal DC plan and the DB plan. To arrive at the full cost difference for the individually directed DC plan, differences in investment expertise and expenses must be taken into account.

Superior Net Returns Compared to Individually Directed DC Plan

In addition to asset allocation, another important reason why DB plans achieve higher investment returns than DC plans is that DB pension assets are pooled and professionally managed. The model attributes a 69 basis point “drag” during the working years (up to age 62) and 168 basis point “drag” post-retirement in individually directed DC plans, based on fees and well-documented individual investor behavior.²⁶

Expenses paid out of plan assets to cover the costs of administration and asset management reduce the amount of money available to provide benefits. As a result, a plan that can keep these costs down will require lower contributions. By pooling assets, large DB plans drive down asset management and other fees. On their face, these differentials may appear small, but over a long period of time, they compound to have a significant impact. To illustrate, over 40 years, a 100 basis point difference in returns compounds to a 24 percent reduction in the value of assets available to pay for retirement benefits.²⁷

TDF expenses vary depending on whether the underlying funds are actively managed or passively managed (e.g., index funds). The Investment Company Institute’s 2021 Fact Book noted that the median expense ratio for TDFs in 2020 was 65 basis points, down from 94 basis points in 2014 and 126 basis points for hybrid funds in 2008.²⁸ Because of the low fees of both well managed DB plans and well managed DC plans which utilize TDF’s, we assume that the investment expenses in both plans are the same level.

Administrative costs are largely driven by scale. Thus, a large DB plan or DC plan can have opportunities to negotiate minimized administrative expenses. A DC plan involves costs that do not exist in a DB plan, such as the

costs of individual recordkeeping, individual transactions, and investment education to help employees make good decisions. However, DB plans, unlike DC plans, bear the administrative costs of making regular monthly payments after retirement.

But fees are only part of the story; differences in the way retirement assets are managed in DB and DC plans play a substantial role. As previously discussed, investment decisions in DB plans are made by professional investment managers, whose activities are overseen by trustees and other fiduciaries.

DB plans have broadly diversified portfolios and managers who follow a long-term investment strategy. Additionally, the average individual in DC plans, despite their best efforts, often falls short when it comes to making sound investment decisions.

Furthermore, studies show that over the long term, individual investor level returns significantly lag behind the returns of any individual asset class or benchmark—largely due to inappropriate investment decisions.²⁹ For example, during the 2008 financial crisis, individual participants generally failed to re-balance their asset allocation, and those who did shift assets incurred significant losses by fleeing from equities near the bottom of the market.³⁰ In 2012 and 2013, investors pulled funds out of asset classes before they experienced price increases, and into asset classes that were about to experience price drops.³¹

The analysis assumes no net disadvantage on the basis of fees or investor skill for the ideal DC plan compared to

the DB plan. This is a generous assumption given real life experience with TDF use and with DC investor behavior in general.

Investor “behavioral drag” is assumed to be 69 basis points before retirement and 168 basis points post-retirement. For information on other levels of disparity, please see the Technical Appendix of the 2014 report.

The “behavioral drag” on individually directed DC plan returns – which is greatest post-retirement once funds leave employer-sponsored plans – compounds over time to create a significant cost disadvantage. In particular, the analysis finds that the amount which must be set aside for each individual at retirement age now climbs to almost \$880,000 (compared to the roughly \$520,000 required in the DB plan). **Thus, after accounting for differences in net returns due to investment expertise and fees—in addition to the longevity risk and asset allocation factors described above—the level of required contributions climbs again for the individually directed DC plan, this time to 32.3 percent of payroll, compared to 16.5 percent under the DB plan (an increase of 96 percent).**

Taken together, the economies that stem from investment pooling and longevity risk pooling can result in significant cost savings to employees and employers/taxpayers. **In this model, required contributions to fund a given level of retirement benefit are 49 percent lower in the DB plan compared with the individually directed DC plan, and 27 percent lower compared to the ideal DC plan.**

V. SUMMARY OF RESULTS: DB PLANS REDUCE COSTS BY NEARLY HALF

The analysis clearly demonstrates that DB plans are far more cost-effective than DC plans. To achieve roughly the same target retirement benefit that will replace 54 percent of final salary, the DB plan will require contributions equal to 16.5 percent of payroll. In contrast, the individually directed DC plan will require contributions to be almost twice as high as the DB plan—32.3 percent of payroll. Even the “ideal” DC plan, generously modeled with the same fees and investor skill as the DB plan—provides benefits at a substantially higher cost of 22.6 percent of payroll.

This study finds that due to the effects of longevity risk pooling, maintenance of portfolio diversification, and greater investment returns over the lifecycle, a DB plan can provide the same level of retirement benefits at about 27 percent lower cost than an ideal DC plan and about 49 percent lower cost than an individually directed DC plan.

Table 1 breaks down the cost savings realized by the DB plan relative to the individually directed DC plan. First, the longevity risk pooling that occurs in the DB plan accounts for 7 percent cost savings. Second, the DB plan’s ability to maintain a more diversified portfolio drives another 12 percent cost savings. Third, superior net investment returns across the lifecycle generate an additional 30 percent reduction in cost compared to an individually directed DC plan—bringing the total cost savings to 49 percent.

Table 1: Tallying DB Plan Cost Savings Compared to Individually Directed DC Plan

Source	Savings
1. Longevity Risk Pooling	7%
2. Maintenance of Portfolio Diversification (staying invested in equities)	12%
3. Lower Fees and Professional Management	30%
All-In Cost Savings in DB Plan	49%

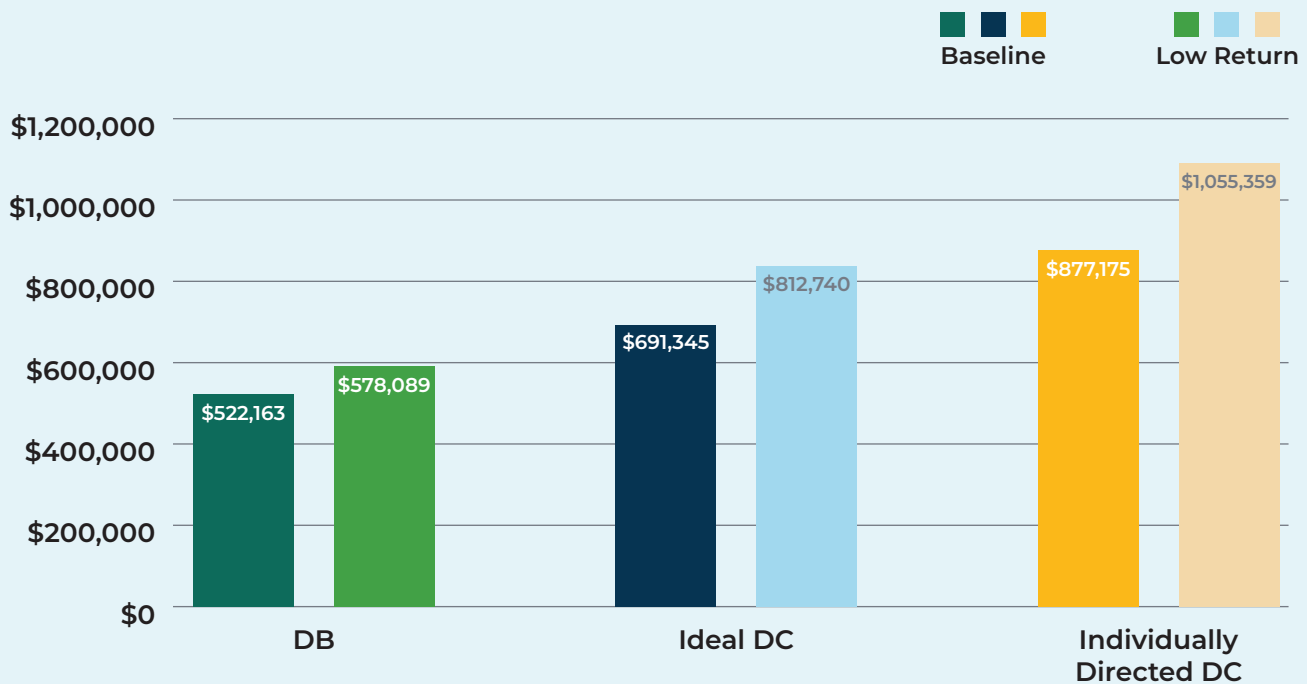
The results also indicate that DB plans can do more with less. That is, DB plans can ensure that all individuals in the plan (even those with very long lives) are able to enjoy an adequate retirement benefit that lasts a lifetime, at the same time that they require less money to be contributed to a retirement plan and fewer assets to accumulate in the plan. The study calculates the amount of money that would be required to be set aside for each retiree in each type of plan, to provide a modest retirement benefit of about \$2,700 per month.

Figure 7A illustrates the comparison between the baseline investment scenario and the low-return environment. It shows that at retirement age, the DB plan requires just over \$520,000 to be set aside for each individual. However, in the persistent low-return environment, the cost jumps about \$60,000 to around \$580,000. The ideal DC plan requires nearly \$700,000 in the baseline scenario, and the low return scenario increases that cost by almost \$122,000 (to \$810,000). Meanwhile, the individually directed DC plan requires \$877,000 in the baseline scenario, with the low return environment driving up costs to over \$1 million.

The difference in resources needed at retirement between the DB plan and the two DC plans illustrates that the efficiencies embedded in DB plans can yield large dollar savings for employers, employees, and taxpayers. The low return scenarios widen the efficiency gap both in terms of the dollar increase and the percentage increase in costs—with the target level of resources needed for the DB plan increasing 11 percent, while the individually directed DC target increases by 20 percent.³²

As discussed in the next section, the target level of resources needed to produce the same income levels for the three types of plans enables us to look at the share of overall inefficiencies that are experienced post-retirement compared to during the working years.

Figure 7A: Per Employee Amount Required at Age 62, DB Plan vs. DC Plan, Baseline Scenario and Low Interest Rate Scenario



This report also looks at how the efficiency of the same three plans is impacted when workers are hired mid-career (at age 45). **Figure 7B shows the resources needed at retirement for the target benefit under each plan, with the partial career benefit being 57 percent of the full career benefit (working 17 years instead of a full 30).** The differences among the three plans in Figure 7B represent the cost differential for the three plans during post-retirement years stemming from longevity pooling and higher/lower returns. The post-retirement efficiency gap is unaffected by the mid-career start, as the post-retirement experience is the same (see **Table 2** below).

Figure 1C lays out the cost of accruing the resources in each plan to fund the mid-career hire target benefit. The percent of payroll needed to fund the target benefit amount increases under all three plans because the contributions start at a later age, allowing less time for investment returns to accrue and subsidize benefit costs. Even with a smaller targeted benefit, a higher contribution rate is required as a result of fewer years of investment earnings. For the DB plan, the rate increases by 29 percent to fund the target benefit for the mid-career hire, while the individually directed DC plan rate increases by 22 percent.

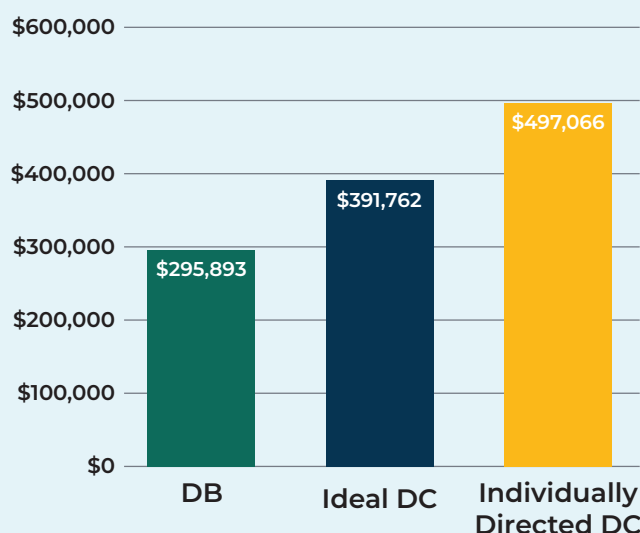
It is important to remember that, if a DC plan were to calculate a contribution rate needed to reach a targeted

level of resources, any such figure would be applicable only to an individual—not the entire workforce. However, normal costs in pension systems are blended, or averaged over all participants. Therefore, comparing a DB plan's blended normal cost to a benefit example for an individual young person hired in a DB plan is not an apples-to-apples comparison.

One takeaway is that any benefit analysis comparing costs and benefit outcomes under DB and DC plans should include a range of ages at hire, so the benefit impacts for those hired at younger and older ages are well understood. This is particularly true given that DB accruals (as dollars of annual income earned for a year of service) increase gradually throughout one's career, while early dollars are much more effective at generating retirement income in a DC plan.³³

The findings indicate that DB plans provide a better bang for the buck when it comes to providing retirement income, which is illustrated in the baseline scenario, the low return scenario, and when looking at workers hired mid-career. The analysis finds that an individually directed DC plan costs nearly twice as much to provide the same level of retirement income as a DB plan. Even compared to an ideal DC plan with generous assumptions about fees and investor skill, a DB plan delivers the same benefit for 19 percent less cost.

Figure 7B: Per Employee Amount Required at Age 62, DC Plan, Mid-Career Hire Scenario



Hence, DB plans should remain a centerpiece of retirement income policy and practice, given the persistent advantages in economic efficiency.

The Cost Impact of Incorporating Today's Low Interest Rate Environment

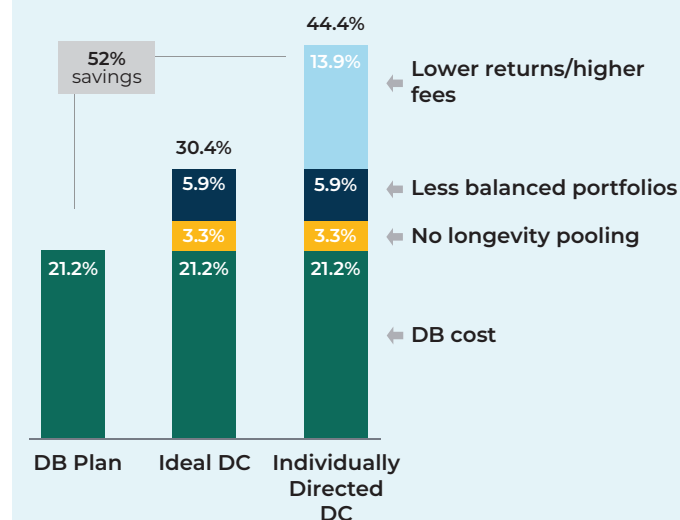
In addition to the baseline scenario, this study analyzes how all three plans would be impacted by a set of assumptions that includes today's low interest rate.

Figure 1B shows the costs of equivalent benefits in the three plans, where market returns are below historical levels. All three plans experience higher costs as a result of lower expected investment returns, which means a higher share of these costs come from contributions (and less from returns) compared to the baseline scenario. DB plan costs increase from 16.5 percent of payroll to 21.2 percent due to lower returns--an increase of 28 percent. Similarly, the ideal DC cost increases by 35 percent to 30.4 percent of payroll. And the individually directed DC costs increase by 37 percent, leaving a contribution of 44.4 percent of payroll to fund the same benefits.

It is worth noting that the assumption set for this scenario includes near-term pessimism that investors currently hold on equity returns over the next decade, since equity prices have run up significantly during the pandemic. This scenario also considers the current low interest rate environment. The baseline scenario backs out this near-term equity

pessimism and low interest rates. This may be reasonable, given that these projections (for a 30-year-old hired today) span the next seven decades.

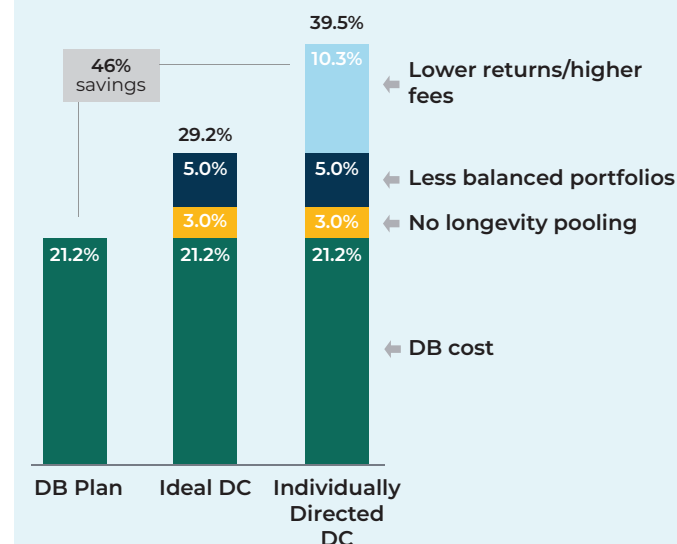
Figure 1B: Cost of DB and DC Plan as Percentage of Payroll, Low Return Scenario



The Cost Impact for Mid-Career Hires

In addition to the baseline scenario, this study analyzes the economic efficiency for an employee who was hired mid-career (age 45). The overall economic efficiency advantage of DB plans is consistent with the baseline findings, although reduced slightly due to the shorter accumulation period.

Figure 1C: Cost of DB and DC Plan as Percentage of Payroll, Mid-Career Hire



Post-Retirement DC Experience Drives Four-Fifths of Efficiency Gap

Another new aspect to this update is the addition of an analysis of how much of the DC inefficiency gap occurs before and after retirement.

Much of the challenge with DC plans, in terms of delivering value, occurs after one retires. This becomes clear when considering the returns at different ages, as shown on Figures 6A and 6B. For instance, returns at all ages are 6.80 percent for the DB plan in the baseline scenario. The individually directed DC plan only lags by 38 basis points at age 35, and the ideal DC plan actually has higher returns. Because the amount of assets accrued at this age is relatively low compared to later ages, these higher returns do not have much impact over a full lifetime.

But, when looking toward the post-retirement years, the differences in annual investment returns increase to 131 basis points for the ideal DC and 299 basis points for the individually directed DC at age 75. Given that account balances are expected to be largest at retirement, the 242 basis point difference between the DB plan and the individually directed DC returns at age 62 is a significant cost-driver, as are all years after retirement when DC participants are typically advised to be more risk-adverse.

Across the three scenarios, about four-fifths of the inefficiencies in the individually directed DC plan (relative to the pension plan) occur after retirement. In the baseline scenario, the pension benefit was 49 percent less expensive. Put another way, the individually directed DC plan was 49 percent more economically inefficient. However, even if there

were no difference before retirement, the DB plan still would reduce costs by 40 percent over the individually directed DC plan due to inefficiency throughout the post-retirement years. The post-retirement inefficiency was the same for mid-career hires (with the same return assumptions), but with fewer working years the pre-retirement inefficiencies were slightly lower. The market assumptions used for the persistent low interest rate environment increased the efficiency gap overall, but also moved a small portion of the difference from the working years to the post-retirement years. It is notable that the efficiency gap during the post-retirement experience of the low interest rate scenario is 45 percent alone.

The DC industry is focused on the post-retirement experience, and has been a topic of legislative proposals. Retirees typically withdraw their funds at retirement and manage their money outside of a workplace plan that offers fiduciary protections. DC plans have been successful at lowering investment fees. The move from a workplace plan to managing funds on one's own is a move from a wholesale to a retail experience—with associated higher fees. Retail investment recommendations face a lower legal standard protecting retirees. As some 401(k) providers seek to keep retirees in workplace plans by providing viable lifetime income options, there is room for improvement. DC plans would achieve greater economies if fees reduce further.

Using private annuities to generate life income in DC plans would not close the efficiency gap with DB plans. This was explored extensively in the 2014 report. Private annuities are expensive due to factors such as the cost of inflation protection, inherent costs faced by insurance companies; the current low interest rate environment increasing annuity costs; and insurance company statutory capital

Table 2: DC Plan Efficiency Gap

	Baseline Scenario	Mid-Career Hire	Low Return Environment
Post-Retirement Inefficiency	40%	40%	45%
Pre-Retirement Inefficiency	9%	6%	7%
Total Inefficiency	49%	46%	52%

requirements which DB plans do not face. The expense of private annuities is a factor in the low utilization by retirees. Building an annuity into a workplace DC plan could perhaps reduce some of these costs and deliver greater value to retirees, but doing so efficiently is challenging when the risk pool is composed of only retirees and no younger workers.

Attention to improving options for spending down DC assets is well-deserved. However, the gap will not be

reduced significantly without the benefits of risk-pooling and risk premiums that come with investments in equities – particularly in light of today’s historically low interest rate environment.

CONCLUSION

Despite notable changes in the retirement benefit landscape since 2008, including some improvement in DC performance and fees, DB pensions retain their cost advantage as a means of providing retirement benefits to workers. This study compares the cost of providing equivalent benefits through a typical large public sector DB plan, an ideal DC plan, and an individually directed DC plan. The study also examines the impacts of both a mid-career start to saving and a persistent low interest rate environment on the efficiency of these three plan types.

Due to the advantages of longevity risk pooling and the maintenance of portfolio diversification, the DB plan costs less than a DC plan, even compared to the ideal DC plan with no disadvantage in terms of fees and investor skill. And when examining the individually directed DC plan with more realistic assumptions regarding fees and investor skill, the cost of the DC plan doubles compared to the DB plan because the DB plan realizes a hefty additional cost advantage due to its low expenses and professional management of assets.

The sources of cost savings in DB plans reflect, at a very basic level, the differences in how DB and DC plans operate. Group-based DB plans provide lifetime benefits and feature pooled, cost-efficient, professionally managed assets invested over a long time horizon. These features drive significant cost savings that benefit employers, employees, and taxpayers. While well-designed DC plans can theoretically mimic some of these advantages—for instance, employers may select low-fee TDFs as a default investment option for their workers—DB plans would still retain their advantages of longevity risk pooling and long-term portfolio diversification. Using private annuities to convert DC account balances at retirement into a lifetime

income stream does not close this gap because such annuities are expensive, especially when they include the kind of inflation protection offered by public DB plans. In fact, the analysis reveals that four-fifths of the inefficiency of DC plans occurs post-retirement.

When considering the results, it is important to keep in mind that in an effort to construct an “apples to apples” comparison, the analysis made a number of simplifying assumptions that do not account for other disadvantages of DC plans. For instance, this analysis did not model any asset leakage from either the ideal or individually directed DC plan before retirement through loans or early withdrawals. The analysis also assumes that individuals followed a sensible “goldilocks-like” withdrawal pattern in retirement—not too fast, not too slow, but just right. This study used conservative estimates of the difference in actual investment returns between DB and DC plans. And, the analysis uses 75th percentile life expectancy to project required accumulations in the DC plans, which means 25 percent of individuals will either outlive their savings or have to reduce drawdowns (income) in their later years.

Thus, if anything, the analysis underestimates the cost of providing benefits in a DC plan and thereby understates the cost advantages of DB plans.

Due to the built-in economic efficiencies of DB plans, employers and policy makers should continue to carefully evaluate claims that “DC plans will save money.” As discussed, benefit generosity is a separate question from the economic efficiency of a retirement plan. While either type of plan can offer more or less generous benefits, DB plans have a clear cost advantage for any given level of retirement benefit. Consequently, shifting from a DB plan to

a DC plan and maintaining the same contribution rate will generate significant cuts in retirement income. Considering the magnitude of the DB cost advantage, the consequences of a decision to switch to a DC plan could be dramatic for employees, employers, and taxpayers.

Finally, policymakers should focus on how to best encourage life income options in DC plans. This is a significant technical challenge, but improved post-retirement options would make retirement in a DC plan more effective. However, it must be done in a manner that presents good value to retirees, as much opinion research indicates retirees are very interested in life income options--but currently few retirees purchase annuity products. Improving offerings may result in closing the gap between the desire of retirees

to simplify their finances and their actual behavior. In addition, policymakers should consider proposals that can strengthen existing DB plans and promote the adoption of new ones. When viewed against the backdrop of workers' increasing insecurities about their retirement prospects and the economic and fiscal challenges facing employers and taxpayers, now more than ever, policy makers ought to focus their attention and energy on this important goal. Many features that make DB plans attractive to employees drive cost savings for employers and taxpayers. In this way, DB plans represent a rare "win-win" approach to achieving economic security in retirement that should be recognized and replicated.

TECHNICAL APPENDIX

Methodology

This report calculates the cost, expressed as a level percent of payroll over a career, of achieving a target benefit in a typical DB plan and compares that with the cost of providing the same target benefit in a typical DC plan.

The analysis begins by constructing a cohort of 1,000 newly-hired employees. This cohort is given a common set of features. All are female teachers age 30 on the start of their employment. They work for three years and then take a two-year break from their careers to have and raise children. They return to work at age 35 and continue working until age 62. Thus, the length of the career is 30 years. By their final year of work, their salary has reached \$60,000, having grown by 3.31 percent each year.

Modeling DB Plan Benefits and Costs

The DB plan provides a benefit in retirement equal to 1.85 percent of final average salary for each year worked, which represents approximately the median benefit among DB plans covering public employees (hired before the Great Recession) who are also covered by Social Security.³⁴ Final average salary is calculated on the basis of the final three years of one's career, which in this case is \$58,098. Thus, the initial benefit in the DB plan is \$32,244 per year or \$2,687 per month.

The DB plan provides a cost-of-living adjustment that ensures the benefit maintains its purchasing power during retirement. Inflation is projected at 2.31 percent per year in the baseline scenario and 2.10 percent in the low return scenario. Thus, each individual in the cohort will receive a benefit equal to 54 percent of her final year's salary that adjusts with inflation. This DB plan (in combination with Social Security) would allow an employee to meet generally accepted standards of retirement income adequacy, or roughly 83 percent of pre-retirement income.

DB plans typically offer married participants the ability to receive joint-and-survivor annuity benefits, whereby when the retiree dies, her spouse can continue to receive a monthly benefit that will last the spouse's lifetime. But the retiree often pays the cost of this survivor's benefit. That is, the monthly benefit that would be payable on a single-life basis will be reduced by an actuarially determined factor to account for the fact that payments may continue if the retiree dies before her spouse. Therefore, for simplicity, the study models all benefit payouts on a single-life basis (and does the same for the DC plan), using the Generational RP-2014 Healthy Female Annuitants mortality table with projection under scale MP 2021 (hired in 2021 at age 30).³⁵

To model the contributions that are required to fund these benefits, the analysis first establishes expected investment returns based on asset allocation. To construct

the asset allocation and future returns for the DB pension, the analysis draws on the latest available average public pension asset allocation and expected return data from surveys from a number of sources: Aon, Horizon Actuarial Services, Investment Company Institute, Morningstar, Vanguard, and the Public Plan Database.³⁶ In particular, the Public Plan Database was used to set allocations to broad asset categories, such as public equity, fixed income, private equity, real estate, hedge funds, cash, and other investments. For investment return assumptions by asset class, the analysis drew on proprietary data provided by Aon and the Horizon Actuarial Services' Survey of Capital Markets Assumptions. The results are listed in **Tables A1** and **A2**.

The baseline scenario analysis uses the 2021 Survey of Capital Market Assumptions by asset class over 10 and 20 year periods, conducted by Horizon Actuarial Services. This was adjusted to determine the asset class assumptions for the second 10-year period and the results are shown in the first column of Table A1.³⁷ Because these projections span over a lifetime of a 30-year old hired in 2021, the longer-term expectation was deemed more appropriate for our analysis. The difference between the Horizon 10-year and 20-year return expectations demonstrates the near-term pessimism that exists as a result of current low interest rates as well as the run up in equity prices during the pandemic.

We made no such adjustment for the second set of capital market assumptions. That analysis used Aon's Investment Consulting Capital Market Expectations as of 2021 Q3 by asset class, as shown in column 1 of Table A2.

Investment consultants and actuaries including Aon use sophisticated techniques including asset class correlation and geometric returns to develop the overall expected rate of return assumption. Such an analysis was beyond the scope of this paper, where a simple weighted average of asset class returns was applied to develop the overall return assumption for the DB plan and the DC plan by age.

Based on this methodology, the DB plan is expected to achieve nominal investment returns of 6.80 percent per year, net of fees, in the base scenario and 5.68 percent in the low interest rate scenario. Readers should exercise caution in comparing this rate of return to expected returns reported by individual public pension funds, because funds tend to use higher inflation assumptions in their forecasting. For the baseline, the analysis used an inflation assumption of 2.31 percent in this study for benefit increases as well as for capital market expectations. For the persistent low interest rate scenario, the study used a 2.10 percent inflation assumption.

On the basis of these inputs, the analysis calculates the contribution that will be required to fund this benefit through the DB plan over the course of a career, and express this as a level percent of payroll. The analysis finds that the cost to fund the target retirement benefit is 16.5 percent of career over a full career. Contributions could be made entirely by the employer or may be split between the employer and employee.

Modeling DC Plan Benefits and Costs

Modeling the cost of the target retirement benefit in the DC plan requires some adjustments based on what is known about how DC plans differ from DB plans. First, because employees are not provided with an annuity benefit at retirement under the DC plan, the analysis determines the size of the lump sum amount that an individual would need to accumulate by their retirement date in order to fund a retirement benefit equivalent to that provided by the DB plan (including inflation adjustments) for a period of 35 years, or to age 97. To make this comparison, the analysis uses a reasonable—though not ideal—spend down strategy of planning for mortality at the 75th percentile life expectancy of female teachers who are now 30 years old can expect when they retire at age 62. This means 25 percent of individuals survive to age 97 and outlive their savings. The other repercussion of this assumption is that 15 percent of the DC value never goes toward producing retirement income. Instead, those who pass away before reaching the age of 97 have their remaining DC asset revert to their estates.

Thus, the model underestimates the cost of funding retirement benefits through a DC plan: as one in four individuals will experience a reduced standard of living, compared to what they would experience under a DB plan. These individuals may have the foresight to gradually reduce their withdrawals from the plan to avoid the possibility of having their retirement income reduced to zero. However, actual behavior varies greatly.

The analysis assumes that the DC plan would be invested in a TDF, which automatically adjusts asset allocation from stocks to bonds as a worker approaches retirement. The study estimates the equity allocation glide path of TDFs from Vanguard's report, *How America Saves 2021*, from 87 percent equities at age 30 to 43 percent equities at age 71, with five percent assumed to be in cash.³⁸ This data represents participant-weighted average equity allocation (by age) in Vanguard funds in 2020. See **Table A1** for the asset allocation trajectory.³⁹

To model the impact of the shift to a more conservative portfolio allocation beyond age 71, the analysis has individuals begin to shift their portfolio allocation to gradually reduce the share held in equities to zero. The model increases the holdings of cash and liquid investments, treasuries and agency debt, and corporate bonds to 100 percent by age 97. The investment/withdrawal strategy modeled is not the result of an optimization rule; rather, it follows this simple straight-line rule.

Finally, in order to arrive at returns for each plan, the model applies estimates of long-term returns for each asset class from Horizon's capital market assumptions survey for the baseline and Aon's capital market expectations for the lower-return scenario.⁴⁰ This gives two possible return environments to study, with the same returns by asset category for both DB and DC plans.

Withdrawals are designed to mimic DB plan payouts, at least in the early years of retirement, declining in later years as retirees adjust to the likelihood of living beyond their original target of age 97. Work by William Sharpe and colleagues suggests that an optimal approach would integrate investment and withdrawal strategies. Specifically, Sharpe finds that a constant withdrawal rate must be paired with a riskless investment strategy to be optimal for an individual.⁴¹ However, a post-retirement asset allocation entirely concentrated in risk-free assets would dramatically drive up the cost of the DC plan. Thus, the model's simple investment and withdrawal strategies would tend to understate the cost advantage of DB plans.

Fees and Behavioral Drag

This study includes estimates of DC plan costs and expected returns based on a review of existing research.

The behavioral drag assumptions are different for pre- and post-retirement years. This is because fees have been reduced significantly in DC plans, and DC plans have continued to move toward target date funds that help reduce behavioral drag. However, those improvements are largely limited to the pre-retirement years, as workers typically pull resources out of the wholesale plan environment at retirement (which provides strong fiduciary protections and competitive fees) and move their money to retail investment strategies that come with far fewer protections.

As a result, the investment behavioral drag impact is larger post-retirement. Before retirement, the behavioral drag in the individually-directed DC plan is assumed to be 69 basis points per year. However, post-retirement fees and

behavioral drag totals 168 basis points. These figures are approximated based upon Exhibit 1 in Morningstar's *Mind the Gap 2021* report. The report notes that allocation funds (stocks and bonds and other asset classes) often are used as core holdings for 401(k) accounts. Thus, the 69 basis point gap for allocation funds were used as a proxy to represent the TDFs pre-retirement experience. For post-retirement years, the investment drag for all funds was used—without backing out allocation funds—which was 168 basis points.

The study assumes that in an ideal DC plan, the plan sponsor would retain expenses consistent with those of the DB plan, but also assumes that participants would avoid well-documented mistakes related to asset allocation and market timing decisions such as investing too much or too little in stocks, and reacting emotionally to market fluctuations by selling assets as prices fall and buying back into the market as prices rise.⁴² In addition to behavioral finance studies, key studies indicate that individual investor returns lag behind market returns. This is not a significant problem for pension funds because they are managed by professionals who exercise discipline in the face of market fluctuations and regularly rebalance. In contrast, investor-level data shows that individuals earn returns significantly below the returns posted by the funds in which they invest.⁴³

Estimates of this gap vary depending on the market cycles captured in the time frame, but most studies that cover a long time-horizon show significant under-performance by individual investors. For instance, Morningstar's *Mind the Gap* study found that, in the 10 years ending on December 31, 2020, investors' actual mutual fund returns lagged by 1.7 percentage points per year, noting the "annual return gap is in line with the gaps measured over the four previous rolling 10-year periods, which ranged from 1.6 to 1.8 percentage points per year."⁴⁴ The study also examined net flows in and out of each asset class, and found the "shortfall, or gap, stems from inopportunistically timed purchases and sales of fund shares, which cost investors nearly one sixth the return they would have earned if they had simply bought and held."⁴⁵

Despite the persistent gap of 1.6 to 1.8 percentage points per year, the analysis uses allocation funds for working years that better represent TDFs and which Morningstar notes "are often used as core holdings for employer-sponsored retirement plans, such as 401(k)s." Thus, the pre-retirement behavioral drag is assumed to be 69 basis points (the behavioral drag for allocation funds), which is much lower than the overall figures. The 2014 study gave a thorough analysis of the variability of findings based on various amounts of behavioral drag.

The model does not include important additional differences between DB and DC plans, such as the “leakage” of assets from DC plans through loans or early withdrawals, two features which are rare in DB plans. Neither does the model analyze the effects of ups and downs in financial markets and the impact that these have on investment returns and costs in both DB and DC plans over a career. Also, the fact that in DC plans some individuals will have “better luck” with investing than others means that individuals’ retirement prospects will exhibit a wider dispersion than what is predicted by the model. A 2012 Texas TRS plan design study, for instance, estimated that participants in an individually directed DC plan would have a 66 percent chance of having less than 62 percent of the benefit offered by the DB plan with the same contributions.⁴⁶

Table A1: Capital Market Assumptions, Excluding Next 10 Years

Asset Class	Projected Long Term Returns	DB Plan	DC Plan Asset Allocation Glidepath by Age of Worker/Retiree									
			30	35	40	45	50	55	60	65	70	100
Public Equity	7.7%	46.5%	87%	85%	81%	76%	70%	64%	56%	49%	43%	0%
Fixed Income	4.4%	23.2%	8%	10%	14%	19%	25%	31%	39%	46%	52%	95%
Private Equity	10.2%	9.4%										
Real Estate	6.9%	8.9%										
Hedge Funds	6.0%	6.3%										
Cash	2.6%	2.4%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Commodities	4.6%	1.7%										
Misc. Alternatives	7.2%	1.5%										
Other	7.3%	0.1%										
Total		100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Net Return: Ideal DC		6.80%	7.18%	7.11%	6.98%	6.81%	6.62%	6.42%	6.15%	5.92%	5.73%	4.31%
Net Return: Individually Directed DC			6.49%	6.42%	6.29%	6.12%	5.93%	5.73%	5.46%	4.24%	4.05%	2.63%
Inflation Assumption	2.31%											

Table A2: Capital Market Assumptions, Including Next 10 Years

Asset Class	Projected Long Term Returns*	DB Plan	DC Plan Asset Allocation Glidepath by Age of Worker/Retiree									
			30	35	40	45	50	55	60	65	70	100
Public Equity	7.0%	46.5%	87%	85%	81%	76%	70%	64%	56%	49%	43%	0%
Fixed Income	2.5%	23.2%	8%	10%	14%	19%	25%	31%	39%	46%	52%	95%
Private Equity	8.7%	9.4%										
Real Estate	5.5%	8.9%										
Hedge Funds	5.2%	6.3%										
Cash	2.0%	2.4%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Commodities	4.4%	1.7%										
Misc. Alternatives	5.7%	1.5%										
Other	5.0%	0.1%										
Total		100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Net Return: Ideal DC		5.68%	6.39%	6.30%	6.12%	5.90%	5.63%	5.36%	5.00%	4.68%	4.41%	2.48%
Net Return: Individually Directed DC			5.70%	5.61%	5.43%	5.21%	4.94%	4.67%	4.31%	3.00%	2.73%	0.80%
Inflation Assumption	2.10%											

*Authors estimates based on Aon's assumptions for various asset classes.

Expected returns are using Aon's Q3 2021 Capital Market Assumptions (CMAs) as of 09/30/2021, which are projections about the future returns of asset classes. For asset classes that can be implemented passively, which includes most public assets, alpha and active management fees are not included in the return expectations. For asset classes that can only be implemented actively, such as hedge funds and private assets, we assume alpha and higher active manager fees. Expected returns are geometric (long-term compounded). Expected returns presented are models and do not represent the returns of an actual client account. Actual returns will be reduced by any advisory fees and other expenses a client may incur. Aon's advisory fees are described in Part 2A of Aon's Form ADV. Not a guarantee of future results. Capital market assumptions disclosure pages are available from Aon upon request.

ENDNOTES

1. B. Almeida and W.B. Forna, 2008, "A Better Bang for the Buck: The Economic Efficiencies of Defined Benefit Pension Plans," National Institute on Retirement Security, Washington, DC and W.B. Forna and N. Rhee, 2014, "Still a Better Bang for the Buck: An Update on the Economic Efficiencies of Defined Benefit Pensions," National Institute on Retirement Security, Washington, DC.
2. The benefit factor could also be a function of a worker's earnings over their entire career (a so-called "career average plan.") Or, the factor could be a flat dollar amount: for example, the plan will pay a monthly benefit equal to \$50 per year of service, so that a 30 year employee would have a benefit of \$1,500 per month. "Flat dollar" plans are primarily seen among blue-collar workers in the private sector.
3. Inflation protection varies among DB pensions. Private DB pensions typically do not offer Cost of Living Adjustments, while public DB pensions usually offer some level of inflation protection.
4. "Asset Allocation for State and Local Pensions, 2020." Public Plans Database. Available on the web at: <https://publicplansdata.org/quick-facts/national/#investments>
5. While not incorporated into our model, the lack of sufficient contributions can be a problem for DB plans and is a widespread problem for voluntary DC accounts. The median 401(k) contribution rate among participating workers was 5.2 percent in the early 2000s and stood at just 5 percent in 2010. (See Table 6, p. 44 in B.A. Butrica and K.E. Smith, 2012, "401(k) Participant Behavior in a Volatile Economy," CRR WP 12-24, Center for Retirement Research at Boston College, Chestnut Hill, MA.) Industry efforts to improve savings have increased the median contribution rate to 6.0 percent in 2020 (Vanguard How America Saves 2021) However, 27 percent of private sector wage and salary employees who have access to a 401(k) type plan do not participate (U.S. Bureau of Labor Statistics (BLS), 2018 National Compensation Survey Employee Benefit Survey, BLS, Washington, DC, <http://www.bls.gov/ncs/ebs/benefits/2018/ownership/private/table02a.htm>), with lower wage earners more likely to not participate (Vanguard How America Saves).
6. There is a wealth of research on behavioral biases in retirement saving and investing. See for instance S. Benartzi and R. Thaler, 2007, "Heuristics and Biases in Retirement Savings Behavior," Journal of Economic Perspectives, v21n3: 81-104. For an accessible overview of research in this field, see S. Benartzi, 2007, "Implications of Participant Behavior for Plan Design," Alliance Bernstein.
7. J.C. Chang, S.W. Simon, and G.K. Allen, 2005, "A Step Beyond Erisa Section 404(c): Improving on the Participant Directed 401(k) Investment Model," Journal of Pension Benefits, v12n4.
8. Plan Sponsor of America. "2020 Plan Investment Trends," Page 14. Available on the web at: <https://www.pasca.org/research/2020/InvestmentTrends>.
9. See I. Boivie, 2011, "Who Killed the Private Sector DB Plan?," National Institute on Retirement Security, Washington, DC; and A.H. Munnell and M. Soto, 2007, "Why Are Companies Freezing Their Pensions?," Center for Retirement Research at Boston College, Chestnut Hill, MA.
10. R. Jung and N. Rhee, 2013, "How Do Public Pensions Invest? A Primer," National Institute on Retirement Security, Washington, DC.
11. K Brainard and Alex Brown, 2018, "Significant Reforms to State Retirement Systems," National Association of State Retirement Systems
12. National Association of State Retirement Administrators (NASRA), 2011 (Oct.), "Public Pension Plan Investment Returns," NASRA Issue Brief, NASRA, Washington, DC; NASRA, 2014 (Apr.), Public Fund Survey, <http://www.publicfunds survey.org/>, accessed December 6, 2021.
13. Investment Company Institute, 2021, 2021 Investment Company Fact Book. Available on the web at: https://www.ici.org/system/files/2021-05/2021_factbook.pdf
14. See footnote 13 The asset-weighted average mutual fund expense ratio declined from 99 basis points in 2000 to 50 basis points in 2020, which indicates that larger funds on average have lower fees.
15. Sarah Holden, Jack VanDerhei, Steven Bass, Employee Benefit Research Institute, 2021, Target Date Funds: Evidence Points to Growing Popularity and Appropriate Use by 401(k) Plan Participants https://www.ebri.org/docs/default-source/ebri-issue-brief/ebri_ib_537_401ktdfs-9sep21.pdf?sfvrsn=bf653b2f_4
16. Sarah Holden, Jack VanDerhei, Steven Bass, Employee Benefit Research Institute, 2021, Target Date Funds: Evidence Points to Growing Popularity and Appropriate

- Use by 401(k) Plan Participants https://www.ebri.org/docs/default-source/ebri-issue-brief/ebri_ib_537_401ktdfs-9sep21.pdf?sfvrsn=bf653b2f_4
17. Recent research indicates that most TDF participants do not use the funds as intended, resulting in inappropriate asset allocation. For instance, as of 2012 only one-third of TDF participants had all or almost all of their account balances in a TDF fund as recommended. Among the remainder, more than had had inappropriate asset allocations in their overall retirement portfolios. (Aon Hewitt and Financial Engines, 2014, "Help in Defined Contribution Plans: 2006 through 2012," Aon Hewitt.)
 18. D. Doonan and E. Wiley, 2021, The Hybrid Handbook: Not All Hybrids Are Created Equal, National Institute on Retirement Security, Washington, DC.
 19. The final salary and required retirement account balances derived from the plan cost comparison model in this report are effectively in today's dollars.
 20. A. Arnott, 2021, "Mind the Gap 2021," Morningstar, Chicago, IL. Available on the web at: <https://www.morningstar.com/lp/mind-the-gap>
 21. Authors' calculations based on Society of Actuaries (SOA) Generational RP-2014 Healthy Female Annuitants mortality table with projection under scale MP 2021. See SOA, 2014a, op cit. and SOA, 2014b, op cit. Available on the web at: <https://www.soa.org/resources/experience-studies/2021/mortality-improvement-scale-mp-2021/>.
 22. The 2014 Bang for the Buck study analyzed annuity options and found that due to low interest rates, annuitization did not reduce the gap between DB and DC plans. At today's even lower interest rates, the gap is widened.
 23. CEM Benchmarking, 2018, "Defined Contribution Plans Have Come a Long Way," available on the web at: <https://www.cembenchmarking.com/ri/insight/13>.
 24. B. McFarland, 2013 (May 22), "DB Versus DC Investment Returns: The 2009 – 2011 Update," Watson Wyatt.
 25. Arnott, 2021, op. cit.
 26. Ibid.
 27. C. Weller and S. Jenkins, 2007, "Building 401(k) Wealth One Percent at a Time: Fees Chip Away at People's Retirement Nest Eggs," CAP Economic Policy Report. Center for American Progress, Washington, DC.
 28. Investment Company Institute, 2021, op. cit. and Investment Company Institute, 2015, 2015 Investment Company Fact Book, available on the web at: https://www.ici.org/system/files/attachments/pdf/2015_factbook.pdf, and Investment Company Institute, 2009, 2009 Investment Company Fact Book, available on the web at: https://www.ici.org/system/files/attachments/pdf/2009_factbook.pdf.
 29. For an overview of research on individual investor behavior and under-performance, see B Barber and T. Odean, 2011 (Sep.), "The Behavior of Individual Investors," Working Paper, http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1872211
 30. N. Tang, O. Mitchell, and S. Utkus, 2011, "Trading in 401(k) Plans During the Financial Crisis," PRC Working Paper 2011-11, Pension Research Council, Philadelphia, PA.
 31. Kinnel, 2014, op cit.
 32. For the DB plan, the level of resources needed at retirement increases from \$522,163 in the baseline to \$578,089 in the low return scenario, an increase of 11%. For the individually directed DC plan, the level of resources needed are \$877,175 and \$1,055,359, respectively, an increase of 20%.
 33. Doonan and Wiley, 2021, op.cit.
 34. K. Brainard, 2007, "Public Fund Survey Summary of Findings for FY 2006," National Association of State Retirement Administrators, Georgetown, TX.
 35. SOA, 2014a and 2014b, op cit.
 36. Investment Company Institute, 2021, op. cit. and B. Alling and J. Clark, 2021, How America Saves 2021, Vanguard, available on the web at: https://institutional.vanguard.com/content/dam/inst/vanguard-has/insights-pdfs/21_CIR_HAS21_HAS_FSreport.pdf.
 37. B. Ablin, 2021, Survey of Capital Market Assumptions: 2021 Edition, Horizon Actuarial Services. Available on the web at: https://www.horizonactuarial.com/uploads/3/0/4/9/30499196/rpt_cma_survey_2021_v0804.pdf.
 38. Alling and Clark, 2021, op. cit.
 39. Ibid.
 40. Ablin, 2021, op. cit.
 41. W.F. Sharpe, J.S. Scott, and J.G. Watson, 2007, "Efficient Retirement Financial Strategies," Pension Research Council Working Paper PRC WP2007-19, The Wharton School, University of Pennsylvania, Philadelphia, PA.
 42. Barber and Odean, 2011, op cit.; Tang, Mitchell, and Utkus, 2011, op cit.
 43. Kinnel, 2014, op cit.
 44. Arnott, 2021, op. cit.
 45. Ibid.
 46. Teacher Retirement System of Texas (TRS), 2012, "Pension Benefit Design Study," TRS, Houston, TX.

WHO WE ARE & WHAT WE DO

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The National Institute on Retirement Security is a non-profit research and education organization established to contribute to informed policymaking by fostering a deep understanding of the value of retirement security to employees, employers, and the economy as a whole.

Our Vision

Through our activities, NIRS seeks to encourage the development of public policies that enhance retirement security in America. Our vision is one of a retirement system that simultaneously meets the needs of employers, employees, and the public interest. That is, one where:

- employers can offer affordable, high quality retirement benefits that help them achieve their human resources goals;
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City of Norcross OPEB Plan

**Governmental Accounting Standards Board (GASB)
Statement 75 Actuarial Valuation and Review of Other
Postemployment Benefits (OPEB)**

**Measured at August 31, 2020 for August 31, 2021
Reporting**



**The Burgess Building
201 Pryor Street, SW
Atlanta, GA 30303-3606
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1-888-488-4462**

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C.1.e

October 18, 2021

City of Norcross
Norcross, GA

Dear GMA Member:

We are pleased to submit this Actuarial Valuation and Review of Other Postemployment Benefits (OPEB) for the City of Norcross measured as of August 31, 2020 for reporting as of August 31, 2021 under Governmental Accounting Standards Board Statement No. 75. The report summarizes the actuarial data used in the valuation, discloses the Net OPEB Liability (NOL), and analyzes the preceding year's experience. The City currently funds this Plan on a pay-as-you-go basis. This report was based on the census data provided by the City and GMEBS, and the terms of the Plan. The actuarial calculations were completed under the supervision of Robert Burrell, ASA, MAAA, EA, Vice President and Consulting Actuary, and Peter Wang, PhD., FCA, ASA, MAAA, Associate Actuary.

The measurements shown in this actuarial valuation may not be applicable for other purposes. 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; and changes in plan provisions or applicable law.

The actuarial valuation has been completed in accordance with generally accepted actuarial principles and practices. To the best of our knowledge, the information supplied in this actuarial valuation is complete and accurate. Further, in our opinion, the assumptions used in this valuation and described in Section 3, Exhibit II are reasonably related to the experience of and the expectations for the Plan. The actuarial projections are based on these assumptions and the plan of benefits as summarized in Section 3, Exhibit III.

Sincerely,

Segal

Robert Burrell, ASA, MAAA, EA
Vice President and Consulting Actuary

Attachment: City of Norcross GASB 75 OPEB Actuarial Valuation Report for August 31 2021 (22-6400 :

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Actuarial Valuation Summary

Purpose and basis

This report presents the results of our actuarial valuation of the City of Norcross' (the "City", the "Employer") OPEB plan as of August 31, 2020, as required by Governmental Accounting Standards Board (GASB) Statement No. 75, *Accounting and Financial Reporting for Postemployment Benefits Other than Pensions*. The actuarial computations made are for purposes of fulfilling plan accounting requirements. Determinations for purposes other than meeting financial accounting requirements may be significantly different from the results reported here. This valuation is based on:

- The benefit provisions of the Plan, as administered by GMA;
- The characteristics of covered active members, retired members and beneficiaries as of July 1, 2019, provided by the City;
- Economic assumptions regarding future salary increases;
- Health care assumptions regarding per capita costs, trend rates and participation; and
- Other actuarial assumptions, regarding employee terminations, retirement, death, etc.

Section 1: Actuarial Valuation Summary

Highlights of the valuation

Accounting and Financial Reporting

1. For GASB 75 reporting as of August 31, 2021, the Net OPEB Liability (NOL) was measured as of August 31, 2020. Consistent with the provisions of GASB 75, the assets and liabilities measured as of August 31, 2020 are not adjusted or rolled forward to the August 31, 2021 reporting date.
2. The NOL as of August 31, 2020 is \$17,576,128, an increase of \$2,788,762, from the prior valuation NOL of \$14,787,366. The NOL had been expected to increase to \$15,709,209, due to normal operations. The difference between actual and expected unfunded actuarial accrued liabilities was the net effect of several factors:
 - a. An actuarial experience loss *increased* the NOL by \$51,640. This was the net result of gains and losses due to actual 2020 contributions and benefit payments that were different from expected. We have taken these actuarial gains and losses into account in reviewing our assumptions for the current valuation.
 - b. Valuation assumption changes *increased* the NOL by \$1,815,279. This was a net result of (1) a *decrease* in the obligations due to removing the potential impact of the excise tax, which was offset by (2) an *increase* in the obligations due to lowering the applicable discount rate from 2.97% to 2.20%.
3. There were no plan changes that impacted liabilities. The current plan of benefits is summarized in Exhibit III of Section 3.
4. The Annual OPEB Expense increased to \$2,161,094 for the year ending August 31, 2020. The expense was \$1,031,136 last year.

Funding (pay-as-you-go)

5. The City funds OPEB benefits on a pay-as-you-go basis. This resulted in a contribution toward OPEB benefits of \$365,856 or 6.11% of payroll in the year ended August 31, 2020. Under GASB Statement No 75, if the City were to begin funding OPEB benefits, it would be able to take advantage of a higher discount rate than what is being currently used.

Section 1: Actuarial Valuation Summary

COVID-19 Considerations

6. The Coronavirus (COVID-19) pandemic is rapidly evolving and continues to have a significant impact on the US economy in 2021, including most retiree health plans, and will likely continue to have an impact in the future. Our results do not include the impact of the following:
- Short-term increases in health plan costs related to the testing or treatment of COVID-19;
 - Short-term or long-term impacts on mortality of the covered population; and
 - The potential for federal or state fiscal relief

Each of the above factors could significantly impact these results. The above factors generally won't have an impact on the August 31, 2020 results, since that is based on a snapshot of assets and liabilities prior to recent events. We will keep you updated on emerging developments.

Section 1: Actuarial Valuation Summary

Summary of key valuation results

Reporting Date for Employer under GASB 75		August 31, 2021	August 31, 2020
Measurement Date		August 31, 2020	August 31, 2019
Disclosure elements for fiscal year ending August 31:	• Total OPEB Liability	\$17,576,128	\$14,787,366
	• Plan Fiduciary Net Position (Assets)	--	--
	• Net OPEB Liability	17,576,128	14,787,366
	• Plan Fiduciary Net Position as a percentage of Total OPEB Liability	0.00%	0.00%
	• OPEB Expense	2,161,094	1,031,136
	• Service Cost at Beginning of Year	829,278	218,411
	• Total Payroll	5,985,594	5,853,882
Schedule of contributions for fiscal year ending August 31:	• Actual contributions	\$365,856	\$297,900
	• Benefit Payments	365,856	297,900

Section 1: Actuarial Valuation Summary

Important information about actuarial valuations

An actuarial valuation is a budgeting tool with respect to defining future uncertain obligations of a postretirement health plan. As such, it will never forecast the precise future stream of benefit payments. It is an estimated forecast – the actual cost of the plan will be determined by the benefits and expenses paid, not by the actuarial valuation.

In order to prepare a valuation, Segal relies on a number of input items. These include:

Plan of benefits	Plan provisions define the rules that will be used to determine benefit payments, and those rules, or the interpretation of them, may change over time. Even where they appear precise, outside factors may change how they operate. For example, a plan may provide health benefits to post-65 retirees that coordinates with Medicare. If so, changes in the Medicare law or administration may change the plan's costs without any change in the terms of the plan itself. It is important for the City to keep Segal informed with respect to plan provisions and administrative procedures, and to review the plan summary included in our report to confirm that Segal has correctly interpreted the plan of benefits.
Participant data	An actuarial valuation for a plan is based on data provided to the actuary by the plan. Segal does not audit such data for completeness or accuracy, other than reviewing it for obvious inconsistencies compared to prior data and other information that appears unreasonable. It is not necessary to have perfect data for an actuarial valuation: the valuation is an estimated forecast, not a prediction. The uncertainties in other factors are such that even perfect data does not produce a "perfect" result. Notwithstanding the above, it is important for Segal to receive the best possible data and to be informed about any known incomplete or inaccurate data.
Assets	There are no plan assets.
Actuarial assumptions	In preparing an actuarial valuation, Segal starts by developing a forecast of the benefits to be paid to existing plan participants for the rest of their lives and the lives of their beneficiaries. To determine the future costs of benefits, Segal collects claims, premiums, and enrollment data in order to establish a baseline cost for the valuation measurement, and then develops short- and long-term health care cost trend rates to project increases in costs in future years. This forecast also requires actuarial assumptions as to the probability of death, disability, withdrawal, and retirement of each participant for each year, as well as forecasts of the plan's benefits for each of those events. The forecasted benefits are then discounted to a present value, typically based on an estimate of the rate of return that will be achieved on the plan's assets or, if there are no assets, a rate of return based on a yield or index rate for 20-year, tax-exempt general obligation municipal bonds with an average rating of AA/Aa or higher (or equivalent quality on another rating scale). All of these factors are uncertain and unknowable. Thus, there will be a range of reasonable assumptions, and the results may vary materially based on which assumptions the actuary selects within that range. That is, there is no right answer (except with hindsight). It is important for any user of an actuarial valuation to understand and accept this constraint. The actuarial model necessarily uses approximations and estimates that may lead to significant changes in our results but will have no impact on the actual cost of the plan. In addition, the actuarial assumptions may change over time, and while this can have a significant impact on the reported results, it does not mean that the previous assumptions or results were unreasonable or wrong.

Section 1: Actuarial Valuation Summary

Models

Segal accounting results are based on proprietary actuarial modeling software. The accounting valuation models generate a comprehensive set of liability and cost calculations that are presented to meet accounting standards and client requirements. Our Actuarial Technology and Systems unit, comprising both actuaries and programmers, is responsible for the initial development and maintenance of these models. The models have a modular structure that allows for a high degree of accuracy, flexibility and user control. The client team programs the assumptions and the plan provisions, validates the models, and reviews test lives and results, under the supervision of the responsible actuaries.

Our claims costs assumptions are based on proprietary modeling software as well as models that were developed by others. These models generate per capita claims cost calculations that are used in our valuation software. Our Health Technical Services Unit, comprised of actuaries and programmers, is responsible for the initial development and maintenance of our health models. They are also responsible for testing models that we purchase from other vendors for reasonableness. The client team inputs the paid claims, enrollments, plan provisions and assumptions into these models and reviews the results for reasonableness, under the supervision of the responsible actuary.

Section 1: Actuarial Valuation Summary

The user of Segal's actuarial valuation (or other actuarial calculations) should keep the following in mind:

The actuarial valuation is prepared for use by the City's Finance Department. It includes information for compliance with accounting standards and for the plan's auditor. Segal is not responsible for the use or misuse of its report, particularly by any other party.

If the City is aware of any event or trend that was not considered in this valuation that may materially change the results of the valuation, Segal should be advised, so that we can evaluate it.

An actuarial valuation is a measurement at a specific date – it is not a prediction of a plan's future financial condition. Accordingly, Segal did not perform an analysis of the potential range of financial measurements, except where otherwise noted. The actual long-term cost of the plan will be determined by the actual benefits and expenses paid and the actual investment experience of the plan.

Sections of this report include actuarial results that are not rounded, but that does not imply precision.

Critical events for a plan include, but are not limited to, decisions about changes in benefits and contributions. The basis for such decisions needs to consider many factors such as the risk of changes in plan enrollment, emerging claims experience, health care trend, and investment losses, not just the current valuation results.

Segal does not provide investment, legal, accounting, or tax advice. Segal's valuation is based on our understanding of applicable guidance in these areas and of the plan's provisions, but they may be subject to alternative interpretations. The City should look to their other advisors for expertise in these areas.

While Segal maintains extensive quality assurance procedures, an actuarial valuation involves complex computer models and numerous inputs. In the event that an inaccuracy is discovered after presentation of Segal's valuation, Segal may revise that valuation or make an appropriate adjustment in the next valuation.

Segal's report shall be deemed to be final and accepted by the City upon delivery and review. The City should notify Segal immediately of any questions or concerns about the final content.

As Segal has no discretionary authority with respect to the management or assets of the Plan, it is not a fiduciary in its capacity as actuaries and consultants with respect to the Plan.

Section 1: Actuarial Valuation Summary

Actuarial Certification

October 18, 2021

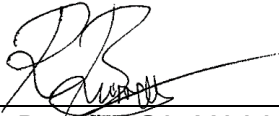
This is to certify that Segal has conducted an actuarial valuation of certain benefit obligations of the City of Norcross' OPEB Plan's other postemployment benefit programs as of August 31, 2020, in accordance with generally accepted actuarial principles and practices. The actuarial calculations presented in this report have been made on a basis consistent with our understanding of GASB Statement 75 for the determination of the liability for postemployment benefits other than pensions.

The actuarial valuation is based on the plan of benefits verified by the Employer and reliance on participant, premium, claims and expense data provided by the Employer or from vendors employed by the Employer. Segal does not audit the data provided. The accuracy and comprehensiveness of the data is the responsibility of those supplying the data. Segal, however, does review the data for reasonableness and consistency.

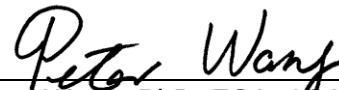
The actuarial computations made are for purposes of fulfilling plan accounting requirements. Determinations for purposes other than meeting financial accounting requirements may be significantly different from the results reported here. Accordingly, additional determinations may be needed for other purposes, such as judging benefit security at termination of the plan, or determining short-term cash flow requirements.

Future actuarial measurements may differ significantly from the current measurements presented in this report due to such factors as the following: retiree group benefits program experience or rates of return on assets differing from that anticipated by the assumptions; changes in assumptions; increases or decreases expected as part of the natural operation of the methodology used for these measurements; and changes in retiree group benefits program provisions or applicable law. Retiree group benefits models necessarily rely on the use of approximations and estimates, and are sensitive to changes in these approximations and estimates. Small variations in these approximations and estimates may lead to significant changes in actuarial measurements. The scope of the assignment did not include performing an analysis of the potential change of such future measurements except where noted.

To the best of our knowledge, this report is complete and accurate and in our opinion presents the information necessary to comply with GASB Statement 75 with respect to the benefit obligations addressed. The signing actuaries are members of the Society of Actuaries, the American Academy of Actuaries, and other professional actuarial organizations and collectively meet the "General Qualification Standards for Statements of Actuarial Opinions" to render the actuarial opinion contained herein.



Robert Burrell, ASA, MAAA, EA
Vice President and Actuary



Peter Wang, PhD, FCA, ASA, MAAA
Associate Actuary

GASB 75 Information

General information about the OPEB plan

Plan Description

Plan administration. The City of Norcross Other Postemployment Benefits Plan (the “OPEB Plan”) is a defined benefit postretirement health care plan. The OPEB Plan is administered through the Georgia Municipal Employees Benefit System (GMEBS), an agent-multiple-employer OPEB Plan administered by the Georgia Municipal Association (GMA).

Plan membership. At July 1, 2019, City plan membership consisted of the following:

Retired members or beneficiaries currently receiving benefits	21
Vested terminated members entitled to but not yet receiving benefits	- -
Active members	130
Total	151

Benefits provided. The City has the authority to establish and amend the OPEB Plan. The City provides medical, prescription drug and dental benefits to retirees. Retirees’ spouses are eligible for the same benefits as the retiree. Employees hired prior to 1999 become eligible for those benefits if they retire on or after the age 62 (55 for Public Safety employees) with 20 completed years of service or after the age of 65 with 5 completed years of service. Employees hired after 1998, but before 2018, become eligible for benefits if they retire on or after the age 62 with 10 years of service (55 and 20 years of service for Public Safety employees). Employees hired in or after 2018, who are permanent full-time career employees, and who have been employed a minimum of 20 full-time continuous years with the City and have attained their 62nd birthday (55th birthday for Public Safety) while employed full time by the City, become eligible to purchase single coverage medical insurance under the then current City medical insurance plan.

City Contributions. The City has not elected to advance fund the OPEB Plan, but rather maintains the OPEB Plan on a “pay-as-you-go” basis, in that claims are paid as they arise, rather than establishing an irrevocable trust to accumulate restricted funds.

Section 2: GASB 75 Information

Net OPEB liability

Reporting Date for Employer under GASB 75	August 31, 2021	August 31, 2020
Measurement Date	August 31, 2020	August 31, 2019
Components of the Net OPEB Liability		
Total OPEB Liability	\$17,576,128	\$14,787,366
Plan Fiduciary Net Position	- -	- -
Net OPEB Liability	17,576,128	14,787,366
Plan Fiduciary Net Position as a percentage of the Total OPEB Liability	0.00%	0.00%

The Net OPEB Liability was measured as of August 31, 2020 and 2019. Total OPEB Liability was determined from actuarial valuations using data as of July 1, 2019.

Actuarial assumptions. The Total OPEB Liability was measured as of August 31, 2020 using the following actuarial assumptions, applied to all periods included in the measurement, unless otherwise specified:

Inflation	2.25%
Salary increases	2.25% plus service based merit increases
Discount rate	2.20%
Healthcare cost trend rates	
Medical	7.00% trended down to 4.50% by 2029
Prescription drug	7.00% trended down to 4.50% by 2029
Dental	4.00%
Mortality rates	Sex-Distinct Pri-2012 (head-count weighted) Tables with adjustments and mortality improvement from 2012

The actuarial assumptions were based on the results of an actuarial experience study for the period January 1, 2015 through June 30, 2019 conducted by Segal in November and December of 2019. Detailed information regarding all actuarial assumptions can be found in Exhibit II.

Section 2: GASB 75 Information

Determination of discount rate

Since the City funds this Plan on a pay-as-you-go basis, GASB requires the discount rate to be based on a yield or index rate for 20-year, tax-exempt general obligation municipal bonds with an average rating of AA/Aa or higher (or equivalently quality on another rating scale). To comply with this requirement, the discount rate is based on an index of 20-year, tax-exempt general obligation bonds. Specifically, the chosen rate is 2.20%, the Bond Buyer 20-Bond GO Index rate published closest to, but not later than, the measurement date of August 31, 2020.

Sensitivity

The following presents the NOL of the City as well as what the City's NOL would be if it were calculated using a discount rate that is 1-percentage-point lower (1.20%) or 1-percentage-point higher (3.20%) than the current rate. Also, shown is the NOL as if it were calculated using healthcare cost trend rates that were 1-percentage-point lower or 1-percentage-point higher than the current healthcare trend rates.

	1% Decrease (1.20%)	Current Discount Rate (2.20%)	1% Increase (3.20%)
Net OPEB Liability (Asset)	\$21,137,773	\$17,576,128	\$14,780,179
	1% Decrease in Health Care Cost Trend Rates	Current Health Care Cost Trend Rates	1% Increase in Health Care Cost Trend Rates
Net OPEB Liability (Asset)	\$14,371,894	\$17,576,128	\$21,802,916

Section 2: GASB 75 Information

Schedule of changes in Net OPEB Liability – Last two fiscal years

Reporting Date for Employer under GASB 75 Measurement Date	August 31, 2021 August 31, 2020	August 31, 2020 August 31, 2019
Total OPEB Liability		
Service cost	\$829,278	\$218,411
Interest	458,421	330,584
Change of benefit terms	- -	-124,555
Differences between expected and actual experience	51,640	2,856,353
Changes of assumptions	1,815,279	3,525,864
Benefit payments, including refunds of member contributions	<u>-365,856</u>	<u>-297,900</u>
Net change in Total OPEB Liability	\$2,788,762	\$6,508,757
Total OPEB Liability – beginning	<u>14,787,366</u>	<u>8,278,609</u>
Total OPEB Liability – ending	<u>\$17,576,128</u>	<u>\$14,787,366</u>
Plan Fiduciary Net Position		
Contributions – employer	\$365,856	\$297,900
Contributions – employee	- -	- -
Net investment income	- -	- -
Benefit payments, including refunds of member contributions	-365,856	-297,900
Administrative expense	- -	- -
Other	<u>- -</u>	<u>- -</u>
Net change in Plan Fiduciary Net Position	- -	- -
Plan Fiduciary Net Position – beginning	<u>- -</u>	<u>- -</u>
Plan Fiduciary Net Position – ending	- -	- -
Net OPEB Liability – ending	<u>\$17,576,128</u>	<u>\$14,787,366</u>
Plan Fiduciary Net Position as a percentage of the Total OPEB Liability	0.00%	0.00%
Covered payroll ¹	\$5,985,594	\$5,853,882
Plan Net OPEB Liability as percentage of covered payroll	293.64%	252.61%

¹ Covered payroll represents compensation earnable for those employees who are currently eligible or could become eligible to receive benefits from this Plan.

Section 2: GASB 75 Information

Notes to Schedule:

Benefit changes:

For 2021 Reporting:

- None.

For 2020 Reporting:

- For participants hired in 2018 and later, spouses are no longer covered and General Employees must have 20 years of service for self-coverage.

Changes of assumptions:

For 2021 Reporting:

- The impact of the ACA excise tax was removed as it was repealed in December 2019.
- The discount rate from the Bond Buyer 20-Bond GO Index for August 31, 2020 was 2.20%. For August 31, 2019 it was 2.97%.

For 2020 Reporting:

- The discount rate from the Bond Buyer 20-Bond GO Index for August 31, 2019 was 2.97%. For August 31, 2018 it was 3.96%.
- Per capita health costs and trend rates were updated to reflect the most recent claims experience and future expectations.
- Enrollment assumptions were lowered from 100% to 90% for retirements before age 65 and from 100% to 90% for spouses.
- A comprehensive Actuarial Experience Review, was conducted November-December 2019. As a result of that study, the following assumption changes were proposed and subsequently approved. These changes are reflected for the first time in this valuation:
 - The mortality table for healthy retirees and beneficiaries was changed from the sex-distinct RP-2000 Combined Healthy Mortality Table, set forward two years in age for males and one year for females to the sex-distinct Pri-2012 head-count weighted Healthy Retiree Mortality Table with rates multiplied by 1.25.
 - The mortality table for disabled participants was changed from the sex-distinct RP-2000 Disabled Retiree Mortality Table to the sex distinct Pri-2012 head-count weighted Disabled Retiree Mortality Table with rates multiplied by 1.25.

Section 2: GASB 75 Information

- The mortality table for active participants, terminated vested participants, and deferred beneficiaries was changed from the sex-distinct RP-2000 Combined Healthy Mortality Table, set forward two years in age for males and one year for females to the sex-distinct Pri-2012 head-count weighted Employee Mortality Table.
- Future mortality improvement is based on projecting generationally from 2012 using 60% of the sex-distinct Scale SSA2019. Previously future mortality improvements were not explicitly projected.
- The retirement assumption was revised with the new rates based on expected Normal Retirement Age.
- The turnover rates were changed from the greater of age-based rates and select rates for the first five years of service followed by age-based rates thereafter to service-based rates only.
- The disability rates were changed to 50% of the rates in the prior age-based table.
- The inflation assumption was decreased from 2.75% to 2.25%.
- The salary increase assumption was changed from a service-based salary scale starting at 8.25% for the first two years of service with an ultimate rate of 3.25% at ten years of service to a service-based scale starting at 8.50% for the first two years of service with an ultimate rate of 3.00% at 15 years of service.

Section 2: GASB 75 Information

Deferred outflows of resources and deferred inflows of resources

Reporting Date for Employer under GASB 75 Measurement Date	August 31, 2021 August 31, 2020	August 31, 2020 August 31, 2019
Deferred Outflows of Resources		
Changes of assumptions or other inputs	\$4,074,431	\$3,022,170
Net difference between projected and actual earnings on OPEB plan investments	0	0
Difference between expected and actual experience in the Total OPEB Liability	<u>2,084,512</u>	<u>2,448,300</u>
Total Deferred Outflows of Resources	\$6,158,943	\$5,470,470
Deferred Inflows of Resources		
Changes of assumptions or other inputs	\$610,511	\$870,794
Net difference between projected and actual earnings on OPEB plan investments	0	0
Difference between expected and actual experience in the Total OPEB Liability	<u>129,025</u>	<u>173,793</u>
Total Deferred Inflows of Resources	\$739,536	\$1,044,587
Deferred outflows of resources and deferred inflows of resources related to OPEB will be recognized as follows:		
Reporting Date for Employer under GASB 75 Year Ended August 31:		
2021	N/A	\$606,694
2022	\$873,397	606,694
2023	873,397	606,694
2024	1,049,014	782,311
2025	1,178,448	911,745
2026	1,178,448	911,745
Thereafter	266,703	0

The average of the expected service lives of all employees is determined by:

- Calculating each active employee's expected remaining service life as the present value of \$1 per year of future service at zero percent interest.
- Setting the remaining service life to zero for each nonactive or retired member.
- Dividing the sum of the above amounts by the total number of active employee, nonactive and retired members.

Section 2: GASB 75 Information

Schedule of recognition of change in total Net OPEB Liability

Increase (Decrease) in OPEB Expense Arising from the Recognition of the
Effects of Differences between Expected and Actual Experience on Total OPEB Liability

Reporting Date for Employer under GASB 75 Year Ended August 31	Differences between Expected and Actual Experience	Recognition Period (Years)	2020	2021	2022	2023	2024	2025	2026	Thereafter
2018	-\$31,671	6	-\$5,279	-\$5,279	-\$5,279	-\$5,279	\$0	\$0	\$0	\$0
2019	-236,936	6	-39,489	-39,489	-39,489	-39,489	-39,489	0	0	0
2020	2,856,353	7	408,053	408,050	408,050	408,050	408,050	408,050	408,050	0
2021	51,640	7	N/A	<u>7,378</u>	<u>7,377</u>	<u>7,377</u>	<u>7,377</u>	<u>7,377</u>	<u>7,377</u>	<u>7,377</u>
Net increase (decrease) in OPEB expense			N/A	\$370,660	\$370,659	\$370,659	\$375,938	\$415,427	\$415,427	\$7,377

Section 2: GASB 75 Information

Increase (Decrease) in OPEB Expense Arising from the Recognition of the Effects of Assumption Changes

Reporting Date for Employer under GASB 75 Year Ended August 31	Assumption Changes	Recognition Period (Years)	2020	2021	2022	2023	2024	2025	2026	Thereafter
2018	-\$1,022,025	6	-\$170,338	-\$170,338	-\$170,338	-\$170,338	\$0	\$0	\$0	\$0
2019	-539,668	6	-89,945	-89,945	-89,945	-89,945	-89,945	0	0	0
2020	3,525,864	7	503,694	503,695	503,695	503,695	503,695	503,695	503,695	0
2021	1,815,279	7	N/A	<u>259,323</u>	<u>259,326</u>	<u>259,326</u>	<u>259,326</u>	<u>259,326</u>	<u>259,326</u>	<u>259,326</u>
Net increase (decrease) in OPEB expense			N/A	\$502,735	\$502,738	\$502,738	\$673,076	\$763,021	\$763,021	\$259,326

Section 2: GASB 75 Information

Total Increase (Decrease) in OPEB Expense

Reporting Date for Employer under GASB 75 Year Ended August 31	Total Increase (Decrease) in OPEB Expense	2020	2021	2022	2023	2024	2025	2026	Thereafter
2018	-\$1,053,696	-\$175,617	-\$175,617	-\$175,617	-\$175,617	\$0	\$0	\$0	\$0
2019	-776,604	-129,434	-129,434	-129,434	-129,434	-129,434	0	0	0
2020	6,382,217	911,747	911,745	911,745	911,745	911,745	911,745	911,745	0
2021	1,866,919	N/A	<u>266,701</u>	<u>266,703</u>	<u>266,703</u>	<u>266,703</u>	<u>266,703</u>	<u>266,703</u>	<u>266,703</u>
Net increase (decrease) in OPEB expense		N/A	\$873,395	\$873,397	\$873,397	\$1,049,014	\$1,178,448	\$1,178,448	\$266,703

Section 2: GASB 75 Information

OPEB expense

Reporting Date for Employer under GASB 75	August 31, 2021	August 31, 2020
Measurement Date	August 31, 2020	August 31, 2019
Components of OPEB Expense		
Service cost	\$829,278	\$218,411
Interest on the Total OPEB Liability	458,421	330,584
Current-period benefit changes	--	-124,555
Expensed portion of current-period difference between expected and actual experience in the Total OPEB Liability	7,378	408,053
Expensed portion of current-period changes of assumptions or other inputs	259,323	503,694
Member contributions	--	--
Projected earnings on plan investments	--	--
Expensed portion of current-period differences between actual and projected earnings on plan investments	--	--
Administrative expense	--	--
Other	--	--
Recognition of beginning of year deferred outflows of resources as OPEB expense	911,745	--
Recognition of beginning of year deferred inflows of resources as OPEB expense	<u>-305,051</u>	<u>-305,051</u>
OPEB Expense	\$2,161,094	\$1,031,136

Section 2: GASB 75 Information

Schedule of reconciliation of Net OPEB Liability

Reporting Date for Employer under GASB 75 Measurement Date	August 31, 2021 August 31, 2020	August 31, 2020 August 31, 2019
Beginning Net OPEB Liability	\$14,787,366	\$8,278,609
OPEB expense	2,161,094	1,031,136
Employer contributions	-365,856	-297,900
New net deferred inflows/outflows	1,600,218	5,470,470
Recognition of prior deferred inflows/outflows	<u>-606,694</u>	<u>305,051</u>
Ending Net OPEB Liability	\$17,576,128	\$14,787,366

Supporting Information

Exhibit I: Summary of Participant Data

As of July 1, 2019	
Retired members or beneficiaries currently receiving benefits	21
Vested terminated members entitled to but not yet receiving benefits	0
Active members	130
Total	151

Section 3: Supporting Information

Exhibit II: Actuarial Assumptions and Actuarial Cost Method

Data:	Detailed census data, premium data and/or claim experience, and summary plan descriptions for OPEB were provided by the employer and GMEBS.
Actuarial Cost Method:	Entry Age Level Percent of Pay
Asset Valuation Method:	Market Value
Reporting Date:	August 31, 2021
Measurement Date:	August 31, 2020
Actuarial Valuation Date:	July 1, 2019
Discount Rate:	2.20%
Salary Increases:	3.00% to 8.50%, including inflation of 2.25%
Basis for Demographic Assumptions:	The demographic assumptions used in this valuation (including mortality, disability, turnover, retirement, percent married and relative ages of spouses) were approved by the GMEBS Board in December 2019 based on the results of an actuarial experience study for the period January 1, 2015 through June 30, 2019 conducted by Segal in November and December of 2019. The remaining demographic assumptions, such as enrollment elections, were based on the experience of the Plan and professional judgment.
Mortality Rates: <i>Healthy retirees and beneficiaries</i> <i>Disabled participants</i> <i>Active participants</i>	Sex-distinct Pri-2012 head-count weighted Healthy Retiree Mortality Table with rates multiplied by 1.25 Sex-distinct Pri-2012 head-count weighted Disabled Retiree Mortality Table with rates multiplied by 1.25 Sex-distinct Pri-2012 head-count weighted Employee Mortality Table The mortality tables are adjusted from 2012 to future years with sex-distinct generational projection using 60% of the improvement rates used for the intermediate (alternative II) assumptions for projections in the 2019 OASDI Trustees Report.

Section 3: Supporting Information

Disability Rates before Retirement:

Disability Rates before Retirement		
Rates (%)		
Age	Male Disability	Female Disability
20	0.03	0.02
25	0.03	0.03
30	0.03	0.03
35	0.03	0.03
40	0.07	0.04
45	0.11	0.06
50	0.17	0.09
55	0.25	0.18
60	0.33	0.28

Termination Rates before Retirement:

Turnover Rates					
Years of Service	Rate (%)	Years of Service	Rate (%)	Years of Service	Rate (%)
0 but less than 1	26.5	6 but less than 7	10.5	12 but less than 13	5.7
1 but less than 2	20.5	7 but less than 8	9.5	13 but less than 14	5.3
2 but less than 3	18.5	8 but less than 9	8.5	14 but less than 15	4.9
3 but less than 4	16.5	9 but less than 10	7.5	15 or more years	4.5
4 but less than 5	14.5	10 but less than 11	6.5		
5 but less than 6	12.5	11 but less than 12	6.1		
Rates end upon eligibility for retirement.					

Section 3: Supporting Information

Actives' Retirement Rates:

The table below is based on a given participant's age when they first become eligible for regular or alternative normal retirement. Rates do not apply if the participant is not eligible for either early or normal retirement.

Age	NRA attained before 60	NRA attained between 60 and 64	NRA attained after 64
Under 55	3% /10% ¹	3%	0%
55-59	3% /10% ¹	3%	5%
60	20%	3% /10% ²	7%
61	25%	10%	7%
62	35%	10%	20%
63	40%	10%	10%
64	45%	10%	10%
65	50%	35%	35%
66-71	25%	25%	25%
72 & over	100%	100%	100%

The rates are adjusted in the year the participant achieves NRA. If the NRA is under 60, the adjustment is +10%, if the NRA is 60 or 61, the adjustment is +20%, if the NRA is 62, 63 or 64, the adjustment is +30%, and if the NRA is 65 or over, there is no adjustment.

¹ 3% prior to normal retirement eligibility, but 10% plus adjustment after normal retirement eligibility

² 3% if NRA is between 62 and 64, but 10% plus adjustment if NRA is 60 or 61

Unknown Data for Participants:

A missing census item for a given participant was assumed to equal the average value of that item over all other participants of the same status for whom the item is known.

Section 3: Supporting Information

Participation and Coverage Election:	For retirements before age 65, 90% of employees eligible to retire and receive subsidized postretirement welfare coverage were assumed to elect medical and prescription drug coverage. For retirements at or after age 65, 100% of employees eligible to retire and receive subsidized postretirement welfare coverage were assumed to elect medical and prescription drug coverage. 100% of employees were assumed to elect dental coverage.																																																	
Dependents:	Demographic data was available for spouses of current retirees. For future retirees, husbands were assumed to be three years older than their wives. 90% of future retirees who elect to continue their health coverage at retirement are assumed to have an eligible spouse who also opts for health coverage at that time.																																																	
Per Capita Cost Development:	Per capita costs were based on the premiums effective on September 1, 2019 for non-Medicare retirees and January 1, 2020 for Medicare retirees. Actuarial factors were applied to the weighted average premium rate to estimate individual retiree and spouse costs by age and gender.																																																	
<i>Medical and Prescription Drugs</i>																																																		
<i>Dental</i>	Per capita dental costs were based on the dental premium rate adjusted for the demographic makeup of the retiree group.																																																	
<i>Administrative Expenses</i>	Administrative expenses are assumed to be included in the premium rates used to calculate the per capita costs.																																																	
Per Capita Health Costs:	Combined medical and prescription drug claim costs for the year beginning July 1, 2019, including assumed expense, are shown in the table below for retirees and for spouses at selected ages. These costs are net of deductibles and other benefit plan cost sharing provisions. <table><tr><th colspan="5">Medical and Prescription Drug</th></tr><tr><th rowspan="2">Age</th><th colspan="2">Retiree</th><th colspan="2">Spouse</th></tr><tr><th>Male</th><th>Female</th><th>Male</th><th>Female</th></tr><tr><td>50</td><td>\$11,812</td><td>\$13,454</td><td>\$8,251</td><td>\$10,803</td></tr><tr><td>55</td><td>14,028</td><td>14,483</td><td>11,041</td><td>12,505</td></tr><tr><td>60</td><td>16,660</td><td>15,611</td><td>14,780</td><td>14,503</td></tr><tr><td>64</td><td>19,113</td><td>16,561</td><td>18,658</td><td>16,323</td></tr><tr><td>65</td><td>4,858</td><td>4,129</td><td>4,858</td><td>4,129</td></tr><tr><td>70</td><td>5,630</td><td>4,450</td><td>5,630</td><td>4,450</td></tr><tr><td>75</td><td>6,068</td><td>4,790</td><td>6,068</td><td>4,790</td></tr></table> The annual per capita dental claims cost for the year beginning July 1, 2019 was assumed to be \$736 increasing 4% per year.	Medical and Prescription Drug					Age	Retiree		Spouse		Male	Female	Male	Female	50	\$11,812	\$13,454	\$8,251	\$10,803	55	14,028	14,483	11,041	12,505	60	16,660	15,611	14,780	14,503	64	19,113	16,561	18,658	16,323	65	4,858	4,129	4,858	4,129	70	5,630	4,450	5,630	4,450	75	6,068	4,790	6,068	4,790
Medical and Prescription Drug																																																		
Age	Retiree		Spouse																																															
	Male	Female	Male	Female																																														
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70	5,630	4,450	5,630	4,450																																														
75	6,068	4,790	6,068	4,790																																														

Section 3: Supporting Information

Health Care Cost Trend Rates:	Health care trend measures the anticipated overall rate at which health plan costs are expected to increase in future years. The rates shown below are "net" and are applied to the net per capita costs shown on the prior page. The trend shown for a particular plan year is the rate that must be applied to that year's cost to yield the next year's projected cost. <table data-bbox="688 337 1146 886"> <thead> <tr> <th>Year Ending June 30,</th><th>Medical & Drug Rate (%)</th></tr> </thead> <tbody> <tr><td>2020</td><td>7.00</td></tr> <tr><td>2021</td><td>6.75</td></tr> <tr><td>2022</td><td>6.50</td></tr> <tr><td>2023</td><td>6.25</td></tr> <tr><td>2024</td><td>6.00</td></tr> <tr><td>2025</td><td>5.75</td></tr> <tr><td>2026</td><td>5.50</td></tr> <tr><td>2027</td><td>5.25</td></tr> <tr><td>2028</td><td>5.00</td></tr> <tr><td>2029</td><td>4.75</td></tr> <tr><td>2030 & later</td><td>4.50</td></tr> </tbody> </table> The trend rate assumptions were developed using Segal's internal guidelines, which are established each year using data sources such as the 2021 Segal Health Trend Survey, internal client results, trends from other published surveys prepared by the S&P Dow Jones Indices, consulting firms and brokers, and CPI statistics published by the Bureau of Labor Statistics.	Year Ending June 30,	Medical & Drug Rate (%)	2020	7.00	2021	6.75	2022	6.50	2023	6.25	2024	6.00	2025	5.75	2026	5.50	2027	5.25	2028	5.00	2029	4.75	2030 & later	4.50
Year Ending June 30,	Medical & Drug Rate (%)																								
2020	7.00																								
2021	6.75																								
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2023	6.25																								
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2026	5.50																								
2027	5.25																								
2028	5.00																								
2029	4.75																								
2030 & later	4.50																								
Medicare Part D Subsidy Assumption:	GASB guidelines prohibit the offset of OPEB obligations by the future value of Medicare Part D subsidies. Therefore, these calculations do not include an estimate for retiree prescription drug plan federal subsidies that the Plan may be eligible to receive for plan years beginning in 2006.																								
Retiree Contribution Increase Rate:	Retiree contributions are assumed to grow at the health care cost trend rates.																								
Excise Tax:	The excise tax for high cost plans beginning in 2022 as required by the Affordable Care Act was repealed in December 2019, and is not reflected in this valuation.																								
Plan Design:	Development of plan liabilities was based on the substantive plan of benefits in effect as described in Exhibit III.																								

Section 3: Supporting Information

Assumption Changes:

- The impact of the ACA excise tax was removed as it was repealed in December 2019.
- The discount rate from the Bond Buyer 20-Bond GO Index for August 31, 2020 was 2.20%. For August 31, 2019 it was 2.97%.

Section 3: Supporting Information

Exhibit III: Summary of Plan

This exhibit summarizes the major benefit provisions as included in the valuation. To the best of our knowledge, the summary represents the substantive plans as of the measurement date. It is not intended to be, nor should it be interpreted as, a complete statement of all benefit provisions.

Eligibility:	Eligibility for medical, prescription drug and dental benefits is as follows:			
	Hire Date	Public Safety	General Employees	
	Before 1999	Earliest of: Age 55 with 20 Years of Service and Age 65 with 5 Years of Service	Earlier of: Age 62 with 20 Years of Service and Age 65 with 5 Years of Service	
	1999 to 2017	Age 55 with 20 Years of Service	Age 62 with 10 Years of Service	
	After 2017	Age 55 with 20 Years of Service	Age 62 with 20 Years of Service	
Benefit Types:	Medical, Prescription Drug, and Dental			
Duration of Coverage:	Lifetime			
Dependent Benefits:	Medical, Prescription Drug, and Dental			
Dependent Coverage:	Lifetime. Surviving spouses also covered for life for employees hired prior to 2018.			
Retiree Contributions:	Retiree and spouse contribution rates are set by the City. The monthly contributions for medical and dental coverage are shown in the table below:			
		Medical		
		Hired before 1999	Hired 1999 to 2017	Hired after 2017
	Retiree only w/o Medicare	\$150.00	\$150.00	\$200.00
	Retiree + Spouse w/o Medicare	\$200.00	\$200.00	N/A
	Retiree only with Medicare	\$0.00	\$0.00	\$0.00
	Retiree + Spouse with Medicare	\$25.00	\$25.00	N/A
		Dental		
	Retiree	\$0.00	\$0.00	\$ 0.00
	Retiree + Spouse	\$30.00	\$30.00	N/A

Section 3: Supporting Information

Benefit Descriptions:	Medical and Prescription Drug	Non-Medicare Plans	
	Description of Coverage	Base	Buy-Up
	Deductible		
	Individual	\$2,000	\$1,000
	Family	\$4,000	\$2,000
	Medical Out-of-Pocket Maximum		
	Individual (includes deductible)	\$6,350	\$6,350
	Family	\$12,700	\$12,700
	Co-Insurance	20%	10%
	Office Visit		
	PCP	\$20 copay	\$20 copay
	Specialist	\$35 copay	\$35 copay
	Prescription Drugs (30-day supply)		
	Formulary Generic		\$5 copay
	Formulary Brand Name		\$25 copay
	Non Formulary Brand		\$50 copay
	Specialty	20% coinsurance with \$150 maximum	
	Prescription Drugs (90-day supply)		
	Formulary Generic		\$13 copay
	Formulary Brand Name		\$63 copay
	Non Formulary Brand		\$125 copay

Section 3: Supporting Information

Benefit Descriptions (continued):	Medical and Prescription Drug		Medicare Plan
	Description of Coverage		In-Network
	Deductible		
	Inpatient		\$200
	Outpatient		\$166
	Co-Insurance		0%
	Part A		0%
	Part B		0%
	Prescription Drugs Out-of-Pocket Maximum*		\$4,850
	Prescription Drugs (30-day supply)		
	Formulary Generic		\$5 copay
	Formulary Brand Name		\$25 copay
	Non Formulary Brand		\$50 copay
	Prescription Drugs (90-day supply – Home Delivery)		
	Formulary Generic		\$10 copay
	Formulary Brand Name		\$50 copay
	Non Formulary Brand		\$125 copay
	<i>*After prescription out-of-pocket maximum is reached, patient pays the greater of 5% coinsurance or \$2.95 copay for generic drugs and \$7.40 copay for all other drugs.</i>		
	Dental		
	Description of Coverage		In Network Out of Network
	Deductible		
	Individual		\$50 \$50
	Family		\$150 \$150
Calendar Year Maximum		\$5,000 \$5,000	
Preventative Services		10% co-insurance 10% co-insurance	
Basic Services		20% co-insurance 20% co-insurance	
Major Services		50% co-insurance 50% co-insurance	
Orthodontic		50% co-insurance 50% co-insurance	
Lifetime Maximum for Orthodontic		\$1,000 \$1,000	
Changes of plan provisions:	There have been no plan changes since the prior valuation		

Section 3: Supporting Information

Appendix A: Definition of Terms

Definitions of certain terms as they are used in Statement 75. The terms may have different meanings in other contexts.

Actuarially Determined Contribution:	A target or recommended contribution to an OPEB plan for the reporting period based on the most recent measurement available.
Assumptions or Actuarial Assumptions:	The estimates on which the cost of the Plan is calculated including: - Investment return — the rate of investment yield that the Plan will earn over the long-term future; - Mortality rates — the death rates of employees and pensioners; life expectancy is based on these rates; - Retirement rates — the rate or probability of retirement at a given age; - Turnover rates — the rates at which employees of various ages are expected to leave employment for reasons other than death, disability, or retirement.
Covered Payroll:	The payroll of the employees that are provided OPEB benefits
Discount Rate:	The single rate of return, that when applied to all projected benefit payments results in an actuarial present value that is the sum of the following: - the actuarial present value of projected benefit payments projected to be funded by plan assets using a long term rate of return, and - the actuarial present value of projected benefit payments that are not included in (1) using a yield or index rate for 20 year tax exempt general obligation municipal bonds with an average rating of AA/Aa or higher
Entry Age Actuarial Cost Method:	An actuarial cost method where the present value of the projected benefits for an individual is allocated on a level basis over the earnings or service of the individual between entry age and assumed exit age
Healthcare Cost Trend Rates:	The rate of change in per capita health costs over time
Net OPEB Liability:	The Total OPEB Liability less the Plan Fiduciary Net Position
Plan Fiduciary Net Position:	Market Value of Assets
Real Rate of Return:	The rate of return on an investment after removing inflation
Service Cost:	The amount of contributions required to fund the benefit allocated to the current year of service.

Section 3: Supporting Information

Total OPEB Liability:	Present value of all future benefit payments for current retirees and active employees taking into account assumptions about demographics, turnover, mortality, disability, retirement, health care trends, and other actuarial assumptions.
Valuation Date:	The date at which the actuarial valuation is performed

Section 3: Supporting Information

Appendix B: Accounting Requirements

The Governmental Accounting Standards Board (GASB) issued Statement Number 75 – Accounting and Financial Reporting by Employers for Postemployment Benefits Other Than Pensions. Under these statements, all state and local government entities that provide other post-employment benefits are required to report the cost of these benefits on their financial statements. The accounting standards supplement cash accounting, under which the expense for postemployment benefits is equal to benefit and administrative costs paid on behalf of retirees and their dependents (i.e., a pay-as-you-go basis).

The statements cover postemployment benefits of medical, prescription drugs, dental, vision and life insurance coverage for retirees; long-term care coverage, life insurance and death benefits that are *not* offered as part of a pension plan; and long-term disability insurance for employees. The benefits valued in this report are limited to those described in Exhibit III of Section 3, which are based on those provided under the terms of the substantive plan in effect at the time of the valuation and on the pattern of sharing costs between the employer and plan members. The projection of benefits is not limited by legal or contractual limits on funding the plan unless those limits clearly translate into benefit limits on the substantive plan being valued.

The new standards prescribe an accrual-basis accounting requirement, thereby recognizing the employer cost of postemployment benefits over an employee's career. The standards also prescribe a consistent accounting requirement for both pension and non-pension benefits.

The total cost of providing postemployment benefits is projected, taking into account assumptions about demographics, turnover, mortality, disability, retirement, health care trends, and other actuarial assumptions. These assumptions are summarized in Exhibit II of Section 3. This amount is then discounted to determine the Total OPEB Liability. The Net OPEB Liability (NOL) is the difference between the Total OPEB Liability and market value of assets in the Plan, called the Plan Fiduciary Net Position.

Once the NOL is determined, the Annual OPEB Expense is determined as the change in NOL from the prior year with deferred recognition of certain elements. In addition, Required Supplementary Information (RSI) must be reported, including historical information about the Net OPEB Liability and the contributions made to the Plan. Appendices A and C of Section 3 contain a definition of terms as well as more information about GASB 75 concepts.

The calculation of an accounting obligation does not, in and of itself, imply that there is any legal liability to provide the benefits valued, nor is there any implication that the Employer is required to implement a funding policy to satisfy the projected expense.

Actuarial calculations reflect a long-term perspective, and the methods and assumptions use techniques designed to reduce short-term volatility in accrued liabilities and the actuarial value of assets, if any.

Section 3: Supporting Information

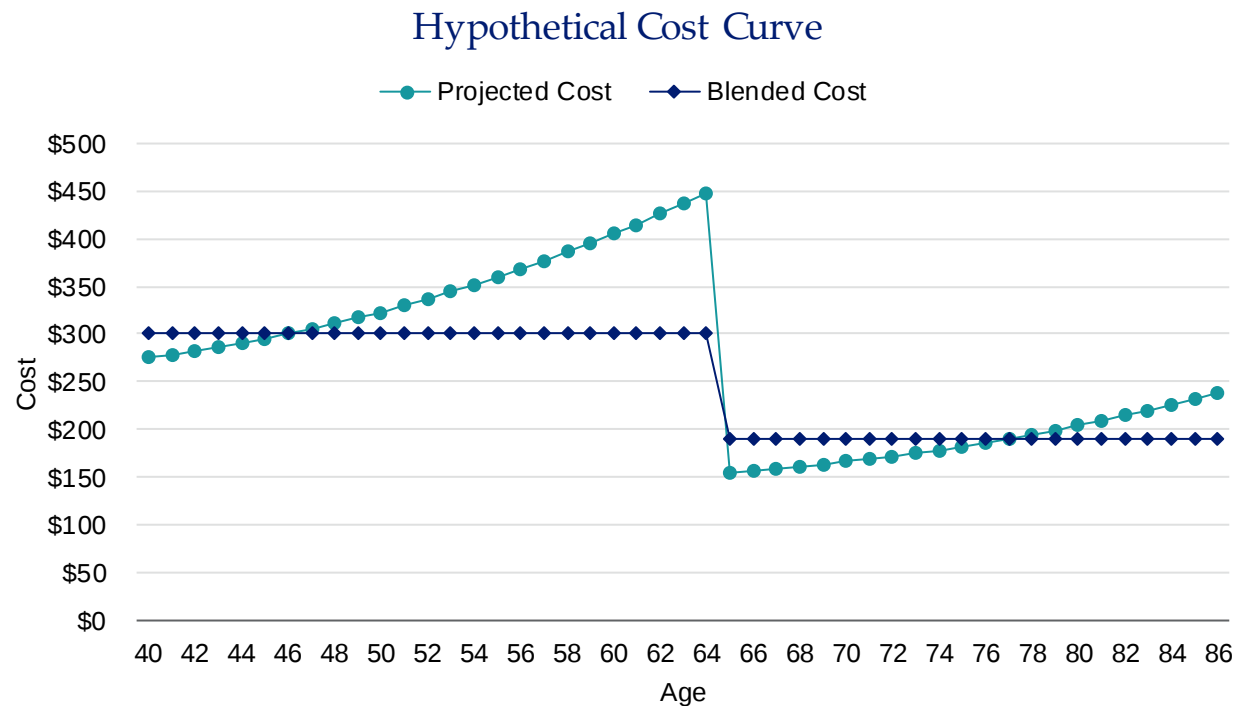
Actuarial valuations involve estimates of the value of reported amounts and assumptions about the probability of events far into the future, and the actuarially determined amounts are subject to continual revision as actual results are compared to past expectations and new estimates are made about the future.

Section 3: Supporting Information

Appendix C: GASB 75 Concepts

The following graph illustrates why a significant accounting obligation may exist even though the retiree contributes most or all of the blended premium cost of the plan. The average cost for retirees is likely to exceed the average cost for the whole group, leading to an implicit subsidy for these retirees. The accounting standard requires the employer to identify and account for this implicit subsidy as well as any explicit subsidies the employer may provide.

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GMEBS OPEB TRUST

ORDINANCE/RESOLUTION AND

PARTICIPATION AGREEMENT

CITY OF NORCROSS, GA.

Administered by:
Georgia Municipal Association
201 Pryor Street, SW
Atlanta, Georgia 30303
Telephone: (404)688-0472
Facsimile: (678)686-6289

ORDINANCE/RESOLUTION

WHEREAS, the Mayor and Council of Norcross, Georgia, (hereinafter referred to as the "Participating Employer") has determined that it is in its best interest to participate in the GMEBS OPEB Trust to prefund post-employment benefits other than pension ("OPEB") liabilities reported in accordance with the Governmental Accounting Standards Board ("GASB") Statement No. 45; and

WHEREAS, the Participating Employer has reviewed the GMEBS OPEB Trust Agreement ("Trust") effective as of July 1, 2007, which Trust is intended to be a tax-exempt trust established under Internal Revenue Code Section 115 and an irrevocable trust under applicable law of the State of Georgia; and

WHEREAS, the Participating Employer is an Eligible Employer as defined in the Trust; and

WHEREAS, the Mayor and Council ("Governing Authority") is authorized by law to adopt this Ordinance/Resolution approving the participation in the Trust on behalf of the Participating Employer;

THEREFORE, the Governing Authority of the Participating Employer hereby ordains/resolves:

Section 1. The Participating Employer adopts the Trust effective March 3, 2008.

Section 2. The Participating Employer acknowledges that the Board of Trustees of the Georgia Municipal Employees Benefit System ("Trustees") is responsible only for providing a funding vehicle as set forth in the Trust and has no responsibility for the adequacy of the contribution level chosen by the Participating Employer or for the benefits disbursed to or by the Participating Employer.

Section 3. The Participating Employer adopts the Participation Agreement, which is attached hereto and made a part of this Ordinance/Resolution. The Participating Employer reserves the right to amend its elections under the Participation Agreement, so long as the amendment is not inconsistent with the Trust or the Internal Revenue Code or other applicable law and is approved by the Trustees. If the Trustees do not approve an amendment, the Trustees will continue to administer the Participation Agreement as if such amendment had not been made.

Section 4. The Participating Employer agrees that all benefit disbursements from the Trust will be solely used to provide health and welfare benefits to eligible retirees, and other eligible former employees, and any eligible spouses or dependents, and in accord with the requirements of GASB 45 and Sections 79, 104, 105, and 106 of the Internal Revenue Code. The Participating Employer is responsible for determining the tax status of all disbursements made to or on behalf of eligible recipients and for performing any tax reporting obligations resulting from such disbursements.

Section 5.

(a) The Participating Employer shall abide by the terms of the Trust, including amendments made by the Trustees and Rules thereunder, all investment, administrative, and other service agreements of the Trust, and all applicable provisions of the Internal Revenue Code and other applicable law.

(b) The Participating Employer accepts the administrative services to be provided by the Georgia Municipal Association ("GMA"). The Participating Employer acknowledges that a licensing fee and other fees related to the services provided by GMA will be imposed with respect to the services provided and that such fees may be deducted from its trust sub-account and/or may be billed directly to the Participating Employer.

(c) The Governing Board hereby authorizes the Trustees and the GMA to act on its behalf in all matters involving the Trust.

Section 6. This Ordinance/Resolution and the Participation Agreement shall be submitted to the Trustees for their approval. The Trustees may refuse to approve a Participation Agreement by an employer that does not have state statutory authority to participate in the Trust, or is not an eligible entity under Code Section 115. The Governing Authority hereby acknowledges that it is responsible to assure that this Ordinance/Resolution and the Participation Agreement are adopted and executed in accordance with the requirements of applicable law.

Adopted by the Governing Authority on March 3, 2008 in accordance with applicable law.

By: _____

Bucky Johnson, Mayor

Attest: _____

A Susan Wuerzner

Date: 3-3-2008

GMEBS OPEB TRUST PARTICIPATION AGREEMENT

ADMINISTRATOR

Georgia Municipal Association
201 Pryor Street, SW
Atlanta, Georgia 30303
Telephone: (404)688-0472
Facsimile: (678)686-6289

PARTICIPATING EMPLOYER

Name: **City of Norcross, Georgia**

GOVERNING AUTHORITY

Name: **City of Norcross**

Address: **65 Lawrenceville Street, Norcross, GA 30071**

Phone: **770) 448-2122**

Facsimile: **770) 448-5945**

Title of Person Authorized to receive Official Notices from the Trust or GMA:

☒ Mayor

☒ City Manager/Administrator

☐ City Clerk

☒ Finance Director

☐ Human Resources Director

☐ Other: _____

E-mail: _____

Title of Person Authorized to Request Disbursements from the Trust:

☐ Mayor

☐ City Manager/Administrator

☐ City Clerk

☒ Finance Director

☐ Human Resources Director

☐ Other: _____

E-mail: _____

TYPE OF ADOPTION AND EFFECTIVE DATE

This Participation Agreement is for the following purpose (**check one**):

- ☒ This is a new Participation Agreement adopted by the Participating Employer effective **March 3, 2008**.
- ☐ This is an amendment of the current Participation Agreement. The effective date of this amended Participation Agreement is _____, 20____. This Participation Agreement is intended to replace and serve as an amendment of the Employer's Participation Agreement that became effective _____[insert date]. This amendment makes the following change(s) to the Participation Agreement (describe):_____.

PARTICIPATING EMPLOYER ELECTIONS

1. Trust Contribution (check one):

- ☒ N/A (using actuarial services only)
- ☐ Monthly
- ☐ Semi-monthly
- ☐ Bi-weekly
- ☐ Weekly

The Participating Employer agrees that contributions shall be based upon appropriate actuarial analysis of the substantive health and welfare benefits plan(s) that it sponsors, and that a contribution, once made, is irrevocable. The Trustees, Custodian, and Program Administrator shall not be responsible for the accuracy of such analysis or for the adequacy of the recommended or actual level of contributions.

To elect use of actuarial services arranged through the GMEBS OPEB Trust, complete Exhibit A, attached.

2. Available Health and Welfare Benefits Following Termination of Employment (check all that apply):

- ☒ Medical
- ☒ Prescription Drug
- ☒ Dental
- ☒ Vision

- ☐ Hearing
☒ Life
☒ Disability
☐ Long-Term Care
☐ Other _____

The Participating Employer agrees that no disbursements will be made from the Trust Fund except for the payment of post-employment "Health and Welfare Benefit(s)," as defined in Section 1.01 of the GMEBS OPEB Trust, and associated reasonable expenses.

MODIFICATION OR TERMINATION OF THE PARTICIPATION AGREEMENT

If a Participating Employer desires to amend any of its elections contained in this Participation Agreement, the Governing Authority by official action must adopt an amended Participation Agreement and forward it to the Trustees for approval. The amended Participation Agreement is not effective until approved by the Trustees.

If a Participating Employer desires to terminate its participation in the Trust, the procedures set forth in the Trust must be followed.

EXECUTION BY EMPLOYER

This Participation Agreement may only be used in conjunction with the GMEBS OPEB Trust. The failure to properly complete this Participation Agreement may result in ineligibility to participate in the GMEBS OPEB Trust. Inquiries regarding the adoption of the Trust or the meaning of Trust provisions should be directed to the Program Administrator (the Georgia Municipal Association) at the address or phone number shown above.

The foregoing Participation Agreement is hereby adopted and approved on the 3rd day of March, 2008.

Signed: Bucky Johnson
 Printed Name: Bucky Johnson
 Title: MAYOR OF NORCROSS
 Date of Signature: 5/5/08

TRUSTEES APPROVAL

The Participation Agreement is approved by the Board of Trustees of the GMEBS OPEB Trust effective as of _____.

Dated: _____

By: _____

Title: _____
on behalf of the Board of Trustees

EXHIBIT A
OPEB PARTICIPATION AGREEMENT
ACTUARIAL SERVICES

Acknowledgement

The Participating Employer acknowledges that GMEBS has contracted with an independent actuary ("actuary") to perform annual OPEB actuarial valuations and certain other actuarial services for those members of the GMEBS OPEB Trust who elect to utilize such services by executing this Exhibit A. The Participating Employer agrees that if it utilizes actuarial services arranged through the GMEBS OPEB Trust, the terms and conditions contained in this Exhibit A will govern the provision of said services. The Participating Employer agrees to cooperate with the actuary and to fulfill its responsibilities as outlined in this Exhibit.

Scope of Services – Annual OPEB Valuation

Subject to the terms and conditions contained in this Exhibit, the actuary will perform an annual actuarial valuation for each Participating Employer that has a defined benefit Other Post Employment Benefits (OPEB) plan and that elects to utilize the services of the actuary for this purpose. The valuation report will be completed in accordance with generally accepted actuarial principles and practices. At a minimum, the valuation report will include the following information:

- 1) an executive summary of the valuation;
- 2) a statement by the Senior Supervising Actuary (who is Member of the American Academy of Actuaries and an Enrolled Actuary) that the valuation report has been completed in accordance with generally accepted actuarial principles and practices, and that in his or her opinion, the actuarial assumptions used are reasonably related to the experience of and the expectations for the participating employer's plan;
- 3) a description of actuarial assumptions, cost methods and procedures used to value the plan;
- 4) the annual required contributions (ARC), expressed as a dollar amount and as a percentage of covered payroll (split between normal cost and unfunded actuarial liability components), a comparison with prior year's ARC and percentage of payroll amount and a reconciliation with the prior year's ARC;
- 5) valuation of present assets and liabilities, including normal cost, market value of assets, actuarial value of assets, actuarial accrued liability, unfunded (or over-funded) actuarial accrued liability and present value of future normal costs;
- 6) a summary of actuarial experience for the year, including net gain/loss from investments, net gain/loss from other experience, market and actuarial rates of return and a summary statement of income and expenses;
- 7) GASB 43/45 required information including, but not limited to, comparison of required contributions versus actual contributions, funded ratio, schedule of employer contributions, schedule of funding progress, development of net OPEB obligation and annual OPEB cost;
- 8) demographic data, including number of retired participants and beneficiaries, number of terminated vested participants, number of active participants, total payroll and reconciliation of participant data with prior year's results;
- 9) a summary of the participating employer's plan provisions, including an explanation of any changes in plan benefits since the last valuation;
- 10) a glossary of terms used in the valuation report.

The actuary will provide one bound original and one copy of the actuarial valuation report for the Participating Employer.

The actuary may perform additional consulting services associated with Other Post Employment Benefits (OPEB), upon the written request of the Participating Employer submitted to GMEBS. There may be additional fees associated with the provision of such services (see "Fees" below).

Responsibilities of Participating Employer

It is the responsibility of the Participating Employer to furnish to the actuary the name(s) of the OPEB plan(s) to be examined, plan provisions, financial data and other information necessary to complete the annual actuarial valuation, as requested by the actuary. Data will be submitted by the Participating Employer in a format that is acceptable to the actuary. All data requested by the actuary will be provided by the Participating Employer on a timely basis and in an accurate and complete format, as determined by the actuary. If the data is not presented in an acceptable format, additional fees or processing time may be assessed to the Participating Employer as necessary to convert and/or reconcile data that contains errors, duplicate records, or missing information.

The Participating Employer is responsible to document all plan provisions to be included in the actuary's review and valuation. The Participating Employer must provide a copy of all relevant plan documents for review by the actuary.

Fees

A schedule of fees associated with the actuarial services set forth in this Exhibit is available to the Participating Employer upon request. Said fees are subject to change. If the Participating Employer requests actuarial services with respect to more than one OPEB plan, additional fees will apply. The Participating Employer agrees to remit payment for actuarial services when due.

Change of Circumstances

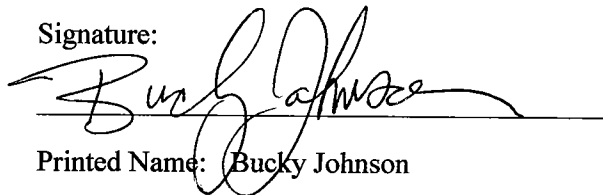
The Participating Employer acknowledges and agrees that GMEBS' arrangement with the actuary is subject to change and that such change may affect fees charged or other terms or conditions associated with provision of OPEB actuarial services.

Discontinuation

The Participating Employer agrees to provide written notice to GMEBS at least 90 days prior to the one-year anniversary of its most recent GMEBS OPEB valuation date if it does not intend to utilize the GMEBS actuary in performing its next annual valuation. GMEBS will provide written notice to the Participating Employer within the same 90-day timeframe if it is unable to provide actuarial services in connection with the Participating Employer's next annual valuation.

The terms of the foregoing Exhibit A are hereby adopted and approved by the City of Norcross Mayor and Council on the 3rd day of March, 2008.

Signature:



Printed Name: Bucky Johnson

Title: Mayor

Date of Signature: March 3, 2008